

## 1. Fried Egg Colonies are produced by?

a) Chlamydia

b) Mycoplasma

c) Niessleria

d) Diphtheria

Correct Answer - B

(67) Mycoplasma

REF: Jawetz 24<sup>th</sup> edition Section III. Bacteriology Chapter 26

Mycoplasma Cultures:

1. The material is inoculated onto special solid media and incubated for 3-10 days at 37°C with 5% CO<sub>2</sub> (under microaerophilic conditions), or into special broth and incubated aerobically. One or two transfers of media may be necessary before growth appears that is suitable for microscopic examination by staining or immunofluorescence. Colonies may have a "Fried Egg" appearance on agar.

## 2. Action of Papain on an IgG molecule produces?

a) 2 Fc fragments & 1 Fab fragment

b) 1 Fc fragment & 2 Fab fragments

c) 2 Fc fragments & 2 Fab fragments

d) 1 Fc fragment & 1 Fab fragment

Correct Answer - B

1 Fc fragment & 2 Fab fragments REF: Jawetz, Melnick, & Adelberg's Medical Microbiology, 24<sup>TH</sup> edition Chapter 44

If an antibody molecule is treated with a proteolytic enzyme (eg, Papain), peptide bonds in the hinge region are broken. This breakage produces two identical Fab fragments, which carry the antigen-binding sites, and one Fc fragment, which is involved in placental transfer, complement fixation, attachment for various cells, and other biologic activities.

### 3. Treatment given to entamoeba cyst carriers is?

a) Metronidazole

b) Diloxanide furoate

c) Paromomycin

d) Nitzoxzanide

Correct Answer - C

Paromomycin REF: Harrison's 18<sup>th</sup> ed chapter 209

Asymptomatic individuals with documented *E. histolytica* infection should be treated because of the risks of developing amebic colitis or amebic liver abscess in the future and of transmitting the infection to others.

Paromomycin or iodoquinol should be used in these cases.

#### 4. Chlamydia causes all except:

a) Urethritis

b) LGV

c) Trachoma

d) Typical pneumoniae

Correct Answer - D  
Typical pneumoniae

## 5. The Weil-Felix reaction is:

a) Precipitation

b) Agglutination

c) CFT

d) Immunoassay

Correct Answer - B  
Agglutination

## 6. Atypical Pneumonia is caused by:

a) Staphylococcus

b) Streptococcus

c) Chlamydia

d) H. Influenza

Correct Answer - C  
Chlamydia

## 7. The intermediate host for *T. Saginata* is:

a) Man

b) Cow

c) Dog

d) Pig

Correct Answer - B

Cow

*cow is intermediate and Man acts as definitive host for almost all important parasites, except for plasmodium, toxoplasma and echinococcus for which man is intermediate host*

## 8. What is the mechanism of action of cholera toxin in the small intestine?

a) ADP-ribosylation of the G regulatory protein

b) Activation of guanylate cyclase

c) Inhibition of adenyl cyclase

d) Inhibition of protein synthesis

Correct Answer - A

**Cholera toxin** is an example of A-B model of toxins. B subunit of the toxin binds to the enterocyte receptors, active toxin subunit A activates adenylate cyclase of the intestinal epithelial cells by ADP ribosylation of the Gs subunit of the G protein of intestinal cells.

This prevents the G protein from being turned off, and result in excess production of cAMP. cAMP in turn act as a second messenger to activate protein kinase A, which intern activates the specific cell proteins that control secretion of electrolytes.

**Ref:** Textbook of Pathology By V. Krishna, Page 178; Medical Microbiology By Fritz H. Kayse, Page 298; Microbiology and immunology By Monica Gandhi, Page 45

## 9. All of the following statements regarding melioidosis are true, EXCEPT:

- a) It is caused by Burkholderia mallei
- b) It is caused by a gram negative aerobic bacteria
- c) Etiologic agent shows bipolar staining with methylene blue stain
- d) Pulmonary infection is the most common form of melioidosis

### Correct Answer - A

**Melioidosis** is caused by Burkholderia Pseudomallei. It is a free living small motile aerobic gram negative bacillary saprophyte normally found in soily ponds & rice paddies. Humans and animals are infected by inoculation, inhalation, or ingestion.

It grows at 42 degree C & oxidize glucose, lactose & is oxidase positive.

It is a facultative intracellular organism which replicates in neutrophils and macrophages with the help of a polysaccharide capsule.

The organism also possesses elements of a type III secretion system that plays a role in its intracellular survival.

Gram's stain of a specimen shows a small gram negative bacilli.

Wright's stain or methylene blue staining shows a bipolar regularly staining (safety pin appearance).

Positive culture is diagnostic.

**Ref:** Harrison's Principles of Internal Medicine, 18th Edition, Chapter 152

**10.** Most common mode of transmission of *Pasteurella Multocida* is:

a) Animal Bites or scratches

b) Aerosols or dust

c) Contaminated tissue

d) Human to human

**Correct Answer - A**

Animal bites and scratch marks are most common mode of transmission of *Pasteurella Multocida*.

**Ref:** Parija Subhash Chandra (2009), Chapter 38, "Haemophilus, Pasteurella, and Actinobacillus", In the book "Textbook of Microbiology and Immunology", Elsevier Publications, India, Page 341; Harrison's Principles of Internal Medicine, 17th Edition, Page 928; Textbook of Microbiology By Ananthnarayanan, 7th Edition, Page 331; Clinical Infectious Diseases By Schlossberg (2008), Page 1016

**11.**

## Innate immunity is stimulated by which part of bacteria that acts as a danger signal?

a) Cell wall carbohydrate sequence

b) Flagella

c) Bacterial cell membrane

d) Nucleus

Correct Answer - A

Conserved antigenic patterns in bacteria such as unmethylated CpG DNA, flagellin, and lipid and carbohydrate structures in the bacterial cell wall serve as danger signals to activate innate immunity, resulting in local inflammation and the influx of the macrophages, neutrophils, and dendritic cells.

**12. After 3 days of a road traffic accident, a wound shows crepitation in the subcutaneous tissue and muscle with foul-smelling discharge. Pus culture shows *Cl. perfringens*. All of the following features about *Cl. perfringens* are TRUE, EXCEPT:**

a) It is the most common cause of gas gangrene

b) Can be detected by Nagler's reaction

c) The most important toxin is hyaluronidase

d) Gas gangrene strains produce heat resistant spores

Correct Answer - C

All types of *C. perfringens* produce the **alpha toxin, a necrotizing, hemolytic exotoxin that is a lecithinase.**

Hemolysis and gas production are characteristic.

Lecithinase activity is evaluated by the precipitate formed around colonies on egg yolk media (**Nagler's reaction**).

Gas Gangrene producing strains of *Cl. Perfringens* produce heat resistant spores.

**Also know:**

Gases formed in gas gangrene are hydrogen and carbon dioxide gas.

**Ref:** Ray C.G., Ryan K.J. (2010). Chapter 29. Clostridium, Peptostreptococcus, Bacteroides, and Other Anaerobes. In C.G. Ray, K.J. Ryan (Eds), Sherris Medical Microbiology, 5e.

### 13. Which of the following is a scrub typhus vector?

a) Trombiculid mite

b) Louse

c) Tick

d) Reduviid bug

Correct Answer - A

**Scrub typhus** Infection is seen in the Far East, especially Myanmar (Burma), India, Sri Lanka, New Guinea, Japan, and Taiwan.

*The larval stage (chigger) of various trombiculid mites serves both as a reservoir, through transovarial transmission, and as a vector for infecting humans and rodents.*

**Ref:** Brooks G.F., Carroll K.C., Butel J.S., Morse S.A., Mietzneron T.A. (2010). Chapter 26. Rickettsia & Ehrlichia. In G.F. Brooks, K.C. Carroll, J.S. Butel, S.A. Morse, T.A. Mietzneron (Eds), Jawetz, Melnick, & Adelberg's Medical Microbiology, 25e.

## 14. Asteroid bodies are seen in:

a) Aspergillosis

b) Nocardiasis

c) Sporotrichosis

d) Histoplasmosis

Correct Answer - C

**Sporotrichosis:** Is caused by the fungus **sporothrix schenckii** which is a dimorphic saprophyte found on plants, thorns and timber. Infection is acquired through thorn pricks or minor injuries (hence known as Rose growers disease).

It is characterized by nodules on the skin subcutaneous tissue and in the lymph nodes which soften and break down to form indolent ulcers.

**Asteroid bodies composed of a central fungus cell with eosinophilic material radiating from it is seen in the lesion.**

**Must know:**

**Dimorphic fungus** are fungus occurring in the yeast phase in tissues at 37 degree celcius and in the mycelial phase in nature and in cultures at room temperature.

**Ref:** Textbook of Microbiology, By R. Ananthanarayan, C.K. Jayaram Paniker, 7th Edition, Page 619.

## 15. Bacillary angiomatosis is caused by:

a) Bartonella henselae

b) Cryptococcus

c) Cryptosporidium

d) Pseudomonas

Correct Answer - A

Bacillary angiomatosis is a disease of severely immunocompromised patients, is caused by *B. henselae*. It occurs primarily in HIV infected persons with CD4 count less than 100/micro L.

Disease usually presents as painless cutaneous lesions which are tan, red or purple in colour.

Common manifestations of skin lesions includes subcutaneous masses or nodules, superficial ulcerated plaques and verrucous growths.

Underneath the cutaneous lesions there can be painful osseous lesions also.

**Warthin-Starry silver staining of bacillary angiomatosis lesions reveals clusters of bacilli.**

Treatment involves prolonged treatment with **macrolides or doxycycline**.

**Ref:** Giladi M., Ephros M. (2012). Chapter 160. Bartonella Infections, Including Cat-Scratch Disease. In D.L. Longo, A.S. Fauci, D.L. Kasper, S.L. Hauser, J.L. Jameson, J. Loscalzo (Eds), *Harrison's Principles of Internal Medicine*, 18e.

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**16. A woman with infertility receives an ovary transplant from her sister who is an identical Twin. What type of graft is it?**

a) Autograft

b) Allograft

c) Isograft

d) Xenograft

Correct Answer - C

Women in the question stem has received transplant from her identical twin, hence it is an isograft. When grafting is done between synergistic individuals (i.e of identical genetic constitution) such as identical twins it is referred to as an isograft.

Ref:Bioethics and Biosafety By M. K. Sateesh, Page 641

17.

**With reference to Bacteroides fragilis the following statements are true, EXCEPT:**

a) B. fragilis is the same frequent anaerobe isolated from clinical samples.

b) B. fragilis is not uniformly sensitive to metronidazole

c) The lipopolysaccharide formed by B. fragilis is structurally and functionally different from the conventional endotoxin

d) Shock and disseminated intravascular coagulation are common in Bacteroides bacteremia

Correct Answer - D

Bacteroides species have lipopolysaccharides, but lack the lipopolysaccharide structures with endotoxic activity (including beta-hydroxymyristic acid).

The lipopolysaccharides of B fragilis are much less toxic than those of other gram-negative bacteria.

***Thus, infection caused by Bacteroides does not directly produce the clinical signs of sepsis (eg, fever and shock) so important in infections caused by other gram-negative bacteria.***

When these clinical signs appear in Bacteroides infection, they are a result of the inflammatory immune response to the infection.

**Ref:** Brooks G.F. (2013). Chapter 21. Infections Caused by Anaerobic Bacteria. In G.F. Brooks (Ed), *Jawetz, Melnick, & Adelberg's Medical Microbiology*, 26e.

## 18. Chocolate agar is an example of ?

a) Enriched medium

b) Enrichment medium

c) Selective medium

d) Transport medium

Correct Answer - A  
Ans is 'a' i.e., Enriched medium

**19. The following phenomenon is responsible for antibiotic resistance in bacteria due to slime production -**

a) Co-aggregation

b) Biofilm formation

c) Mutation evolving in altered target site for antibiotics

d) Mutation evolving a target bypass mechanism

Correct Answer - B

Ans. is 'b' i.e., Biofilm formation

. *Slime* is an amorphous, viscid colloidal material that is secreted extracellularly by some bacteria (e.g. *Staph epidermidis*). The slime remains around the bacteria and provides a matrix in which *biofilm* formation can take place.

. In *biofilm* formation the bacterial colony is spread very thinly (300-400nm thick) for e.g. *formation of biofilms on catheters and prosthetic devices*.

. This biofilm formation in the slime provides antibiotic resistance by restricting access of drugs to the bacterium.

## 20. Best method of sterilising disposable syringes is -

a) Hot air oven

b) UV rays

c) Boiling

d) Gamma rays

Correct Answer - D

Ans. is 'd' i.e., Gamma rays

Ionizing irradiations [ $\beta$  (electrons) irradiation and  $\gamma$  (*photon*) irradiation] are used for sterilization of *single-use disposable* items such as needles and *syringes*, latex catheters and surgical gloves. Ethylene oxide **is** also used for disposable plastic syringes.

## 21. MHC class III genes encode -

a) Complement component C3

b) Tumor necrosis factor

c) Interleukin 2

d) Beta 2 microglobulin

Correct Answer - B

Ans. is 'b' i.e., Tumor necrosis factor

Class III (MHC-III)

It encodes for *complement components C2 & C4*, properdin factor B, Heat shock protein and *Tumor necrosis factor- $\alpha$  and 13 (TNF- $\alpha$  and 13)*. MHC-III is involved in *susceptibility to autoimmune diseases like SLE*

**22. The secretory component of immunoglobulin molecule is -**

a) Formed by epithelial cells of lining mucosa

b) Formed by plasma cell

c) Formed by epithelial cell and plasma cell

d) Secreted by bone marrow

Correct Answer - A

Ans. **is 'a'** i.e., Formed by epithelial cells of lining mucosa

**23. Prozone phenomenon is a feature is-**

a) Tularemia

b) Legionnaire's disease

c) Plague

d) Brucellosis

Correct Answer - D  
Ans. is 'd' i.e., Brucellosis

## 24. SCID which is true -

a) Adenosine deaminase deficiency

b) Decreased circulating lymphocytes

c) NADPH oxidase deficiency

d) CI esterase deficiency

Correct Answer - A

Ans. is 'a' i.e., Adenosine deaminase deficiency

**25. Complement necessary for neisseria infection is/ are -**

a) C5

b) C6

c) C7

d) All

Correct Answer - D

Ans. is All 'a' i.e., C 5; 'b' i.e., C 6; 'c' i.e., C 7

## 26. Acute phase reaction in acute inflammation are

a) Albumin

b) Fibrinogen

c) Haptoglobin

d) All

Correct Answer - D

Ans. is 'a' i.e., Albumin, 'b' i.e., Fibrinogen & 'c' i.e., Haptoglobin

- Acute phase reactants are a class of proteins whose plasma concentration increases or decreases in response to inflammation.
- This response is called the acute phase reaction ( acute phase response)
- It should be noted that acute phase proteins not only increase in response to inflammation ; some decrease also?
  - 1) Proteins which increase in response to inflammation --> Positive acute phase proteins
  - 2) Proteins which decrease in response to inflammation --> Negative acute phase proteins

## 27. Catalase positive coagulase negative beta hemolytic bacteria -

a) Strep pyogens

b) Staph aureus

c) Coagulase negative staph

d) Enterococci

Correct Answer - C

Ans. is 'c' i.e., Coagulase negative staph

- The examiner himself has given the answer by writing coagulase negative in option 'c'.
- Staphylococci are catalase positive.

**28. 11 Year old child presented with sore throat since 3 days, which medium is used to culture the throat swab -**

a) Blood agar

b) L. J. medium

c) Stewart medium

d) Chocolate agar

Correct Answer - A

Ans. is 'a' i.e., Blood agar

- Most common bacterial cause of sore throat (pharyngitis) in children is streptococcal pyogenes. The culture medium of choice for throat swab sample is sheep blood agar plate.

*"The throat culture is performed by culturing swab for bacteria collected from the back of throat. The bacteria are allowed to grow on special plates called sheep blood agar plate".*

Essentials of pediatrics microbiology Also know

- Overall most common cause of sore throat (acute pharyngitis) in children is viral pharyngitis, rhinovirus being the most common organism.

## 29. Which of the following is not true about *Neisseria gonorrhoea* -

- a) It is an exclusive human pathogen
- b) Some strains may cause disseminated disease
- c) Acute urethritis is the most common manifestation in males
- d) All strains are highly sensitive to penicillin

Correct Answer - D

Ans. is. 'd'.i.e., All the strains are highly sensitive to penicillin

. Penicillin is ineffective in treatment of gonorrhoea as most of the strains are resistant to penicillin because penicillinase producing *N. gonorrhoeae* (PPNG) have spread widely.

- . Ceftriaxone is the drug of choice for gonococcal infections.
- . All other options have been explained earlier.

**30. Corynebacterium diphtheriae can be grown within 6-8 hour on -**

a) Potassium tellurite media with iron

b) McConkey's agar

c) Dorset egg medium

d) Loeffler's serum slope

Correct Answer - D

Ans. is 'd' i.e., Loeffler's serum slope

### 31. True about Bacillus anthracis ?

a) Zoonotic disease

b) Man to man transmission possible

c) Agent for bioterrorism

d) a and c

Correct Answer - D

Ans. is 'a' i.e., Zoonotic disease; 'c' i.e., Agent for bioterrorism

. Anthrax is a zoonosis. It is primarily a disease of herbivorous - goats, sheep, cattle, horses etc.

. Human become infected incidentally by contact with infected animals or their products.

. B. anthracis is among the category A pathogens (ie the highest priority pathogens) for bioterrorism.

. Antibiotic therapy is effective in humans, and ciprofloxacin is recommended for the treatment - (Jawetz 23<sup>rd</sup>/e 204). For prophylaxis ciprofloxacin or doxycycline should be given.

. M' Fadyean's reaction is characteristic of anthrax bacillus. it is non motile bacteria.

- Bacillus anthracis is '**gram positive**' '**non-motile**' **bacilli** arranged singly, in pairs or in short chains.
- It is **capsulated**, having **polypeptide** capsule.
- It is **spore forming** bacteria. **Spores are formed in culture or in soil but never in animal body during life**. Spores are **central or subterminal, elliptical or oval** in shape. Oxygen is required for sporulation. Spore formation is inhibited by CaCl<sub>2</sub>.

**32. Among the toxin produced by clostridium botulinum, the non neurotoxic one is -**

a) A

b) B

c) C1

d) C2

Correct Answer - D

Ans. is 'd' i.e., **C<sub>2</sub>**

. Toxin of all types (A, B, C, D, E, F, G) are neurotoxin except C<sub>2</sub> which is a cytotoxin (enterotoxin).

### 33. All of the following statements about Botulism are true except -

a) Botulism is caused by endotoxin

b) Honey ingestion causes infant botulism

c) Constipation is seen

d) Detection of antitoxin in the serum can aid in diagnosis

Correct Answer - A

Ans. is 'a' i.e., Botulism is caused by endotoxin

. *C. botulinum* produces a powerful exotoxin (not endotoxin) that is responsible for the pathogenesis.

. Source of infection for infant botulism is contaminated honey.

. Symmetric descending paralysis with parasympatholytic symptoms like constipation and urinary retention are characteristic.

. A retrospective diagnosis may be made by detection of antitoxin in the patient's serum but it may not be seen in all cases.

Remember

. *Diagnosis of botulism is confirmed by demonstration of the organism or its toxin in vomitus, gastric fluid, stool or food.*

. *The edrophonium chloride (Tensilon) test for myasthenia gravis may be falsely positive.*

**34. Shigella are be divided into subgroup on the basis of ability to ferment -**

a) Lactose

b) Maltose

c) Fructose

d) Mannitol

Correct Answer - D

Ans. is 'd' i.e., Mannitol

Fermentation of mannitol is of importance in classification

Shigella

Mannitol fermenting

Mannitol

nonfermenting

. *Sh. flexneri* (sub group B)

*Sh. dysenteriae*

(sub group A)

. *Sh boydii* (sub group C)

. *Sh. Sonnei* (sub group D)

### 35. The following are true regarding Lyme's Disease, except -

a) It is transmitted by ixodid tick

b) Erythema chronicum migraines may be a clinical feature

c) Borrelia recurrentis is the aetiological agent

d) Rodents act as natural hosts

Correct Answer - C

Ans. is 'c' i.e., Borrelia recurrentis is the aetiological agent

Lyme's disease

- . *Borrelia burgdorferi* is the causative agent of *Lyme's disease*.
- . *Borrelia burgdorferi* is transmitted by the bite of Ixodid ticks.
- The natural reservoir hosts are rodents, deer and other mammals.
- Incubation period of lyme disease is 3-30 days.*
- . Lyme disease occurs in three stages.
  1. Stage I (Local infection)
    - Characteristic expanding skin lesion 'Erythema migrans' at the site of tick bite.
  2. Stage 2 (Disseminated infection)
    - Spirochete spreads to many different sites secondary annular skin lesions, carditis/AV block, migratory musculoskeletal pain etc.
  3. Stage 3 (Persistent infection)
    - Intermittant attacks of oligoarthritis (most common in knee), acrodermatitis chronica atrophicans, encephalomyelitis, encephalopathy, polyneuropathy.

### 36. Nocardia is differentiated from Actinomyces by ?

a) Gram stain

b) ZN stain

c) Nocardia causes mycetoma, Actinomyces does not

d) Nocardia is facultative anaerobe

Correct Answer - B

Ans. is 'b' i.e. Z.N. Stain

Differences between Actinomyces and Nocardia

Actinomyces Nocardia

- |  |   |
|--|---|
| . Anaerobic or microaerophilic             | . <i>Strict aerobe</i>                          |
| . Non-acid fast                            | . Acid fast (N. asteroides and N. brasiliensis) |
| . Natural habitat mouth, intestine, vagina | . Natural habitat -- Soil                       |
| . Most infections are endogenous           | . Most infections are exogenous                 |
| . Grows at 35 - 37°C                       | . Can grow at wide range of temperature         |
| . Causes Actinomycosis                     | . Causes Nocardiosis                            |
| . Can occur with normal host immunity      | . More common with deficient CMI                |
| . T/t → Penicillin                         | . T/t → Sulfonamide                             |
- . Nocardia is acid fast, can be differentiated from Actinomyces by

Ziehl Neelsen (Z.N.) stain.

- . Both can cause actinomycetoma.
- . Both are gram positive so can not be differentiated by Gram stain.

### 37. Which of the following is false regarding H pylori ?

a) With chronic infection urease breath test become negative

b) H. pylori infection remains life long if untreated

c) Endoscopy is diagnostic

d) Toxigenic strains usually cause ulcer

Correct Answer - A

Ans. is 'a' i.e., With chronic infection urease breath test become negative

- . Urea breath test is the most consistently accurate test for diagnosis of H. Pylori infection.
- . It is useful for follow-up after treatment, as it becomes negative after treatment.
- . In chronic infection it remains positive.

About other options

- . Most H. pylori - colonized person do not develop clinical sequelae. They may carry infection life long.
- . Endoscopic culture is the most specific test.
- . Ulcer is caused by strains carrying vacuolating cytotoxin gene.

### 38. All of the following are correct regarding Legionella except -

a) Legionella can be grown on complex media

b) Legionella pneumophila serogroup 1 is the most common serogroup isolated from humans

c) Legionella are communicable from infected patients to others

d) Legionella pneumophila is not effectively killed by polymorphonuclear leukocytes

Correct Answer - C

Ans. is 'c' i.e., Legionella are communicable from infected patients to others

. The source of legionella is water. Man of man transmission does not occur.

#### LEGIONELLA

##### Morphology

- . Gram negative
- . Coccobacilli
- . Non capsulated
- . Motile by polar or subpolar flagella.
- . Best visualized by direct fluorescent antibody (DFA)

##### Culture

- . Strict aerobe
- . *Has fastidious requirements and grow on complex media such as buffered charcol, yeast extract (BCYE) agar.*

##### Transmission

- . The nature habitats for L. pneumophila are aquatic bodies, including lakes and streams.
- . The legionellae survive and multiply inside freeliving amebae

and other protozoa.

. Mode of transmissions :

1) *Aerosolization* - Inhalation of aerosols produced by cooling towers, air conditioners and shower heads which act as disseminators.

2) *Aspiration* - *Is the predominant mode of transmission -*

3) *Direct instillation in to the lung*

- . The source of legionella is water
- . No animal reservoir exists
- . No carrier state is established
- . Man to man transmission does not occur.

About option d

. *Because of its intracellular location legionella is not effectively killed by the polymorphs and humoral antibodies.*

. Cell mediated immunity is the primary mechanism of host defense against legionella.

About option b

. At least 14 serogroups of *L. pneumophila* have been identified.

. *L. pneumophila* serogroup 1 (SG 1) accounts nearly all severe infections.

. *L. pneumophila* serogroup 6 is more commonly involved in hospital - acquired legionnaire's disease.

**39. Levinthal Coles Lillie bodies are seen in -**

a) WV

b) Psittacosis

c) Kala Azar

d) Chicken pox

Correct Answer - B

Ans. is 'b' i.e., Psittacosis

. In psittacosis infected cells, including alveolar macrophages from patients, and mouse brain, yolk sac and cell cultures shows inclusion bodies  
Levinthal - Cole - Lillie (LCL) bodies.

**40. Lymphogranuloma venerum is caused by**

-

a) Chlamydia trachomatis

b) Calymmatobacter granulomatis

c) Haemophilus ducreyii

d) Treponema pallidum

Correct Answer - A

Ans. is 'a' i.e., Chlamydia trachomatis

**41. The bacteria producing a picture resembling 'pseudohemoptysis' in a sputum sample due to prodigiosin production is -**

a) *Serratia marcescens*

b) *Erwinia herbicola*

c) *Ehrlichia sennetsu*

d) *Legionella pneumophila*

Correct Answer - A

Ans. is 'a' i.e., *Serratia marcescens*

. In genus *Serratia* only one species is of medical importance - *S. marcescens* (*Bacillus prodigiosus*).

. It may grow in sputum after collection and may suggest hemoptysis because of the pigment formed → Pseudohemoptysis

. It can cause meningitis, endocarditis, septicemia, peritonitis and respiratory infection.

**42. Pocks on chick embryo are formed by all except**

a) Variola

b) Vaccinia

c) Chickenpox

d) Cowpox

Correct Answer - C  
Ans. is 'c' i.e., Chicken Pox

### 43. True about infectious mononucleosis -

a) Associated with heterophile antibodies

b) Monocytosis

c) Associated with cold agglutinin

d) a and c

Correct Answer - D

Ans. is. 'a' i.e., Associated with heterophile antibodies, 'c' i.e., Associated with cold agglutinin

. EBV causes a self limited illness; infectious mononucleosis also known as glandular fever.

. EBV causes autoimmune hemolytic anemia which is due to presence of cold agglutinins.

. In IMN, there is there is predominantly lymphocytosis (not monocytosis).

. In EBV infection, there is production of heterophile antibodies.

. CMV and EBV can cause latent co-infection in childhood.-----

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## 44. Coxsackie group A does not cause ?

a) Conjunctivitis

b) Aseptic meningitis

c) Hepatitis

d) H.F.M.D

Correct Answer - B

Ans. is 'b' i.e., Aseptic meningitis

. Aseptic meningitis is caused by all types group B Coxsackie viruses and by many group 'A' Coxsackie viruses most commonly A7 and A9.

*History of fever and headache with neck stiffness suggest the diagnosis of meningitis. CSF analysis findings of increased opening pressure, mildly increased proteins, normal glucose, increased lymphocytes are highly suggestive of viral (Coxsackie virus) meningitis. Meningitis with normal glucose is highly suggestive of viral meningitis*

	Normal	Bacterial Meningitis	Viral Meningitis	Typical CSF Profile	Fungal Meningitis	Parasitic Meningitis
WBC count (per pL)	<5	>1000°	25-500°	40-600	150-200	150-200
Differential of WBC	60-70% lymphocytes, 30% monocytes / macrophages	TiPMNs° (N30%)	Predominantly lymphocytes°	Lymphocytes or PMNs, depending on specific organism	TT	Eosinophil (50%/0)
Gram's	Negative	Positive°	Negative°	Rarely	Negative	Negative

stain		(in >60% of cases)		positive	
Glucose (mg/dL)	40-85	<40°	Normal°	I to normal	Normal
Protein (mg/dL)	15-45	>100°	20-80°	150-300	50-200
Opening pressure (mm H2O)	50-180	>300°	100-350°	160-340	Normal

*About other options*

- . Acute hemorrhagic conjunctivitis can be caused by Coxsackie virus A-24, but it is not common. Mostly it is caused by enterovirus - 70.
- . Myocarditis and hepatitis are mainly caused by Coxsackie virus group B.

## 45. Influenza virus belongs to which family?

a) Paramyxovirus

b) Orthomyxovirus

c) Bunyaviridae

d) Togaviridae

Correct Answer - B

Ans. is 'b' i.e., Orthomyxovirus

- Influenza virus belongs to orthomyxoviridae.

**46. Which of the following are true regarding KFD ?**

a) It is zoonosis

b) Affects monkeys

c) Caused by bacteria

d) a and b

Correct Answer - D

Ans. is 'a' i.e., It is zoonosis & 'b' i.e., Affects monkeys

. KFD is a zoonosis. The transmission cycle involves mainly monkeys and ticks.

*Man is an incidental dead end host and plays no part in virus transmission*

## 47. Dengue hemorrhagic fever is caused by -

- a) Type I dengue virus
- b) Reinfection with same serotype of dengue virus
- c) Reinfection with a different serotype of dengue virus
- d) Infection in an immunocompromised host

Correct Answer - C

Ans. is. 'c' i.e. Reinfection with a different serotype of dengue virus

### DENGUE FEVER

- Dengue fever is caused by *arboviruses* (*at least 4 serotypes have been recognized*)
- It is transmitted by *Aedes* (*Aedes aegypti* is the main vector).
- The reservoir of infection is both man and mosquito.
- The transmission cycle is Man-mosquito-man
- Dengue fever occurs both epidemically and endemically. Epidemics starts in rainy season and are usually explosive.
- *Aedes* mosquito becomes infective by feeding on a patient from the day before onset to the 5<sup>th</sup> day of illness.
- *Various manifestations of Dengue infection*
  - A) Classical dengue fever —
    - i) Also known as break bone fever
    - ii) Incubation period 2-7 days (3-10 days → Park)
    - iii) Onset is sudden with chills and fever. Fever is usually between 39°C and 40°C temperature returns to normal after 5-6 days or subside on about the 3<sup>rd</sup> day and rise again after 5-8 days after onset (*saddle back fever*).
    - iv) Rashes appear in 80 % of cases during remission or during second febrile phase. The rash lasts for 2 hours to several days and may be followed by desquamation.

B) Dengue Hemorrhagic fever (DHF) ?

- It is a severe form of dengue fever caused by *infection with more than one dengue virus*.
- The severe illness is thought to be due to double infection with more than one dengue virus.
- *Dengue hemorrhagic fever is believed to result from reinfection with a virus of different serotype ( due to enhancing antibodies)*
- DHF usually occurs after sequential infection with any two of the four serotypes of dengue virus.
- Sequence of infection may be important; serotype 1 followed by serotype 2 is more dangerous than serotype 4 followed by serotype 2.

C) Dengue shock syndrome

#### 48. Speed of rabies virus in axon is?

a) 1 mm per hour

b) 3 mm per hour

c) 5 mm per hour

d) 7 mm per hour

Correct Answer - B

Ans. is 'b' i.e., 3 mm per hour

**49. With which of the following of viral hepatitis infection in pregnancy, the maternal mortality is highest ?**

a) Hepatitis A

b) Hepatitis B

c) Hepatitis C

d) Hepatitis E

Correct Answer - D

Ans. is 'd' i.e., Hepatitis E

A unique feature of Hepatitis E is the clinical severity and high case fatality rate (20-40%) when it affects pregnant women, especially in last trimester.

## 50. Reverse Transcriptase is -

a) DNA polymerase

b) DNA dependant RNA polymerase

c) RNA dependant DNA polymerase

d) None

Correct Answer - C

Ans. is 'c' i.e. RNA dependent DNA polymerase

The Characteristic biochemical feature of retroviruses is the presence of RNA dependent DNA polymerase (reverse transcriptase)

## 51. Ebola virus is a -

a) Reovirus

b) Filovirus

c) Arbovirus

d) Arenavirus

Correct Answer - B

Ans. is 'b' i.e., Filovirus

. Filoviridae includes - Marburg virus, Ebola virus

## 52. The pathogenecity of *Entamoeba histolytica* is indicated by -

a) Zymodeme pattern

b) Size

c) Nuclear pattern

d) ELISA test

Correct Answer - A

Ans. is 'a' i.e., Zymodeme pattern

### Zymodeme

. There are distinct invasive and noninvasive strains of *E. histolytica*. These strains vary according to their *isoenzyme patterns (zymodemes)*.

. *E. histolytica* strains have 22 zymodemes of these 10 zymodemes are invasive and 12 are noninvasive.

. Zymodemes of *E. histolytica* are identified according to the electrophoretic mobility of 4 enzymes.

1. L-malate : NADP+ Oxidoreductase
2. Phosphoglucomutase (PGM) ----- most important
3. Glucose-phosphate isomerase
4. Hexokinase

. Electrophoresis of PGM can show one or more of the 4 bands : a, (3, 7 and S. Strains of *E. histolytica* showing, an absence of a-band together with the presence of 13 band are virulent i.e., invasive.

**53. The normal habitat of giardia *is-***

a) Duodenum and jejunum

b) Stomach

c) Caecum

d) Ileum

Correct Answer - A

Ans. is 'a' i.e., Duodenum and jejunum

## 54. Aseptate hyphae are seen in -

a) Phycomycetes

b) Ascomycetes

c) Basidiomycetes

d) Deutromycetes

Correct Answer - A

**Ans.** is 'a' i.e., Phycomycetes

. Lower fungi (phycomycetes or zygomycetes) -->Aseptate hyphae

. Higher fungi (Ascomycetes, Basidiomycetes, Deutromycetes)

Septate hyphae.

**55. "Tuberculate spores" are characteristic features of-**

a) Candidia

b) Histoplasma

c) Coccidiomyces

d) Cryptococcus

Correct Answer - B

Ans. is 'b' i.e., Histoplasma

- On *Sabourauds agar*, at room temperature, white cottony mycelia growth appears, with large (8-20 micrometer) thick walled, spherical spores with tubercles or finger-like projections. This appearance of "tuberculate spores" is diagnostic of *Histoplasma capsulatum*.

## 56. Micro-organism used as weapon in biological terrorism -

a) Small pox V

b) Rabies V

c) Ebda V

d) Influenza CV

Correct Answer - A

Ans. is 'a' i.e., Small pox V

. Some *microbial pathogens* can be used as *potential weapons of war or terrorism Bioterrorism*.

## 57. In donovanosis-

a) Pseudolymphadenopathy

b) Penicillin is used for treatment

c) Painful ulcer

d) Suppurative lymphadenopathy

Correct Answer - A

Ans. is 'a' i.e., Pseudolymphadenopathy

### Donovanosis

- Caused by *Calymmatobacterium granulomatis*.
- *C. granulomatis* is ?
  - Gram negative
  - Encapsulated
  - Nonmotile
  - Intracellular
- *It shares many morphologic and serologic characteristic (antigenic) and > 99% homology at the nucleotide level with Klebsiella.*
- Clinical manifestations
  - IP —) 1-4 weeks
  - Begins as one or more subcutaneous nodules that erode through skin to produce clean, *granulomatous*, sharply defined, usually *painless* lesions.
    - The genitalia are involved in 90% of cases.
    - Genital swelling, particularly of labia, is common.
    - In donovanosis, heaped-up granulomatous tissue may follow and via subcutaneous extension to inguinal area may form "*pseudo-buboes*"; however, the absence of true lymphadenopathy is the hallmark of this infection.
  - Complications Pseudoelephantiasis, phimosis and

paraphimosis.

- Diagnosis:
  - *The preferred diagnostic method involves demonstration of typical intracellular Donovan bodies within large mononuclear cells visualized in smears prepared from lesions or biopsy specimens.*
  - Stain used is wright - Giemsa
- Treatment:
  - *Azithromycin (DOC)*
  - Doxycycline (2<sup>d</sup> choice)
  - Chloramphenicol

**58. It is true regarding the normal microbial flora present on the skin and mucous membranes that ?**

- a) It cannot be eradicated by antimicrobial agents
- b) It is absent in the stomach due to the acidic pH
- c) It establishes in the body only after the neonatal period
- d) The flora in the small bronchi is similar to that of the trachea

Correct Answer - A

Ans is 'a' i.e., It cannot be eradicated by antimicrobial agents

. *The normal microbial flora are more or less constant for each species and are broadly divided into residents and transients. The former constitute a constant population which cannot be completely removed permanently.*

- *Ananthanarayan 7<sup>th</sup>/e 599*

. *Because of low pH of stomach, it is virtually sterile except soon after eating - Ananthanarayan 71/4 601*

. *With in 4-24 hours of birth an intestinal flora is established - Ananthanarayan r/e 600*

. *In the pharynx and trachea, flora is similar to that of mouth, while smaller bronchi and alveoli are normally sterile*

- *Ananthanarayan 7<sup>th</sup>/e 600*

**59. Autoclaving is done at what temperature for 15 minutes:**

***March 2010***

a) 118 degree C

b) 121 degree C

c) 126 degree C

d) 134 degree C

Correct Answer - B  
Ans. B: 121 degree C

**60. True about IgM is:**  
***September 2005***

a) Mediates Prausnitz-Kustner reaction

b) Primary response

c) Transported across placenta

d) Secondary response

Correct Answer - B

Ans. **B**: Primary response

IgM is the immediate antibody that is produced once a human body is exposed to bacteria, virus or a toxin. Their demonstration in the serum indicates recent infections.

IgG is found throughout the body, mainly in most of the bodily fluids, while IgM is found mainly in the blood and lymphatic fluids.

Antibodies formed in primary response are predominantly IgM and in the secondary response is IgG. IgM is temporary and disappears after a few weeks. It is then replaced by IgG.

**61. Hyperacute rejection occurs most commonly in which organ:**  
***March 2007***

a) Liver

b) Kidney

c) Lung

d) Heart

Correct Answer - B

Ans. B: Kidney

Hyperacute rejection is a complement-mediated response in recipients with pre-existing antibodies to the donor (for example, ABO blood type antibodies).

Hyperacute rejection occurs within minutes and the transplant must be immediately removed to prevent a severe systemic inflammatory response. Rapid agglutination of the blood occurs.

This is a particular risk in kidney transplants, and so a prospective cytotoxic crossmatch is performed prior to kidney transplantation to ensure that antibodies to the donor are not present.

Hyperacute rejection is analogous to a blood transfusion reaction as it is a humoral-mediated immune response. For other organs, hyperacute rejection is prevented by transplanting only ABO-compatible grafts.

Hyperacute rejection is not significant in liver allografts and cellular transplants because these tissues have remarkable regenerative abilities.

Hyperacute rejection is the outcome of xenotransplanted organ in non-immunosuppressed recipients

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**62. Most common cause of acute bacterial endocarditis is:**  
***September 2009***

a) Staphylococcus aureus

b) Streptococcus viridans

c) Streptococcus intermedius

d) Candida albicans

Correct Answer - A

Ans. A: Staphylococcus aureus

Overall, *S aureus* infection is the most common cause of Infective Endocarditis (IE), including acute IE, and Intravenous drug abusers IE.

More than half the cases are not associated with underlying valvular disease.

*Streptococcus viridans* accounts for approximately 50-60% of cases of subacute disease.

Most clinical signs and symptoms are mediated immunologically.

*Streptococcus intermedius* group infections may be acute or subacute.

*S intermedius* infection accounts for 15% of streptococcal IE cases.

*S intermedius* is unique among the streptococci; it can actively invade tissue and can cause abscesses.

**63. All are dimorphic fungi except:**  
***March 2005***

a) Blastomycoses

b) Cryptococcus

c) Histoplasma

d) Paracoccidia

Correct Answer - B

Ans. B: Cryptococcus

The term Dimorphic fungus has been employed to potential pathogens that grow as mycelial form when incubated at room temperature under laboratory conditions and yeast phase, yeast like cells or spherule form when grown in human tissue or incubated at 37°C on synthetic laboratory media.

Highly virulent dimorphic fungi are: *Histoplasma capsulatum* var. *capsulatum*, *Histoplasma capsulatum* var. *duboisii*, *Blastomyces dermatitidis*, *Paracoccidioides brasiliensis*, *Sporothrix schenckii*, *Penicillium marneffeii* and *Coccidioides immitis*.

Dimorphic fungi cause systemic mycosis often termed as histoplasmosis, blastomycosis, paracoccidioidomycosis, sporotrichosis, penicilliosis marneffeii and coccidioidomycosis. Cryptococcus is yeast/unicellular fungi.

**64. All of the following are arthropod borne diseases except:**  
***September 2007***

a) Malaria

b) Filariasis

c) Dengue

d) Dracunculosis

Correct Answer - D

Ans. D: Dracunculosis

Arthropod-borne diseases are transmitted by arthropods, members of the invertebrate phylum Arthropoda, which includes insects, spiders, and crustaceans.

Mosquitoes, fleas, ticks, lice, and flies are the arthropods that usually act as vectors for various pathogens (disease-causing microorganisms), including bacteria, viruses, helminths (parasitic worms), and protozoa.

Transmission of these pathogens to humans by the arthropod vector can cause a variety of human diseases, including malaria, yellow fever, Chagas disease, and dengue fever.

## 65. Runt disease is ?

a) Graft rejection

b) Graft vs host disease

c) Host vs graft disease

d) Type III hypersensitivity

Correct Answer - B

Ans. is 'b' i.e., Graft vs host disease

**66. Radiometric BACTEC detect growth of M tuberculosis in how much time ?**

a) 1 week

b) 2-3 week

c) 4-8 week

d) > 10 weeks

Correct Answer - B  
Ans. is `b' i.e., 2-3 weeks

**67. Culture medium for campylobacter jejuni  
?**

a) BYCE medium

b) Skirrow's medium

c) Thayer-Martin medium

d) TCBS medium

Correct Answer - B  
Ans. is 'b' i.e., Skirrow's medium

## 68. Super carrier of HBV shows following serum markers ?

a) HBsAg

b) HbsAg + HBV DNA

c) HbsAg + HBeAg + HBV DNA

d) Anti-HBsAg + HBV DNA

Correct Answer - C

**Ans. is 'c' i.e., HbsAg + HBeAg + HBV DNA**

- In HBV infection, there are two types of carriers :  
***Super Carriers***
- High titre of HBs Ag, HBe Ag, DNA polymerase and HBV in the circulation
- Highly infective
- ***Simple carriers***
- Low titre of HBsAg with negative HBe Ag, DNA polymerase and HBV
- Have low infectivity

**69. Cowdry type A inclusion bodies are seen in ?**

a) HBV

b) Herpesvirus

c) Adenovirus

d) Poxvirus

Correct Answer - B

**Ans. is 'b' i.e., Herpesvirus**

**Intranuclear inclusion bodies were classified into two types by cowdry :**

a) Cowdry type A :- These are of variable size and *granular in appearance*, e.g. in *herpesvirus and yellow fever virus*.

b) Cowdry type B :- These are more circumscribed and often multiple, as with *adenovirus and poliovirus*.

## 70. Maximum cell size in bacterial cell growth cycle?

a) Lag phase

b) Log phase

c) End of plateau phase

d) Early stage of decline

Correct Answer - A

Ans. is 'a' i.e., Lag phase

The various phases of growth curve are associated with morphological and physiological alterations of the cells.

**71. The following infection resembles malignancy ?**

a) Echinococcus granulosus

b) E. multilocularis

c) E.vogeli

d) E. oligarthus

Correct Answer - B

Ans. is 'b i.e., E. multilocularis

The chief character of E. multilocularis cyst is its tendency to proliferate, thereby *resembling a neoplasm*.

## 72. Skin penetration not seen in ?

a) *Taenia saginata*

b) *Nectator americanus*

c) *Ankylostoma duodenale*

d) *Strongyloides stercoralis*

Correct Answer - A

Ans. is 'a' i.e., *Taenia saginata*

### 73. True about exotoxin ?

a) Non-antigenic

b) Enzymatic

c) Non-protein

d) Heat stable

Correct Answer - B  
Ans. is 'b' i.e., Enzymatic

## 74. Continuous cell culture of bacteria

a) U tube

b) Craige tube

c) Chemostat device

d) Agar dilution method

Correct Answer - C

Ans. is 'c' i.e., Chemostat device

Bacterial cultures can be maintained in a state of exponential growth over long periods of time using a system of continuous culture.

Continuous culture, in a device called chemostat, can be used to maintain a bacterial population at a constant density, a situation that is, in many ways, more similar to bacterial growth in natural environments.

In a chemostat microbial cells are grown at a steady state where cell biomass production, substrates and products concentrations remains constant, and growth occurs at a constant rate.

These features make a chemostat unique and powerful tool for biological and physiological research.

## 75. Lipopolysaccharide of gram negative bacteria ?

a) Hapten

b) Heterophile antibody

c) Stimulator for B lymphocytes

d) Induce cell mediated immunity

Correct Answer - C

**Ans. is 'c' i.e., Stimulator for B lymphocytes**

The biological activity of endotoxin is associated with lipopolysaccharide (LPS).

i) Toxicity is associated with lipid component (Lipid A).

ii) Immunogenicity is associated with polysaccharide component.

The cell wall antigen (O antigen) of Gram-negative bacteria are components of LPS.

LPS elicits a variety of inflammatory responses and activates alternate complement pathway.

The susceptibility to infections induced by Gram-negative bacteria is largely determined by innate immune response to bacterial cell wall lipopolysaccharide (LPS).

The stimulation of B-cells by LPS enhances their antigen-presenting capacity and is accompanied by B-cell proliferation and secretion of large quantities of LPS neutralizing antibodies.

## 76. Which of the following is non-lactose fermenting bacteria ?

a) E. coli

b) Klebsiella

c) Citrobacter

d) Salmonella

Correct Answer - D

**Ans. is 'd' i.e., Salmonella**

### **Lactose fermentation by Enterobacteriaceae members**

Initially Enterobacteriaceae was classified on the bases of their lactose fermenting ability on *MacConkey's medium*, the most popular medium for the isolation of fecal bacilli.

Lactose fermenters produce pink/bright red colonies on MacConkey's agar, while lactose non-fermenters produce pale colonies :

*i) Lactose fermenters (rapid)* : These are Coliforms, e.g. Escherichia, Klebsiella and Enterobacter aerogenes.

*ii) Late lactose fermenters (slow)* : These are Shigella Sonnei, Serratia, Citrobacter, Arizona, Providencia and Ervinia.

*iii) Non-lactose fermenters* : Shigella except Shigella Sonnei, Salmonella, Proteus.

## 77. True about hepatitis C virus are all except

a) Most common cause of chronic infection

b) Has live attenuated vaccine

c) Spread by blood transfusion

d) Is a flavivirus

Correct Answer - B

**Ans. is 'b' i.e., Has live attenuated vaccine**

### **HEPATITIS C VIRUS (HCV)**

- The hepatitis 'C' virus has been classified as a new genus Hepacivirus in the family flaviviridae.
- *The virus can not be cultured* but can be cloned in Escherichia coli.
- *It is the commonest cause of post transfusion hepatitis and chronic hepatitis.*
- Incubation period is 50 days (15 - 160 days).
- Modes of transmission of HCV are :?
  - i. *Blood transfusion* : Most common mode of transmission and *HCV is the most common cause of post-transfusion hepatitis.*
  - i. *Percutaneous transmission* : By needle punctures.
  - i. *Perinatal transmission* : *Transmission appears to be a function of the degree of maternal viremia which is detected by PCR for HCV RNA.*
  - i. *Sexual transmission.*
- *Among hepatitis viruses, HCV has the maximum propensity for chronic hepatitis and chronic carrier state. It can also cause cirrhosis and hepatocellular carcinoma.*
- *The most common indication for liver transplantation currently is cirrhosis due to chronic hepatitis'C' infection.*
- *HCV usually does not cause acute liver failure (vary rare with HCV)*
- *Extrahepatic manifestation with HCV infection may be essential*

*mixed cryoglobulinemia (more than HBV), porphyria cutanea tarda, pulmonary fibrosis and membranoproliferative GN.*

- Among the Hepatitis viruses, vaccine is available for HAV and HBV..
- Live attenuated vaccine is available for HAV only (among hepatitis viruses).

## 78. Not an enrichment medium ?

a) Selenite F broth

b) Tetrathionate broth

c) Alkaline peptone water

d) Loeffler's serum

Correct Answer - D

Ans. is `d' i.e., Loeffler's serum

## 79. Most common cause of sporadic encephalitis ?

a) EBV

b) HSV

c) Poliovirus

d) CMV

Correct Answer - B

Ans. is `b' i.e., HSV

*"HSV encephalitis is the most common sporadic acute viral encephalitis in most part of the world." — Ananthnarayan*

## 80. Least common cause of sporadic encephalitis ?

a) HSV

b) VZV

c) Arbovirus

d) Rhinovirus

Correct Answer - D

**Ans. is `d' i.e., Rhinovirus**

**Causes of viral encephalitis are :-**

1. HSV
2. Rabies virus
3. VZV
4. Arboviruses (west Nile, eastern equine)
5. CMV

## 81. Not a DNA oncovirus ?

a) HTLV

b) HBV

c) HCV

d) HPV

Correct Answer - A

Ans. is 'a' i.e., HTLV

Human T-cell leukemia virus (HTLV) is a RNA oncogenic virus.

## 82. Selective media for Pseudomonas ?

a) EMJH medium

b) PALCAM agar

c) PLET medium

d) Cefrimide agar

Correct Answer - D  
Ans. is 'd' i.e., Cefrimide agar

### 83. Selective medium for *Vibrio cholerae* ?

a) GTTA medium

b) Stuart medium

c) Skirrow's medium

d) MYPa medium

Correct Answer - A  
Ans. is 'a' i.e., GTTA medium

## 84. Fungus not isolated in culture ?

a) Cryptococcus

b) Dermatophyte

c) Candida

d) P. jiroveci

Correct Answer - D

**Ans. is 'd' i.e., P. jiroveci**

### **Culture of fungi**

- **Culture media used in mycology are :**
  - .. Sabouraud's glucose agar (most common)
  2. Czapek - Dox medium
  3. Corn meal agar
- Culture media are supplemented with chloramphenicol to minimize bacterial contamination and cycloheximide to reduce contamination with saprophytic fungi.
- Cultures are incubated at 22 - 30°C and 37°C.
- *Rhinosporidium seebri* and *Pneumocystis jiroveci* (formerly *P. carinii*) can not be cultivated in media.
- *Malassezia furfur* does not grow on regular sabouraud's medium. It requires complex media to grow.
- *Malassezia furfur* does not grow on regular sabouraud's medium.
- It requires complex media to grow
- *M. furfur* is a *lipid dependent fungus* and 1% emulsified olive oil is added to sabouraud medium for its cultivation
- Two media are now widely employed for all malassezia species.
  - .. Dixon medium
  2. Modified dixon medium

## 85. True about corynebacterium diphtheriae ?

a) Schick test is done for resistance

b) Gram positive organism

c) Schick test is an intramuscular test

d) Most important treatment is antibiotic

Correct Answer - B

Ans. is 'b' i.e., Gram positive organism

Corynebacterium diphtheriae is a gram positive bacillus.

Schick test was an intradermal test which was used for susceptibility.

Administration of diphtherial antitoxin is the most important element in the treatment of respiratory diphtheria.

The primary goal of antibiotic therapy is to eradicate C. diphtheriae.

Drugs currently used are erythromycin or procaine penicillin G. alternatives are rifampicin or clindamycin.

**86. An organism grown on agar shows green coloured colonies, likely organism is ?**

a) Staphylococcus

b) Streptococcus

c) Pseudomonas

d) E. coli

Correct Answer - C  
Ans. is 'c' i.e., Pseudomonas

## 87. Which of the following immunoglobulins can cross placenta ?

a) IgA

b) IgM

c) IgG

d) IgD

Correct Answer - C

**Ans is 'c' i.e., IgG**

**IgG**

- It is the major serum immunoglobulin (80%).
- It is distributed equally between the intravascular and extravascular compartments.
- It contains less carbohydrate than other immunoglobulins.
- It has maximum half life.
- It binds to micro-organisms and enhances their phagocytosis.
- Considered as *general purpose antibody*, protective against those infectious agents which are active in the blood and tissues.
- It is the predominant antibody in secondary antibody response.
- Four subclasses of IgG are there with IgG<sub>1</sub>, is found in greatest amount and IgG<sub>4</sub> in least amount.
- IgG, is directed against polysaccharide antigen so it is important in defence against encapsulated bacteria.
- IgG is the only maternal immunoglobulin, that is normally transported across the placenta and provides natural passive immunity in the newborn.

## 88. Trophozoite of Entamoeba histolytica ?

a) Has eccentric Karyosome

b) Shows erythrocyte in cytosol

c) Central nucleus

d) Non motile

Correct Answer - B

Ans. is 'b' i.e., Shows erythrocyte in cytosol

## 89. HCV virus is ?

a) Enveloped DNA

b) Enveloped RNA

c) Nonenveloped DNA

d) Nonenveloped RNA

Correct Answer - B

Ans. is 'b' i.e., Hepatitis C virus is a small, enveloped, positive-sense single-stranded RNA virus of the family Flaviviridae.

**90. Which of the following is true about P. falciparum**

a) James dots are seen

b) Accole forms are seen

c) Relapses are frequent

d) Longest incubation period

Correct Answer - B

Ans. is 'b' i.e., Accole forms are seen

The parasite often attaches itself to the margin or the edge of the host cell, the nucleus and a small part of the cytoplasm remaining almost outside. This is known as form *applique* or *accole*.

There is no relapse in P. falciparum.

P. falciparum has minimum incubation period (9-14 days).

## 91. Role of Malachite green in LJ medium ?

a) Increase growth of M. tuberculosis

b) Inhibits growth of other bacteria

c) Nutritive value

d) As an indicator

Correct Answer - B

**Ans. is 'b' i.e., Inhibits growth of other bacteria**

**Lowenstein-Jensen Medium (LJ medium)**

LJ medium consists of mineral salts, asparagine, glycerol, malachite green and hen's egg.

*The malachite green prevents the growth of other microorganism on medium.*

It is used as a primary isolation medium for mycobacteria.

## 92. Ideal urine specimen for anerobic culture should be ?

- a) Mid stream urine sample
- b) First few drops at morning
- c) Sample by foley's catheter
- d) Sample by suprapubic aspiration

Correct Answer - D

Ans. is 'd' i.e., Sample by suprapubic aspiration

Suprapubic aspiration is the preferred method of urine collection when anaerobic bacteria are suspected as cause of UTI.

### 93. Endothrix is caused by ?

a) Epidermophyton

b) E. tonsurans

c) T. tonsurans

d) M. Canis

Correct Answer - C  
Ans. is `c' i.e., T. tonsurans

**94. Glassware is sterilized in Hot air oven at -**

a) 160°C for 1 hour

b) 170°C for 1 hour

c) 180°C for 1 hour

d) 190°C for 1 hour

Correct Answer - A

Ans. is 'a' i.e., 160°C for 1 hour

## 95. Bivalent HPV vaccine contains which types ?

a) Type 6,11

b) Type 6,16

c) Type 16,18

d) Type 11,18

Correct Answer - C

**Ans. is 'c' i.e., Type 16,18**

### **Human papillomavirus (HPV) vaccine**

- HPV is one of the most important risk factor for cervical cancer, widespread vaccination has the potential to reduce cervical cancer deaths around the world by as much as two thirds, if all women were to take the vaccine and if protection turns out to be long term.
- In addition, the vaccine can reduce the need for medical care, biopsies and invasive procedures associated with the follow up from abnormal pap tests. Thus, helping to reduce the health care costs and anxieties related to abnormal pap tests and follow up procedures.
- HPV vaccines are ?
  - 1) Preventive vaccines
- The role of HPV vaccine is to prevent infection with certain species of Human papillomavirus associated with the development of cervical cancer, genital warts and some less common type of cancers.
- These vaccines are based on *virus like particles (VLPs)* assembled from recombinant *HPV coat proteins (major capsid protein L1)*.
- Currently, one *quadrivalent product* containing HPV types 6,11,16 and 18 has been licenced in US and recommended by the centres

for disease control and prevention for administration to girls and young women 9-26 years of age — *type 16 and 18 are most important as they cause 70% of cervical cancer world wide.*

- Another product contains *HPV types 16 and 18 ( bivalent)* and is likely to be available in the near future.
- 2) Therapeutic vaccines (under trial)
- In addition to above two preventive vaccines, laboratory research and several human clinical trials are focused on the development of therapeutic HPV vaccines. In general these vaccines focus on the *main HPV oncogenes, E6 and E7*. Since expression of E6 and E7 is required for promoting the growth of cervical cancer cells and cells within warts, it is hoped that immune responses against two oncogenes might eradicate established tumors.

## 96. Live TB bacilli culture is by -

a) Tinsdale medium

b) MGIT

c) MYPA medium

d) BYCE agar

Correct Answer - B

**Ans. is 'b' i.e., MGIT**

### **Culture of Tubercular bacilli (M. tuberculosis)**

Isolation of micobacteria from clinical samples by culture is the most reliable method for diagnosis.

M. tuberculosis can be cultivated by ?

A) On conventional media

Mycobacterial culture on conventional media is the gold standard for primary isolation.

Various liquid and solid media are used.

*The solid medium most widely employed for routine culture of tubercular is Lowenstein - Jensen Medium (L.J. medium).*

## 97. Best virucidal disinfectant is?

a) Phenol

b) Hypochlorite

c) BPL

d) Formaldehyde

Correct Answer - D

**Ans. is 'd' i.e., Formaldehyde**

Among the options, formaldehyde is high level disinfectant.

### **Categories of effective potency**

**Sterilants** :- are capable of completely eliminating or destroying in all forms of microbial life, including spores.

**Disinfectants** :- Destroy some, but not necessarily all organisms. The category is further divided into subcategories:-

*i) High level disinfectants* :- In their usual concentration and contact period, they destroy all microorganisms, with exception of high number of bacterial spores ( small number of spores can be destroyed). It is worth noting that at higher concentrations and prolonged contact period, high level disinfectant can act as sterilant, i.e. can kill high numbers of spores as well. Examples are :-2% gluteraldehyde, 8% formaldehyde, 6-10% hydrogen peroxide and ethylene oxide gas.

*ii) Intermediate level disinfectants* :- Inactivate even resistant organisms such as mycobacterium tuberculosis as well as vegetative bacteria, most viruses and most fungi, but do not necessarily kill bacterial spores. Examples are :-0.5% iodine, 70-90% ethanol and isopropanol, chlorine compounds (hypochlorite), some phenolic compounds and iodophor based disinfectants.

*iii) Low level disinfectants* :- kill most bacteria, some viruses and

some fungi, but cannot be relied on to kill resistant microorganisms such as tubercular bacilli or bacterial spores. Examples are :- *quarterly ammonium compounds, mercurials, some phenolic compounds and iodophores*. Note:- the disinfectant levels of iodophors (iodines) and phenolic compounds may be classified as intermediate or low depending on the concentration employed.

## 98. Rickettsial infections cause 30% mortality due to ?

a) Endothelial injury

b) Hemodynamic instability

c) Endocarditis

d) Renal failure

Correct Answer - A

Ans. is 'a' i.e., Endothelial injury

Rickettsial infections are associated with a high morbidity and mortality.

The mortality rate can be as high as 20% of Rocky Mountain Spotted fever and 30% for epidemic typhus.

On entry into the human body, the rickettsiae multiply locally and enter the blood. They become localized chiefly in vascular endothelial cells, which enlarge, degenerate and cause thrombus formation, with partial or complete occlusion of the vascular lumen.

*The overall pathological features of the rickettsial diseases are due to the damage of vascular endothelium.*

## 99. Most common organism causing fungal infection of oral cavity ?

a) Candida

b) Blastomycosis

c) Aspergillosis

d) Cryptococcus

Correct Answer - A

Ans. is 'a' i.e., Candida

*The most prevalent fungal infections in oral cavity are those caused by Candida species, especially C. albicans.*

Candidiasis (Moniliasis)

*Candidiasis is the most common systemic mycosis.*

*Candidiasis is an opportunistic endogenous infection and is the most common fungal infection in neutropenic patients. Candida is the most common fungal infection in immunocompetent persons as well.*

## 100. True about CMV are all except ?

a) Most common cause of post-transplantation infection

b) Most common cause of transplacental infection

c) A non-enveloped DNA virus

d) Produces intranuclear inclusions

Correct Answer - C

Ans. is 'c' i.e., A non-enveloped DNA virus

CMV is an enveloped DNA virus, belongs to Herpesviridae.

## 101. Best test to diagnose prodrome of Hepatitis A ?

a) HAV in blood

b) IgG anti-HAV

c) IgM anti-HAV

d) HAV in stool

Correct Answer - C

**Ans. is 'c' i.e., IgM anti-HAV**

### **Lab diagnosis of HAV**

- "Detection of IgM - specific anti-HAV in the blood of an acutely infected patient confirms the diagnosis of hepatitis A".
- IgM appears in acute phase, peaking about 2 weeks after elevation of liver enzymes and becomes undetectable within 3-6 months.
- *ELISA* is the method of choice for measuring antibodies.
- Diagnosis can also be established by detection of virus in the stool from about 2 weeks prior to the onset of jaundice up to 2 weeks after. "But these tests for detection of HAV, are not widely available or useful in practice".

## 102. Single stranded RNA with segmented genes is found in ?

a) Influenza

b) Rotavirus

c) Reovirus

d) Measles virus

Correct Answer - A

Ans. is 'a' i.e., Influenza

Some viruses have segmented nucleic acid (genome).

**These are (Mnemonic BORA) :?**

1) *Bunyaviridae* : 3 segments of single stranded RNA.

2) *Orthomyxoviridae (influenza)* : 8 segments of single stranded RNA.

3) *Reoviridae (rotavirus, reovirus)* : 10-12 segments of double stranded RNA.

4) *Arenaviridae* : 2 segments of single stranded RNA.

### 103. Most common opportunistic infection in HIV, globally ?

a) P. jiroveci

b) Candida

c) M. tuberculosis

d) Cryptococcus

Correct Answer - A

Ans. is 'a' i.e., P. jiroveci

*P jiroveci (Carinii) is the most common opportunistic infection in AIDS patients, overall.*

*"P jiroveci pneumonia remains the most common AIDS related opportunistic infection"*

– *Textbook of diagnostic microbiology* o In developing countries (like India), most common opportunistic infection in AIDS is M. tuberculosis.

## 104. DCA media used in differentiation of which infection?

a) Salmonella

b) Staph aureus

c) H. influenzae

d) Bordetella

Correct Answer - A

Ans. is 'a' i.e., Salmonella

Deoxycholate citrate agar (DCA) medium is a selective medium for Salmonella and Shigella.

It is also used as a differential medium to differentiate lactose fermenter from non-lactose fermenting enteric pathogens.

Salmonella and Shigella (except Shigella Sonnei) are non-lactose fermenters.

**105. Gamma irradiation used for all of the following except?**

a) Syringes

b) Catgut suture

c) Grafts

d) Endoscope

Correct Answer - D  
Ans. is 'd' i.e., Endoscope

## 106. Thayer Martin medium is used for ?

a) Legionella

b) Meningococcus

c) Pneumococcus

d) Mycoplasma

Correct Answer - B  
Ans. is 'b' i.e., Meningococcus

## 107. Hepatitis E usually affects ?

a) Children

b) Adults

c) Old age

d) Toddlers

Correct Answer - B  
Ans. is `b' i.e., Adults

## 108. Seitz filter is a ?

a) Candle filter

b) Asbestos filter

c) Membrane filter

d) Sintered glass filters

Correct Answer - B

Ans. is 'b' i.e., Asbestos filter

### 109. Sabaroud's medium is used for ?

a) Protozal parasites

b) Nematodes

c) Fungi

d) Anaerobes

Correct Answer - C  
Ans. is 'c' i.e., Fungi

## 110. Differential media is ?

a) Nutrient agar

b) Chocolate agar

c) MacConkey's agar

d) Tetrathionate broth

Correct Answer - C

**Ans. is 'c' i.e., MacConkey's agar**

**Differential media**

- A medium has substances which bring out different characteristics of bacteria and thus helping to distinguish between them.
- Example - MacConkey's medium.

**Remember**

- MacConkey's medium acts both as indicator and differential media.

## 111. Rabies is diagnosed by ?

a) Hair follicle smear

b) Corneal smear

c) Isolation from blood

d) Nerve biopsy

Correct Answer - B

**Ans. is 'b' i.e., Corneal smear**

### **Diagnosis of rabies**

The diagnosis of rabies is usually made by the detection of rabies virus antigens by immunofluorescence.

**The specimens collected are :**

- Antemortem
- Corneal smear
- Skin biopsy from neck or saliva
- Postmortem
- Brain biopsy
- *A definitive pathologic diagnosis of rabies can be based on the finding of Negri bodies in the brain or spinal cord.*
- Other methods for Rabies diagnosis
  - i) Rabies virus specific antibodies detection in serum and CSF.
- But rabies virus-specific antibodies develop relatively late in the clinical course when the patient survives beyond the acute phase.
- Two methods are used to detect antibodies:
  - Indirect fluorescent antibody test.
  - Rapid fluorescent focus inhibition (RFFIT)
- ii) Reverse-transcription polymerase chain detection of rabies virus nucleic acid in the saliva.
- It is done during early CNS infection.

---

## 112. EBV action in nasopharynx is through?

a) CD 3

b) Cd 4

c) CD 8

d) CD 21

Correct Answer - D

**Ans. is 'd' i.e., CD 21**

### **Epstein - Barr Virus (EBV)**

- Belongs to Herpes viruses family.
- Infection is most common in early childhood, with a second peak during late adolescence.
- *Infectious mononucleosis (IM) is usually a disease of young adults.*
- EBV is transmitted by saliva (oral secretions) of infected person.
- Intimate oral contact, as in *kissing* is the predominant mode of transmission causes kissing disease.
- The virus enter the pharyngeal epithelial cells and B cells through (CR 2 / or CD21) receptors.
- *Memory B Cells are the reservoir of EBV.*

### 113. Amastigote form is seen in?

a) Leishmania

b) Plasmodium

c) Babesia

d) Ascaris

Correct Answer - A

Ans. is 'a' i.e., Leishmania

Leishmania are hemoflagellates which occur in two forms :?

*Amastigote* (aflagellar stage) : It occurs in RE system (reticuloendothelial system) of vertebrates (Man, dog).

*Promastigote* (flagellar stage) : It is infective form and occurs in gut of sandfly or in artificial cultures.

*Promastigote form is transmitted by sandfly (vector is female sand fly).*

## 114. Virus which has more than one serotypes ?

a) Measles

b) Mumps

c) Rubella

d) Influenza

Correct Answer - D

Ans. is 'd' i.e., Influenza

Influenza virus is an *enveloped RNA virus* containing 8 pieces (8 segments) of single stranded RNA.

There are three viral subtypes : (i) *Type A* (causes all pandemics and most epidemics); (ii) *Type B*; and (iii) *Type C* (not circulating currently).

## 115. Koch's postulate is not fulfilled by ?

a) M. tuberculosis

b) Gonococci

c) Staph aureus

d) Bacillus Anthracis

Correct Answer - B

**Ans. is 'b' i.e., Gonococci**

**Koch postulates**

Robert Koch proposed a series of postulates that have been applied broadly to link many specific bacterial species with particular disease.

**Koch's postulates are :**

1. The microorganism should be found in all cases of the disease in question and its distribution in the body should be in accordance with the lesions observed.
  2. The microorganism should be grown in pure culture in vitro (or outside the body of the host) for several generations.
  3. When such a pure culture is inoculated into susceptible animal species, the typical disease must result.
  4. The microorganism must again be isolated from the lesions of such experimentally produced disease.
- o Microorganisms that do not meet the criteria of Koch's postulates.
5. *Mycobacterium leprae* (leprosy)
  6. *Treponema pallidum* (syphilis)
  7. *Neisseria gonorrhoeae*
  8. No animal model for experimental infection
- Microorganism that partially satisfy the postulates. q E. coli induced diarrhea.

---

**116. Mannitol Salt agar is used for isolation of ?**

a) Gonococcus

b) Pneumococcus

c) Staphylococcus

d) Pseudomonas

Correct Answer - C  
Ans. is 'c' i.e., Staphylococcus

## 117. Pentameric structure ?

a) IgM

b) IgG

c) IgA

d) IgD

Correct Answer - A

**Ans. is 'a' i.e., Ig M**

- IgM is a pentameric immunoglobulin with five, four - peptide subunits. o The subunits are joined together by J chain.
- IgM**
- *IgM is the earliest immunoglobulin class to be synthesized by the fetus, beginning at 20 weeks of age.*
  - *As it is not transported across the placenta, the presence of IgM in the fetus or newborn indicates intrauterine infection and its detection is useful in the diagnosis of congenital infections such as syphilis, rubella and toxoplasmosis.*
  - It normally circulates as pentamer.
  - *It is the oldest immunoglobulin class.*
  - *It is the predominant antibody in primary antibody response.*
  - It is short lived, disappearing earlier than IgG.. Hence, *its demonstration in serum indicates recent infection.*
  - Treatment with 2-mercaptoethanol selectively destroys IgM without affecting IgG. This is a simple method for the differential estimation of IgG and IgM.
  - *The isohemagglutinins (blood group anti A, anti B) are usually IgM*
  - Being largely confined to the intravascular space, IgM is believed to be responsible for protection against blood invasion by microorganisms.

- *Monomeric IgM is the major antibody receptor on the surface of B lymphocytes for antigen recognition.*
- IgM is an important component of immune complexes in autoimmune diseases e.g. IgM antibodies against IgG in Rheumatoid arthritis.

## 118. Clonorchis sinensis infection is due to ingestion of?

a) Fish

b) Pork

c) Snail

d) Beef

Correct Answer - A

**Ans. is 'a' i.e., Fish**

**Clonorchis sinensis**

- Clonorchis sinensis is a trematode. It is also known as liver luke.
- Man is definitive host for clonorchis and snail is the secondary host.
- Clonorchis sinensis is caused by ingestion of metacercaria in inadequately cooked freshwater fish.
- The organisms excyst in the duodenum.
- The larva travel through the ampulla of Vater and mature into adult worms in bile canaliculi.
- The adult worms release small operculated eggs which pass with bile into the intestines and are voided with stools.
- Most of the infections are *asymptomatic* because of the low worm burden.

**Chronic infection or repeated infection is associated with manifestations such as :**

- Cholangitis
- Cholangiohepatitis
- Biliary obstruction (*Biliary obstruction causes increase in alkaline phosphatase*).

**Also know**

- Clonorchis sinensis infection is associated with cholangiocarcinoma.



## 119. Gentian violet colouration of gram positive bacteria is due to ?

a) Peptidoglycan

b) Capsule

c) Cell membrane

d) None of the above

Correct Answer - A

**Ans. is 'a' i.e., Peptidoglycan**

### **GRAM STAINING**

The gram stain differentiates bacteria into two broad groups :?

1. *Gram positive* → Resist decolourization and retain primary stain, appear violet.
2. *Gram negative* → Decolourised by organic solvents, and therefore, take the counterstain, appearing red.

## 120. True about Shiga toxin ?

a) An endotoxin

b) Inhibit protein synthesis

c) Activate adenyl cyclase

d) Increase cGMP

Correct Answer - B

**Ans. is 'b' i.e., Inhibit protein synthesis**

**Shiga toxin (verocytotoxin)**

- It is an exotoxin.
- It is produced by shigella dysenteriae type 1.
- Genes encoding shiga toxin are located on chromosome, while the VT1 of EHEC is phage-encoded.
- Toxin consists of two subunits - b Subunits, helps in binding and A subunit which has the active portion of toxin.
- Subunit 'A' is divided into A<sub>1</sub> and A<sub>2</sub> fragment. A<sub>1</sub> fragments inhibits protein synthesis by inactivating 60s ribosome.

**121. Phage encoded exotoxin fo vibrio cholerae resembles which toxin of E. coli ?**

a) Heat labile toxin

b) Heat stable toxin

c) Shiga like toxin

d) Verocytotoxin

Correct Answer - A

Ans. is 'a' i.e., Heat labile toxin

*Heat labile toxin of E. coli and cholera toxin resemble each other in their structure, antigenic properties and mode of action. Both act by activating adenyl cyclase in the enterocyte to form cyclic adenosine 5' monophosphate (c AMP).*

Heat stable toxin of E. coli acts by activation of cyclic guanosine monophosphate (c GMP) in the intestine.

## 122. Not ture about El Tor biotype of vibrio cholerae?

a) Lower mortality

b) Less SAR

c) Less chances of survival in environment

d) VP (+)

Correct Answer - C

Ans. is 'c' i.e., Less chances of survival in environment

## 123. Germ theory of disease was proposed by ?

a) Louis Pasteur

b) James Linds

c) Aristotle

d) Pattenkoffer

Correct Answer - A

Ans. is 'a' i.e., Louis Pasteur

- *Germ theory of disease* → *Louis pasteur*
- *Spontaneous generation theory* → *Aristotle*
- *Multifactorial causation of disease* → *Pattenkoffer.*
- *Intake of fresh (citrus) fruits in prevention of scurvy* → *James Lind*
- *Term 'Vaccination'* Edward Jenner
- *Term 'Vaccine'* *Louis Pasteur*
- *Life cycle of plasmodium* → *Ronald Ross*
- *Transmission of yellow fever* *Walter Reed*
- *First vaccine developed* → *Small pox (Edward Jenner)*
- *First antibiotic* → *Penicillin (Alexander Fleming)*
- *Growth chart* *David Moley*

## 124. Clonorchis sinensis is?

a) Tapeworm

b) Roundworm

c) Threadworm

d) Fluke

Correct Answer - D

**Ans. is 'd' i.e., Fluke**

**Trematodes (fluke)**

- These are *flat, leaf* like helminths.
- They can be classified depending on their site of localization in human tissues.
  - A) Blood flukes
    - i. *Vesical venous plexus* : Schistosoma hematobium.
    - i. *Rectal venous plexus & portal venous system* : S mansoni (inferior mesenteric vein), S japonicum (superior mesenteric vein).
  - B) Intestinal flukes
    - i. *Small intestine* : Fasciola buski, Heterophyes heterophes, Metagonimus yokogawi, Watsonius watsoni.
    - i. *Large intestine* : Gastrodiscoides hominis.
  - C) Tissue flukes
    - i. *Liver flukes* : Fasciola hepatica, Clonorchis sinensis, Opisthorchis felinus, O viverrini.
    - i. *Lung fluke* : Paragonimus westermani.
- Trematodes are monoecious (hermaphrodite), i.e. sexes are not separate. One exception being Schistosomes, which are diecious with separate sexes.
- Trematodes complete their life cycle in three hosts: One definitive (man) and two intermediate hosts (Freshwater snail or mollusc as

first intermediate host and fish or crab as second intermediate host).

- Trematodes are Oviparous and lay operculated eggs, except for schistosomes which lay non-operculated eggs.

## 125. Not true about streptococcus pyogenes ?

a) Gram positive

b) Bacitracin sensitive

c) Catalase positive

d) Not soluble in bile

Correct Answer - C

Ans. is 'c' i.e., Catalase positive

Streptococcus pyogenes (group A streptococci) are gram-positive cocci arranged in chains. *Chain formation is due to cocci dividing in one plane only and daughter cells failing to separate completely.* Chain formation is more pronounced in broth media.

- Fresh isolates form capsule which is made up of hyaluronic acid. It protects the organism from phagocytosis
- Cultural characteristics
- Virulent strains produce 'matt' (finely granular) colony
- Avirulent strains produce 'glossy' colonies.
- Capsulated strains produce mucoid colonies, corresponding in virulence to the matt type.
- Biochemical reactions
- Sensitivity to bacitracin is employed as a convenient method for differentiating str. pyogenes from other hemolytic streptococci (Maxted's observation).
- Catalase negative
- Not soluble in 10% bile.
- Hydrolyse PYR
- Ferment trehalose but not ribose.

## 126. Invasive amoebiasis can be best diagnosed by ?

a) ELISA

b) Countercurrent immunoelectrophoresis

c) Indirect hemagglutination test

d) Complement fixation test

Correct Answer - A

**Ans. is 'a' i.e., ELISA**

### **Diagnosis of amoebiasis**

- Diagnosis is made by :?
  - 1) Stool examination
- *For amoebic colitis definitive diagnosis is made by the demonstration of hematophagous trophozoites.*
- Fecal findings are :-
  - i. Positive test for heme.
  - i. *Paucity (lack) of neutrophils (pus cells).*
  - i. Presence of amebic cysts or trophozoites
  - i. *Charcot-leyden crystals.*
- Charcot-leyden crystals are also seen in whipworm (trichuris), Ascaris pneumonia, and bronchial asthma.
- 2) Serological tests
  - i. These test are *most useful for invasive amaebiasis (e.g. amaebic hepatitis/liver abscess).*
  - i. *Most commonly used test is indirect hemagglutination (IHA). But ELISA is best (sensitive and specific) test and now replacing IHA.*
- 3) Exploratory technique
- Exploratory puncture is one of the most practical methods for confirming the diagnosis of amoebic liver abscess. *The aspirated*

*pus may be examined for the demonstration of trophic forms (trophozoites) of E. histolytica.*

- Aspirations from the center of amoebic liver abscess do not show trophozoites, while aspirates from the margins show trophozoites.

**127. Graft from homozygotic twin is known as ?**

a) Autograft

b) Isograft

c) Allograft

d) Xenograft

Correct Answer - B

Ans. is 'b' i.e., Isograft

Graft from homozygotic (identical) twin is called as isograft.

**Graft**

- A tissue graft is a medical procedure in which tissue from a donor is used to replace missing or damaged tissue on a patient ( recipient).

## 128. Rickettsial disease with positive Weil-Felix reaction by only OX-19 ?

a) Epidemic typhus

b) Scrub thphus

c) Trench fever

d) Q-fever

Correct Answer - A

**Ans. is 'a' i.e., Epidemic typhus**

**Weil felix reaction**

- This reaction is an *agglutination test* in which sera are tested for agglutinins to O antigens of certain nonmotile *proteus strains OX - 19, OX - 2 and OX - K*.
- The basis of the test is the sharing of an alkali - stable carbohydrate antigen by some rickettsiae and by certain strains of proteus, *P. vulgaris OX - 19 and OX - 2 and P. mirabilis OX - K*.
- The test is usually done as a tube agglutination, though rapid slide agglutination methods have been employed for screening.

**129. Lancefield classification of beta hemolytic streptococci is based on ?**

a) Protein percent

b) Cell wall carbohydrate antigen

c) Cell membrane M protein

d) Hemolytic properties

Correct Answer - B

Ans. is 'b' i.e., Cell wall carbohydrate antigen

### 130. Genus neisseria is ?

a) Gram positive diplococci

b) Gram negative diplococci

c) Gram negative coccobacilli

d) Gram positive bacilli

Correct Answer - B

Ans. is 'b' i.e., Gram negative diplococci

The genus Neisseria consists of Gram negative aerobic nonsporulating, non motile oxidase positive cocci typically arranged in pairs (diplococci).

### 131. Larvae of *Ascaris lumbricoidis* most commonly causes?

a) Cardiac symptoms

b) Respiratory symptoms

c) Genitourinary symptoms

d) Cerebral symptoms

Correct Answer - B

**Ans. is 'b' i.e., Respiratory symptoms**

**Clinical manifestations of ascariasis can be divided into two groups :-**

*Due to adult worm* : Adult worm causes malnutrition, abdominal pain, anorexia, *intestinal obstruction, appendicitis, obstructive jaundice, pancreatitis, intestinal perforation* and allergic manifestations. in *Due to migrating larva* : Loeffler's syndrome (eosinophilic pneumonia).

**132. Stain which differentiates cryptococcus from other fungus ?**

a) Gram Stain

b) Wright-Giemsa

c) India ink

d) Toluidine blue

Correct Answer - C

Ans. is 'c' i.e., India ink

Unstained wet preparations of CSF mixed with drop of *India ink* or *nigrosine* demonstrate the capsule as a clear halo.

*Methenamine silver* or *periodic acid-Schiff* are used for staining a tissue sample.

### 133. Byproducts of complement system Anaphylactotoxins ?

a) C3b

b) C4a

c) C5a

d) c and b both

Correct Answer - D

Ans. is 'c' i.e., C5a > 'b' i.e., C4a

C<sub>5a</sub>, C<sub>3a</sub>, to a lesser extent C<sub>4a</sub> → are called *anaphylotoxin* because they have effects similar to those of mast cell mediators that are involved in the reaction called anaphylaxis. These effects are *due to stimulation of histamine release by these anaphylotoxin*. The effects are *increased vascular permeability and vasodilatation*.

### 134. CDC recommended treatment for uncomplicated gonorrhoea -

a) Ceftriaxone

b) Tetracycline

c) Azithromycin

d) Cotrimoxazole

Correct Answer - A

**Ans. is 'a' i.e., Ceftriaxone**

For uncomplicated gonococcal infection ceftriaxone is DOC (along with azithromycin or doxycycline to cover chlamydial infection).

- For penicillin allergic patients quinolones are DOC.
- Person who can not tolerate both cephalosporin and quinolones, spectinomycin is DOC.

### 135. All clostridia cause myonecrosis except?

a) *C septicum*

b) *C difficile*

c) *C novyi*

d) *C welchii*

Correct Answer - B

Ans. is 'b' i.e., *C difficile*

*C difficile* [Ref Ananthanarayan 9<sup>th</sup>ie p. 253-254, Harrison 18<sup>th</sup>/e p. 1206-1207]

- Anaerobic myonecrosis (gas gangrene) is caused by ?

i) *Cl perfringens* (*Cl welch* ii) most common (80%)      iii) *Cl novyi*  
*Cl Septicum* iv) *Cl histolyticum*

### 136. Dienes stain is used for?

a) Compylobactor

b) Helicobacter

c) Rickettsiae

d) Mycoplasma

Correct Answer - D

Ans. is 'd' i.e., Mycoplasma

*Dienes method (Dienes staining)* → For colonies of mycoplasma.

*Dienes phenomenon* → To detect swarming of proteus.

### 137. Battey bacillus is ?

a) Klebsiella pneumoniae

b) Mycobacteria paratuberculosis

c) Klebsiella ozaenae

d) Mycobacteria intracellulare

Correct Answer - D

Ans. is 'd' i.e., Mycobacteria intracellulare

. *intracellulare* is commonly known as the Battey bacillus because it was first identified as human pathogen at the Battey state hospital for tuberculosis, Georgia. U.S.A.

### 138. Transport media for vibrio cholerae ?

a) Alkaline peptone water

b) Cary - Blair medium

c) TC BS medium

d) None of the above

Correct Answer - B  
Ans. is 'b' i.e., Cary-Blair medium

## 139. Giardiasis true is all except ?

a) Diarrhea with steatosis

b) Bloody diarrhea

c) Metronidazole is the drug of choice

d) Absent fever

Correct Answer - B

**Ans. is 'b' i.e., Bloody diarrhea**

### **Giardiasis**

- Most of the infected patients are asymptomatic.
- Giardia causes diarrhea and **malabsorption**. Malabsorption is due to *loss of brush border enzyme activities*, which cause fat malabsorption (*steatorrhea*) and vitamin deficiency.
- There may be *abdominal pain, bloating, nausea & vomiting, flatulence* and flatus.
- The mechanisms by which Giardia causes alteration in small bowel function are largely unknown. Although trophozoites adhere to the epithelium, *they do not cause invasive or locally destructive alterations*.
- *Fever, the presence of blood or mucus in the stools suggest a different diagnosis as all these are absent in giardiasis.*
- *Giardia may also cause traveller's diarrhea.*
- **Predisposing conditions** to giardiasis are agammaglobulinemia, *common variable immunodeficiency*, and selective IgA-deficiency.

### **Diagnosis and treatment**

- *The gold - standard for diagnosis of giardiasis is microscopic demonstration of the trophozoite, cyst or both in faeces.*
- Duodenal aspirate or jejunal biopsy may be required for diagnosis.
- In acute giardiasis trophozoites show the typical "**falling-leaf**"

motility in wet mount examination of faeces. o *Metronidazole and tinidazole are drug of choice for Giardia lamblia.*

## 140. Most common cause of artificial heart valve infection?

a) Staphylococcus aureus

b) Streptococcus mutans

c) Staph epidermidis

d) Pneumococcus

Correct Answer - C

Ans. is 'c' i.e., Staph epidermidis

Most common cause of prosthetic valve endocarditis upto 12 months is coagulase - negative staphylococci (staph. epidermidis).

### **Most common causes of infective endocarditis**

- In native wall → Staphylococcus aureus.
- In early prosthetic valve (up to 12 months after valve surgery) → Staphylococcus epidermidis (coagulase negative staphylococcus).
- In late prosthetic valve (more than 12 months after valve surgery) → streptococcus viridans.
- In IV drug abusers → Staphylococcus aureus.
- In patients with intravenous catheter → coagulase negative staphylococci.
- After dental procedure (tooth extraction) → streptococcus mutans.

## 141. Simple Basal media is?

a) Simple nutrient agar

b) Alkaline peptone water

c) Glucose broth

d) Blood agar

Correct Answer - A

**Ans. is 'a' i.e., Simple nutrient agar**

A culture medium is a liquid or gel designed to support the growth of microorganism or cell.

A culture medium may be liquid or solid.

A culture medium may be?

**i) Basal (Simple) media**

- This is simple with no added ingredients.
- It may be liquid ( peptone water) or solid (**Nutrient agar**).

**ii) Special (Complex) media**

- These have added ingredients for special purpose or for bringing out certain characteristics or providing special nutrients required for the growth of the bacterium under study.
- It may be liquid (enrichment media) or solid (selective media).

**About option b**

- Peptone water (simple peptone water) is a simple media, but not alkaline peptone water as it has added ingredient to make it alkaline.

## 142. HSV-2 (Herpes simplex) causes ?

a) Oral ulcers

b) Genital ulcers

c) U.T.I.

d) Pharyngitis

Correct Answer - B  
Ans. is 'b' i.e., Genital ulcer

**143. Streptococcus pyogenes shows pathogenicity by all except?**

a) M protein

b) Pyrotoxin

c) Pili

d) Streptolysin O

Correct Answer - C

Ans. is 'c' i.e., Pili

**Virulence factors of str. pyogenes**

Str. pyogenes forms several exotoxins and enzymes which contribute to its virulence, but M protein is the most important of these.

## 144. Receptor for diphtheria toxin lies at ?

a) Cell membrane

b) Mucous membrane

c) Nucleus

d) None

Correct Answer - A

**Ans. is 'a' i.e., Cell membrane**

### **Diphtheria toxin**

The diphtheria toxin acts by inhibiting protein synthesis. It inhibits polypeptide chain elongation in the presence of nicotinamide adinine dinucleotide (NAD) by inactivating elongation factor, EF - 2.

- The diphtheria toxin is a protein which consists of two fragments, A and B.
- Both fragments are necessary for the toxic effect :
- *Fragment A* - has enzymatic activity and inhibits protein synthesis by inhibiting the chain elongation by inactivating the elongation factor - 2 (Ef - 2).
- *Fragment B* - responsible for binding the toxin to the cells.
- The toxin binds to specific receptors (HB-EGF receptors) present on *susceptible cells* and enters by receptor-mediated endocytosis.
- *Toxin has special affinity for certain tissues such as myocardium, adrenals and nerve endings.*

### 145. Hot air oven is used to sterilize ?

a) Inoculating loop or wire

b) Glassware

c) Dusting powder

d) Liquid paraffine

Correct Answer - B  
Ans. is 'b' i.e., Glassware

**146. Cell wall of gram positive bacteria contains?**

a) Lipids

b) Aromatic amino acids

c) Teichoic acid

d) All of the above

Correct Answer - C  
Ans. is 'c' i.e., Teichoic acid

## 147. Reidel walker test measures efficacy of disinfection by using?

a) Phenol coefficient

b) Glutaraldehyde coefficient

c) Ethanal coefficient

d) Formalin coefficient

Correct Answer - A

Ans. is 'a' i.e., Phenol coefficient

There is no reliable test available to determine the efficacy of a disinfectant.

- This is due to the number of parameters which influence disinfectant activity.
- Traditionally in such tests phenol is taken as the standard.
- Two important tests are :-
  - i) Rideal-Walker test
- Suspensions containing equal numbers of typhoid bacilli are submitted to action of varying concentration of phenol and of the disinfectant to be tested.
- The dilution of test disinfectant which sterilises the suspension in given time, divided by the corresponding dilution of phenol, is stated as the phenol coefficient of disinfectant (phenol-I).
- In this test disinfectant react directly *without any organic matter* being present.
  - ii) Chick-Martin test
- In this, the disinfectant *acts in the presence of organic matter* (dried yeast or feces).

## 148. True about chlamydia

a) Extracellular bacteria

b) HeLa cells for isolation

c) Gram positive

d) Penicillin is drug of choice

Correct Answer - B

Ans. is 'b' i.e., HeLa cells for isolation

Chlamydia is an *obligate intracellular parasite*. This means they can survive only by establishing residence inside animal cells.

- They need their host's ATP as an energy source for their own cellular activity. They are energy parasites using a cell membrane transport system that uses ATP from the host system and gives out ADP.
- This obligate intracellular existence makes it impossible to culture these organisms on nonliving artificial media. Due to their small size and failure to grow in cell - free media they were considered to be viruses.
- Chlamydiae grows in cultures of a variety of eukaryotic cell lines Mc Coy or HeLa cells. It may be necessary to treat cells with polyanionic compounds such as DEAD-dextran to reduce the electrostatic barrier to infection. Antimetabolite such as cycloheximide is added to favour competition for host cell amino acid pools. All types of chlamydiae proliferate in embryonated eggs particularly in the yolk sac.
- **The special features in structure and chemical composition of chlamydiae are :**
  - .. The outer cell wall resembles the cell wall of gram negative bacteria
  - .. It has a relatively high lipid content

3. It is rigid but it does not contain typical bacterial peptidoglycan; perhaps it contains a tetrapeptide linked matrix.
4. N Acetylmuramic acid also appears to be absent from chlamydiae cell wall.

**Antibiotic susceptibility of chlamydiae:**

- Penicillin binding proteins occur in chlamydiae cell wall and chlamydiae cell wall formation is inhibited by penicillins and other drugs that inhibit transpeptidation of bacterial peptidoglycan. But remember the important point about t/t, that cell wall inhibitors result in the production of morphologically defective forms but are not effective in clinical disease.
- Inhibitors of protein synthesis (tetracyclines, erythromycins) are effective in most clinical infections. Erythromycin or tetracyclines are considered the drug of choice for chlamydiae infections.

## 149. Dark field microscopy used in ?

a) Vibrio

b) Syphilis

c) TB

d) Brucellosis

Correct Answer - B

Ans. is 'b' i.e., Syphilis

Dark field microscopy is used for spirochetes (for example *T pallidum* which causes syphilis).

### **Dark ground/ Dark field microscope**

- Very slender organisms such as spirochetes and filamentous organs such as flagella are not visible under ordinary illumination.
- The contrast in dark field microscopy gives an illusion of increased resolution so that these structures can be seen under the dark field microscope.
- In dark field microscopy reflected light is used instead of the transmitted light used in the ordinary microscope.

**150. Most common clinical feature of toxoplasmosis in an immunocompetant adult?**

a) Encephalitis

b) Lymphadenopathy

c) Chorioretinitis

d) Glaucoma

Correct Answer - B

**Ans. is 'b' i.e., Lymphadenopathy**

**Clinical manifestation of toxoplasmosis**

1. Adults

a) Immunocompetant host

- *Asymptomatic in 90% of patients.*
- *M.C. clinical featur is cervical lymphadenopathy.*
- Other less common manifestations are pneumonia, myocarditis, encephalitis.

b) Immunocompromised host

- *M.C. signs and symptoms are principally within CNS —> Encephalopathy, Meningoencephalitis.*

2. Children

a) Congenital

- May present with hydrocephalus, microcephaly mental retardation, deafness, blindness, epilepsy.
- *Intracerebral calcification may occur.*

b) Acquired

- Mostly asymptomatic
- C/Fs are chorioretinitis (most common), cataract, glaucoma.

---

**151. Which of the following is the mechanism of action of tetanospasmin ?**

a) Inhibition of release of GABA and glycine

b) Inhibition of Ach release from synapse

c) Inhibition of protein synthesis

d) Activation of adenylyl cyclase

Correct Answer - A

**Ans. is 'a' i.e., Inhibition of release of GABA and glycine**

**Pathogenicity**

- *CL tetani has little invasive property and is confined to the primary site of lodgment. Tetanus results from the action of the potent exotoxin it produces.*

**152. Antibiotic used to for sensitivity in identification of streptococcus pyogenes?**

a) Bacitracin

b) Novobiocin

c) Penicillin

d) Optochin

Correct Answer - A

Ans. is 'a' i.e., Bacitracin

Sensitivity to bacitracin is employed as a convenient method for differentiating str. pyogenes from other hemolytic streptococci (Maxted's observation).

**153. Salmonella infection is most commonly caused by?**

a) Infected water

b) Infected vegetable

c) Aerosol infection

d) a and b both

Correct Answer - D

**Ans. is 'a & b' i.e., Infected water & Infected vegetable**

**Transmission of salmonella typhi**

Typhoid fever is transmitted via the faecal-oral route or urine-oral routes. This may take place *directly* through soiled hands contaminated with faeces or urine of cases or carriers, or *indirectly* by the ingestion of contaminated water, milk and/or food, or through flies.

## 154. Which of the following is not associated EBV virus ?

a) IMN

b) Kapasi sarcoma

c) Oral hairy leukoplalkia

d) NHL

Correct Answer - B

Ans. is 'b' i.e., Kaposi sarcoma

[Ref: Ananthanarayan 8<sup>th</sup>/e p. 472,473; Harrison 18<sup>th</sup>/e p. 1467-1470]

### Important diseases/malignancies associated with EBV

- *Infectious mononucleosis (IMN)* (mixed cellularity)
- *NHL (especially Burkitti's lymphoma)* carcinoms
- *Oral hairy leukoplasia in AIDS* syndrome
- Duncan's disease
- Gastric Carcinoma
- Hodgkin's disease
- Naso pharyngeal
- Chronic fatigue
- Tonsillar Carcinoma
- CNS lymphoma

## 155. Which of the following is a wrong association ?

a) HPV - CaCx

b) EBV - Burkitt's lymphoma

c) HHV 8 - Kaposi sarcoma

d) CMV - Nasopharyngeal carcinoma

Correct Answer - D

Ans. is 'd' i.e., CMV-Nasopharyngeal carcinoma

[Ref Harrison's 17<sup>th</sup>le Chap. 105 table 105-4; Jawetz 24<sup>th</sup>le table 43-1]

- DNA viruses causing cancers are :?
  - 1) Papillomaviridae (HPV) : Causes genital tumors, SCC and oropharyngeal carcinoma.
  - 2) Herpesviridae : These viruses are :
    - i) HSV-2 : Causes cervical carcinoma.
    - ii) EBV : Causes nasopharyngeal carcinoma and Burkitt's lymphoma.
    - iii) HHV-8 : It causes Kaposi sarcoma
  - 3) Hepadnaviridae (HBV) : It causes hepatocellular carcinoma.
  - 4) Flaviviridae (HCV) : It causes hepatocellular carcinoma

## 156. Which of the following is used to increase antigenicity of vaccine ?

a) Stabilizer

b) Adjuvant

c) Preservative

d) None of the above

Correct Answer - B

Ans. is 'b' i.e., Adjuvant

Adjuvants

Any substance that *enhances the immunogenicity of an antigen.*

**Actions :**

- May confer immunogenicity on nonantigenic substances.
- Increases the concentration and persistence of the circulating antibodies.
- Enhances the degree of cellular immunity
- Leads to production of adjuvant disease such as allergic disseminated encephalomyelitis.
- The most potent adjuvant is Freund's complete adjuvant which is the incomplete adjuvant along with a suspension of killed tubercle bacilli.
- Other adjuvants.
  1. Incorporation of protein antigen in the water phase of water in oil emulsion (*Freund's incomplete adjuvant*)
  2. *Aluminium hydroxide and Aluminium phosphate are commonly used with human vaccines.*
  3. Gram negative bacilli show an adjuvant effect due to their lipopolysaccharide (endotoxin) fraction.
  4. *Bordetella pertussis acts as a good adjuvant for diphtheria and tetanus toxoid in triple vaccine.*



## 157. Enterobacteriaceae is classified based on?

a) Mannitol fermentation

b) Catalase and oxidase reaction

c) Oxygen requirement

d) Lactose fermentation

Correct Answer - D

Ans. is 'd' i.e., Lactose fermentation

Initially Enterobacteriaceae was classified on the bases of their lactose fermenting ability on *MacConkey's medium*, the most popular medium for the isolation of fecal bacilli.

Lactose fermenters produce pink/bright red colonies on MacConkey's agar, while lactose non-fermenters produce pale colonies :

i) *Lactose fermenters (rapid)* : These are Coliforms, e.g. Escherichia, Klebsiella and Enterobacter aerogenes.

ii) *Late lactose fermenters (slow)* : These are Shigella Sonnei, Serratia, Citrobacter, Arizona, Providencia and Ervinia.

iii) *Non-lactose fermenters* : Shigella except Shigella Sonnei, Salmonella, Proteus.

## 158. Which serum is used for testing streptococcal pyrogenic toxin?

- a) Convalescent human serum
- b) Serum from patient of acute scarlet fever
- c) Horse serum
- d) None of the above

Correct Answer - A

**Ans. is 'a' i.e., Convalescent human serum**

Tests related to pyrogenic toxin (erythrogenic /Dick toxin) of streptococcus

**There were two historical tests which were used :**

- i) Dick test* : Intradermal Injection of toxin in a child produces erythematous reaction if he/she is susceptible to scarlet fever.
- ii) Schultz scharlton reaction* : It was used as a diagnostic test for Scarlet fever. Blanching of erythematous rash is produced during scarlet fever on local injection of convalescent serum (As serum from patient in convalescent phase has antibodies against this toxin)

## 159. Periplasmic space is seen in ?

a) Gram positive bacteria

b) Gram negative bacteria

c) Acid fast bacteria

d) All

Correct Answer - B

Ans. is 'b' i.e., Gram negative bacteria

Periplasmic space is a narrow space between cytoplasmic membrane (plasma membrane) and cell wall.

*Periplasmic space has been more frequently and better recorded in gram-negative bacteria as compared to gram-negative.*

*"At present most gram positive bacteria are thought to have only periplasm, but not periplasmic space".*

## 160. Forschheimer spot is seen in ?

a) Measles

b) Chicken pox

c) Erythema infectiosum

d) Rubella

Correct Answer - D

**Ans. is 'd' i.e., Rubella**

**Clinical features of rubella**

Incubation period is 2-3 weeks (14-21 days).

**Clinical features are :?**

1. *Prodrome* (fever, sore throat, coryza)
2. Lymphadenopathy (posterior auricular, cervical, suboccipital)
3. Rash which begins on face and spreads down the body.
- Furschheimer spots is a petechial exanthem on soft palate.
- Complications include arthralgia, encephalitis and thrombocytopenia.

## 161. Pigment production by staphylococcus aureus occurs in?

a) Erythrasma

b) Bullous impetigo

c) Buruli ulcer

d) Food poisoning

Correct Answer - B

Ans. is 'b' i.e., Bullous impetigo

I am not able to understand this question. As *most of the isolates of virulent staph aureus produce golden yellow pigment* in culture. It is not disease specific.

In Bullous impetigo, there may be postinflammatory pigmentation, especially in dark-skinned patients (But this is not due to pigment produced by staph aureus. Pigment is produced in culture).

Among the given options a & c are not caused by staph aureus. So, I will go for option b.

## 162. Medusa head colonies on nutrient agar is seen in?

a) Pneumococcus

b) Legionella

c) Brucella

d) Anthrax

Correct Answer - D

**Ans. is 'd' i.e., Anthrax**

**BACILLUS ANTHRACIS**

**Morphology ?**

- *Gram positive*
- Non motile (*all other members of genus Bacillus are motile*)
- Arranged singly, in pairs or in short chains
- *Capsulated* - entire chain being surrounded by a capsule.  
- *Capsule is polypeptide*
- Sporing - *Spores are formed in culture or in soil but never in animal body during life.*
- Chain of bacilli presents a bamboo stick appearance.

### 163. BCYE medium is used to culture ?

a) Mycoplasma

b) T. pallidum

c) H.pylori

d) Legionella

Correct Answer - D

Ans. is 'd' i.e., Legionella

*[Ref Ananthanarayan 9<sup>th</sup>le p. 401 & e/e p. 400]*

**Legionella is grown on complex media such as Buffered Charcoal Yeast Extract agar (BCYE)** with alpha ketoglutarate at pH 6.9, temp 35°C and 90% humidity. Antibiotics can be added to make the medium selective for legionella

## 164. CD 3 receptor is seen in ?

a) T cells

b) B cells

c) Macrophages

d) Eosinophils

Correct Answer - A

**Ans. is 'a' i.e., T cells**

**CD marker**

- Lymphocytes and other leukocytes have a number of surface antigens or marker → *leukocyte differentiation antigen*.
- A particular leucocyte differentiation antigen has been given a *CD (cluster of differentiation)* number on the bases of its reaction with a cluster of monoclonal antibodies.
- These markers reflect the stage of differentiation and functional properties of cell.

## 165. Not true about viral envelop?

a) Lipid is derived from host cells

b) Protein is derived from virus itself

c) Dissolves in solvent

d) Propagates in next generation

Correct Answer - D

Ans. is 'd' i.e., Propagates in next generation

Envelope is lipoprotein in nature, lipid is derived from host cell, while protein is virus coded.

*Enveloped viruses are susceptible to the action of lipid solvents like ether, chloroform and bile salts.*

Envelop is not propagated in next generation. Rather progeny virions synthesize new envelop (by self protein and host lipid).

## 166. In PCR, DNA polymerase is derived from?

a) Experimental E coli

b) *Thermus aquaticus*

c) Retroviruses

d) Bacteriophages

Correct Answer - B

Ans. is 'b' i.e., *Thermus aquaticus*

PCR is a method of enzymatic amplification of a target sequence of DNA.

It is *sensitive, selective (specific) and extremely rapid* means of amplifying any desired sequence of double stranded DNA, which can be as short as 50-100 base pairs (bp) and as long as 10 kbp.

In PCR, the DNA to be amplified is replicated by DNA polymerase of *Thermus aquaticus* (Taq).

Taq polymerase is used because it is thermostable, not denatured at a temperature upto 95°C (in PCR DNA is to be heated to 94°-95° C for separation of strands).

## 167. Acid fastness of tubercle bacilli is attributed to ?

a) Presence of mycolic acid

b) Integrity of cell wall

c) Both of the above

d) None of the above

Correct Answer - C

Ans. is 'c' i.e., Both of the above

Acid fastness has been ascribed variously to the presence in the bacillus of the unsaponifiable wax (*mycolic acid*) or to a semipermeable membrane around the cell. It is related to the *integrity of the cell wall* and appears to be a property of lipid-rich waxy cell wall.

*Acid fastness is not a property of lipids alone but depends also on the integrity of the cell wall. - Ananthanarayan*

## 168. Most common infection caused by streptococcus pneumonia ?

a) Otitis media

b) Sore throat

c) Meningitis

d) Pneumonia

Correct Answer - A

**Ans. is 'a' i.e., Otitis media**

**Important infections caused by streptococcus pneumoniae**

*The source of human infection is the respiratory tract of carriers and less often, of patients. Pneumococci occur in the throat of approximately half of the population sampled at any time.*

*Str. pneumoniae is the most frequent cause of pneumonia.*

*The commonest pneumococcal infections are otitis media and sinusitis.*

*Meningitis is the most serious of pneumococcal infections.*

*Empyema is the most common complication of pneumococcal pneumonia.*

## 169. Causative agent of syphilis?

a) *Treponema pertunae*

b) *Treponema endemicum*

c) *Treponema corateum*

d) *Treponema pallidum*

Correct Answer - D

Ans. is 'd' i.e., *Treponema pallidum*

## 170. Frei test which type of hypersensitivity ?

a) Type I

b) Type II

c) Type III

d) Type IV

Correct Answer - D  
Ans. is 'd' i.e., Type IV

## 171. Mc fayden reaction seen with which organism ?

a) Clostridium perfringens

b) Clostridium botulinum

c) Bacillus cereus

d) Bacillus anthracis

Correct Answer - D

**Ans. is `d' i.e., Bacillus antracis**

**Mc Fadvean's reaction**

- When blood films containing anthrax bacilli are stained with polychrome methylene blue for a few seconds and examined under microscope, an amorphous purplish material is noticed around bacilli. This represents the capsular material and is characteristic of the anthrax bacillus.

## 172. Gene expert used for getting diagnosis of TB in ?

a) 1-2 hrs

b) 5 hrs.

c) 10 hrs.

d) 20 hrs.

Correct Answer - A

Ans. is 'a' i.e., 1-2 hrs.

Results are obtained from unprocessed sputum samples in 90 minutes, with minimal biohazard and very little technical training required to operate.

## 173. MDR TB is defined as?

- a) Resistance to INH and Ethambutol
- b) Resistance to Rifampicin and Ethambutol
- c) Resistance to Pyrazinamide and Rifampicin
- d) Resistance to INH and Rifampicin

Correct Answer - D

**Ans. is 'd' i.e., Resistance to INH and Rifampicin**

### **Treatment of multidrug resistance (MDR) TB**

- MDR-TB is defined as resistance to at least both INH and rifampicin. Previously it was classified as Category IV under DOTS (DOTS-PLUS).
- The treatment is given in two phases, the intensive phase (IP) and the continuation phase (CP). *The total duration of treatment for regimen for MDR-TB is 24-27 months, depending on the IP duration.*
  - o Treatment regimen comprises :-
- i. Intensive phase (6-9 months) : *Six drugs* : Kanamycin (Km), levofloxacin (Lvx), ethionamide (Eto), pyrazinamide (Z), ethambutol (E), and cycloserine (Cs).
- i. Continuation phase (18 months) : *Four drugs* : Levofloxacin, ethionamide, ethambutol and cycloserine.
- i. Total duration of treatment is 24-27 months.

### **Treatment of extensive drug resistance (XDR) TB**

- XDR-TB is defined as *resistance to any fluoroquinolone and at least one of the following three second-line drugs (capreomycin, kanamycin, amikacin), in addition to multidrug resistance.*
- The Regimen for XDR-TB would be of 24-30 months duration, with 6-12 months Intensive Phase (IP) and 18 months Continuation Phase (CP).

**Regimen is :-**

- i. Intensive phase (6-12 months) : *Seven drugs* : Capreomycin, PAS, moxifloxacin, high dose INH, clofazimine, Linezolid, amoxycly.
- i. Continuation phase (18 months) : *Six drugs* : PAS, moxifloxacin, high dose NH, clofazimine, linezolid, amoxycly.

## 174. Shiga toxin is produced by?

a) Enteropathogenic E coli

b) Enteroinvasive E coli

c) Enterohemorrhagic E coli

d) Enterotoxigenic E coli

Correct Answer - C

Ans. is 'c' i.e., Enterohemorrhagic E coli

- Verocytotoxin (VT) or Shiga like toxin (SLT) is produced by *enterohemorrhagic E coli* (also called *verotoxigenic E coli*)
- **Shiga like toxin** belongs to class **ribosome inactivating proteins (RIPs)**. It **inhibits protein synthesis** by inhibiting ribosomal function.
- **This toxin also acts on vascular endothelium to promote the synthesis of coagulation factor VIII, vWF** -> Platelet aggregation.

## 175. Coagulase test differentiates?

a) Staphylococci from streptococci

b) Streptococci from enterococci

c) Staph aureus from staph epidermidis

d) Staph epidermidis from staph saprophyticus

Correct Answer - C

Ans. is 'c' i.e., Staph aureus from staph epidermidis

[Ref Ananthanarayan 9<sup>th</sup> ed p. 206]

- *Catalase test differentiates* -> Staphylococci (catalase positive) from streptococci (catalase negative)
- *Coagulase test differentiates* -> Staphylococcus aureus (coagulase positive) from coagulase negative staphylococci (staph epidermitis, S hemolyticus, S saprophyticus).

**176. Which of the following infection is mainly diagnosed by serological tests?**

a) Actinomycosis

b) Q Fever

c) TB

d) Leprosy

Correct Answer - B

Ans. is 'b' i.e., Q fever

The diagnosis of actinomycosis is most commonly made by microscopic identification of sulphur granules.

In most instances, *the diagnosis of Q-fever relies upon serology.*

TB is usually diagnosed by sputom microscopy and/or culture.

Leprosy is diagnosed clinically which is confirmed by histological examination of skin biopsies and by the detection of acid fast bacilli in nasal discharges, scraping from nasal mucosa and slit-skin smear.

## 177. Not true regarding the mimicry of Strpyogenes ?

a) Peptidoglycan and skin antigen

b) Cell wall protein and myocardium

c) Hyaluronic acid and synovial fluid

d) Group A carbohydrate and vascular intima

Correct Answer - D

**Ans. is 'd' i.e., Group A carbohydrate and vascular intima**

**Antigen cross-reactivity**

- Various streptococcal components (specially strep. pyogenes) exhibit antigenic cross reaction with different tissues of the human body.

## 178. Hemagglutination done by all virus except

a) Influenza

b) Rubella

c) Measles

d) HPV

Correct Answer - D

Ans. is 'd' i.e., HPV

When *hemagglutinating viruses* grow in cell cultures, their presence can be indicated by the addition of guinea pig erythrocyte to culture. If the viruses are multiplying in the culture, the erythrocytes will adsorb on to the surface of cells. This is known as Hemadsorption.

**Viruses causing Hemagglutination are :**

- Influenza Virus
- *Measles*
- Rubella
- Coxsackie Virus
- RhinoVirus
- *Rabies*
- Parainfluenza Virus
- TogaVirus
- EnteroVirus
- EchoVirus
- ReoVirus

**179. Diagnosis of Dengue fever can be made earliest by?**

a) Viral culture

b) NS - 1 antigen detection

c) IgG antibody detection

d) Nucleic acid test

Correct Answer - B

Ans. is 'b' i.e., NS-1 antigen detection

## 180. Dental carries is caused by?

a) Streptococcus salivarius

b) Streptococcus mutans

c) Streptococcus pyogenes

d) Streptococcus equisimulus

Correct Answer - B

**Ans. is 'b' i.e., Streptococcus mutans**

Viridans streptococci consists of multiple species of alpha hemolytic streptococci.

*Various species of viridans streptococci are -*

- *S. salivarius*
- *S. sanguis*
- *S. mitis*
- *S. mutans*

They are ordinarily nonpathogenic but can on occasion cause disease. In persons with preexisting cardiac lesions, they may cause bacterial endocarditis, *Str. sanguis* being most often responsible. *Str. mutans* is important in causation of dental caries.

The transient viridans streptococcal bacteremia induced by eating, tooth-brushing, flossing and other source of minor trauma, together with adherence to biological surfaces, is thought to account for the predilection of these organisms to cause endocarditis.

Viridans streptococci are also isolated, often as a part of a mixed flora, from sites of sinusitis, brain abscess and liver abscess.

Viridans streptococcal bacteremia occurs relatively frequently in neutropenic patients, particularly after bone marrow transplantation or high dose chemotherapy for cancer.

Treatment of viridans streptococcal infections include :-

- i. *Bacteremia in neutropenic patients* → Vancomycin.
- i. *Other infection* → Penicillin.

## 181. Porin present in ?

- a) Cell wall of gram positive bacteria
- b) Cell membrane of gram positive bacteria
- c) Cell wall of gram negative bacteria
- d) Outer membrane of gram negative bacteria

Correct Answer - D

**Ans. is 'd' i.e., Outer membrane of gram negative bacteria**  
**Cell envelop of bacteria comprises?**

- 1. An outer membrane (only in gram negative bacteria).
- 2. A cell wall composed of peptidoglycan.
- 3. Periplasm (only in gram negative bacteria).
- 4. Cell membrane (cytoplasmic membrane), which encloses cytoplasm.
- Outer membranes, which are present only in gram negative bacteria, function as the cell's initial barrier to the environment.
- The membrane is a bilayered structure composed of lipopolysaccharide.
- Scattered throughout the lipopolysaccharide macromolecules are protein structures called porins. These control the passage of nutrients and other solutes, including antibiotics, through outer membrane.

## 182. Griffith classification is based on?

a) Cell wall carbohydrate

b) M protein

c) Hemolytic property

d) None of the above

Correct Answer - B

Ans. is b' i.e., M protein

Group 'A' strep. are subdivided into types based on the protein (M, T and **R**) antigens present on the cell surface (Griffith typing). About 80 types of str. pyogenes have been recognized

### 183. Streptococcal cell wall polysaccharide cross reacts with?

a) Myocardial muscle

b) Cardiac valve

c) Endocardium

d) Synovial fluid

Correct Answer - A

Ans. is 'a' i.e., Myocardial muscle

Group A carbohydrate (cell wall polysaccharide of group A streptococcus, i.e. streptococcus pyogenes) cross reacts with myocardium.

**184. To notify a slide as AFB negative minimum how many fields should be checked? ?**

a) 20

b) 100

c) 50

d) 200

Correct Answer - B

Ans. is `b' i.e., 100

<b>Number of bacilli</b>	<b>Results reported</b>
No. AFB per 100 oil immersion fields ◆	<b>0</b>
1-9 AFB per 100 oil immersion fields ◆	Scanty (or number AFB seen)
10-99 AFB per 100 oil immersion fields ◆	(1+)
1-10 AFB per oil immersion fields ◆	++ (2+)
> 10 AFB per oil immersion fields ◆	+++ (3+)

## 185. LJ media is used for ?

a) Bacillus antracis

b) M. tuberculosis

c) Leptospira

d) Legionella

Correct Answer - B

Ans. is 'b' i.e., M tuberculosis

*The solid medium most widely employed for routine culture of tubercular is Lowenstein - Jensen Medium (L.J. medium).*

**186. Most chemotactic property is with ?**

a) C3a

b) C5a

c) C5-9

d) C3b

Correct Answer - B

Ans. is `b' i.e., C5a

C is a powerful *chemotactic agent*.

## 187. Infective dose of salmonella typhi ?

a) 10 bacilli

b) 1000 bacilli

c)  $10^3$ - $10^6$  bacilli

d)  $10^{10}$  -  $10^{12}$  bacilli

Correct Answer - C

Ans. is 'c' i.e.,  $10^3$ - $10^6$  bacilli

In human volunteer experiments, the infective dose was found to be  $10^3$ - $10^6$  bacilli.

### 188. pH of sabarouds dextrose agar ?

a) 7.4

b) 7.0

c) 9.6

d) 5.6

Correct Answer - D

Ans. is 'd' i.e., 5-6

pH of sabouraud agar is 5-6 which inhibits bacterial growth and allow fungus to grow.

## 189. All are important causes of UTI except?

a) E coli

b) Proteus

c) Klebsiella

d) Streptococcus viridans

Correct Answer - D

Ans. is 'd' i.e., Streptococcus viridans

The dominant etiologic agents, accounting for more than 85% of cases of urinary tract infection, are the gram-negative bacilli that are normal inhabitants of intestinal tract.

By far the most common is Escherichia coli, followed by proteus, klebsiella, and Enterobacter.

*In most patients with urinary tract infection, the infecting organisms are derived from the patient's own fecal flora. This is thus a form of endogenous infection.*

## 190. CAMP test is positive for?

a) Group A streptococcus

b) Group B streptococcus

c) Group C streptococcus

d) Group D streptococcus

Correct Answer - B

Ans. is 'b' i.e., Group B streptococcus

[Ref Ananthanarayan 9<sup>th</sup> le p. 210]

- CAMP reaction (Christine, Atkins, Munch-Petersen reaction) is positive in *Group B Streptococcus (Streptococcus agalactiae)*.
- CAMP reaction is due to CAMP factor which is diffusible substance that Completes the hemolysis of sheep RBCs exposed to Sphingomyelinase-C (13-toxin of staphylococcus).

**191. E6, E7 genes of which virus are implicated in oncogenesis ?**

a) EBV

b) CMV

c) HTLV- 1

d) HPV

Correct Answer - D

Ans. is 'd' i.e., HPV

HPV selectively infects the epithelium of skin and mucous membrane and may immortalize the keratinocytes leading either asymptomatic infection, or warts or neoplasia.

Products of E-genes (E6, E7) are related to immortalization or malignant transformation of keratinocytes by interfering with p53 and Rb genes, respectively.

## 192. EBV enters B-cells through?

a) CD-1

b) CD-2

c) CD-21

d) CD-19

Correct Answer - C

Ans. is 'c' i.e., CD-21

The virus enter the pharyngeal epithelial cells and B cells through (CR 2 / or CD21) receptors.

### 193. Technique of sterilization was introduced by?

a) Robert Koch

b) Edwerd Jenner

c) Louis Pasteur

d) Lister

Correct Answer - C

**Ans. is 'c' i.e., Louis Pasteure**

**Louis Pasteur is associated with :**

- Development of live vaccine (first was anthrax).
- *Development of vaccine for rabies (hydrophobia).*
- Introduction of technique of sterilization.
- *Disprove the theory of spontaneous generation (abiogenesis).*
- Established the different growth need of different bacteria (helped in complex media).
- Coined the term vaccine.

## 194. Paramyxoviruses enters the body via?

a) Blood

b) Respiratory route

c) Conjunctiva

d) Fecal-oral route

Correct Answer - B

**Ans. is 'b' i.e., Respiratory route**

### **Myxoviruses**

- Myxoviruses are enveloped *RNA viruses*.
- They are characterized by ability to adsorb on to mucoprotein (*affinity for mucin*) on erythrocytes causing *agglutination of erythrocytes*.

## 195. Immunoglobulin present in mouth local secretions?

a) IgA

b) IgM

c) IgG

d) IgE

Correct Answer - A

Ans. is 'a' i.e., IgA

It is the second most abundant antibody (after IgG).

*It is major immunoglobulin in clostrum, saliva, tears, respiratory and gastrointestinal secretions.*

## 196. Most common cause of gas gangrene ?

a) *Cl welchii*

b) *Cl septicum*

c) *Cl novyi*

d) *Cl histolyticum*

Correct Answer - A

Ans. is 'a' i.e., *Cl welchii*

Most common cause of gas gangrene is *Cl perfringens* (*Cl welchii*) causing 80% of cases of gas gangrene.

Other causes are *Cl septicum*, *Cl novyi* and *Cl histolyticum*.

## 197. HHV-8 causes ?

a) Burkitt's lymphoma

b) Nasopharyngeal carcinoma

c) Kaposi sarcoma

d) Hepatic carcinoma

Correct Answer - C

Ans. is 'c' i.e., Kaposi sarcoma

## 198. Human is dead end host for?

a) Malaria

b) Typhoid

c) Bubonic plague

d) Filaria

Correct Answer - C

Ans. is 'c' i.e., Bubonic plague

A dead end host is an infected person from which infectious agents are not transmitted to other susceptible host or from which a parasite cannot escape to continue its life cycle.

The diseases in which human acts as dead end host, i.e., dead end disease : ?

1. Japanies encephalitis
2. Trichinosis
3. Bubonic plaque
4. Echynococcosis (hydatid disease)
5. Tetanus

## 199. Chinese letter configuration is seen in ?

a) *Cl tetani*

b) *Cl perfringens*

c) *Strept salivarius*

d) *C diphtheriae*

Correct Answer - D

Ans. is 'd' i.e. *C diphtheriae*

*C. diphtheriae* is gram positive, non motile, nonsporing, noncapsulated.

- Babes Ernest or volutin granules
- Also known as *metachromatic granules* or *polar bodies*.
- Composed of polymetaphosphate.
- Usually stained with Loeffler's methylene blue.
- Special stains for demonstration are *Albert's*, *Neisser 's* and *Ponder 's*.

## 200. Ebola virus belongs to?

a) Picornaviridae

b) Togaviridae

c) Flaviviridae

d) Filoviridae

Correct Answer - D  
Ans. is 'd' i.e., Filoviridae

## 201. Castleman disease is associated with ?

a) HSV

b) CMV

c) EBV

d) HHV- 8

Correct Answer - D

Ans. is 'd' i.e., HHV - 8

Castleman disease is group of lymphoproliferative disorders.

Disease is caused by hypersecretion of IL-6.

Release of these cytokines may be caused by HHV-8 in HHV-8 associated Multicentric Castleman Disease (MCD).

- Castleman disease (CD) has been divided into a solitary and a multicentric form.
  - The solitary form presents as a mass located most commonly in the mediastinum, neck, lung, axilla, mesentery, broad ligaments and retroperitoneum.

Grossly, it is round, well circumscribed, with a solid gray cut surface and can measure 15 cm in diameter.

The follicles show marked vascular proliferation and hyalinization of their abnormal or atrophic germinal centers, surrounded by concentrically arranged small lymphocytes imparting an "onion-skin" appearance.
- Remember angiolymphoid hyperplasia show thick walled blood vessels with prominent endothelial cells and inflammatory eosinophilia infiltrates.

## 202. Acute hemorrhagic conjunctivitis is caused by ?

a) Enterovirus 70

b) Adenovirus

c) Poliovirus

d) Hepadnavirus

Correct Answer - A

Ans. is 'a' i.e., Enterovirus 70

Acute hemorrhagic **conjunctivitis** (AHC) may be caused by adenoviruses, but two **enteroviruses**, **enterovirus 70** and coxsackie A24 variant, are the major causes.

## 203. Hand-foot-mouth disease is caused by?

a) Coxsackie - A virus

b) Coxsackie - B virus

c) EBV

d) CMV

Correct Answer - A

Ans. is 'a' i.e., Coxsackie- A virus

- The most well known Coxsackie A disease is hand, foot and mouth disease (unrelated to foot-and-mouth disease), a common childhood illness which affects mostly children aged 5 or under, often produced by Coxsackie A16.
- In most cases infection is asymptomatic or causes only mild symptoms. In others, infection produces short-lived (7–10 days) fever and painful blisters in the mouth (a condition known as *herpangina*), on the palms and fingers of the hand, or on the soles of the feet.
- There can also be blisters in the throat, or on or above the tonsils.
- Adults can also be affected. The rash, which can appear several days after high temperature and painful sore throat, can be itchy and painful, especially on the hands/fingers and bottom of feet.

**204. Which of the following is microaerophilic?**

a) E coli

b) Bacteroides

c) Clostridium

d) Helicobacter pylori

Correct Answer - D

Ans. is 'd' i.e., Helicobacter pylori

Microaerophiles are those groups of bacteria that can grow under reduced oxygen (5% to 10%) and increased carbon dioxide (8% to 10%).

Higher oxygen tensions may be inhibitory to them. This environment can be obtained in specially designed jars or bags.

Examples of Microaerophiles are: *Campylobacter jejuni*, *Helicobacter pylori* etc.

**205. Streptococcus pneumonia produces which type of hemolysis ?**

a) Alpha

b) Beta

c) Gamma

d) Any of the above

Correct Answer - A

Ans. is 'a' i.e., Alpha

**Streptococcus pneumoniae**, or **pneumococcus**, is a Gram-positive, alpha-hemolytic (under aerobic conditions)

## 206. Globi in leprosy consist of ?

a) AFB + macrophages

b) neutrophils + AFB

c) Platelet plug

d) None of the above

Correct Answer - A

Ans. is 'a' i.e., AFB + Macrophages

*The bacilli are clumped together by a lipid - like substance, the glia, these masses are known as globi.*

*"In clinical material from lepromatous patient they (lepra) bacilli are typically found within the macrophages in dense clump"*

## 207. Positive tuberculin test means?

a) Resistance to TB

b) Susceptibility to TB

c) Hypersensitivity

d) None of the above

Correct Answer - C

Ans. is 'c' i.e., Hypersensitivity

A positive tuberculin test indicates hypersensitivity to tuberculo-protein, it may be due to :

- Active infection
- Subclinical infection
- Past infection
- BCG vaccination

*In overwhelming tuberculosis (fulminant cases) due to depressed cellular immunity montoux test may be false negative.*

## 208. Bollinger bodies are seen in ?

a) Chickenpox

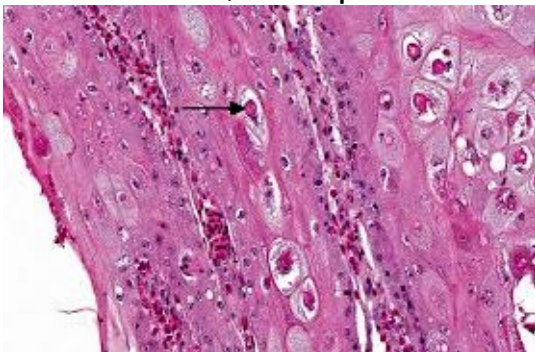
b) Cowpox

c) Fowlpox

d) Smallpox

Correct Answer - C

Ans. is 'c' i.e., Fowl pox



## 209. Which of the following is false about Botulism?

a) It is a type food poisoning

b) Botulinum toxin is a potent neurotoxin

c) It is an infection and not intoxication

d) The causative organism is Clostridium botulinum

Correct Answer - C

**Ans. is 'c' i.e., It is an infection and not intoxication**

### **Botulism**

- It is a form of food poisoning.
- Botulinum toxin is a potent neurotoxic protein. It paralyses the nerve endings by blocking the nerve impulses at the myoneural junction. It blocks the action of acetylcholine.
- Botulism is an intoxication, not an infection. Clostridium botulinum organism does not grow in the body.
- The causative organism is Cl. botulinum. It multiplies in food (sausages, tinned meat) before it is consumed, and produces a powerful exotoxin under suitable anaerobic conditions.

**210. Which of the following is an essential medium ?**

a) MacConkey agar

b) Nutrient agar

c) Deoxycholate citrate agar

d) Selenite F broth

Correct Answer - B

Ans. is 'b' i.e., Nutrient agar

A minimum essential medium is a culture medium whereupon most bacteria can grow.

Examples is Nutrient agar.

## 211. Sputum can be disinfected by all except:

a) Auto claving

b) Boiling

c) Cresol

d) Chlorhexidine

Correct Answer - D

Ans. d. Chlorhexidine

Sputum can be disinfected by autoclaving, boiling or Cresol.

Chlorhexidine has no role in disinfection of sputum.

"Chlorhexidine (hibitane) is one of the most useful skin antiseptic.

Creams and lotion containing 1% Chlorhexidine are recommended for burns and hand disinfection."

**212. Child acquires antibody against ABO antigen at which age**

a) At birth

b) 6 Months

c) 2 Years

d) 5 Years

Correct Answer - B  
Ans. is 'b' i.e., 6 Months

## 213. Active replication in Hepatitis B infection is indicated by ?

a) HBeAg

b) HBsAg

c) HBcAg

d) Anti-HBsAg

Correct Answer - A

Ans. is 'a' i.e., HBeAg

- HBeAg is an indicator of active intrahepatic replication and high infectivity.
- It is a qualitative marker of HBV replication.

### **Serologic and virologic markers of HBV infection**

#### 1. HBs Ag

- First virological marker detectable in the serum
- HBsAg presence precedes elevations of serum aminotransferase activity and onset of clinical illness.
- HBsAg become undetectable 1-2 months after the onset of jaundice and rarely persists beyond 6 months.
- In chronic HBV infection, HBsAg remains detectable beyond 6 months.

#### 2. HBc Ag

- It is not demonstrable in the circulation because it is enclosed within the HBs Ag coat.
- HBc Ag remain in the hepatocyte, where it can readily be detectable by immunohistochemical staining.

#### 3. HBeAg

- HBe Ag appears concurrently with or shortly after HBs Ag.
- Be Ag is an indicator of active intrahepatic replication and high

infectivity.

- It is a qualitative marker of HBV replication.
- HBs Ag carrier mothers who are HBe Ag positive almost invariably (> 90%) transmit hepatitis B infection to their offspring, whereas HBs Ag carrier mothers with anti HBe rarely (10 to 15%) infect their offspring.
- HBe testing is indicated primarily during follow up of chronic infection.

#### 4. Anti HBc Ag

- Appears within the first 1 to 2 weeks after the appearance of HBs Ag.
- In acute or recent infection IgM anti HBc is detected.
- Ig G anti HBc indicates remote infection.

#### 5. Anti HBs Ag

- It becomes detectable in blood when HBs Ag disappears.
- Anti HBs Ag is protective antibody.
- It is the only serological marker, present after immunization.

#### 6. Anti HBe Ag

- Disappearance of HBe Ag is followed by the appearance of anti HBe Ag.
- Its presence indicates low infectivity and virus replication.

#### 7. HBV DNA

- It is the *quantitative* marker of virus replication.

## 214. Quellung reaction is seen in ?

a) Group B streptococcus

b) Staphylococcus

c) Pneumococcus

d) Enterococcus

Correct Answer - C

Ans. is 'c' i.e., Pneumococcus

- A suspension of pneumococci is mixed on a slide with a drop of the type specific antiserum and methylene blue. On the presence of homologous antiserum capsule becomes apparently swollen, sharply *delineated* and refractile.
- This is called Quellung reaction.

**215. Cytolytic activity of membrane attack complex is modulated by ?**

a) Factor I

b) Factor B

c) Factor S

d) Factor H

Correct Answer - C  
Ans. is 'c' i.e., Factor S

## 216. Most common type of HPV associated with cervical cancer ?

a) 6, 11

b) 5, 8

c) 16, 18

d) 6, 8

Correct Answer - C

Ans. is `c' i.e., 16, 18

- HPV DNA of oncogenic types (High risk) in HPV-16, 18, 31, 33 and 45 → associated with cervical cancer
- HPV-6 and 11 (Low risk HPV) → associated with precursor lesions of cervical cancer (CIN) and Condyloma Acuminatum.
- In patients with epidermodysplasia verruciformis, Squamous cell cancer develop frequently at sites infected with specific HPV types, including 5 and 8.
- E6 and E7 genes of HPV are responsible for carcinogenicity.

## 217. True about bacteriophage is:

a) Can transmit toxin to bacteria

b) Bacteria which transmits DNA to another bacteria

c) Causes transformation of bacteria

d) Is a virus which invades bacteria

Correct Answer - D

**Ans. (d) Is a virus which invades bacteria**

Bacteriophage are the virus that infect bacteria. They play an important role in transmission of genetic information between bacteria by the process of transduction.

**The presence of phage** genome integrated with bacterial chromosome confers certain properties to the bacteria, this process is called phage conversion.

Note: Nucleic acid of phage is surrounded by a protein coat

- Some phage also contains lipid
- Most bacteriophage possess ds DNA as genetic material
- In diphtheria bacillus toxin production is determined by the presence of a bacteriophage prophage beta
- So option 'a' is also partially correct, as option 'd' is universal for bacteriophage it is taken as correct answer

## 218. Classic complement is activated by:

a) IgG

b) IgA

c) IgM

d) both A and C

Correct Answer - D

Ans. (a) and (c) IgG and IgM

Ref *Harrison 17/c*, p 2036;

*Ananthanarayan 9/e*, p 97

- Classic complement pathway is not activated by IgG4 subtype.
- Alternate complement pathway is activated by IgA, IgD, IgG4.

## 219. True about interferon is:

a) It is a synthetic antiviral agent

b) Inhibits viral replication in cells

c) Is specific for particular virus

d) None

Correct Answer - B

Ans. (b) Inhibits viral replication in cells *Rt,11* *itlii*

*ilallarayl111 CO, p* *p* *liii i tC,i ;,r, p*

- Interferon (host coded protein) has no direct action on viruses but inhibit viral replication by selectively inhibiting translation of viral m-RNA without affecting cellular m-RNA.
- IFN are not virus specific but species specific.
- It is of 3 types:

Type target	Cell source.	Cell Biological activity
<i>IFN a (protein) or leukocyte IFN</i>	All cells	Antiviral activity; stimulates T L.cell, macrophages and NK cell activity
<i>IFN 13 (glycoprotein) or Fibroblast IFN</i>	All cells	All cells Direct antitumor effects Upregulates MHC class I antigen expression. Used thereapeutically in viral and autoimmune disease
<ul style="list-style-type: none"> <li>• <i>IFN<math>\gamma</math> (glycoprotein) or immune IFN</i></li> </ul>	All cells	Regulates macrophage and NK cells activation
NK		Stimulates Ig secretion by B

cells

cells Induction of class II  
histocompatibility antigens  
TH1 **T** cell differentiation

## 220. Antigen-antibody complexes are detected by:

a) Western blot

b) Southern blot

c) Northern blot

d) ELISA

Correct Answer - A:D

Ans **(a; d) Western blot; ELISA** *Ref Ananthanarayan 8/e, p 103-113* Precipitation reactions are seen in:

Agglutination

- Precipitation

Complement fixation

- ELISA

Immunofluorescence (Direct/indirect)

Radioimmunoassay

Chemiluminescence immunoassay (CLIA)

Immunoblot techniques e.g. western blot

Immunochromatographic test

Immune electron microscopy tests

## 221. Cy Bromide green dye is used for:

a) HLPR

b) PCR

c) ELISA

d) Immunofluorescence

Correct Answer - B

Ans. (b) PCR *See below*

*Cy Bromide green dye is a dye that binds to minor groove of double stranded DNA and generates fluorescence. Uses:*

- To determine presence of amplified DNA product.
- For optimizing PCR reaction.

**222. True about streptococcus pyogenes are all except:**

a) Causes only localized infection

b) Rheumatic fever is non-supporative complications

c) Erythrogenic toxin causes scarlet fever

d) Glomerulonephritis is due to antigenic cross-reactivity

Correct Answer - A  
Causes only localized infection

## 223. Culture medium used for streptococcus pneumoniae

a) Human blood agar

b) Sheep blood agar

c) MacConkey's agar

d) Deoxycholate agar

Correct Answer - B  
Sheep blood agar

## 224. Capsule of pneumococcus is:

a) Polypeptide

b) Polysaccharide

c) Lipopolysaccharide

d) Not a Virulence factor

Correct Answer - B  
Polysaccharide

**225. Which of following clostridia is non-invasive:**

a) Clostridium novyi

b) Clostridium botulinum

c) Clostridium perfringens

d) Clostridium tetani

Correct Answer - B

Ans. is. 'b' i. e. Clostridium botulinum

**226. Most common symptom of tetanus is:**

a) Tonic-clonic seizures

b) Hemiplegia

c) Lock-jaw

d) Opisthotonus

Correct Answer - C  
Ans. is. 'c' i. e. Lock-jaw

**227. True about *C. perfringens* are all except:**

a) Invasive as well as toxigenic

b) Alpha toxin is detected by Naegler's reaction

c) Beta toxin is most important in gas gangrene

d) Theta toxin is perfringolysin

Correct Answer - C

Ans. is. 'c' i. e. Beta toxin is most important in gas gangrene

**228. Naegler's reaction is due to:**

a) Coagulase

b) Hyaluronidase

c) Lecithinase

d) None of the above

Correct Answer - C  
Ans. is. 'c' i. e. Lecithinase

## 229. True about *Corynebacterium diphtheriae* are all except:

a) Iron is required for toxin production

b) Toxin production is responsible for local reaction

c) Nonsporing, noncapsular and nonmotile

d) Toxin production is by lysogenic conversion

Correct Answer - B

Ans. (b) Toxin production is responsible for local reaction

"Mechanical complications of diphtheria are due to the membrane while the systemic effects are due to the toxin."

- Toxin acts mainly systemically though there are partial local effects.
- It has affinity for myocardium, adrenals and nerve endings.
- Toxin acts by inactivating EF-2 thus inhibiting protein synthesis.
- Toxin production is influenced by iron concentration in the medium. Toxin production is optimal at 0.14 p.g/ ml and is suppressed at 0.5 .tg/ml.
- Toxicogenicity of diphtheria bacillus depends on symbiotic bacteriophages, so it shows lysogenic or phage conversion i.e. nontoxicogenic strain toxicogenic strain by infecting with beta phage.

**230. Most dangerous type of diphtheria:**

a) Facial

b) Laryngeal

c) Nasal

d) Cutaneous

Correct Answer - B  
Ans. is. 'b' i. e. Laryngeal

**231. Beta phage is seen in:**

a) *Bacillus anthracis*

b) *Corynebacterium diphtheriae*

c) *Clostridium botulinum*

d) *Peptostreptococci*

Correct Answer - B

Ans. is. 'b' i. e. *Corynebacterium diphtheriae*

**232. Pediculus humanus can transmitt:**

a) Sleeping sickness

b) Plague

c) Chaga's disease

d) Relapsing fever

Correct Answer - C

**Ans. c. Chaga's disease**

**233. Rhinosporidiosis is caused by:**

a) Fungus

b) Protozoa

c) Aquatic bacterium

d) Protista

Correct Answer - A  
**Ans. a. Fungus**

**234. Disease transmitted from men to animals:**

a) Antropozoonoses

b) Zooanthroponoses

c) Amphixenoses

d) Aptoazonoses

Correct Answer - B  
Ans. b. Zooanthroponoses

**235. Capsule of Bacillus anthracis is formed of:**

a) Polysaccharide

b) Lipopolysaccharide

c) Polypeptide

d) Long chain fatty acids

Correct Answer - C  
Ans. is. 'c' i. e. Polypeptide

**236. Actinomyces differs from bacteria in that:**

a) Gram positive

b) Filamentous organism

c) Non-motile

d) Non-acid fast

Correct Answer - B

Ans. is. 'b' i. e. Filamentous organism

**237. An early diabetic has left sided orbital cellulitis CT scan of paranasal sinus shows evidence of left maxillary sinusitis. Gram stained smear of the orbital exudate shows irregularly branching septate hyphae. The following is most likely etiological agent:**

a) *Aspergillus*

b) *Rhizopus*

c) *Mucor*

d) *Candida*

Correct Answer - A

Ans. (a) *Aspergillus* Ref. Ananthanarayan 8/e, p 613, 9/e, p 609; Harrison 19/e, p 1345 - 1347, 18/e, p 1658

*"Presence of branched septate hyphae in a patient of orbital cellulitis (occur as complication of sinusitis) suggest Aspergillus."*

*Aspergillus* Sinusitis occur in three forms:

1. Ball of hyphae may form in chronically obstructed paranasal sinus, without tissue invasion.
  2. A chronic fibrosing granulomatous inflammation begin in sinus and spread slowly to the orbit and brain.
  3. Allergic fungal sinusitis
- Mucor* and *Rhizopus* belong to family Zygomycetes and have non-septate hyphae.

**238. Phagocytosis of mycobacterium tuberculosis by macrophages is mainly mediated by:**

a) IL 6

b) IL 3

c) IL 12

d) IFN Gamma

Correct Answer - D  
Ans. is. 'd' i. e., IFN Gamma

### 239. Organism identified by interferons:

a) Staphylococcus

b) Leptospira

c) Campylobacter

d) M. tuberculosis

Correct Answer - D

Ans. is. 'd' i. e., M. tuberculosis

## 240. True about visceral leishmaniasis:

a) Neutropenia

b) Eosinophilia

c) Hyper gamma globulinemia

d) Skin hyperpigmentation

Correct Answer - A:D:E

**Ans. (a, d, e) Neutropenia, Skin hyperpigmentation, Lymphadenopathy**

Manifestations of visceral leishmaniasis

- Moderate to high grade fever with chills & rigor
- Lymphadenopathy: Lymphadenopathy is common in most endemic regions of the world except the Indian subcontinent
- Organomegaly: Splenomegaly occurs by 2nd week of illness followed by hepatomegally (moderate)
- Hyperpigmentation: Patient loose weights feel weak and the skin gradually develops dark discoloration due to hyper-pigmentation
- Hematological: Anemia, hypoalbuminemia, thrombocytopenia, leukopenia.

**241. Eosinophilic meningoencephalitis is caused by:**

a) *Gan thostoma spiralis*

b) *Naegleria*

c) *Toxocara canis*

d) *Angiostrongylus cantonensis*

Correct Answer - B:D

Ans. (b) and (d) *Naegleria* and *Angiostrongylus cantonensis*

**242. Amastigote form of which parasite is found in human?**

a) *Trypanosoma cruzi*

b) *Trypanosoma brucei*

c) *Trypanosoma gambiense*

d) *Trypanosoma rhodesiense*

Correct Answer - A

Ans. a. *Trypanosoma cruzi*

**243. Charcot Leyden crystal in stool is seen in:**

a) Amoebic dysentery

b) bacillary dysentery

c) Shigella

d) bacillus cereus

Correct Answer - A  
Ans. a. Amoebic dysentery

**244. Cholera toxin binds to which receptors in intestine:**

a) Sphingosine through A subunit

b) Sphingosine through B subunit

c) GM1 gangliosides through A subunit

d) GM1 gangliosides through B subunit

Correct Answer - D

Ans. is. 'd' i. e., GM1 gangliosides through B subunit

**245. A patient in ICU and on ventilator develops cough with fever. The gram-staining on microscopy will show:**

a) Gram negative cocci

b) Gram negative bacilli

c) Gram positive bacilli

d) Gram variable organism

Correct Answer - B

Ans. is. 'b' i. e., Gram negative bacilli

**246. Malignant hydatid cyst is caused by:**

a) *Echinococcus granulosus*

b) *E. multilocularis*

c) *E. vogeli*

d) *E. oligarthus*

Correct Answer - B  
Ans. b. *E. multilocularis*

**247. Opisthorchis sinensis can cause:**

a) Cholangiocarcinoma

b) Liver carcinoma

c) Pancreatic carcinoma

d) All of the above

Correct Answer - A  
Ans. a. Cholangiocarcinoma

**248. School of fish appearance is characteristic of:**

a) Bordetella pertussis

b) Yersinia enterocolitica

c) Haemophilus ducreyi

d) Legionella

Correct Answer - C

Ans. is. 'c' i. e., Haemophilus ducreyi

**249. Painful vaginal ulcer with inguinal lymphadenopathy and school of fish appearance of microorganism or microscopy are characteristic of:**

a) Syphilis

b) LGV

c) Granuloma inguinale

d) Chancroid

Correct Answer - D

Ans. is. 'd' i. e., Chancroid

- Chancroid is a bacterial sexually transmitted disease (STD) caused by infection with *Haemophilus ducreyi*.
- It is characterized by painful necrotizing genital ulcers that may be accompanied by inguinal lymphadenopathy. It is a highly contagious but curable disease.
- *H ducreyi*, a small, gram-negative, facultative anaerobic bacillus that is highly infective.
- It is pathogenic only in humans, with no intermediary environmental or animal host.
- *H ducreyi* enters the skin through disrupted mucosa and causes a local inflammatory reaction
- *H ducreyi* is transmitted sexually by direct contact with purulent lesions and by autoinoculation to nonsexual sites, such as the eye and skin.
- The organism has an incubation period of 1 day to 2 weeks, with a median time of 5-7 days.

**250. Penile ulcer is painful in:**

a) Syphilis

b) LGV

c) Donovanosis

d) Chancroid

Correct Answer - D  
Ans. is. 'd' i. e., Chancroid

**251. Temperature required for isolation of  
compylobacter:**

a) 20°C

b) 25°C

c) 37°C

d) 42°C

Correct Answer - D  
Ans. is. 'd' i. e., 42°C

## 252. Pontiac fever is caused by:

a) Legionella

b) Listeria

c) Scrub typhus

d) Leptospira

Correct Answer - A

Ans. (a) Legionella

Pontiac fever is a mild nonfatal influenza like illness caused by Legionella pneumophila.

Pontiac fever,

- An acute self limiting flue like illness with IP of 24-48 hours
- Malaise, fatigue and myalgia are the most frequent presenting symptoms
- Pneumonia doesn't develop.
- Complete recovery takes place, without antibiotic therapy.
- Diagnosis is established by antibody detection.

## 253. Legionella causes:

a) Pontiac fever

b) Myocarditis

c) Diarrhea

d) All of the above

Correct Answer - D

Ans. is. 'd' i. e., All of the above

## 254. All are true about scrub typhus, except:

a) Causative organism is R.TSUTSUGAMOSHI

b) Vector is trombiculide mite

c) Adult female feeds on vertebrate hosts

d) Tetracycline is the drug of choice

Correct Answer - C

**Ans.** (c) Adult female feeds on vertebrate hosts on serum of warm blood animals only during there larval stage (chiggers) and adult mites feed only on plants"

### **Scrub typhus**

- **Caused by 0. tsutsugamushi**
- Transmitted by trombiculid mite which also shows transovarian spread. It must be noted that disease is transmitted by chiggers (larva), not by adult mite
- **Clinical features:** - Fever, headache, myalgia, cough and GI symptoms.
- - Classic case present with an eschar, regional lymphadenopathy and a maculopapular rash.
- **Diagnosis:** Serologic assays (IFA, indirect immunoperoxidase and enzyme immunoassays) are main stay of diagnosis.

**Treatment** - Rifampin

- Azithromycin and clarithromycin

Trudy speaking doxycycline is not drug of choice but it can be used for all rickettsial infections.

**255. HPV-6 most often implicated in causation of:**

a) Cervical cancer

b) Condyloma acuminata

c) Flat wart

d) Common wart

Correct Answer - B  
Ans. b. Condyloma acuminata

**256. Which of the herpes virus is included in Biohazard risk group 4:**

a) HSV 1

b) CMV

c) EBV

d) Herpes simiae

Correct Answer - C

Ans. c. EBV

**257. Human B-cell lymphotropic virus  
belongs to:**

a) Picorna virus

b) Pox virus

c) Reovirus

d) Herpes virus

Correct Answer - D  
Ans. d. Herpes virus

## 258. True about chlamydia is:

a) Replicative form is elementary body

b) Infective form to host cell is elementary body

c) Cell wall contains N-acetylmuramic acid and peptidoglycan

d) All of the above are correct

Correct Answer - B

Ans. is. 'b' i. e., Infective form to host cell is elementary body

**259. Chlamydia is associated with which bodies?**

a) Torres bodies

b) Negri bodies

c) Reticulate bodies

d) Bollinger bodies

Correct Answer - C  
Ans. (c) Reticulate bodies

**260. Painless ulcer along with painless lymphadenopathy is characteristic of which STD:**

a) Syphilis

b) Chancroid

c) LGV

d) Donovanosis

Correct Answer - A  
Ans. is. 'a' i. e., Syphilis

**261. Culture medium used for leptospira for laboratory diagnosis:**

a) Skirrows medium

b) EMJH medium

c) BYCE agar

d) Pike's medium

Correct Answer - B  
Ans (b) EMJH medium

**262. Example of selective medium is:**

a) LJ medium

b) Blood agar

c) Selenite F broth

d) Chocolate agar

Correct Answer - A  
Ans. is. 'a' i. e., LJ medium

## 263. Principal of using Robertson cooked meat broth:

- a) Meat kills other bacteria
- b) Meat is utilized by anaerobes
- c) Content of meat extract utilize O<sub>2</sub>
- d) All of the above

Correct Answer - C

Ans. is. 'c' i. e., Content of meat extract utilize O<sub>2</sub>

**264. High level disinfectant are used for:**

a) Stethoscopes

b) Electronic thermometers

c) Bronchoscopes

d) Surgical instruments

Correct Answer - C

Ans. is. 'c' i. e., Bronchoscopes

## 265. Prophage is defined as:

a) Insertion of viral nucleic acid into bacteria by bacteriophage

b) First cycle of division of bacterial nucleic acid

c) Last cycle of division of bacterial nucleic acid

d) Integrated temperate bacteriophage genome into bacterial chromosome

Correct Answer - A

Ans. is. 'a' i. e., Insertion of viral nucleic acid into bacteria by bacteriophage

## 266. True about rotavirus vaccine:

a) Killed vaccine

b) Given subcutaneous

c) Pentavalent vaccine

d) Should be given before 5 years

Correct Answer - C

**Ans. c.** Pentavalent vaccine

**267. Human metapneumovirus is structurally similar to:**

a) Influenza virus

b) Respiratory syncytial virus

c) Measles virus

d) Rubella virus

Correct Answer - B  
Ans. b. Respiratory syncytial virus

## 268. Coxsackie group A commonly causes:

a) Conjunctivitis

b) Aseptic meningitis

c) Hepatitis

d) Myocarditis

Correct Answer - B  
Ans. b. Aseptic meningitis

**269. True about HCV include all except:**

a) Highest rate of chronicity among all hepatitis viruses

b) Can be cultured

c) Diagnosed by detection of HCV RNA

d) Transmitted through transfusion of infected food

Correct Answer - B  
Ans. b. Can be cultured

## 270. Hepatitis A virus is:

a) Flavivirus

b) Calcivirus

c) Enterovirus

d) Defective virus

Correct Answer - C

Ans. c. Enterovirus

1)

Hepatitis

A

2)

Hepatitis

B Enterovirus (Picornavirus), non- enveloped RNA virus

3) Hepadana virus, DNA virus

Hepatitis Flavivirus, enveloped RNA virus

C Defective RNA virus resembling viroids

4) Calcivirus, non-enveloped RNA virus

Hepatitis

D

5)

Hepatitis

E

**271. Councilman body is seen in:**

a) Molluscum contagiosum

b) Rabies

c) Granuloma inguinale

d) Viral hepatitis

Correct Answer - D  
Ans. d. Viral hepatitis

**272. HTLV-1 is also known as:**

a) HIV

b) ATL

c) RSV

d) ALV

Correct Answer - B

**Ans. b. ATL**

## 273. Rubella virus belongs to which family ?

a) Rheovirus

b) Togavirus

c) Picornavirus

d) Orthomyxo

Correct Answer - B

And. B. Togavirus

- Rubella virus (RuV) is the pathogenic agent of the disease rubella, and is the cause of congenital rubella syndrome when infection occurs during the first weeks of pregnancy.
- Rubella virus is the only member of the genus Rubivirus and belongs to the family of Togaviridae, whose members commonly have a genome of single-stranded RNA of positive polarity which is enclosed by an icosahedral capsid.

## 274. true about TRIAD congenital rubella syndrome

a) PDA, cataract and deafness is seen

b) Hepatosplenomegaly, mental retardation, deafness

c) Chorioretinitis, multiorgan failure, pneumonitis

d) None of these

Correct Answer - A

Answer: A. PDA, cataract and deafness is seen

- Congenital rubella syndrome (CRS) can occur in a developing fetus of a pregnant woman who has contracted rubella, usually in the first trimester. If infection occurs 0–28 days before conception, the infant has a 43% risk of being affected.
- Infection in 2nd trimester – may be deafness only.
- >6 wks – no major abnormalities
- Diagnosis: Isolation of virus in cell cultures of throat samples, urine or other secretions.
- Detection of IgM in single serum sample shortly after birth.
- Persistence of Rubella IgG antibodies serum beyond 1 year or rising antibody titer anytime during infancy in an unvaccinated child

**275. A patient was brought to emergency with complaints of high-grade fever and altered sensorium. He was diagnosed to be suffering from meningococcal meningitis. Which of the following is the most appropriate empirical treatment option?**

a) Ceftriaxone

b) Piperacillin—Tazobactam

c) Penicillin

d) Cotrimoxazole

Correct Answer - A

Answer- A. Ceftriaxone

Meningococcal meningitis

**Treatment:**

- 3rd generation cephalosporin such as cefotaxime or ceftriaxone is DOC for initial therapy
- Prophylaxis: Rifampicin is DOC for meningococcal prophylaxis

ANTIBIOTIC RECOMMENDATIONS FOR BACTERIAL

MENINGITIS:

BACTERIA	ANTIBIOTIC(IV)	DURATION
Streptococcus Pneumonia	Vancomycin+3rd gen. Cephalosporin(Cefotaxime or ceftriaxone)	10-14 days
Nesseria	3rd gen. Cephalosporin(Cefotaxime or ceftriaxone) or	5-10 days

meningitidis	Penicillin G or Ampicillin	
H.influenza	3rd gen. Cephalosporin(Cefotaxime or ceftriaxone)	7-10 days
Listeria monocytogens	Penicillin G or Ampicillin ± Aminoglycocide	14-21 days
GBS	Penicillin G or Ampicillin ± Aminoglycocide	14-21 days
E.coli	3rd gen. Cephalosporin(Cefotaxime or ceftriaxone)	21 days

## 276. Griffith experiment was done on ?

a) Streptococcus

b) Pneumococcus

c) Enterococcus

d) Staphylococcus

Correct Answer - B

Ans. is 'b' i.e., Pneumococcus [*Ref Advanced biology p. 396*]

- In 1928, Frederick Griffith's experiment first demonstrated transformation in streptococcus pneumoniae.
- Frederick Griffith's experiment on pneumococcus (streptococcus pneumoniae) proved that genetic characters are transmitted from one generation to the other through transformation.

## 277. Colony forming unit includes?

a) Viable cells

b) Dead cells

c) Viable plus dead cells

d) None

Correct Answer - A

**Ans. is 'a' i.e., Viable cells** [Ref *Environmental microbiology and biotechnology* p. 41]

- Colony-forming unit (CFU or cfu) *is a measure of viable bacterial or fungal cells.* In direct microscopic counts (*cell counting using haemocytometer*) where all cells, dead and living, are counted, but CFU measures only viable cells.
- For convenience the results are given as CFU/mL (colony-forming units per milliliter) for liquids, and CFU/g (colony-forming units per gram) for solids. CFU can be calculated using miles and misra method, it is useful to determine the microbiological load and magnitude of infection in blood and other samples.

**278. Medium used to isolate M. tuberculosis contains all except ?**

a) Malachite green

b) Hen's egg

c) Bromothymol blue

d) Glycerol

Correct Answer - C

**Ans. is 'c' i.e., Bromothymol blue**

**Lowenstein-Jensen Medium (LT medium)**

- LJ medium consists of mineral salts, asparagine, glycerol, malachite green and hen's egg.
- The malachite green prevents the growth of other microorganism on medium.
- It is used as a primary isolation medium for mycobacteria.  
*Mineral salts are monopotassium phosphate, magnesium or sodium citrate and magnesium sulphate*

## 279. Limulus amoebocyte lysate test is used to detect ?

a) Endotoxin

b) Verocytotoxin

c) Pyroexotoxin-A

d) Alpha-toxin of *Cl. perfringens*

Correct Answer - A

**Ans. is 'a' i.e., Endotoxin** [*Ref asn.org*]

- Limulus amoebocyte lysate (LAL), an aqueous extract of amoebocytes from the horseshoe crab, *Limulus polyphemus*, reacts with endotoxin to form a gel or a clot.
- Under standardized conditions, this reaction detects picogram quantities of endotoxin.
- The clotting reaction is triggered when the LAL reagent comes in contact with the lipopolysaccharide (endotoxin) fraction of the cell wall of gram-negative bacteria.
- The endotoxin activates an enzyme in the LAL reagent which then reacts with a low-molecular-weight clottable protein to form a gel.

## 280. Inspissation is ?

a) Heating at 160°C for 15 minutes

b) Heating at 160°C for 30 seconds

c) Heating at 80°C for 30 minutes

d) Heating at 120°C for 15 seconds

Correct Answer - C

**Ans. is 'c' i.e., Heating at 80°C for 30 minutes** [*Ref Handbook of media for clinical microbiology p. 495*]

**Inspissation:** It is heat exposure method that is employed with high protein material, like *egg containing media*, that cannot withstand the high temperature used in autoclaving.

- The medium is exposed to 80°C for 30 minutes for three successive days in inspissator. It can be used for LI medium and loeffler serum slop.

## 281. Spoligotyping is done for ?

a) Staphylococcus

b) Salmonella

c) Mycobacterium tuberculosis

d) Brucella abortus

Correct Answer - C

**Ans. is 'c' i.e., Mycobacterium tuberculosis** [Ref [www.ncbi.nlm.nih.gov](http://www.ncbi.nlm.nih.gov)]

- Spoligotyping (spacer oligotyping) is a type of polymerase chain reaction (PCR).
- Compared with other PCR-based methods that combine detection and typing of such DNA, spoligotyping is more sensitive, because it targets the direct repeats (DRs) present in multiple (sometimes up to 60) copies in the genomic DR locus of *M. tuberculosis* complex bacteria.
- The well-conserved 36-bp DRs are interspersed with nonrepetitive spacer sequences of 34 to 41 bp in length (2, 3, 4).

**282. Triple sugar iron agar showing gas production with red slant and yellow butt. The organism cultured is ?**

a) E coli

b) Shigella flexneri

c) Pseudomonas

d) None

Correct Answer - B

**Ans. is 'b' i.e., Shigella flexneri [Ref Clinical microbiology p. 1263]**

### 283. Example of heterophile antigen is ?

a) Forssman antigen

b) Cryptococcus polysaccharide

c) Protein A of staphylococcus

d) All of the above

Correct Answer - A

**Ans. is 'a' i.e., Forssman antigen** [*Ref Essentials of microbiology p. 89*]

#### **Heterogenetic (Heterophile) specificity**

- Same or closely related antigens occurring in different biological species, classes and kingdoms are known as heterogenetic or heterophile antigens.

**284. Which of the following cell does not have cytotoxic activity ?**

a) NK cells

b) Cytotoxic T-cells

c) Helper T-cells

d) Antibody dependent cells

Correct Answer - C

**Ans. is 'c' i.e., Helper T-cells** [Ref : *Essentials of microbiology p. 786*]

**285. RA antibody causes which type of hypersensitivity?**

a) Type 1

b) Type 2

c) Type 3

d) India ink

Correct Answer - C

**Ans. is 'c' i.e., Type 3**

- Rheumatoid arthritis (caused by RA antibody) is type - 3 hypersensitivity.

## 286. Which stain is used for *Corynebacterium diphtheriae* ?

a) Geimsa

b) Albert

c) PAS

d) India ink

Correct Answer - B

**Ans. is b' i.e., Albert**

- The diphtheria bacillus was first observed and described by Klebs (1883) but was first cultivated by Loeffler (1884).
- Therefore, it is known as Klebs - Loeffler bacillus (KLB).
- *Corynebacterium diphtheriae* is gram positive slender rod (bacilli) which is noncapsulated and non-motile.
- The bacilli are arranged in a characteristic fashion in smears, being at various angles to each other, resembling the letter V or L Chinese letter or .neiform arrangement. There is characteristic 'Clubbed appearance'.
- Characteristic feature is irregular staining due to presence of granules, called Babes Ernest or volutin granules. These granules are also called metachromatic granules or polar bodies.

**287. A 12 years old child presenting with painless neck swelling in supraclavicular region which started discharging after few days. The most probable diagnosis?**

a) Scrofuloderma

b) Actinomycosis

c) Botromycosis

d) Fungal mycetoma

Correct Answer - A

**Ans. is 'a' i.e., Scrofuloderma**

- scrofuloderma is neck swelling with discharge. SCRUFuloderma is cutaneous tuberculosis due to direct extension of infection from an underlying tuberculosis present either in a lymphnode, bone or a joint.
- Starts as bluish painless swelling, which breaks open to form Sinuses -> Most common presentation is discharging sinuses.

**288. There is outbreak of infection with staphylococcus in a burn ward. Best site to take a swab ?**

a) Skin

b) Oral cavity

c) Nose

d) Conjunctiva

Correct Answer - C

**Ans. is 'c' i.e., Nose** [Ref: Harrison 19<sup>th</sup>/e p. 955-957; Jawetz 24<sup>th</sup>/e p. 224-230]

- S. aureus is part of normal human flora. The anterior nares is the most frequent site of human colonization although the skin (especially when damaged), vagina, axilla, perineum and oropharynx may also be colonized.
- Staphylococci are part of normal human bacterial flora with about 30% of general population being nasal carriers and another 10% carrying it on the perineal skin.

## 289. Toxic shock syndrome is due to ?

a) Endotoxin

b) Exotoxin

c) Lipopolysaccharide

d) Staphylococcal protein A

Correct Answer - B

**Ans. is 'b' i.e., Exotoxin** [Ref Harrison 19<sup>th</sup>/e p. 959]

TSS is a potentially fatal multisystem disease characterized by sudden high fever, fainting, watery diarrhea, headache and muscle ache.

## 290. Ideal percentage of CO<sub>2</sub> required for growth of *Brucella abortus* ?

a) 2-5%

b) 5-10%

c) 15-20%

d) 25-30%

Correct Answer - B

**Ans. is. b. i.e., 5-10%** [Ref : *Essentials of microbiology p. 719*]

"Addition of 5-10% CO<sub>2</sub> improves the growth of *B. abortus* and *B. melitensis*".

All *Brucella* spp. are strictly aerobic, but some *B. abortus* biovars, some *Brucella* isolates from marine mammals, and *B. ovis* only grow in atmospheres containing 5-10% CO<sub>2</sub>.

## 291. Miyagawa corpuscles are characteristic of ?

a) Psittacosis

b) Malaria

c) Rabies

d) Lymphogranuloma venerum

Correct Answer - D

**Ans. is. d. i.e., Lymphogranuloma venerum** [Ref : Textbook of STD p. 124]

- Inclusion body of C.trachomatis causing conjunctivitis  
→ Halberstaedter prowazek (H.P.) body.
- Inclusion body of C. trachomatis causing L.G.V. -s Miyagawa's granulocorpuscles.
- In psittacosis -s Levinthal - toles - lillie bodies.

**292. Bacteriophage carries gene for which of the following ?**

a) Cholera toxin

b) Heat labile toxin of E. coli

c) Verocytotoxin of EHEC

d) Anthrax toxin

Correct Answer - C

**Ans. is 'c' i.e., Verocytotoxin of EHEC**

### 293. Cat scratch disease is characterized by?

a) Caused by a virus

b) Regional lymphadenopathy is prominent

c) More common in adults

d) **All** of the above

Correct Answer - B

**Ans. is `b' i.e. Regional lymphadenopathy is prominent**

- Cat-scratch disease (CSD) is a common and usually benign infectious disease *caused by the bacterium Bartonella henselae, a fastidious, intracellular, gram-negative bacteria.*
- cases are benign and self-limiting, but lymphadenopathy may persist for several months after other symptoms disappear. The disease usually resolves spontaneously, with or without treatment, in one month.

## 294. Most common form of Nocardial respiratory tract infection is ?

a) Laryngitis

b) Pharyngitis

c) Tonsillitis

d) Pneumonia

Correct Answer - D

**Ans. is 'd' i.e.,Pneumonia**

*[Ref: Harrison 19<sup>th</sup>/e p. 1086]*

- Nocardia are 'gram positive' `acid fast' filaments.
- Nocardia are strict aerobes and partially urease and catalase positive. Since nocardiae are among the few aerobic microorganism that use paraffin as a carbon source, paraffin baiting can be used to isolate the organism from mixed culture.

**295. Bisected pearls appearance on culture medium is seen in ?**

a) Brucella

b) Bordetella

c) Haemophilus ducreyi

d) Pseudomonas

Correct Answer - B

**Ans. is 'b' i.e., Bordetella** [Ref: Ananthanarayan 9<sup>th</sup>/e p. 333]

- Bordetella are gram-negative, capsulated, fimbriated, nonmotile coccobacillus.
- They show bipolar metachromatic granules on staining with toluidine blue.

## 296. Haverhill fever is caused by ?

a) Bartonella henselae

b) Streptobacillus moniliformis

c) Eikenella corrodens

d) Coccidioides

Correct Answer - B

**Ans. is 'b' i.e., Streptobacillus moniliformis** [*Ref Textbook of Microbiology p. 712*]

- Streptobacillus moniliformis causes rat-bite fever in humans.
- It enters the body through the wound caused by the rat bite.
- The infection also occurs by the ingestion of water, milk or food contaminated with rat excreta. In these cases, the infection is known as 'Haverhill fever'.
- Clinical symptoms include fever, rash and arthralgia.

## 297. Best culture for primary isolation of H. influenzae?

a) Blood agar

b) Fildes agar

c) Nutrient broth

d) Tryptose agar

Correct Answer - B

**Ans. is 'b' i.e., Fildes agar**

*[Ref Ananthanarayan 9<sup>th</sup> ed p. 328 & 5<sup>th</sup> ed p. 335]*

- H. influenzae does not grow on blood agar.
- Culture media used for isolation are Fildes agar (best for primary isolation), Levinthal medium (capsulated strains show iridescence) and Chocolate agar.

**298. On blood agar target appearance of *Cl. perfringens* is due to which toxin ?**

a) Alpha toxin

b) Theta toxin

c) Beta toxin

d) Mu toxin

Correct Answer - A

**Ans. is 'a' i.e., Alpha toxin** [*Ref Ananthanarayan 9/e p. 254*]

**Two important characteristic feature of *Cl. perfringens* are :?**

1. Target hemolysis (double zone hemolysis) on blood agar. It is a narrow zone of complete hemolysis by theta toxin which is surrounded by a wider incomplete hemolysis by alpha-toxin.
2. Naegler's reaction detects alpha toxin (phospholipase or lecithinase C). When *Cl. perfringens* is grown on a medium with the antitoxin spread on one half of the plate, colonies on the other half without the antitoxin will be surrounded by a zone of opacity. There will be no opacity around the colonies on the half of the plate with the antitoxin, due to the specific neutralisation of the alpha-toxin.

## 299. Cefoxitin - cycloserine fructose agar is used for ?

a) Neisseria

b) Clostridium difficile

c) Bacillus anttaxis

d) Reiter's treponema

Correct Answer - B

**Ans. is 'b' i.e., Clostridium difficile** [*Ref Clinical microbiology ydle p. 119*]

**Cefoxitin - cycloserine fructose agar (CCFA)** is an enriched selective and differential medium recommended for the isolation and cultivation of clostridium difficile from fecal specimens.

### 300. Reverse CAMP test is positive for ?

a) Streptococcus agalactiae

b) Listeria monocytogenes

c) Clostridium perfringens

d) Vibrio parahaemolyticus

Correct Answer - C

**Ans. is 'c' i.e., Clostridium perfringens**

- CAMP positive → Area of increased hemolysis (arrow head) around staphylococcus streaks (by streptococcus agalactiae).
- **CAMP test** is also positive in **Listeria monocytogenes**, **Reverse CAMP test** is positive in **Clostridium perfringens**.
- **Reverse CAMP test** : It is used to differentiate Cl perfringens from other Clostridia. CAMP positive group 'B' streptococcus is streaked in Blood agar and Cl perfringens is streaked perpendicular to it. There is enhanced hemolysis (arrowhead) between the growth of Cl.

**301. Neutrophil count below which there is increased risk of nosocomial invasive pulmonary aspergillosis -**

a) < 4000/4

b) < 3000/4

c) < 2000/4

d) < 1000-500/RL

Correct Answer - D

**Ans. is 'd' i.e., < 1000-500/RL** [*Ref Essentials of medical microbiology p. 712*]

- Invasive aspergillosis is a severe respiratory infection with a mortality rate of over 90% in neutropenic patients.
- It is most often encountered in patients with absolute neutrophil counts of <500/4 from leukemia or chemotherapy.
- Patients undergoing bone marrow transplantation are susceptible to a greater extent than patients with heart, kidney, or liver transplants.

### 302. Nosocomial aspergillosis is spread by ?

a) Aerosols from renovation

b) Aerosols from doctor to patients

c) Contact in OPD

d) Contact with contaminated dressings

Correct Answer - A:D

**Ans. is 'a > d' i.e., Aerosols from renovation > Contact with contaminated dressings**

*[Ref Clinical mycology E Book p. 72]*

- Nosocomial transmission of *Aspergillus* to patients occurs primarily by airborne route (via aerosols), but contact transmission (e.g. direct inoculation from occlusive materials) has also been implicated.
- Most outbreaks of nosocomial airborne aspergillosis have been associated with construction or renovation in or adjacent to the hospital, contaminated air-handling systems, and insulation or fireproofing material within the walls or ceilings of hospital units.

### 303. Foam cells are seen in infection with which virus ?

a) Measles

b) EBV

c) Molluscum contagiosum

d) RSV

Correct Answer - B

**Ans. is 'b' i.e., EBV** [*Ref Textbook of CNS infection p. 184*]

**EBV encephalomyelitis shows :**

- .. Abnormal white matter with perivascular infiltrates of inflammatory cells and *foam* cells.
- ?. Some myelin is replaced by lipid-filled macrophages and hyperplastic astrocytes.

**304. E6 gene product of HPV causes malignance transformation by acting on ?**

a) p53 gene

b) RAS gene

c) C-myc gene

d) N-myc gene

Correct Answer - A

**Ans. is 'a' i.e., p-53 gene** [Ref : *Essentials of microbiology p. 712*]

- HPV selectively infects the epithelium of skin and mucous membrane and may immortalize the keratinocytes leading either asymptomatic infection, or warts or neoplasia.
- Products of E-genes (E6, E7) are related to immortalization or malignant transformation of keratinocytes by interfering with p53 and Rb genes, respectively.

### 305. Most common virus causing tumor in human ?

a) HSV

b) HPV

c) EBV

d) HTLV

Correct Answer - B

**Ans. is 'b' i.e., HPV** [*Ref Essentials of medical microbiology p. 719*]

- Warts are the most common tumor caused by viruses.
- HPV is the cause of warts.

**306. Growth of virus in embryonated egg, eggs are incubated for -**

a) 4-8 hours

b) 1-2 days

c) 5-12 days

d) 20-25 days

Correct Answer - C

**Ans. is 'c' i.e., 5-12 days** [Ref: Principles of microbiology - 213]

"For virus isolation, fertile chicken eggs are incubated for 5-12 days, and a viral Suspension or suspected virus - containing" tissue is injected into the fluid of the egg.

### 307. Most rapid test for diagnosis of malaria is ?

a) Thick blood smear

b) HRP-2 antigen

c) Thin blood smear

d) PCR

Correct Answer - B

**Ans. is 'b' i.e., HRP-2 antigen** [Ref Essentials of Microbiology 3/e p. 712]

- Rapid diagnostic tests are simple and the procedure can be performed on the spot in field conditions. These tests use finger-stick or venous blood, the completed test takes a total of 15-20 minutes, and a laboratory is not needed.

**Rapid diagnostic tests are antigen based and directed against :**

1. Histidine rich protein-II (HRP-II)
2. Plasmodium glutamate dehydrogenase (pGluDH)
3. Plasmodium falciparum lactate dehydrogenase (PfLDH)
4. Plasmodium falciparum aldolase (pAldo) or fructose-bisphosphate aldolase

### 308. Rapid diagnostic test for *P. falciparum* utilizes which enzyme ?

a) HRP-2

b) SGOT

c) LDH

d) Peroxidase

Correct Answer - C

**Ans. is 'c' i.e., LDH** [Ref : *Essentials of medical microbiology p. 712*]

**Among the given options two are used in rapid diagnostic tests**

:

.. HRF-2

?. LDH

- Among these LDH is an enzyme while HRP-2 is a simple protein antigen.

**309. 18 years old male developed meningitis 5 days after taking a bath in pond. The likely causative organism ?**

a) Meningococcus

b) Cryptococcus

c) Naegleria fowleri

d) Enterococcus

Correct Answer - C

**Ans. is 'c' i.e., Naegleria fowleri**

*[Ref Lippincott's guide to infectious disease p.118]*

- Primary amebic meningoencephalitis (PAM) is an acute, fulminant, and rapidly fatal infection involving the central nervous system. It is caused by the parasite *Naegleria fowleri*, a free-living amoeboflagellate found in soil and fresh or brackish water (lakes, rivers, ponds)

**310. Ring forms of babesia differ from ring forms of malarial parasite [plasmodium] ?**

a) Infected RBCs are not enlarged

b) Lack pigment

c) Multiple infection is seen

d) Tetrad forms are seen

Correct Answer - B:D

**Ans. is 'b' i.e., Lack pigment; 'd' i.e., Tetrad forms are seen** [Ref *Essentials of microbiology - 1132*]

- Unlike plasmodium species, rings of babesia lack pigment.
- Tetrad forms [maltese cross] are characteristics of babesia.
- **About option a & c**
- Infected RBCs are not enlarged both in babesia and *P. falciparum*
- Multiple infection of RBCs is common both in babesia & *P falciparum*

**311. A patient had Dengue fever 2 years back caused by Dengue virus serotype 1. Now he is infected with serotype -4. Which is correct statement?**

a) The recent infection will cause mild disease

b) There are increased chances of Dengue hemorrhagic fever

c) There is no chance of Dengue hemorrhagic fever

d) Old infection has no bearing on recent infection

Correct Answer - B

**Ans. is 'b' i.e., There are increased chances of Dengue hemorrhagic fever**

[Ref Park 23<sup>rd</sup> /e p. 251; Harrison 19<sup>th</sup>/e p. 1322; Jawetz 23<sup>th</sup>/e p. 6]

- Reinfection with a virus of different serotype can cause dengue hemorrhagic fever.
- Dengue hemorrhagic fever (DHF) is a severe form of dengue fever caused by infection with more than one dengue viruses. hemorrhagic manifestations (epistaxis, petechiae, positive tourniquet test), thrombocytopenia, and increased hematocrit due to hemoconcentration. There is hepatomegaly.

### 312. True about peripheral blood smear of plasmodium vivax?

- a) Single ring with cytoplasm condensed around in each erythrocyte
- b) Mature /old erythrocytes affected
- c) Parasitized erythrocytes of same size as normal erythrocytes
- d) Only ring and gametocytes are seen

Correct Answer - A

**Ans. is 'a' i.e., Single ring with cytoplasm condensed around in each erythrocyte**

*[Ref Pankar 6<sup>th</sup>/e p. 75, 76; Chatterjee 12<sup>'</sup>/e p. 79]*

**313. A hospital worker is found to be HBs Ag (+) <sup>ve</sup>. Further serum investigations show HBe(+)<sup>ve</sup> and IgG anti HBc (+)<sup>ve</sup>. The given hospital worker is?**

a) Acute Hepatitis B patient with High infectivity

b) Simple carrier with high infectivity

c) Chronic infection with high infectivity

d) Immunized person for Hepatitis B

Correct Answer - C

**Ans. is 'c' i.e., Chronic infection with high infectivity**

[Ref Ananthanarayan 9<sup>th</sup>/e p. 548]

	HBsAg	Anti HBs Ag	HBeAg	Anti HBe Ag	Anti HBcAg
Acute HBV (high infectivity)	+	-	+		IgM
Acute HBV (low infectivity)	+	-		+	IgM
Chronic HBV (high infectivity)	+	-	+		IgG
Chronic HBV (low infectivity)	+	-		+	IgG
Recovery	-	+	-	+	IgG

**314. Among the given viruses, which is best cultivated from urine?**

a) Rubella

b) Norwalk

c) CMV

d) Mumps

Correct Answer - C

**Ans. is 'c' i.e.,CMV**

[Ref **Textbook of viruses and their method of identification of Adu** p. 23, 24]

**"Viral culture of the urine and saliva obtained within first two weeks of life continue to be the gold standard for diagnosis of Congenital CMV infection"**

### 315. True about peripheral blood smear of malaria are all except?

- a) Single ring form in P vivax
- b) Multiple ring form in P. falciparum
- c) Enlarged erythrocytes in P. vivax
- d) Enlarged erythrocytes in P falciparum

Correct Answer - D

**Ans. is 'd' i.e., Enlarged erythrocytes in P falciparum**

*[Ref Pankar 6<sup>th</sup>/e p. 75, 76; Chatterjee 12<sup>th</sup>/e p. 79]*

- Single infection (single ring form) per erythrocyte is seen in, P vivax malaria, whereas, P faciparum malaria is characterized by multiple infections (multiple rings) per erythrocyte,
- Infected erythrocyte is enlarged in P vivax malaria whereas, it is of normal size in P falciparum malaria.

**316. Laryngeal papillomas is caused by which HPV ?**

a) 6, 11

b) 16, 18

c) 33, 45

d) 4, 27

Correct Answer - A

**Ans. is 'a' i.e., 6, 11**

*[Ref Harrison 19<sup>th</sup>ie p. 1199; Medical microbiology p. 786]*

- Laryngeal papillomatosis is wart with commonly site of involvement is larynx and respiratory tract, involving HPV type 6 and 11.

### 317. Intermediate host for *Taenia saginata* is?

a) Man

b) Snail

c) Cattle

d) Pig

Correct Answer - C

**Ans. is 'c' i.e., Cattle**

*[Ref Chatterjee 12<sup>th</sup>ie p. 120]*

- commonly known as the **beef tapeworm**, is a zoonotic tapeworm.
- Humans are generally infected as a result of eating raw or undercooked beef which contains the infective larvae, called cysticerci.
- embryonated eggs, called oncospheres, are released with faeces and are transmitted to cattle through contaminated fodder.
- Oncospheres develop inside muscle, liver, and lungs of cattle into infective cysticerci.

### 318. Virus causing Acute respiratory distress syndrome [ARDS] is?

a) RSV

b) Coronavirus

c) H1 N1

d) Measles

Correct Answer - B:C

**Ans. is 'b' > 'c' i.e., Coronavirus and H1 N1**

*[Ref Textbook of human respiratory viral infections p. 239] .*

- The acute respiratory distress syndrome (ARDS) can be induced by viral diseases like community-acquired pneumonia and Herpesviridae
- ARDS has predominantly linked with Influenza virus (Mostly H5N1, sometimes H1N1), Corona virus (SARS - CoV, MERS - CoV)

### 319. Lues maligna is caused by?

a) Borrelia

b) Leptospira

c) Brachyspira

d) Treponema

Correct Answer - D

**Ans. is 'd' i.e., Treponema**

*[Ref Textbook of Clinical microbiology p. 712; Clinical Microbiology Review journals]*

- Lues maligna represents a rare form secondary syphilis ( caused by treponema pallidum).
- also known as 'malignant syphilis' or 'ulceronodular syphilis'.

**320. Outbreak of abscess following vaccine injection can be caused by which mycobacteria?**

a) M fortuitum

b) M. scrofulaceus

c) M Hordinae

d) M Avium

Correct Answer - A

**Ans. is 'a' i.e., M. fortuitum [Ref [www.ijmm.org](http://www.ijmm.org)]**

- "Most outbreaks of post-injection abscess have been caused by M fortuitum and M abscessus", Injection site abscess is an iatrogenic infection and is a simple out patient procedure to treat.
- M. chelonae, M. fortuitum and M. abscessus are the most important rapidly growing mycobacteria associated with such infections.

**321. Fletcher's medium containing Rabbit serum is used for ?**

a) Streptococcus

b) Bacillus anthracis

c) Leptospira

d) Borrelia

Correct Answer - C

**Ans. is 'c' i.e., Leptospira [Ref Essentials of clinical microbiology p. 786]**

- Media for the culture of leptospirae usually contain either rabbit serum (Fletcher medium, Stuart broth) or bovine serum albumin (EMJH medium plus long-chain fatty acids and vitamins (B1 & B12)).

## 322. Action of lysozymes on gram negative bacteria ?

- a) Faster than gram positive bacteria
- b) Has no action
- c) Depends on integrity of outer membrane
- d) Cause resistance to antibiotic

Correct Answer - C

**Ans. is 'c' i.e., Depends on integrity of outer membrane [Ref *Fundamentals of food microbiology 6<sup>th</sup>/e p. 496*]**

- **Lysozyme is an acetyl - mura midase** which cleaves bond between N-acetylmuramic acid and N-acetyl - D-glucosamine residues in peptidoglycan of all wall.
- Gram-positive bacteria are sensitive to action of lysozymes -> lysozymes cause lysis of gram-positive bacteria easily.
- Gram-negative bacteria are less susceptible and are protected by outer membrane, which is the outer most covering in gram negative bacteria (outside the cell wall) and has barrier function.
- However, lysozyme can cleave the peptidoglycan layer of Gram-negative bacteria if this layer is exposed by membrane attack complex (MAC or C5-9) of complement which destroys outer membrane.
- (Note : gram positive bacteria do not have outer membrane thus lysozymes directly act on cell membrane).

### 323. Cell wall of bacillus anthracis is composed of -

a) Peptidoglycan

b) Polysaccharide

c) Lipopolysaccharide

d) Polypeptide

Correct Answer - A

**Ans. is 'a' i.e., Peptidoglycan [Ref Ananthnarayan 9<sup>th</sup>/e p. 13]**

- The layer just outside the bacterial cytoplasmic membrane is the peptidoglycan layer or cell wall.
- It is present in both gram-positive and gram negative organisms.
- The peptidoglycan layer of gram positive bacteria is thick and contain teichoic acid, while in gram negative bacteria it is thin and does not contain teichoic acid.
- In gram negative organisms, there is outer cell membrane just outside the thin peptidoglycan layer (cell wall)
- Unique feature of gram negative bacteria dissolution of this layer by ethanol is responsible for gram negativity on gram staining.
- Chemically, cell wall is composed of mucopeptide (peptidoglycan or murein) scaffolding formed by N acetyl glucosamine and N acetyl muramic acid molecules alternating in chains, which are cross linked by peptide chains.

### 324. Throat swab is kept in ?

a) Plastic jar

b) Test tube

c) Petri dish

d) None

Correct Answer - B

**Ans. is 'b' i.e., Test tube [Ref Textbook of experiment in microbiology p. 49]**

- A throat - swab consists of an orange - stick with cotton wool wrapped round one end and placed in a test tube passing through a plug of non-absorbent cotton wool, with the free end of the stick protruding.
- The tubes with the swabs are kept in oven for sterilization.

### 325. Spore forming anaerobic gram positive bacilli ?

a) Bacillus Anthracis

b) Clostridia

c) Corynebacterium

d) Peptostreptococcus

Correct Answer - B

**Ans. is 'b' i.e., Clostridia [Ref Ananthanarayan 9<sup>th</sup>ie p. 245, 254]**

There are two medically important spore forming bacteria. Both of them are 'gram positive' `bacilli' :-

.. Aerobic : Bacillus

?. Anaerobic (obligate anaerobes) : Clostridia.

### 326. True about mycobacterium leprae ?

- a) Transmitted by droplet infection
- b) Phenolic glycolipid (PGL) is virulence factor
- c) Generation time 12-13 days
- d) All are true

Correct Answer - D

**Ans. is 'd' i.e., All are true [Ref Greenwood le p. 210; Ananthnarayan 9<sup>th</sup>ie p. 364-368]**

- Generation time of M. leprae is 12-13 days.
- 'Phenolic glycolipid- I (PGL-1)' acts as a virulence factor.
- Modes of transmission are :?**
- Droplet infection : Most common mode.
- Contact transmission : Either direct (skin to skin) or indirect (contact with contaminated soil or fomite).
- Other : Breast milk from lepromatous leprosy, by insect vector, by tattooing needles.

### 327. Which of the following is late lactose fermenter ?

a) E coli

b) Klebsiella

c) Salmonella

d) Shigella sonnei

Correct Answer - D

**Ans. is 'd' i.e., Shigella sonnei [Ref Ananthanarayan 9<sup>th</sup>ie p. 274]**

- **Lactose fermenters produce pink/bright red colonies on MacConkey's agar** , while lactose non-fermenters **produce** pale colonies :
- Lactose fermenters (rapid) : These are **Coliforms**, e.g. **Escherichia**, Klebsiella and Enterobacter aerogenes.
- Late lactose fermenters (slow): These are Shigella Sonnei, Serratia, Citrobacter, Arizona, Providencia and Ervinia.
- Non-lactose fermenters : Shigella except Shigella Sonnei, Salmonella, Proteus

### 328. Trachoma is caused by which serotype of chlamydia trachomatis ?

a) D to K

b) A, B, C

c) L<sub>1</sub> L<sub>2</sub> L<sub>3</sub>

d) All of the above

Correct Answer - D

**Ans. is. D. 'All of the above [Ref Ananthanarayan 9<sup>th</sup>/e p. 417 er S<sup>a</sup>le p. 417]**

#### **Diseases caused by C trachomatis**

1. Serotype A, B, Ba, C (Biovar TRIC) : Endemic blinding trachoma.
2. Serotype D to K (Biovar TRIG) : Inclusion conjunctivitis, genital chlamydiasis (non gonococcal urethritis & others), infantile pneumonia.
3. Serotype L I, L2, L3 (Biovar LGV) : Lymphogranuloma venerum, hemorrhagic proctitis.

**329. L<sub>1</sub> L<sub>2</sub> L<sub>3</sub> serovar of chlamydia trachomatis cause ?**

a) Trachoma

b) Inclusion conjunctivitis

c) NGU

d) LGV

Correct Answer - D

**Ans. is 'd' i.e., LGV [Ref Ananthanarayan 9<sup>th</sup>Ve p. 417 & 8<sup>th</sup>Ve p. 417]**

**330. Which of the following is always present in a virus?**

a) Enzymes

b) Envelop

c) RNA or DNA

d) All of the above

Correct Answer - C

**Ans. is 'c' i.e., RNA or DNA [Ref Ananthanarayan 9<sup>m</sup>/e p. 427, 428]**

- Viruses are obligate intracellular parasites.
- They lack enzymes necessary for protein and nucleic acid synthesis and are dependent for replication on the synthetic machinery of host cells - so, they cannot grow in cell free culture media.
- They do not have cellular organization - do not contain ribosome, ER, mitochondria etc.
- They contain only one type of nucleic acid, either RNA or DNA, never both.
- Virion may be enveloped or nonenveloped (naked).

### 331. Epidemic pleurodynia is caused by ?

a) Enterovirus -70

b) Coxsackie - A virus

c) Coxsackie -B virus

d) Enterovirus

Correct Answer - C

**Ans. is 'c' i.e., Coxsackie -B virus [Ref Greenwood 16<sup>th</sup>/e p 459]**

**There are two types of Coxsackie viruses :**

1. **Coxsackie A (Serotypes 1 to 24) :** They cause aseptic meningitis (especially A7 and A9), **Herpangina**, febrile illness, acute hemorrhagic conjunctivitis (by A24), and 'Hand-foot-mouth disease'.
2. **Coxsackie B (Serotypes 1 to 6) :** They cause aseptic meningitis (all serotypes), neonatal disease, **Bornholm disease (pleurodynia or epidemic myalgia)**, myocarditis, hepatitis, pancreatitis & DM (serotype B4), and pneumonia.

**332. Acute hemorrhagic fever with renal involvement is caused by ?**

a) KFD

b) Yellow fever

c) Hanta virus

d) JE

Correct Answer - C

**Ans. is 'c' i.e., Hanta virus [Ref Ananthanarayan 9<sup>th</sup>/e p. 527]**

**Hantavirus causes hemorrhagic fever with renal syndrome.**

### 333. Which virus may produce incomplete progeny ?

a) Influenza

b) Measles

c) Mumps

d) Polio

Correct Answer - A

**Ans. is 'a' i.e., Influenza [Ref Pariza 2<sup>nd</sup> ed p. 435]**

- When cells are infected with high dose of influenza virus, there is defective assembly during replication and the progeny virions are incomplete and non-infective.
- This is called as Man - magnus phenomenon

### 334. HPV causes which change in cervical epithelium ?

a) Induction of apoptosis

b) Induction of necrosis

c) Immortalization of epithelial cells

d) By stimulating telomerase

Correct Answer - C

**Ans. is 'c' i.e., Immortalization of epithelial cells [Ref Essentials of microbiology p. 424]**

- HPV selectively infects the epithelium of skin and mucous membrane and may immortalize the keratinocytes leading either asymptomatic infection, or warts or neoplasia.
- Products of **E-genes (E6, E7)** are related to immortalization or malignant transformation of keratinocytes by interfering with p53 **and Rb genes**, respectively.

### 335. Type of pneumonia in *P. jirovecii* ?

a) Lobar pneumonia

b) Interstitial pneumonia

c) Bronchopneumonia

d) Any of the above

Correct Answer - B

**Ans. is 'b' i.e., Interstitial pneumonia [Ref: Harrison 19<sup>th</sup>/e p. 1358]**

- Pneumocystis is an opportunistic fungal pulmonary pathogen.
- Most common site of involvement is **lung (pneumonia)**. Classical finding is bilateral diffuse infiltrates beginning in perihilar region.
- Upper lobe infiltrates may develop after aerosolized pentamidine therapy. There may be **pneumothorax**.

**336. Fungus which infects reticuloendothelial cells is -**

a) Cryptococcus

b) Candida

c) Aspergillus

d) Histoplasma

Correct Answer - D

**Ans. is 'd' i.e., Histoplasma [Ref Harrison 19<sup>th</sup>/e p. 1332; Ananthnarayan 8<sup>th</sup> le p. 612]**

- Histoplasma capsulatum is a dimorphic fungus.
- It causes intracellular infection of reticuloendothelial system

### 337. Immunoglobulin variation does not depend on -

a) Light chain

b) Heavy chain

c) Amino acid sequence

d) Constant region

Correct Answer - A

**Ans. is 'a' i.e., Light chain [Ref Ananthanarayan 9<sup>th</sup>le p. 99]**

- The isotype *variation* or class of antibody is due to variation in the amino acid sequence in the constant region of the heavy chain.
- Because there are five potential variation in the amino acid sequence in the constant region there are five classes of antibody i.e. IgG, IgM, IgA, IgD, IgE.

### 338. Postzone phenomenon is seen in ?

a) Antigen excess

b) Antibody excess

c) Equivalence zone

d) None of the above

Correct Answer - A

**Ans. is 'a' i.e., Antigen excess [Ref Ananthnarayan 9<sup>th</sup>/e p. 109]**

- Postzone phenomenon → Antigen excess
- Prozone phenomenon → Antibody excess

### 339. Opsonic index is the ratio of ?

a) C<sub>3b</sub> opsonin to antibody opsinin

b) Phagocytic activity of patient to phagocytic activity of normal individual

c) Serum concentration of opsonin in patient to serum concentration in normal individual

d) Complement activity in patient to complement activity in normal individual

Correct Answer - B

**Ans. is 'b' i.e., Phagocytic activity of patient to phagocytic activity of normal individual [Ref Pariza 2<sup>nd</sup> /e p. 115]**

- The coating of an antigen or particle (eg - infectious agent) by substances, such as antibodies, complement components and fibronectin facilitate phagocytosis. This is called opsonization.
- The substance which enhances phagocytosis (causing opsonization) is called opsonin. Two most important opsonins are antibodies (IgM, IgG) and complement (C3b).
- IgM is more effective than IgG in causing opsonization. Other opsonins are serum proteins like fibrinogen, mannose binding lectin and C-reactive proteins.
- The term 'Opsonic index' is defined as the ratio of of the phagocytic activity of patient's blood for a particular bacterium to the phagocytic activity of blood of normal individual.
- It is used to study the progress of resistance during the course of the disease.

### 340. True about LGV ?

a) Bleeding ulcer in 1<sup>st</sup> stage

b) Bubos in 1<sup>st</sup> stage

c) Groove's sign in 2<sup>nd</sup> stage

d) Proctocolitis in 2<sup>nd</sup> stage

Correct Answer - C

**Ans. is 'c' i.e., Groove's sign in 2<sup>nd</sup> stage**

**Stages of LGV are :?**

- First stage (Primary LGV) :- Self limited, Single, asymptomatic, painless, nonbleeding genital ulcer.
- Secondary stage : - Painful inguinal lymphadenopathy (Remember Ulcer is pain less but lymphadenopathy is tender & painful).
- Swollen lymph nodes coalesce to form **bubos, i.e.**, matted lymph nodes. Buboes may rupture to form discharging sinus. Groove's sign - Enlarge lymph nodes both above and below inguinal ligament.
- Tertiary LGV (genitorectal syndrome) : - Characterized by proctocolitis.

**341.  $>10^2$  colony forming unit per ml of urine is significant in ?**

a) Suprapubic aspiration

b) In-out catheterization

c) Per urethral catheterization

d) Clean void urine

Correct Answer - A

**Ans. is 'a' i.e., Suprapubic aspiration [Ref: Hutchison's textbook p. 614]**

- The number of bacteria taken as significant bacteriuria varies depending upon the type of sample -
- Suprapubic aspiration of bladder  $\rightarrow 10^2$  colony-forming units (CFU) per ml.
- In-out catheterization of bladder  $>10^3$  CFU/ml
- Clean void urine  $>10^4$  CFU/ml
- Carefully, collected urine in bag (unspun urine)  $\rightarrow >10^5$  CFU/ml

## 342. Burton's agammaglobulinemia is due to?

a) B-cell defect

b) IgA deficiency

c) Ig M deficiency

d) Ig G deficiency<sup>313</sup>

Correct Answer - A

**Ans is 'a' i.e. B-cell defect**

**[Ref Harrison 18 /e p. 478 & 17th/e p. 381; Robbin's 9<sup>th</sup>ie p. 240 & 8<sup>th</sup>ie p. 53, 55] X-Linked agammaglobulinemia of burton**

- There is defective humoral immunity with normal cell mediated immunity. It is characterized by the failure of B cell precursors (Pro-B cells and pre B cells) to mature into B cells.
- There is mutation in cytoplasmic tyrosine kinase called B - cell tyrosine kinase (Btk).
- The disease usually does not become apparent until about age 6 months, when maternal immunoglobulins are depleted.
- B cells are absent or markedly decreased in the circulation, and the serum levels of all classes of immunoglobulin.
- There is depletions of B cell area of lymphnode (Cortical follicles and medullary cord) and spleen (perifollicular region, germinal centre and mantle layer). Tonsil and adenoids are atrophic.
- T-cell collection areas are normal i.e. (i) Paracortical area in lymph nodes, and (ii) Periarterial lymphoid region & malpighian corpuscle in white pulp of spleen.
- The disease is seen almost entirely in males. There is recurrent bacterial infections of respiratory tract by H. influenzae, str. pneumoniae or staph. aureus.
- There is increased susceptibility to infection with enterovirus (echo,

coxsackievirus, poliovirus), giardia lamblia, and arthritis by mycoplasma.

- As there is agammaglobulinemia, Opsonization is defective (Immunoglobulins are the major opsonins in body).

### 343. Culture media for transport of stools in suspected case of shigellosis -

a) Deoxycholate medium

b) Blood agar

c) Nutrient broth

d) Buffered glycerol saline

Correct Answer - D

**Ans. is 'd' i.e., Buffered glycerol saline**

Streptococcus  
pyogenes

Pike's medium

Neisseria

Stuart's medium, Amies medium

For stool  
specimen

Buffered glycerol saline, Cary-Blair, Stuart  
medium

Salmonella,  
Shigella

Sach's buffered glycerol saline

V cholerae

VR medium, Cary-Blair medium,  
Autoclaved sea water

Bordetella

Modified Stuart's, Mischulow's charcol agar

### 344. True about hand hygiene -

a) Betadine can cause irritation

b) Alcohol based preparation are used

c) Hot water is best

d) Gluteraldehyde is used

Correct Answer - B

**Ans. is 'b' i.e., Alcohol based preparation are used [Ref Greenwood 16<sup>th</sup>/e p. 81]**

- Povidone iodine is the best skin disinfectant
- Povidone iodine (Betadine) is less irritant and cause less staining.
- Aqueous and alcohol-based povidone iodine preparations are widely used in skin disinfection including preoperative preparation of the skin.
- Commonly used skin disinfectants for hand washing are
- Povidone iodine (Betadine) 4 Best
- Chlorhexidine
- Isopropyl alcohol

**345. Blood soaked linen are disposed in -**

a) Black bag

b) Red bag

c) Green bag

d) White bag

Correct Answer - B

**Ans. is 'b' i.e., Red bag** [*Ref [www.osha.gov](http://www.osha.gov)*]

### 346. Glutraldehyde is used to sterilize -

a) Endoscopes

b) Corrugated rubber anaesthetic tube

c) Plastic endotracheal tubes

d) All of the above

Correct Answer - D

**Ans. is 'd' i.e., All of the above**

**Glutraldehyde is used for -**

1. Cystoscopes and bronchoscopes
2. Plastic endotracheal tubes
3. Corrugated rubber anaesthetic tubes
4. Polythene tubing Face masks
5. Endoscopes

### 347. Which portion of antibody binds to antigen -

a) Hinge region

b) Constant region

c) Variable region

d) Hypervariable region

Correct Answer - D

**Ans. is 'd' i.e., Hypervariable region [Ref: Harrison 19<sup>th</sup>/e p. 372 & 18<sup>11\*</sup> p. 2672, 2673;**

**Ananthanarayan 9<sup>th</sup>/e p. 95 & 8<sup>th</sup> le p. 97]**

- The amino acid sequences of the variable regions are not uniformly variable along their length, but consist of relatively invariable and some highly variable zones. The highly variable zones are involved with the formation of antigen binding sites. The sites on the hypervariable regions that make actual contact with the epitopes are called "complementarity determining regions (CDRs)".
- "The idiotype is defined as the specific region of the Fab portion of the Ig molecule to which antigen binds". - Harrison 16<sup>th</sup>/e 1922
- The infinite range of the antibody specificity of immunoglobulin depends on the variability of the amino acid sequences at the variable regions of the H and L chains which form the antigen combining sites.

### 348. True about staphylococcus aureus -

a) Micro aerophilic

b) Produce lemon yellow colonies

c) Grows with 10% NaCl

d) All are true

Correct Answer - C

**Ans. is 'c' i.e., Grows with 10% NaCl [Ref: Ananthanarayan 9<sup>th</sup> le p. 199-202]S**

- staphylococcus is facultative anaerobe. Optimum pH for growth is 7.4 - 7.6 and optimum temperature is 37°C.
- Staph aureus produces golden yellow pigment, which is maximum at 22°C.
- Most of the staphylococcus species grow in the presence of 10% NaCl.
- On nutrient agar slope there is characteristic Oil paint appearance. For primary isolation, sheep blood agar is recommended. Human blood should not be used as it may contain antibodies or other inhibitors
- Staph aureus → Golden yellow colonies
- Staph epidermidis (also called staph albus) → White colonies
- Staph citreus → Lemon yellow colonies

### 349. Griffith typing is done for -

a) Staphylococcus

b) Streptococcus

c) Meningococcus

d) Gonococcus

Correct Answer - B

**Ans. is 'b' i.e., Streptococcus** [Ref: Ananthanarayan 9<sup>th</sup>/e p. 209, 210]

- Hemolytic streptococci were classified by lancefield serological classification into groups based on nature of 'C' carbohydrate antigen on the cell wall.
- These are known as Lancefield groups, twenty of which have been identified so far and named A to V (without I and J).
- Group 'A' strep. are further subdivided into types based on the protein (M, T and R) antigens present on the cell surface (Griffith typing). About 80 types of str. pyogenes have been recognized.

### 350. Incubation period for *Nector americanus*

-

a) 1 week

b) 2 weeks

c) 3 weeks

d) 5-6 weeks

Correct Answer - D

**Ans. is 'd' i.e., 5-6 weeks**

- Following penetration, *N-americanus* migrates to the lung within about 10 days.
- After 3-5 weeks, it passes through the GIT and attaches to the intestinal mucosa, where it matures into the adult worm and may stay for up to – 5 years
- The average period between larva penetration and egg production (prepatent period) is 4-8 weeks.
- "Incubation period is variable, generally GI symptoms can appear 35-40 days after penetration of filiform larva."
- "The incubation period can vary between a few weeks to many months and largely dependent on the number of hook worm parasites an individual is infected with" -

**351. What genetic peculiarity is there in pathogenic/ toxigenic strain of corynebacterium diphtheriae but not in nonpathogenic [non-toxigenic] strain -**

a) Presence of R-factor

b) Presence of [tox-]gene

c) Integrated temperate phage

d) Presence of MDR gene

Correct Answer - C

**Ans. is 'c' i.e., Integrated temperate phage [Ref: See above explanation]**

- The toxigenicity of the diphtheria bacilli depends on the presence in it of corynephages (tox +). Nontoxigenic strains may be rendered toxigenic by infecting them with beta phage or some other larger phage.
- This is known as lysogenic conversion or phage conversion.

**352. All are true about Norwalk virus except -**

a) Belongs to calciviridae

b) Cultivated in cell culture

c) Causes gastroenteritis

d) Is a RNA virus

Correct Answer - B

**Ans. is 'b' i.e., Cultivated in cell culture** [Ref Medical microbiology by Patrick p. 473]

- "Most calciviruses and astroviruses can be grown in cell culture, but the Norwalk viruses cannot"
- Norwalk virus belongs to family calciviridae (RNA viruses) and genus Noroviruses.
- Norwalk virus causes outbreak of gastroenteritis from a common source of contamination (water, shellfish, salad).

**353. Thick pus of streptococci is converted thin by enzyme -**

a) DNAase

b) Streptokinase

c) RNAase

d) C5a peptidase

Correct Answer - A

**Ans. is 'a' i.e., DNAase [Ref Vasantha kumari p. 194]**

- Deoxyribonuclease (DNAase) of streptococcus is also called as streptodornase.
- They cause depolymerization of DNA. **They liquefy highly viscous DNA that accumulates in thick pus.**
- This is responsible for the thin serous character of streptococcal exudates.

### 354. Most common genital infection in HIV infected patient

a) Chlamydia

b) Herpes

c) Syphilis

d) Candida

Correct Answer - B

**Ans. is 'b' i.e., Herpes**

- 'Herpes simplex (in the developed world) and chancroid (in Africa) are the most common cause of genital ulceration in HIV infected patients.' - An Atlas of differential diagnosis in HIV disease' by Lipman, Gluck and Johnson 1st (1995) p. 30

### 355. Which of the following is a lentivirus

a) HIV

b) HBV

c) HCV

d) Rabies virus

Correct Answer - A

**Ans. is 'a' i.e., HIV [Ref Harrison 19<sup>th</sup>ie p. 1215-1221;  
Anentnarayan 9<sup>th</sup> le p. 574, 575]**

- The etiologic agent of AIDS is HIV, which belongs to the family of human retroviruses (Retroviridae) and the subfamily of lentiviruses.
- HIV is also known as Human T cell lymphotropic virus HI (HTLV-III) or Lymphadenopathy associated virus (LAV).

### 356. Cell fusion of HIV with target cell is done by

a) gp 120

b) gp 41

c) p24

d) p 18

Correct Answer - B

**Ans. is 'b' i.e., gp 41 [Ref Harrison 19<sup>th</sup>/e p. 1215-1221; Ananthanarayan 9<sup>th</sup>/e p. 574, 575]**

- gp 120 → Binding of HIV to CD4 antigen on T-cell.
- gp 41 → Fusion of HIV to target cell (T-cell)
- The HIV envelop contains two glycoproteins, surface gp120 that is noncovalently attached to transmembrane protein, gp41.
- The initial step in infection is the binding of gp120 envelop glycoprotein to CD4 molecules.
- This binding leads to a conformational change that result in the formation of a new recognition site on gp120 for the coreceptor CCR5 or CXCR4.
- The next step involves conformational changes in gp41.
- These changes results in the insertion of fusion peptide at the tip of gp41 into the cell membrane of target cell (CD4 T-cells or macrophages).
- After fusion, the virus core containing the HIV genome enters the cytoplasm of the cell.

### 357. Sereny test is positive in -

a) Entero-invasive E.coli [EICE]

b) Entero-pathogenic E.coli [EPEC]

c) Entero-toxigenic E.coli [ETEC]

d) Entero-aggregative E.coli [EAEC]

Correct Answer - A

**Ans. is 'a' i.e., Entero-invasive E. coli**

- Sereny test is done for EIEC and shigella.
- In this test, instillation of a suspension of freshly isolated ETEC or shigella into the eyes of guinea pigs leads to mucopurulent conjunctivitis and severe keratitis.

**358. Halophilic vibrio which causes wound infection at sea coast is**

a) *Vibrio vulnificus*

b) *Vibrio parahaemolyticus*

c) *Vibrio mimicus*

d) *Vibrio cholerae*

Correct Answer - A

**Ans. is 'a' i.e., *Vibrio vulnificus* [Ref Harrison 19<sup>th</sup>ie p. 1065]**

- ***Vibrio vulnificus* is an opportunistic pathogen (Halophilic vibrio) that is primarily associated with wound and ear infections and occasionally eye infections.**

**359. Most important serotype of E coli causing hemolytic uremic syndrome -**

a) O 157: H7 of EHEC

b) O 107: H7 of EIEC

c) O 157: H7 of ETEC

d) O 109: H7 of EAEC

Correct Answer - A

### 360. HP body is seen in

a) Chlamydia trachomatis

b) Chlamydia psittaci

c) Chlamydia pneumoniae

d) Mycoplasma hominis

Correct Answer - A

**Ans. is 'a' i.e., Chlamydia trachomatis [Ref: Ananthanarayan 9<sup>th</sup>/e p. 421)**

**HP bodies are seen in :-**

- Chlamydia trachomatis - Halberstaedter Prowazek (HP) body
- Molluscum contagiosum - Henderson paterson (HP) bodies.

### 361. Most serious form of Rickettsial disease -

a) Scrub typhus

b) Q-fever

c) Trench fever

d) Rocky mountain spotted fever

Correct Answer - D

**Ans. is 'd' i.e., Rocky mountain spotted fever [Ref: With text]**

- "Among the Rickettsial diseases, Rocky mountain spotted fever is the most common and the most serious"
- The microbial challenge "**R rickettsii (causative agent of RMSF) is the most virulent Rickettsia**" — Clinical microbiology

### 362. Most common cause of cellulitis ?

a) Streptococcus

b) Staphylococcus

c) Pseudomonas

d) E. coli

Correct Answer - A

**Ans. is 'a' i.e., Streptococcus**

**Streptococcus pyogenes (group A  $\beta$  - hemolytic streptococcus) is the most common cause of:-**

- Acute tonsillitis in children ii) Cellulitis iii) Peritonsillar abscess (quinsy)
- Sore throat (pharyngitis)

**363. Which complement binds with Fc portion of IgM in Classic pathway ?**

a) C1

b) C2

c) C3

d) C4

Correct Answer - A

**Ans. is 'a' i.e., C1 [Ref Jawetz 24<sup>th</sup>/e Chapter 8]**

- C1q portion of C1 binds to the Fc portion of IgM (C<sub>H</sub>2 region) and IgG (C<sub>H</sub>4 region).

**364. Which of the following complement components attaches to the crystallizable fragment of immunoglobulin M ?**

a) C5b

b) C5a

c) Clqrs

d) C4b2a

Correct Answer - C

**Ans. is 'c' i.e., Clqrs [Ref Jawetz 24<sup>th</sup>/e Chapter 8]**

- Only IgM and IgG activate or fix complement via the classic pathway. Of the IgGs, only IgG subclasses 1, 2 and 3 fix complement; IgG4 does not.
- Cl, which is bound to a site in the Fc region, is composed of three proteins: Clq, Clr and Cls. Clq is an aggregate of polypeptides that bind to the Fc portion of IgG and IgM.
- The antibody-antigen immune complex bound to Cl activates Cls, which cleaves C4 and C2 to form C4b2b. The latter is an active C3 convertase, which cleaves C3 molecules into two fragments: C3a and C3b.

**365. Immunoglobulin responsible for anamnestic response is -**

a) IgA

b) IgG

c) IgM

d) IgE

Correct Answer - B

**Ans. is 'b' i.e., IgG [Ref Essential immunology p. 126]**

- Antibody response to antigenic stimulus are?
- Primary response : It is the response to first exposure to antigen and is mainly mediated by IgM.
- Secondary response (anamnestic response) : It is due to subsequent exposure to antigen and is mediated mainly by IgG.

**366. Patient presented with fever, coughing, headache. He developed rash on 3rd day, what is probable diagnosis ?**

a) Measles

b) Mumps

c) Small pox

d) Chicken pox

Correct Answer - A

**Ans. is 'a' i.e., Measles [Ref Jawetz 24<sup>5</sup>/e chapter 40]**

- Measles → Rash appears 3-4 days after onset of febrile illness
- Mumps → There is no rash
- Small pox → Already eradicated
- Chicken pox → Rash appears on day 1 of febrile illness.

### 367. Heavy chain of IgA is ?

a) Gamma

b) Mu

c) Delta

d) Alpha

Correct Answer - D

**Ans. is 'd' i.e., Alpha [Ref Ananthanarayan 8<sup>th</sup>/e p. 96]**

Ig G  $\gamma$  (gamma)

Ig A  $\alpha$  (alpha)

IgM  $\mu$  (mu)

Ig D (delta)

Ig E  $\epsilon$  (epsilon)

### 368. Feces are not routinely inoculated in ?

a) Chocolate broth

b) Selenite F broth

c) Mc Conkeys agar

d) Blood agar

Correct Answer - A

**Ans. is 'a' i.e., Chocolate broth [Ref Essentials microbiology p. 393]**

**Inoculate media for routine stool culture are :?**

- Blood agar
- MacConkey agar
- Hektoen enteric HE ( agar)
- Selective media for campylobactor : Campy BAP, skirrow
- Selenite F broth or GN Broth
- Xylose-lysine deoxycholate agar (XLD agar)

**For specific situations, selective media are used :-**

- Vibrio : TCBS agar or Alkaline peptone broth.
- Yersinia : Cefsulodin-Irgasan-Novobiosin (CIN) agar or Phosphate Buffered Saline (PBS) broth.
- E.coli 0157: H7 : Sarbitol-MacConkey agar.

**369. Most of the Bacteriophage capsid exhibits which symmetry?**

a) Helical

b) Icosahedral

c) Spherical

d) Filamentous

Correct Answer - B

**Ans. is 'b' i.e., Icosahedral [Ref Essentials of Microbiology p. 638]**

**There are three basic structural forms of a phage :-**

1. Icosahedral head with a tail
  2. Icosahedral head without a tail
  3. Filamentous form
- Icosahedral head with a tail is the most common

### 370. Composition of ZN stain are all EXCEPT?

a) Basic fuchsin

b) Acid fuchsin

c) Phenol

d) Alcohol

Correct Answer - B

**Ans. is 'b' i.e., Acid fuchsin [Ref Jawetz Microbiology 24<sup>51e</sup> chapter 47]**

**Reagents required in Ziehl-Neelsen (ZN) staining**

1. Carbol fuchsin → Strong Carbol fuchsin is basic fuchsin dissolved in phenol (Carbolic acid).
2. Acid alcohol (or sulfuric acid).
3. Methylene blue (or malachite green).

### 371. Which Viral Infection associated with Exacerbation of Asthma in COPD Patients ?

a) Adenovirus + Rhino Virus

b) Rhinovirus + Corona Virus

c) RSV + Coronavirus

d) Rhinovirus + RSV + Influenza

Correct Answer - D

**Ans. is 'd' i.e., Rhinovirus + RSV + Influenza [Ref Harrison 18<sup>th</sup>Ve chapter 260]**

- Viruses associated with exacerbation of COPD : Rhinovirus, Coronavirus, RSV, influenza virus.
- Bacteria associated with exacerbation of COPD : Pneumococcus, H influenzae, M catarrhalis, Mycoplasma pneumoniae, Chlamydia pneumoniae.

### 372. Phototropism means ?

- a) Growing towards the sunlight
- b) Obtaining energy from sunlight
- c) Reflecting energy from light source
- d) None of above

Correct Answer - B

**Ans. is 'b' i.e., Obtaining energy from sunlight [Ref Lehninger's 4<sup>th</sup>le p. 5]**

- Phototropism → Trapping and using sunlight for energy.

**373. Most common cause of pyelonephritis in pregnant women?**

a) E. Coil

b) Klebsiella

c) N. gonorrhoea

d) S. aureus

Correct Answer - A

**Ans. is 'a' i.e., E. Coil [Ref Harrison 17<sup>th</sup>/e p. 1820-1823 & Harrison 18<sup>th</sup>/e chapter 288]**

E. Coil is the most common cause of pyelonephritis in pregnant and nonpregnant women.

### 374. Most common cause of non gonococcal septic arthritis is ?

a) Staph aureus

b) H. influenzae

c) Streptococcus pyogenes

d) Pneumococcus

Correct Answer - A

**Ans. is 'a' i.e., Staph aureus**

- Staphylococcus aureus is the most common cause of septic arthritis in all ages although group-B streptococcus is also a common cause in newborns.
  - H. influenzae was a common cause of septic arthritis in children but has now become rare due to the routine use of the conjugate vaccine. In young sexually active adolescents and adults two bacteria are commonly implicated.
- .. Staph aureus (non-gonococcal septic arthritis)  
?. Neisseria gonorrhoeae (gonococcal septic arthritis).

### 375. Community acquired pneumonia in person rearing sheep ?

a) *Coxiella burnetii*

b) *Histoplasma capsulatum*

c) *Streptococcus Pneumoniae*

d) *Bacillus anthracis*

Correct Answer - A

**Ans. is 'a' i.e., *Coxiella burnetii* [Ref Jawetz Microbiology 24<sup>th</sup>/e chapter 27, 48]**

- *C. burnetii* is found in ticks, which transmit the agent to sheep, goats and cattle.
- Workers in Slaughterhouses and in plants that process wool and cattle hides have contracted the disease (Q fever) as a result of handling infected animal tissue.
- *C. burnetii* causes Q-fever which presents as interstitial pneumonia.

**376. Eschar is formed by which of the following organism ?**

a) B. Henslae

b) B. Anthracis

c) Staph aureus

d) E. coli

Correct Answer - B

**Ans. is 'b' i.e., B. Anthracis**

- Cutaneous anthrax is also called malignant pustule. The lesion *starts as macule* then typically progress through papular and vesicular or pustular stages to the formation of an ulcer with a blackened necrotic eschar.

### 377. HPV is associated with ?

a) Carcinoma lung

b) Carcinoma brain

c) Carcinoma kidney

d) Carcinoma head neck

Correct Answer - D

**Ans. is 'd' i.e., Carcinoma head neck [Ref Essentials microbiology p. 424]**

**Cancers associated with HPV are :?**

Cervical carcinoma

Anal carcinoma

Vulvar carcinoma

Penile carcinoma

Vaginal carcinoma

Oropharyngeal carcinoma (soft palate, base of tongue, tonsils).

### 378. Variola virus is ?

a) Orthopox

b) Parapox

c) Copripox

d) Suipox

Correct Answer - A

**Ans. is 'a' i.e., Orthopox [Ref Ananthanarayan S<sup>t</sup>/Ye p. 461]**

**Poxviridae has been classified into two subfamilies -**

- Chordopoxvirinae : Poxviruses of vertebrates.
  - Entomopoxvirinae : Poxviruses of insects which do not infect vertebrates.
- Chordopoxvirinae are classified into six genera or subgroups -**
- Orthopoxvirus : These are mammalian poxviruses that tend to cause generalized infection with rash. Exmples are variola (smallpox virus), vaccinia, cowpox, monnkeypox, rabbitpox, buffalopox, camelpox, mousepox.
  - Parapoxvirus : Viruses of ungulates that may occasionally infact human, eg. Orf (contagious pustular dermatitis) and paravaccinia (milker's node, bovine pupular stomatitis).
  - Copripoxvirus : Viruses of goat and sheeps, eg. sheep-pox, goatpox, lumpy skin disease.
  - Leporipox virus : Viruses of of leporids (rabbits, hares, squirrels), e.g. myxoma and fibromas.
  - Avipoxvirus : Virus of birds, eg. fowlpox, turkeypox, pigeonpox, canarypox.
  - Suipoxvirus : Virus of swine, eg. swinepox.

### 379. Sensitivity of urinary Antigen test of Legionella is?

a) 80%

b) 90%

c) 95%

d) 99%

Correct Answer - B

**Ans. is 'b' i.e., 90% [Ref Infectious Disease Secrets edited by Robert H. Gates 2<sup>nd</sup>/e p. 5]**

- Rapid urinary antigen detection test for L. Pneumophila is a latest test. Sensitivity of the Legionella urinary antigen is 65-90%, with higher sensitivities in patients with severe disease and patients with mild disease whose specimen are concentrated prior to testing. Sensitivity with concentrated urine reaches 90%.

### 380. Which antigen of rabies virus stimulates antibody production ?

a) Lipoprotein

b) Glycoprotein

c) Phosphoprotein

d) Intranuclear protein

Correct Answer - B

**Ans. is 'B' i.e., Glycoprotein**

**There are following antigenic structures in rabies virus :?**

- 1) Glycoprotein G (on surface spikes)
  - It is important in virulence, pathogenesis and immunity.
  - It is *serotype specific*.
  - It induces protective antibodies(D<sup>''''</sup>), mediates binding of virus to Ach receptors and stimulates cytotoxic T-cells.
- 2) Nucleocapsid protein
  - It is group specific and antibodies against it are not protective.
- 3) Other antigens
  - These are two membrane proteins, glycolipid, and RNA dependent RNA polymerase.

**381. In burn ward there is a staphylococcus infection to many patients. Where would the staphylococcus be colonized at ?**

a) Throat

b) Nose

c) Vagina

d) Peri-anal region

Correct Answer - B

**Ans. is 'b' i.e., Nose [Ref Jawetz Microbiology 24<sup>th</sup>/e chapter 14]**

- S. aureus is part of normal human flora. The anterior nares is the most frequent site of human colonization although the skin (especially when damaged), vagina, axilla, perineum and oropharynx may also be colonized.
- Staphylococci are part of normal human bacterial flora with about 30% of general population being nasal carriers and another 10% carrying it on the perineal skin.

### 382. True about protein A of staph aureus ?

a) Causes opsonization

b) Binds to Fc part of IgG

c) Stimulate phagocytosis

d) T-cell mitogen

Correct Answer - B

**Ans. is 'b' i.e., Binds to Fc part of IgG [Ref Ananthanarayan 8<sup>th</sup>le p. 197, 198]**

- Protein 'A' binds to Fc terminal of IgG (IgG 1, 2 & 4 but not IgG3) and prevents opsonophagocytosis by PMNs.
- It is a B-cell mitogen. It is chemotactic, anti-complementary and antiphagocytic.

### 383. Avian flu is ?

a) Type A

b) Type B

c) Type C

d) Type D

Correct Answer - A

**Ans. is 'a' i.e., Type A [Ref Harrison 18<sup>th</sup>/e p. 1494]**

- Avian flu (avian influenza) is caused by Type A influenza virus with various HN strains.

**384.**

## Protein A of staph aureus is part of bacterial ?

a) Genome

b) Cell wall

c) Limiting membrane

d) Plasmid

Correct Answer - B

**Ans. is 'b' i.e., Cell wall [Ref Jawetz Microbiology 24<sup>th</sup>/e chapter 20]**

- Protein A is a cell wall component of many S aureus strains that binds to the Fc portion of IgG molecules except IgG3.
- The Fab portion of IgG bound to protein A is free to combine with a specific antigen. Protein A has become an important reagent in immunology and diagnostic laboratory technology; for example, protein A with attached IgG molecules directed against a specific bacterial antigen will agglutinate bacteria that have that antigen ("coagglutination").

### 385. Red pigment producing bacteria is ?

a) E coli

b) Bordetella parapertussis

c) Pseudomonas aeruginosa

d) Serratia marcesans

Correct Answer - C:D

**Ans. is 'd > c' i.e., Serratia marcesans > Pseudomonas aeruginosa [Ref: Read below]**

- Serrati marcescens produces red-colored pigment prodigiosin.
- Pseudomonas mainly produces blue-green Colored pyocyanin. But it can also produce pyoverdin (greenish-yellow), pyorubin (red) and pyomelanin (black).

### 386. ASO titre is useful in diagnosis of ?

a) S. bovis

b) S. pyogenes

c) S. agalactiae

d) S. pneumonia

Correct Answer - B

**Ans. is 'b' i.e., S. pyogenes [Ref Pediatric cardiology for practitioners 2<sup>nd</sup>ie p. 251]**

- Positive throat cultures or rapid streptococcal antigen tests for group A streptococci are less reliable for antecedent infection capable of producing rheumatic fever because they do not distinguish between recent infection and chronic pharyngeal carriage (as many people are carrier of this bacteria).
- Antibody tests are the most reliable laboratory evidence of antecedent streptococcal infection capable of producing acute rheumatic fever. The onset of clinical manifestations of acute rheumatic fever coincides with the peak of the streptococcal antibody response.
- The antibodies used commonly for serological tests are antistreptolysin O (ASO), antideoxyribonuclease (Anti-DNAse) and antihyaluronidase.

### 387. Streptococcus is called as flesh eating bacteria due to its?

a) Streptolysin A

b) Streptolysin O

c) Pyrogenic exotoxin

d) Hyaluronidase

Correct Answer - C

**Ans. is 'c' i.e., Pyrogenic exotoxin [Ref Ananthanarayan 8<sup>th</sup>/e p. 209]**

- Streptococcal necrotising fasciitis is caused by streptococcus pyogenes M types 1 and 3 strains forming pyrogenic exotoxin A.
- These strains have earned notoriety under the name "Flesh eating bacteria" and cause extensive necrosis of subcutaneous and muscular tissue and adjacent fascia which may be associated with severe systemic illness.

**388. Surrogate marker for MRSA detection is ?**

a) Cefotaxime

b) Ceftazadime

c) Cephloridine

d) Cefoxitin

Correct Answer - D

**Ans. is 'd' i.e., Cefoxitin**

- Testing with cefoxitin as a surrogate marker for the detection of methicillin resistance was very accurate with both disc both disc diffusion and agar dilution methods.
- Such testing clearly distinguished methicillin-resistant strains of S.aureus from methicillin-susceptible strains.

### 389. Staphalococcus Oxacillin resistance is best detected by?

a) Cefotixin MIC

b) Cefotixin disc diffusion

c) Oxacillin disc diffusion

d) Oxacillin agar

Correct Answer - B

**Ans. is 'b' i.e., Cefotixin disc diffusion**

- Oxacillin (also methicillin) resistance is detected by finding the presence of mec A gene.
- "Cefoxitin disc diffusion has been reported to more accurately predict mec A gene presence than oxacillin disc diffusion."
- The use of cefoxitin MIC test has not been recommended by the CLSI-AST (Clinical and Laboratory Standards Institute), but its presence is equivalent to cefoxitin disc diffusion.

### 390. Staphylococcus is localized in ?

a) SSSS

b) TSS

c) Food poisoning

d) Carbuncle

Correct Answer - D

**Ans. is 'd' i.e., Carbuncle [Ref Harrison's 10e chapter 135]**

- Carbuncle is a localized infection of Staphylococcus.
- SSSS (Staphylococcal Scalded Skin Syndrome), food poisoning and TSS are toxin mediated

### 391. Diphtheria toxin resembles toxin of ?

a) Birds

b) Spider

c) Snake

d) Scorpion

Correct Answer - C

**Ans. is 'c' i.e., Snake [Ref Jawetz Microbiology 24<sup>th</sup>/e chapter 13]**

- Nerve damage caused by diphtheria toxin resembles to action of neurotoxic snakes (Cobra).

**392. Streptococcus toxin which is responsible for connective tissue breakdown ?**

a) Hyaluronidase

b) Streptolysin O

c) Streptolysin S

d) Streptococcus pyogenic exotoxin

Correct Answer - A

**Ans. is 'a' i.e., Hyaluronidase [Ref Jawetz 24<sup>th</sup>/e chapter 15]**

- Hyaluronidase splits hyaluronic acid, an important component of the ground substance of connective tissue. Thus, hyaluronidase aids in spreading infecting microorganisms (spreading factor).
- Hyaluronidases are antigenic and specific for each bacterial or tissue source. Following infection with hyaluronidase-producing organisms, specific antibodies are found in the serum.

**393. A 4 yr old partially immunized boy came to OPD with history of bouts of coughing. On staining the sputum sample an organism with bipolar staining was seen. Which among the following organism it would be ?**

a) Y. Pestis

b) B. pertussis

c) S. Agalactae

d) K. Pneumoniae

Correct Answer - B

**Ans. is 'b' i.e., B. pertussis [Ref Jawetz Microbiology 24<sup>th</sup>/e chapter 19]**

- Bouts of Coughing and bipolar staining suggest the diagnosis of whooping cough (pertussis).