1. All of the following are part of innate immunity except:

a) Complement

b) NK cells

c) Macrophages

d) T cells

e) None

Correct Answer - D

Ans. (d) T **cells** *Ref Harrison 17/e; p 2021, 2031, 18/e, p 2651. 2668* Components of the Adaptive Immune System

Cellular	Thymus-derived (T) lymphocytes - T cell precursors in the thymus; naive mature T lymphocytes before antigen exposure; memory T lymphocytes after antigen contact; helper T lymphocytes for B and T cell responses; cytotoxic T lymphocytes that kill pathogen- infected target cells.
Humoral	Bone-marrow-derived **(B)** lymphocytes - B cell precursors in bone marrow; naive B cells prior to antigen recognition; memory B cells after antigen contact; plasma cells that secrete specific antibody.
Cytokines	**Soluble proteins that direct focus and regulate specific T versus B lymphocyte immune responses.**

Major Components of the Innate Immune System

Pattern recognition	**C type lectins, leucine-rich proteins, scavenger receptors, pentraxins, lipid transferases;**

receptors(PRR)	**integrins**
Antimicrobial peptides	a-Defensins, 8-defensins, cathelin, protegrin, granulysin, histatin, secretory leukoprotease inhibitor, and probiotics
Cells	Macrophages, dendritic **cells, NK cells, NK-T cells, neutrophils, eosinophils, mast cells, basophils, and epithelial cells.**
Complement components	Classic and altAutocrine, paracrineernative complement pathway, and proteins that bind complement components
Cytokines	Autocrine, paracrine, endocrine cytokines that mediate host defence and inflammation, as well as recruit, direct, and regulate adaptive immune **responses**

2. Which is true about syphilis:

a) VDRL test detects antibodies

b) Jarisch herxheimer reaction-IgE mediated

c) Penicillin is preferred treatment for primary and secondary stage

d) RPR can be done for CSF

e) None

Correct Answer - A:C

Ans (a and c) VDRL test detects antibodies, Penicillin is preferred treatment for primary and secondary stage

Jarisch: Herxheimer reaction is mediated by release of lipoproteins, cytokines and immune complex.

Evaluation for neurosyphilis:

- Pleocytosis, increased protein concentration
- CSF VDRL is highly specific and when reactive is considered diagnostic of neurosyphilis
- Patient with RPR titre 1:32 are at higher risk for developing neurosyphilis.

3. True regarding leptospirosis is?

a) Rats are the only reservoirs

b) Fluoroquinolones are the DOC

c) Person to person transmission rare

d) Hepatorenal syndrome occurs in 50% cases

e) None

Correct Answer - C

Ans. (c) i.e. Person to person transmission rare

Note: - Weil syndrome develops in 5-10% of infected individual • Treatment of choice for leptospirosis is Ampicillin • Doxycycline is the drug of choice for chemoprophylaxis.

4. Function of reverse transcriptase:

a) RNA dependent DNA synthesis

b) DNA dependent RNA synthesis

c) DNA dependent DNA synthesis

d) RNA dependent RNA synthesis

e) Involved in protein synthesis

Correct Answer - A
Ans. a. RNA dependent DNA synthesis

5. True about staphylococcus aureus -

a) Micro aerophilic

b) Produce lemon yellow colonies

c) Grows with 10% Nacl

d) All are true

e) None

Correct Answer - C

Ans. is 'c' i.e., Grows with 10% Nacl *[Ref: Ananthanarayan 9th 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 at it may contain antibodies or other inhibitors
- Staph aureus → Golden yellow colonies
- Staph epidermidis (also called staph albus) → White colonies
- Staph citrus → Lemon yellow colonies

6. Gram negative cell wall contains?

a) Peptidoglycan

b) Lipopolysaccharides

c) Lipids

d) Teichoic acid

e) All of the above

Correct Answer - A:C

Ans. is 'a' i.e., Peptidoglycan & 'c' i.e., Lipids

[Ref: Ananthanarayan 9th/e p. 15 & 8th/e p. 17; Bailey & Scott's diagnostic microbiology p. 19]

- Lipoploysacharide are found in the outer membrane of cell wall, not in cell wall itself
- 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.
- 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.
- The outer 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.

7. Which of the following organism(s) is/are not cultivable?

a) Mycobacterium leprae

b) Klebsiella rhinoscleromatis

c) Rhinosporidium seeberi

d) Pneumocystis jiroveci

e) None

Correct Answer - C:D

Ans. is 'c' i.e., Rhinosporidium seeberi,

- The life cycle of pneumocystis probably involves sexual and asexual reproduction, although definitive proof awaits the development of a reliable culture system
- Rhinosporidium seeberi has not been cultivated in media.
- M. leprae is obligate intracellular organism, thus cannot be grown in cell free culture medium. Two animals are used for cultivation.

8. Halophilic vibrios include?

a) Vibrio cholare

b) Vibrio parahymolyticus

c) Vibrio vulnificus

d) Vibrio alginolyticus

e) Vibrio mimicus

Correct Answer - B:C:D

Ans. is 'b' i.e., Vibrio parahymolyticus,

- Vibrios that have a high requirement of sodium chloride are known as halophilic vibrios. They are abundant in coastal water throughout the world.
- All vibrios are halophilic except V cholerae and V mimicus.
- Examples are - V. Parahaemolyticus, V. fluvialis, V. alginolyticus, V. Hallisae, V. Vulnificus, V. furnissii, V. damsel.
- Vibrio alginolyticus is the most salt tolerant (most halophilic) species of vibrio.

9. Lymphatic filariasis is caused by?

a) Loa loa

b) Wuchreria bacrofti

c) Brugia malayi

d) Brugia timori

e) Onchocerca volvulus

Correct Answer - B:C:D

Ans. is 'b' i.e., Wuchreria bacrofti, 'c' i.e., Brugia malayi & 'd' i.e., Brugia timori *[Ref: Harrison 19th/e p. 1418 & 17th/e p.1324, Panikar 6th Ie p.196]*

- Filariasis is a parasitic and infectious tropical disease, that is caused by filarial nematode worms.
- Lymphatic filariasis : Wuchereria bancrofti, Brugia malayi,Brugia timori.
- Lymphatic filariasis is caused by Wauchereria bancrofti: Most commonly(Bancroftian filariasis); and B. malayi & B. timori (Brugian filariasis).
- Man is the definitive host and mosquito is the intermediate host.
- Microfilariae resides in the blood and adult worm in the lymphatics.
- The inflammatory phase is characterized by Lymphangitis, lymphadenitis and adenolymphangitis. It lasts for a few days, then subsides spontaneously & recurs at irregular intervals for a period of weeks to months.

10. Fever with rash is caused by?

a) Streptococcus pyogens

b) Staphylococcus aureus

c) Meningococcus

d) Vibrio cholera

e) Salmonella typhi

Correct Answer - A:B:C:E

Ans. is 'a' i.e., Streptococcus pyogens, 'b' i.e. Staphylococcus aureus, 'c' i.e

- Vesiculobullous eruptions are caused by Scarlet fever, Streptococcal toxic shock syndrome, Staphylococcal toxic shock syndrome, Staphylococcal scalded-skin syndrome
- *Central distributed maculopapular eruption are caused by* Scarlet fever, Typhus, Rickettsial spotted fever, Ehrlichiosis, Typhoid fever (S. typhi), Lepto*spirosis,*

11. Larva in stool can be seen in?

a) Echinococcus granulosus

b) Ankylostoma duodenale

c) Ascaris lumbricoides

d) Strongyloides stercoralis

e) Trichinella spiralis

Correct Answer - B:D:E

Ans. is 'b' i.e., Ankylostoma duodenale, 'd' i.e. Strongyloides stercoralis & `e' i.e. Trichinella spiralis *[Ref Chatterjee 12th ie p. 172; Panikar 7th/e p. 162; Rajesh karyakarte p. 121*

Infective forms of helminthes in stool (larva)

- **Strongyloides stercoralis (filariform larva)**
- **Ancylostoma duodenale (filariform larva)**
- **Nector americans (filariform larva)**
- **Trichinella spiralis (encysted larva)**

Infective forms of helminthes in stool (EGGS)

- **T-solium**
- **Echinococcus granulosus**
- **H. Nana**
- **Ascaris lumbricoidus(enibryonated ergs)**
- **Enterobius (embryonated egg)**
- **Trichuris Trichiura (embryonated egg)**

12. Which of the following is false regarding electron microscopy?

a) There is arisk of radiation leakage

b) Can magnify upto 30,000 times

c) Both fixed and living specimens can be studies

d) Vaccume is not required for proper functioning

e) Black and white image

Correct Answer - C:D
Ans. is 'c' i.e., Both fixed and living specimens can be studies & 'd' i.e. Vaccume is not required for proper functioning *[Ref Essentials of medical microbiology]*

13. Antibody present in antigen binding site of B-cells?

a) Ig G

b) Ig M

c) Ig A

d) Ig D

e) Ig E

Correct Answer - B:D

Ans. is 'b' i.e., IgM & 'd' i.e. IgD *[Ref Ananthanarayan 9th Ie p. 136 & 8th Ie p. 100] B-cells*

- B cells are part of adaptive immunity. B cells constitute 10% to 20% of the circulating peripheral lymphocytes. B cells originate as well as mature in bone marrow.
- Ig M and Ig D, present on the surface of all naive B cells, constitute the antigen binding component of B-cell receptor complex. Combination of cell membrane bound Ig M or Ig D with the corresponding antigen leads to specific stimulation of the B cells - either activation and cloning to produce antibody, or suppression.

14. Which of the following is not associated with Borrelia burgdorferi?

a) Relapsing fever

b) Lyme disease

c) Vincent's angina

d) Transmitted by ixodid tick bite

e) Culture in BSK medium

Correct Answer - A:C

Ans. is 'a' i.e., Relapsing fever & 'c' i.e. Vincent's angina *[Ref: Ananthanarayan W^h^ie p. 380 & 8^th^le p. 381]*

- **Lyme disease : Caused by B. burgdorferi transmitted by the bite of Ixodid ticks**
- **Relapsing fever : Caused by B. recurrentis, B duttoni, B. hermsii, B. Parkeri, B. turicatae, B. persica, B. hispanica.**
- **Vincent's angina : Caused by B. vincenti.**
- **The culture of B. burgdorferi in Barbour - Stoenner - kelly (BSK) medium permits definitive diagnosis, but this complex method has been used only research studies.**

15. Pre-formed toxin is?

a) Staphylococcus aureus exotoxin

b) Emetic toxin of bacillus cereus

c) Clostridium botulinum toxin

d) Vibrio cholera toxin

e) Shigella toxin

Correct Answer - A:B:C

Ans. is 'a' i.e., Staphylococcus aureus exotoxin, 'b' i.e. Emetic toxin of bacillus cereus & 'c' i.e. Clostridium botulinum toxin [Ref Essentials of Microbiology p. 820, Harrison M^{l} p. 1088 & 17^{h}/e p. 816, 817]

- Enterotoxins are produced by : Shigella, B. cereus, Staphylococcus aureus, Cl perfringens, V. cholera, ETEC, EHEC, Cl difficle, Yersinia enterocolitica, Rota virus.
- Preformed toxins are produced by : Staph aureus, B. cereus, Cl botulinum and Cl perfringens.
- Heat labile toxins are produced by : Cl perfringens, LT of ETEC, V. cholerae, Diarrheal form of B. cereus.
- Heat stable toxins are produced by : Staph aureus, Y. enterocolitica, ST of ETEC, emetic form of B. cereus.

16. Indications of use of antibiotics in acute diarrhea include?

a) Traveller's diarrhea

b) Bacillary dysentery

c) Caused by shiga like toxin producing E.coli

d) Cholera

e) All of the above

Correct Answer - A:B:D

Ans. is 'a' i.e., Traveller's diarrhea, 'b' i.e. Bacillary dysentery & 'd' i.e. Cholera

- Bacillary dysentery is associated with species of bacteria from the Enterobacteriaceae family. The term is usually restricted to Shigella infections.
- when used appropriately, antibiotics are effective for shigellosis, cholera, C. difficile (pseudomembranous enterocolitis), traveler's diarrhea, and protozoal infections.
- If the patient's clinical presentation suggests the possibility of Shiga toxin-producing E. coli (e.g., bloody diarrhea, history of eating seed sprouts or rare ground beef proximity to an outbreak), antibiotic use should be avoided because it may increase the risk of hemolytic uremic syndrome.
- In traveller's diarrhoea, antimicrobial therapy is unequivocally effective; Traveller's diarrhoea is mainly due to bacterial enteropathogens (approximately 80%), the most frequently isolated being enterotoxigenic E coli; Quinolone antibiotics are now the

treatment of choice

17. All is are true about Rotavirus infection except:

a) Most commonly seen in adult of > 30 year age group

b) Person to person transmission may occur

c) Severity of disease decreases with each repeat infection

d) Commonest cause of diarrhea in infants and children

e) Single infection provide lifelong immunity against reinfection

Correct Answer - A:E

Answer: (a) Most commonly seen in ... (e) Single infection provide...

[Ref: Ananthanarayan 9th/560-61; Park 23'223;Harrison 19th/1287-88 ;Jawetz 27h/534-35; Greenwood 16th/525-26]

- Reinfections are cornn on, but the severifir of dkease dzcreases with each repeat intectlon. Therefore, severe rotavirus infections are less common among older children and adults than among younger individuals.
- Rota diarrhea is usually seen in children below the age of five years, but is most frequent b/w 6 and 24 months of age.

18. True about pseudomonas aeruginose:

a) Not lysine decarboxylase positive

b) Oxidase positive

c) Produce pyocyanin pigment

d) Gram-negative bacilli

e) Has 6-12 flagella

Correct Answer - A:B:C:D

Answer a)Not lysine decarboxylase positive (b) Oxidase positive (c) Produce pyocyanin pigment (d) Gram-negative bacilli

[Ref: Ananthanarayan 9th/314-16; Harrison 19th/1042-43 ;Jawetz 27th/137-39; Greenwood 16th/282,16]

- It is positive in the indophenol oxidase test, and is Simmon's citrate positive, 1-arginine dihydrolase positive, 1-lysine decarboxylase negative, and 1-ornithine decarboxylase negative.
- P. aeruginosa : Motile by virtue of one or two polar flagella"
- P aeruginosa is a non fastidious, motile, gram-negative rod that grows on most common laboratory media, including blood and MacConkey agars.
- TWo of the identifying biochemical characteristics of p aeruginosa are an inability to ferment lactose onMacConkey agar and a positive reaction in the oxidase test.

19. Which of the following is/are DNA viruses:

a) Herpes virus

b) Hepadnaviridae

c) Parvovirus

d) Orthomyxoviridae

e) Enteroviruses

Correct Answer - A:B:C

Answer: (a) Herpes virus, (b) Hepadnaviridae, (c) Parvovirus

[Ref: Ananthanarayan 9th/428,439-40; Harrison 19th/214e-1 ;Jawetz 27th/852]

- herpes viruses consists of a relatively large, double-stranded, linear DNA genome encased within an icosahedral protein cage called the capsid, which is wrapped in a lipid bilayer called the envelope.
- Partially dsDNA circular genome, about 3.2 kb.
- Parvoviruses are linear, nonsegmented, single-stranded DNA viruses, with an average genome size of 5-6 kb.

20. True about ZIKA virus:

a) Belong to flavivirus

b) First case detected in 1953 in Nigeria

c) RT PCR is useful in diagnosis

d) Causes macrocephaly

e) May presents with conjunctivitis

Correct Answer - A:C:E

Answer: (a) Belong to flavivirus, (c) RT PCR is useful in diagnosis, (e) May presents with conjunctivitis (Ref: Harrison 19th/1314; www. cdc. gov;www. nytimes. corn]

- It is spread mostly by the bite of an infected Aedes species mosquitoes (A. aegptiand A. albopictus). T
- It can be passed to a pregnant woman to her fetus. Infection during pregnancy can cause certain birth defects..
- Real-time reverse transcription-polymerase chain reaction (RT PCR) testing should be performed on serum collected during the first two weeks after symptom onset.
- There's no vaccine or specific treatment tor tlw disease. Treatment instead focuses on relieving symptoms and includes rest, rehydration and medications for fever and pain.
- A maculopapular rash, conjunctivitis, myalgia, and arthralgia usually accompany or follow those manifestations.

21. Autoclave is/are used for sterilization of:

a) Wooden material

b) Metallic instrument

c) Plastic

d) Glasswares

e) Fibro-optic bronchoscope

Correct Answer - B

Ans: (b) Metallic instrument [Ref: Ananthanarayan 5^0/37,30-32; Greenwood 16^{th}/77-78;Chakraborty 2nd/45-46; en.wikipedia.org]

- Autoclaves in operation theaters is used to sterilize surgical instrument, OT garments, linen, gloves, masks, gown etc. However, it is not suitable for plastics"-Community Medicine with Recent Advances by Suryakantha

22. Parasite which infects through ingestion of aquatic vegetation:

a) Fasciola hepatica

b) Fasciolopsis buski

c) Paragonimus westermani

d) Watsonius watsoni

e) Gastrodiscoides hominis

Correct Answer - A:B:D:E

Answer: (a) Fasciola hepatica, (b) Fasciolopsis buski, (d) Watsonius watsoni, (e) Gastrodiscoides hominis

[Ref: Paniker's Parasitology 7th/151; Chatterjee Parasitology 13"/174; Harrison 19th/245e-1]

- mode of infection of Fasciola hepatica' The definitive host sheep and, man, get infection by ingestion of metacercariae encysted on aquatic vegetation.
- Infective form of Fasclolopsls Bush: Encysted metacercariae on aquatic vegetarian.
- Second intermediate host of fasciolopsis BusKi Encystment occurs on aquatic plants, roots of the lotus, bulb of water chestnut which act as second intermediate host.
- Second intermediate host of Gastrodiscoides hominis: aquatic plant. The cercariae encyst on water pl.ants. Man and animals become infected by feeding upon vegetations harbouring the metacercaria".

23. Which of the follwing is/are true about Dengu fever:

a) Positive Tourniquet test means more than 10 petechiae per square inch

b) Caused by flavivirus

c) Aedes aegypticus and albopictus are most important vector in India

d) IgM/IgG ratios may be used to distinguish primary from secondary infection

e) No vaccine available at present

Correct Answer - A:B:C:D:E

Answer: A, Positive Tourniquet test means... B,Caused by... C,Aedes aegypticus and albopictus... D,IgM/IgG ratios may be used... E,No vaccine available... (Ref.: Park 23' /246-56; Davidson 22'/323,-Ananthanarayan 9th/523; Harrison 19th/1318-19;Jawetz 27h/552-54]

- Positive torniquet test (i,e. 10 or more petechiae per square inch) is most common hemorrhagic phenomenon. In DHF the test usually gives a definite positive with 20 petechiae or more- Park 23'd /249
- Vaccine- So far there is no satisfactory vaccine and no immediate prospect of preventing the disease by immunization- Park 23' /254
- "The diagnosis is made by IgM ELISA or paired serology during recovery or by antigen-detection ELISA or RT-PCR during the acute phase"- Harrison 19m/1318-19

24. which of the following dyads of vector with disease is/are correctly matched:

a) Rat flea- Endemic typhus

b) Sand flea-Oriental sore

c) Blackfly-Kafaazar

d) Cyclops-Dracunculus

e) Louse-Chagas Disease

Correct Answer - A:B:D

Answer: (a) , (b) and (d) [Ref Park 23'/768;Paniker's Parasitology 7th/223]

- Rat flea→ Bubonic plague, endemic typhus, chiggerosis, hymenolepis diminuta.
- Sandfly→ Kala-azar, oriental sore, sa ndfl y fever, oroya fever.
- Cyclops→ Guinea-worm disease, fish topeworm (D. lotus).

25. All are features of scrub typhus except:l

a) Black eschar

b) Maculo-papular rash

c) More common in rural areas

d) Ciprofloxacin is drug of choice

e) Tick borne disease

Correct Answer - D:E

Answer: (d) Ciprofloxacinis is drug of choice, (e) Tick borne disease

(Ref: Ana nthanarayan 9th/408 ; Harrison 19th/1159 ; Park 23rd/300; Medical microbiology by Greenwood 16th /372]

- "Scrub typhus: One typical feature is the punched-out ulcer covered with a blackened scab(eschar) which indicates the location of mite bite"
- "Scrub typhus,:Most travel-acquired cases occur during visits to rural areas in endemic countries for activities such as camping, hiking or rafting, but urban cases have also been described. Tetracycline is drug of choice"- Park 23rd/300
- ""Scrub typhus, originally found in scrub jungles, has also been identified in a variety of other habitats, such as sandy beaches, mountain deserts and equatorial rain-forests"- Ananthanarayan 9th/408

26. Unlike nocardia, Actinomycosis is;

a) Facultative anaerobes

b) Not acid fast

c) Endogenous Cause Of disease

d) Environmental saprophyte

e) Grow at wide range of temperature range

Correct Answer - A:B:C

Ans. (a) Facultative anaerobes, (b) Not acid fast, (c) Endogenous cause of disease [Ref: Ananthonarayan gh/j9l-93;Jawetz 2vh/295,198-99;Greenwood l6h/221-22; Hanison lN/l088

• Actinomycete are facultative anaerobes, but often fail to grow aerobically on primary culture. They grow best under anaerobic or microaerophilic conditions with the addition of 5-10% carbon dioxide. • Facultative anaerobes, Grow at 35-37°C, Oral commensals, Non-acid fast mycelia, Endogenous cause of disease

27. All of the following are caused by dermatophytes except:

a) Madura foot

b) Athlete's foot

c) Athlete's foot

d) Favus

e) None

Correct Answer - A

Answer: (A) Madura foot [Ref: Ananthanarayan 9th/596-97 ; Harrison 19th/1358]

- "Madura foot(eumycetoma or nadurantycosis) is caused by fungi-scedosporium, madurella mycetomatis and M.grisea, acremonium spp., exophiala spp., aspergillus spp. fusarium spp."
- "Favus: A chronic type of ringworm in which dense crusts (scutula) develop in the hair follicles, leading to alopecia and scattering. • "Kerlon: Severe boggy lesions with marked inflammatory reaction that sometimes develops in scalp infection due to dermatophyte s"

28. All are true about dengue virus except:

a) Belong to flaviviridae

b) Type DEN 4 is most common in India

c) Main vectors are aedes aegypti and aedes albopictus

d) Virus has positive sense RNA

e) Vector is sensitive to DDT

Correct Answer - B

Ans: (b) Type DEN 4 is most common... (Ref: Park 23'/246-56; Ananthanarayan 9th/523; Harrison 19th/1318-19;Jawetz 27th/552-541

- Belong to genus flavivirus with positive sense RNA(Harrison 19th 214e-1 table)
- All the 4 serotypes i.e dengu 1,2,3 and 4 have been isolated in India but at present DENV-1 and DENV-2 serotypes are widespread, Vector- Aedes aegypti and Aedes albopictus are the two most important vectors of dengue

29. Which of the following has least minimum infective dose(MID) required for causing infection:

a) Salmonella typhi

b) Campylobacter jejuni

c) Shigella dysentery

d) Vibrio cholera

e) None

Correct Answer - C

Ans. (c) Shigella dysentery ***[Ref: Ananthanarayan 9th/287,295;Greenwood 16th/261,252,289]***

- "Shigella cause bacillary dysentery. Infection occur by ingestion. The minimum infective dose is low: as few as I0-I(N bacilli are capable of initiating the disease, probably because they survive gastric acidity better than other enterobacter"- Ananthanarayan.

30. True about Gas gangrene:

a) Onset is usually acute

b) Painless condition

c) Wound is swollen

d) At first wound is dusky or red, later becomes pale

e) Caused by gram +ve organism

Correct Answer - A:C:E

Ans: (a) Onset is usually acute, (c) Wound is swollen, (e) Caused by gram +ve organism

[Ref: Davidson 22"d/305;L and 826`/57;; Harrison 19th/990-95; Ananthanarayan 9th/257-59; Jawetz 27th/186-87;Greenwood 16th/231-35]

- Gas gangrene (clostridia) myonecrosis) is defined as acute invasion of healthy living muscle undamaged by previous trauma, and is most commonly caused by C. perfringens.
- Severe pain, crepitus, brawny induration with rapid progression to skin sloughing, violaceous bullae, and marked tachycardia are characteristics found in the majority of patients.
- Traumatic gas gangrene C. perfringens myonecrosis (gas gangrene) is one of the most fulminant gram-positive bacterial infections of humans.
- The infection is characterized by the sudden onset of excruciating pain at the affected site and the rapid development of a foul-smelling wound containing a thin serosanguineous discharge and gas bubbles.
- The wound produces a thin, brown, sweet-smelling exudate, in which Gram staining will reveal bacteria.

31. Which type of bacteria can not survive in absence of oxygen:

a) Obligate aerobe

b) Facultative anaerobes

c) Microaerophilic

d) Obligate Anaerobes

e) Facultative aerobes

Correct Answer - A

Ans. (a) Obligate aerobe [Ref: Ananthanarayan 5^0/ 24-25;Greenwood 16th/41]

- Aerobic bacteria require oxygen for growth. They may be *obligate aerobes* like the cholera vibrio, which will *grow only in the presence of oxygen,* or *facultative anaerobes* which are ordinarily aerobic but can also grow in the absence of oxygen, though less abundantly.
- Most bacteria of medical importance are facultative anaerobes. Anaerobic bacteria, such as clostridia, grow in the absence of o>rygen and the obligate anaerobes may even die on exposure to oxygen.
- Microaerophilic bacteria are those that grow best in the presence of low oxygen tension.

32. Which of the following mechanism is/are used by bacteria to escape host defence mechanism:

a) Mycobacterium tuberculosis prevent intracellular killing by inhibiting phagolysosome formation

b) Streptococcus pyogenes by M protein

c) Neisseria meningitidis by capsular polysaccharide

d) Staphylococcus aureus by iron-regulated outer membrane proteins

e) Polysaccharide capsules of H. influenzae

Correct Answer - A:B:C:E

Answer: (a) Mycobaterium tuberculosis... (b) Streptococcus pyogenes... (c) Neisseia men in gti tides... (e) Polysaccharide...
[Ref: Ananthanarayan 9`'/350,212; textbookofbacteriology.net/antiphago ;Jawetz 27^{h}/158-65; Greenwood 16th/244]

- The bacteria survive inside of phagosomes because they prevent the discharge of lysosomal contents into the phagosome environment. Specifically, *phagolysosome formation is inhibited in the phagocyte.* This is the strategy employed by *Salmonella, M. tuberculosis, Legionella* and chlamydiae.
- **Survival inside the phagolysosome-Mycobacteria** (including M. *tuberculosis* and *Mycobacterium leprae).*
- **M protein** and **fimbriae** of Group A streptococci **Surface slime** (polysaccharide) produced as a **biofilm** by *Pseudomonas aeruginosa*

- **M protein** and **fimbriae** of Group A streptococci **Surface slime** (polysaccharide) produced as a **biofilm** by *Pseudomonas aeruginosa*
- antiphagocytic substances on bacterial surfaces include:**Polysaccharide capsules** of *S. pneumoniae, Haemophilus influenzae,Treponema pallidum* and *Klebsiella pneumoniae*

33. All are true about H l Nl influenza except:

a) Zanamivir commonly given through IV route

b) Fatality more in some high risk group

c) RT-PCR is used for investigation

d) WHO latest trivalent influenza vaccine contains two influenza A subtypes (H3N2 and H1N1) and one influenza B component

e) CDC latest quadrivalent influenza vaccine contains two influenza A subtypes (H3N2 and H1N1) and two influenza B component

Correct Answer - A

Answer (a) Zanamivir commonly given through IV route *[Ref: Park 23'd/l 56-59;Ananthanarayan Eh/4gg-504 ; Harrison 1 Eh/t 209-t 4; KDT 7h/802-03]*

- WHO: It is recommended that trivalent vaccines for use in the 2017 southern hemisphere influenza season contain the following
  . An A/Michigan/45/2015 (H1N1)pdm09-like virus;
  . An A/Hong Kong/4801/2014 (H3N2)-like virus; and
  . A B/Brisbane/60/2008-like virus.
- RT-PCR provides the most timely and sensitive detection of the infection
- Pandemic influenza A (Hl nl) Treatment: oseltamivir adult oral dose is 75 mg twice daily for 5 days. Zanamivir dose is two inhalation (2 x 5 mg) twice daily for 5 days

34. True about serum marker of inactive carrier phase of chronic Hepatitis B:

a) Hbs Ag +ve

b) Hbe Ag +ve

c) Anti-HBe antibody positive

d) Low level DNA

e) Increased ALT

Correct Answer - A:C:D

Answer: (a) Hbs Ag +ve, (c) Anti-H Be antibody positive, (d) Low level DNA (Ref: Ananthanarayan 9`h/543-48; Harrison 19th/2032-33,2007 ;Davidson 22"°/950-52;Park 23rd/215.1

- Chronic HBV Infection:Inactive carriers are patients with circulating hepatitis B surface antigen (HBsAg), normal serum aminotransferase levels, undetectable HBeAg, and levels of HBV DNA that are either undetectable or present at a threshold of 103 IU/mL.
- The relatively replicative phase is characterized by the presence in the serum of HBeAg and HBV DNA levels well in excess of 103-104 IU/mL, sometimes exceeding 109 IU/mL; by the presence in the liver of detectable intra hepatocyte nucleocapsid antigens (primarily hepatitis B core antigen [HBcAg]); by high infectivity; and by accompanying liver injury.

35. In which of the following condition(s), children are prone to fungal & viral infection:

a) Thymic aplasia

b) Agammaglobulinemia

c) Lymphocytopenia

d) Severe combined immune deficiencies (SCID)

e) Chediak-Higashi syndrome

Correct Answer - A:C:D

Ans: (A) Thymic aplasia (C) Lymphocytopenia (D) Severe combined immune deficiencies (SCID)

[Ref Harrison 19th/2104-08; Ananthanarayan 9th/171-76; Jawetz 27th/146-47; Greenwood 16th/148J

- T cell disorders affect both cell-mediated and humoral immunity making the patient susceptible to viral, protozoal and fungal infections. Viral infections such as those by cytomegalovirus and attenuated measles in the vaccine can be fatal in these patients.
- Lymphocytopenia is most often due to AIDS or undernutrition, but it also may be inherited or caused by various infections, drugs, or autoimmune disorders. Patients have recurrent viral, fungal, or parasitic infections.
- Hypogammaglobulinemia leads to recurrent bacterial infections. Viral & fungal infections are controlled by cell-mediated immunity, which is normal in hypogammaglobulinemic individual.

36. Which of the following is type 3 hypersensitivity reaction (immune complex disease):

a) SLE

b) Diabetes Mellitus I

c) Goodpasteur syndrome

d) Multiple sclerosis

e) Bronchial asthma

Correct Answer - A

Ans: a. SLE

[Ref Ananthanarayan 9th/162-67; Robbins 9th/201; lawetz 27th/145 - 46; Greenwood 16th/144]

- Type 3 Hypersensitivity reaction (Immune complex disease) Ananthanarayan 9th/162, It is two types-arthus reaction & serum sickness.
- the damage is caused by antigen-antibody complexes. These may precipitate in & around small blood vessels causing damage to cells secondarily, or on membranes, interfering with their function .

37. Which of the following infection has incubation period

a) Brucella

b) Gonorrhoea

c) Syphilis

d) HBV

e) Leishmaniasis

Correct Answer - A:B:C

Ans: (A) Bruce...,(B) Gonorrho..., (C) Syphilis

[Ref Harrison 19th/1134, 194e-2, 1005; Ananthanarayan 9th/341 .1]

- **Brucella:** The incubation period is usually about 10-30 days, but may be sometimes be very prolonged" (Ananthanarayan 9th/341)
- **"Brucella:** The incubation period varies from 1 week to several months, and the onset of fever and other symptoms may be abrupt or insidious" (Harrison 19th/194e-2)
- **Syphilis:** Clinical disease sets in after an incubation period of about a month(range 10-90 days)" (Ananthanarayan 9th/372)
- **"Syphilis:** The median incubation period in humans (-21 days) suggests an average inoculum of 500-1000 infectious organisms for naturally acquired disease; the incubation period rarely exceeds 6 weeks.
- Gonococcal infection in men: Acute urethritis is the most common clinical manifestation of gonorrhea in male patients. The usual incubation period after exposure is 2-7 days, although the interval can be longer & some men remain asymptomatic (Harrison 19th/1005)

38. Stain used for Mycobacterium tuberculosis is/are:

a) Ziehl-Neelsen technique of staining

b) Auramine-rhodamine stain

c) Gomori methenamine silver stain

d) Kinyoun stain

e) Gram staining

Correct Answer - A:B:D

Ans: a. Ziehl-Neelsen techni..., b. Auramine-rhodamine sta..., d. Kinyoun stain

[Ref Harrison 19th/1113; Ananthanarayan 9th/346-48; Lippincott Microbiology 3rd/ 21; Jawetz 27th/38; Text Book of Diagnostic microbiology by Connie R. Mohan 3rd/691;Greenwood 16th/15]

- When stained with carbol fuchsin by Ziehl-Neelsen method or by fluorescent dyes(Auramine 0, Rhodamine), mycobacterium tuberculosis reist decolourisation by 20% sulphuric acid & are therefore called acid fast.
- Ziehl-Neelsen method d phenol-auramine procedures are methods of great practical importance in the diagnosis of mycobacterial diseases" .
- The Kinyoun method, or Kinyoun stain, is an acid-fast procedure used to stain any species of the genus Mycobacterium and Nocardia species. It involves the application of a primary stain (carbol fuchsin), a decolorizer (acid-alcohol), and a counter stain (methylene blue)"

39. Food borne diseases are:

a) Japanese encephalitis

b) Hemophilia

c) HBV

d) Botulism

e) Typhoid fever

Correct Answer - D:E

Ans: d. Botuli..., e. Typhoid ...,*[Ref Park 23rd/657]*

- The term" food-borne disease" is defined as: "A disease, usually either infectious or toxic in nature, caused by agents that enter the body through the ingestion of food." With the catering systems, food-borne diseases are on the increase throughout the world.
- Due to toxins produced by certain bacteria LIKE Botulism, Staphylococcus poisonS
- Bacterial diseases:- Typhoid,fever, Paratyphoid fever, salmonellosis, staphylococcal intoxication, C. perfringens, Shigellosis brucellosis etc.

40. Which of the following is NOT lysine positive non-fermentor:

a) Burkholderia pseudomallei

b) Burkhomelia mallei

c) Burkholderia cepacia

d) Stenotrophomonas maltophilia

e) Pseudomonas aeruginosa

Correct Answer - A:B:E

Ans: a. Burkholderia..., b. Burkhomelia..., e. Pseudomonas Aeru .....

- The Burkholderia cepacia complex (BCC) and Stenotrophomonas maltophilia are closely related groups of non fermenting gram-negative bacilli (NFGNBs) having a similar spectrum of infections ranging from superficial to deep-seated and disseminated infections.
- Identification of these lysine decarboxylase-positive NFGNBs lags behind in most Indian laboratories. A simplified identification scheme was devised for these two pathogens that allowed us to isolate them with an increasing frequency at our tertiary care institute.

41. A person is suffering from acquired immunodeficiency disease(AIDS) & visited the zoo. After some days, he is complaining of headache & cough. He has also have some neurological symptoms. On staining of CSF sample, it shows capsulated yeast. Likely infection is:

a) Histoplasma

b) Aspergillus

c) Cryptococcus

d) Blastomycosis

e) Coccidioidomycosis

Correct Answer - C

Ans: C, Cryptococcus

- Like CNS disease, pulmonary cryptococcosis can follow an indolent course, and the majority of cases probably do not come to clinical attention.
- Pulmonary cryptococcosis can be associated with antecedent diseases such as malignancy, diabetes, and tuberculosis.
- **Cryptococcus** Infection can be acquired by inhalation of desiccated yeasts(or basidiospores) from feces of pigeon or other birds
- Direct microscopic examination of India ink-stained wet films of material from lesions reveals capsulated, budding yeast cells; the

capsule are prominent in the India ink preparatio

42. Normal flora of Oral cavity is/are except:

a) Veillonella

b) Anerobic micrococci

c) Geotrichum

d) Gemella

e) Yersinia

Correct Answer - A:B:C:D

Ans: a. Veillone..., b. Anerobic microc..., c. Geotrich..., d. Gemell.

- More than 700 bacterial species or phylotypes, of which over 50% have not been cultivated, have been detected in the oral cavity.
- The mouth contains a plethora of organisms- pigmented & non-pigmented micrococci; some of which are aerobic, gram positive, aerobic, spore bearing bacilli, coliforms, proteus & lactobacilli
- The gum pocket b/w the teeths, & the crypts of the nostrils have a wide spectrum of anaerobic flora- anerobic micro-cocci, microaerophilic & anaerobic streptococci, vibrios, fusiform bacilli, corynebactrium species, actinomyces, leptothrix, mycoplasma, Neisseria eb• bacteriodes are all found in varying extents. Among fungi, candida er geotrichum have been reported.

43. Gold standard diagnostic test for babeiosis is:

a) Peripheral blood smear examination

b) Blood Culture

c) PCR

d) ELISA

e) Indirect fluorescent antibody (IFA) test

Correct Answer - A

Ans: a. Peripheral blood smear ...,

[Ref Harrison 19th/1385-86; Paniker Parasitology 7th/85;Chatterjee Parasitology 13th/137; Lippincott Microbiology 3rd/225; Jawetz 27th/708; Greenwood 16th/599]

- Microscopic examination of stained blood smear is gold standard test for babesiosis"
- A specific diagnosis usually is established by microscopic examination of Giemsa-stained thin blood smears. Babesia trophozoites appear round, pear-shaped, or ameboid.
- The ring form is most common and lacks the central brownish deposit (hemozoin) typical of Plasmodium falciparum trophozoites. Other distinguishing features are the absence of schizonts and gametocytes and the occasional presence of tetrads ("Maltese cross").
- If parasites cannot be identified by microscopy and the disease is still suspected, amplification of the babesial 18S rRNA gene by polymerase chain reaction (PCR) is recommended. Quantitative PCR has greatly lowered the threshold for detection of B. microti

DNA

44. True about listeria monocytogens infection:

a) Common in pregnant women

b) Common in elderly

c) Common in children

d) Common in newborns

e) Ampicillin is drug of choice

Correct Answer - A:B:D:E

Ans: a. Common in pregnant..., b. Common in elderly...,d. Common in newborns..., e. Ampicillin.
[Ref Harrison 19th/982-84; Ananthanarayan 9th/395-96; Lippincott Microbiology 3rd/ 98; Jawetz 27th/ 197-98; Greenwood 16th/195-96]

- Listeria infections are most common in pregnant women, fetuses and newborns, and in immunocompromised individuals, such as older adults and patients receiving corticosteroids" (Lippincott Microbiology 3rd/ 98).
- The disease affects pregnant women, newborns, adults with weakened immune systems, and the elderly,
- Listeria monocytogenes is a food-borne pathogen that can cause serious infections.
- Meningitis in older adults (especially with parenchymal brain involvement or subcortical brain abscess) should trigger consideration of L. monocytogenes infection.

45. True about Japanese encephalitis:

a) Most severe epidemic spread occured in 2006

b) Main vector in India is culex tritaeniorhynchus

c) Spread by aedes mosquito

d) India still not able to develop vaccine indigenously

e) Pigs are amplifier host

Correct Answer - B:E

Ans: (B) Main vector in India is culex tritaeniorhynchus (E) Pigs are amplifier host

[Ref Park 23rd/284-87;Harrison 19th/1315; Ananthanarayan 9th/52022, 519]

- During 2006, there was a large outbreak of chikungunya in India, with 1. 39 million officially reported cases spread over 16 states; attack rates were estimated at 45% in some areas**"**
- The virus is particularly common in areas where irrigated rice fields attract the natural avian vertebrate hosts and provide abundant breeding sites for mosquitoes such as Culex tritaeniorhynchus, which transmit the virus to humans.
- Additional amplification by pigs, which suffer abortion, and horses, which develop encephalitis, may be significant as well. Vaccination of these additional amplifying hosts may reduce the transmission of the virus.

46. Not AIDS defining cancer:

a) Anal carcioma

b) Hodgkin's lymphoma

c) Cervial cancer

d) Non -Hodgkins lymphoma

e) Kaposi carcinoma

Correct Answer - A:B

Ans: (A) Anal carcioma (B) Hodgkin's lymphoma

[Ref Harrison 19th/1268; Ananthanarayan 9th/576-77; Lippincott Microbiology 3rd/ 302]

- The neoplastic diseases considered to be AIDS defining conditions are Kaposi's sarcoma, non-Hodgkin's lymphoma, and invasive cervical carcinoma.
- In addition, there is also an increase in the incidence of a variety of non-AIDS-defining malignancies including Hodgkin's disease; multiple myelotna; leukemia; melanotna;and cervical, brain, testicular, oral, lung, gastric, liver, renal, and anal cancers.

47. True about Plasmodium falciparum:

a) Increased size of infected RBC

b) Crescentric shaped gametocyte

c) Delicate ring present

d) Small & multiple rings common

e) Erythrocyte preference- old cells

Correct Answer - B:C:D

Ans: (B) Crescentric shaped gametocyte (C) Delicate ring present (D) Small & multiple rings common

[Ref Harrison 19th/1369; Parasitology by Chatterjee 13th/103; Parasitolgy by Paniker 7th/75]

- Ring stage- delicate, small, double chromatin, multiple rings common, Accole forms found
- Macrogametocyte- Crescentric, deep blue cytoplasm, large diffuse nucleus
- The mature gametocytes are round in shape, except in P, falciparum, in which they are crescent-shaped
- Schizont: Fills two-third of red blood cell which is not enlarged- Chatterjee 13th/103
- Infected erythrocyte- Normal size, Maurer's cleft, sometimes basophilic stippling
- Erythrocyte preference- young erythrocyte, but can infect all stages

48. Which of the following statement is/are true about Giardia:

a) Cause bloody diarrhorea

b) Invasive to GI mucosa

c) More common in hypogammaglobulinemic person

d) Less common in achlorohydria

e) Metronidazole is effective in treatment

Correct Answer - C:E

Ans: (C) More common in hypogammaglobulinemic person (E) Metronidazole is effective in treatment *[Ref Parasitology by Chatterjee 13th/47-48;Parasitolgy by Paniker 7th/32-33;Harrison 19th/1406]*

- Metronidazole, trimidazole, furazoilidone have been found to be effective for giardiasis
- G. lamblia is typically seen within the crypts of duodenal & jejunal mucosa. It does not invade the tissue, but remains tightly adhered to intestinal epithelium by means of the sucking disc
- Te person having agammaglobulinemia, malnourished persons are more susceptible to giardiasis

49. In which organism can be isolated:

a) CSF specimen of tetanus infection

b) CSF specimen of listeria monocytogenes

c) From valves in rheumatic valvulitis

d) From myocardium in diphtheric myocarditis

e) Meningococcal rash

Correct Answer - B:E

Ans: (B) CSF specimen of listeria monocytogenes (E) Meningococcal rash

- **L.** monocytogenes : The diagnosis is typically made by culture of blood, cerebrospinal fluid (CSF), or amniotic fluid. L. monocytogenes may be confused with "diphtheroids" or pneumococci in gram-stained CSF or may be gram-variable and confused with Haemophilus spp.
- Petechial lesion: Meningococci may sometimes be demonstrated in petechial lesions by microscopy & culture.

50. Which are transmitted by Dog:

a) Echinococcus granulosus

b) Toxocara Canis

c) Echinococcus multiocularis

d) Toxoplasma Gondii

e) None

Correct Answer - A:C

Ans: A. Echinococcus granulosus C. Echinococcus multiocularis" [Ref Park 23rd/ 3}4;Hanison 1 9th/ 1 432, 1 67 e- 1 : Chatterjee Parasitology 1 3th/ 1 59; CMDT 20 16/ 12801.

- **Alveolar echinococcosis (AE)** is caused by infection with the larval stage of Echinococcus multilocularis. The adult tapeworm is normally found in foxes, coyotes, and dogs. Infection with the larval stages is transmitted to people through ingestion of food or water contaminated with tapeworm eggs.
- Toxocara canis: Human infection is by ingestion of eggs, which are shed in feces of dog.
- Toxoplasma gondii: Man acquires infection by ingestion of contaminated food and water containing sporulated oocyst (from cat) or by ingestion of undercooked meat containing tissue cysts"

51. All are true about gas gangrene except:

a) Type 1 gangrene is fournier's gangrene

b) Devitalized tissue predispose to gas gangrene

c) High 02 tension in tissue is important precondition

d) a -toxin is main cause of the toxaemia associated with gas gangrene

e) Mainly caused by C. perfringens

Correct Answer - E

Ans: E. Mainly caused by C. perfringens[Ref Harrison 19th/990-95; Ananthanarayan 9th/257-59; Jawetz 27th/186-87;Greenwood 16th /231-35]

- C. perfringens in association with mixed aerobic and anaerobic microbes can cause aggressive life-threatening type I necrotizing fasciitis or Fournier's gangrene.
- Predisposing host factors include debility, old age & diabetes
- a -toxin is generally considered to be the main cause of the toxaemia associated with gas gangrene
- "a-toxin: This is the most important toxin biologically & is responsible for profound toxaemia of gas gangrene"

52. True about cytomegalovirus -

a) Characteristic owl eye appearance

b) Type 5 Human herpesvirus type

c) Lymphocyte enlargement

d) Cause congenital infection

e) Lymphoproliferative

Correct Answer - A:B:D

Ans: a. Characteristic..., b. Type 5 Human..., d. Cause congenital ....

[Ref Harrison 19th/1190-91; Ananthanarayan 9th/473-74; Jawetz 27th/470-74]

- It is cytomegalic (not lymphoproliferative, which occur in HHV4, 6 & 7)
- Characterized by enlargement of infected cells
- Congenital infection- Intrauterine infection leads to fetal death or cytomegalic inclusion disease of newborn which is often fatal

53. Which of the following is/are true about Mycoplasma pneumonia infection except:

a) Causes many extrapulmonary manifestations

b) Cold agglutinin titer is not increased

c) Cause atypical pneumonia

d) Paucity of respiratory signs on physical examination

e) Cough is typically productive

Correct Answer - B:E

Ans: b. Cold agglutinin..., e. Cough is typically

- Cold hemagglutinins for group 0 human erythrocyte appear in about 50% of untreated patients, in rising titer, with the maximum reached in the third or fourth week after onset.
- A titer of 1:64 or more supports the diagnosis of M. pneumoniae infection.
- The cough is typically nonproductive, but some patients produce sputum. Headache, malaise, chills, and fever are noted in the majority of patients.

54. Serological test is/are useful in diagnosis of which of the following disease:

a) Typhoid

b) Q fever

c) Acanthamoeba infection

d) Scrub typhus

e) Brucellosis

Correct Answer - A:B:D

Ans: a. Typhoid b. Q fever d. Scrub typhus

- The diagnosis of Q fever is based mainly on serological tests, such as microagglutination, complement fixation, immunofluorescence & ELISA.
- Serological tests: There are not used for early diagnosis of rickettsial diseases(including Q fever, scrub typhus), from a treatment perspective, but to confirm the diagnosis for epidemiological investigations.
- Scrub typhus: Serological assay (indirect fluorescent antibody, indirect immunoperoxidae & enzyme immunoassays), are mainstays of laboratory diagnosis.
- Tube agglutination is routinely used for serological diagnosis of typhoid, brucellosis & typhus fever.

55. True about enteroviruses:

a) In 1999, wild polio virus 2 was eradicated from world

b) Vaccine associated paralytic poliomyelitis(VAPP) most frequently caused by serotype 1 vaccine

c) Bivalent OPV contains type 1 & type 3 strain

d) Primary course of OPV consists of only 1 dose

e) Coxasackie A7 & enterovirus type 71 causes aseptic meningitis

Correct Answer - A:C:D:E

Ans: (A) In 1999, wild polio virus 2 was eradicated from world (C) Bivalent OPV contains type 1 & type 3 strain (D) Primary course of OPV consists of only 1 dose (E) Coxasackie A7 & enterovirus type 71 causes aseptic meningitis

[Ref Park 23rd/ 202-09; Harrison 19th/1289-91; Ananthanarayan 9th/485]

- Of the 3 strains of wild poliovirus, wild poliovirus type 2 was eradicated in 1999 & case numbers of type 3 are down to the lowest-ever levels with the last case reported in Nov 2012 from Nigeria.
- The WHO programme on immunization(EPI) & the national immunization programme in India recommended a primary course of 3 doses of OPV at one-month intervals, commencing the first dose when infant is 6 weeks old.
- Poliovirus type 1 is responsible for most epidemics of paralytic poliomyelitis. Type 3 also causes epidemics to a lesser extent. . Type 2 usually causes inapparent infections in western countries but in India paralysis due to type 2 is quite common"

GROUP	SEROTYPE
Poliovirus	1-3
Coxsackie virus A	1-22 AND 24
Coxsackie virus **B** s	1-6
Echovirus	1-9, 11-27, 29-34
Numbered echovirus	(EV) 68-78

56. Biosafety level 4 infection includes:

a) Hantavirus

b) Nile virus

c) Ebola virus

d) Crimean-Congo HF

e) Lyssa Fever

Correct Answer - C:D:E

Ans: c. Ebola virus d. Crimean-Congo HF e. Lyssa Fever [Ref Harrison 19th/1323, 1328; consteril. corn/biosafety-levels; thecerebrallounge. wordpress. corn]

- Filoviruses (includes three genera: Cueva virus, Ebola virus, and Marburg virus) are categorized as World Health Organization (WHO) Risk Group 4 Pathogens.
- Biosafety Level 4- Hemorrhagic fevers, Marburg virus, Ebola virus, Lassa virus, Smallpox

57. True about chickengunya fever:

a) Caused by single stranded RNA arbovirus

b) Excruiting arthralgia in peripheral joints

c) Antiviral therapy is very effective

d) Absolute lymphocytosis is present

e) Vector is aedes mosquitoes

Correct Answer - A:B:E

Ans: (A) Caused by single stranded RNA arbovirus (B) Excruiting arthralgia in peripheral joints (E) Vector is aedes mosquitoes.[Ref Harrison 19th/13j3; park 23ril/289; Ananthanarayan gth/440,519; Jawetz 27th/ 548.

- Chickengunya: Blood counts may be normal, or patients may have leukopenia with relative lymphocytosis.
- The vector is Aedes aegypti, It is caused by arbovirus (Family- Togaviridae, Genus- Al?phavirus) (Ananthanarayan 9th/517)
- The Chikungunya virus by single stranded RNA virus?
- Chikungunya is a local word meaning doubling up owing to excruciating joint pains
- There is no specific treatment & usually self limiting. Analgesics & antipyretics along with fluid supplementation are recommended to manage infection & relieve fever, joint pains & swelling. Drugs like aspirin & steroids should be avoided

58. True about Zika virus:

a) Sexually transmitted

b) 50% infected person develop symptoms

c) Effective therapy available

d) Transmitted by Aedes vector

e) Transmission in utero

Correct Answer - A:D:E

Ans: a. Sexually transmitted d. Transmitted by Aedes vector e. Transmission in utero[Ref Harrison 19th/1314;

- It is spread mostly by the bite of an infected Aedes species mosquitoes (A. aegypti and A. albopictus). These mosquitoes are aggressive daytime biters.
- It can be passed from a pregnant woman to her fetus. Infection during pregnancy can cause certain birth defects.
- It can be passed through sex from a person who has Zika to his or her partners. It can be passed through sex, even if the infected person does not have symptoms at the time.
- The majority of people infected with Zika virus do not display any symptoms

59. Which of the following dyad of disease and incubation period is/are correctly matched ?

a) Measles : 4-5 day

b) Chicken pox : 3-20 day

c) Bubonic plague: 2-5 day

d) Leptospirosis: 4-20 days

e) Heptatis A : 45-180 day

Correct Answer - C:D

Ans. is 'c' i.e., Bubonic plague:2-5 days; & d. Leptospirosis; 4-20 days ***[Ref Park's 24th Ie p.157; Ananthanarayan 9th/e p. 322, 512, 381; Harrison's 19ffi/e p,1 /831***

• Bubonic plague → caused by Yarsinia pestis → 2-7 days • Leptospirosis → caused by H1N1 Type A influenza→ 1-4 days 1-3

60. True about Human papilloma virus?

a) Belongs to family papovaviridae

b) DNA virus

c) RNA virus

d) Enveloped

e) Causes anal warts

Correct Answer - A:B:E

Ans. is 'a' i.e., Belongs to family papovaviridae; 'b' Le., DNA virus & `e' i.e., Causes anal warts [Ref: Ananthanarayan 9th/e p.553; Harrison's 19th le p. 1197-99; Robbins (SEA) 9Th le p. 326].

- HPV is a non enveloped DNA virus (ds DWA), belongs to Papovaviridae.
- HPV causes anogenital warts (condyloma accuminata).

61. All are true about Ebola virus infection except?

a) Air dropler is most common mode of transmission

b) Haemorrhagic manifestation may occur

c) Thai forest type - most common species in epidemics

d) presents as sudden onset of fever and sore throat

e) Case fatality rate may be high as 70%

Correct Answer - A:C

Ans. is 'a' i.e., Air dropler is most common mode of transmission & 'c' i.e., Thai forest type - most common species in epidemics]Ref *Park 24^{m}/e* p. *374]*

- The virus is transmitted through direct contact with blood, organs, body secretions or other body fluids of infected animals like chimpanzees, gorillas, monkeys, fruit bats etc.
- Human to human transmission is through blood or body fluids of an infected symptomatic person or through exposure to objects (such a needle) that have been contaminated with infected secretions.
- It is not transmitted through air, water, or food.
- The virus is transmitted through direct contact with blood, organs, body secretions or other body fluids of infected animals like chimpanzees, gorillas, monkeys, fruit bats etc.
- Human to human transmission is through blood or body fluids of an infected symptomatic person or through exposure to objects (such as needle) that have been contaminated with infected secretions
- It is not transmitted through air, water, or food
- The illness is characterized by sudden onset of fever, intense

weakness, muscle pain, headache, sore throat, vomiting, diarrhea, rash, impaired kidney and liver function and in some both internal and external bleeding.

- **The virus family Filoviridae includes three genera: Cuevavirus, Marburgvirus, and Ebolavirus.**
- **Within the genus Ebolavirus, five species have been identified: Zaire, Bundibugyo, Sudan, Reston and TalForest.**
- **The first three, Bundibugyo ebolavirus, Zaire ebolavirus, and Sudan ebolavirus have been associated with large outbreaks in Africa.**

62. Antigen presenting cell(s) is/are?

a) Skin langerhans cell

b) T-lymphocytes

c) Macrophages

d) Kuffer cell

e) Thymic epithelial cells

Correct Answer - A:C:E

Ans. is 'a' i.e., Skin langerhans cell; 'c' i.e., Macrophages; ie., Kuffer cell; & `e' i.e., Thymic epithelial cells *[Ref Ananthanarayan 9th/e p. 137-38; Greenwood 16th/e* p. *133-34]*

- Important antigen presenting cells are *macrophages, B-cells, dendritic cells* and *Langherhans cells. Dendritic cells are the most potent and effective antigen presenting cells.*
- CD_4helpar T cells are activated only when antigen is presented by MHC-class II of APC —> MHC - H restricted.
- CD_8 cytotoxic T-cells recognize antigen that is presented by MHC - class I —> MHC - I restricted.
- B-cells receptors (i.e. surface immunoglobulin) can be bind to antigen and activate B-cells without involvement of MHC and antigen presenting cells Antigen *processing and presentation by APCs is not required for B cells* (in contrast to T-cells).

63. Deficiency of both T and B lymphocyte involved in all except?

a) Chronic mucocutaneous candidiasis

b) Wiskott-Aldrich syndrome

c) DiGeorge syndrome

d) Ataxia Telangiectasia

e) Common variable immunodeficiency

Correct Answer - A:C:E

Ans. is 'a' i.e., Chronic mucocutaneous candidiasis; 'c' i.e., DiGeorge syndrome; & `e' i.e., Common variable immunodeficiency *[Ref Ananthanarayan 9th/e p.174-75; Robbin's 7h/e p. 239-401*

64. Dimorphic fungi is/are?

a) Histoplasma capsulatum

b) Sporothrix schenckii

c) Malassezia furfur

d) Cryptococcus neoformans

e) Aspergillus

Correct Answer - A:B

Ans. is 'a' i.e., Histoplasma capsulatum; & 'b' i.e., Sporothrix schenckii [Ref Ananthanarayan ele p. 601,609; Jawetz 23'/e p. 6451.

- Fungi that have two growth forms, such as mold (filaments) and a yeast, which develop under different growth conditions.
- In host tissues or cultures at 37°C they occur as yeasts, while in the soil and in cultures at 22°C they appear as moulds.
- *Yeasts* are seen as rounded single cells or as budding organisms. *Candida* and *Cryptococcus* are traditionally classified as yeasts.
- Most fungi causing systemic infections are dimorphic fungi

Dimorphic Fungi are *Jawetz 27th/853*

- Blastomycosis dermatitidis
- Paracoccidioides brasiliensis
- Coccidioides posadasii & Coccidioides immitis
- Histoplasma capsulatum
- Sporotrix schenckii
- Penicillium marneffe
-

65. Non ture about Donovanosis?

a) Caused by Klebsiella granulomatis

b) Associated with pseudobuboes

c) Caused by Leishmania donovani

d) Drug of choice is Miltefosine

e) Drug of choice is sodium stibogluconate

Correct Answer - C:D:E

Ans. is 'c' i.e., Caused by Leishmania donovani; 'd' i.e., Drug of choice is Miltefosine; & `e' i.e., Drug of choice is sodium stibogluconate [Ref Ananthanarayan 9th/e p.397; Harrison's 19th/e p. 298e 1-2; Greenwood tele p.310; Park's 24th/e p.350]

- Donovanosis is caused by Calymmatobacterium granulomatis, a gram negative intracellular bacteria. Incubation period of donovanosis is 1 to 4 weeks. It begins as one or more subcutaneous nodules that erode through skin to produce an ulcer.
- Azithromycin is the DOC Alternatives are doxycycline (2" choice) and chloramphenicol. Streptomycin, once used, is not in use now. Note :Calymmatobacterium granulomatis is now called as Klebsiella granulomatis.

66. True about Actinomycosis?

a) Caused by madurella mycetomatis

b) Caused by anaerobic or microaerophilic bacteria

c) Cervicofacial is the most common site affected

d) Sulphur granules are present in lesion

e) Belongs to growth factor category of oncogene

Correct Answer - B:C:D:E

Ans. is 'b' i.e., Caused by anaerobic or microaerophilic bacteria ; 'c' i.e., Cervicofacial is the most common site affected; `d' i.e., Sulphur granules are present in lesion; & `e' i.e., Belongs to growth factor category of oncogene ***[Ref Ananthanarayan 9"'/e p.391-93, 600-01; Greenwood 16"/e p.221-22; Harrison's 19th/e p.1088]***

- These are considered as a transitional form between bacteria and fungi.
- Actinomyces are `gram-positive'non-motile"non-capsulated"non-acid fast' and 'non-sporing' filaments that break up into bacillary and coccoid elements.
- They are anaerobic or microaerophilic (Ananthnarayan 9th/e p. 391-393)
- Two important species are A. israelli and A. bovis. Most cases are due to A israelli.
  • Actinomyces are members of normal oral flora and are often cultured from bronchi, G.I. tract, and the female genital tract. • Actinomycosis in human beings is an endogenous infection.
- The critical step in the development of actinomycosis is disruption of

mucosal barrier.

67. Water loss of 5fi)-l0ffiml/hour in cholera is know as-

a) Cholera gravis

b) Cholera mitis

c) Cholera majoris

d) Cholera intermedius

e) Cholera totalis

Correct Answer - A

Anwer-Ans. is 'a' i.e., Cholera gravis ***[Ref Harrison's 19^{m}/e*** **p,** ***1063; www.ncbi.nlm.nih.gov]***

- Vibrio cholera infection manifestations range from asymptomatic to mild diarrhea to severe diarrhea.
- Massive watery diarrhea (known as cholera gravis) may cause loss of **1000** ml water per hour. This can cause hypotensive shock & death.

68. Organism(s) commonly causing infection in cystic fibrosis patients

a) Burkholderiacepacia

b) Pseudomonas Aeruginosa

c) Staphylococcus Aureus

d) Burkholderia Mallei

e) Streptococcus Pyogenes

Correct Answer - A:B:C

Ans. is 'a' i.e., Burkholderia cepacia; 'b' i.e., Pseudomonas aeruginosa; & 'c' i.e., Staphylococcus aureus ***[Ref Harrison 19^{m}/e p. 1699]***

Infections seen in cystic fibrosis are caused by

- • Burkholderia cepacia
- • Pseudomonas aeruginosa (mucoid type)
- • Atypical mycobacteria
- • Non-typeable hemophilus influenzae •

Staphylococcus aureus (including MRSA

69. Wbich of the following is/are Tick-borne.disease-

a) Murine typhus

b) Epidemic thyphus

c) Lyme's disease

d) Tularemia

e) Trench fever

Correct Answer - C:D

Ans. is 'c' i.e., Lyme's disease; & 'd' i.e., Tularemia ***[Ref Park's 24^{m}/e p.817, 805; Ananthanarayan Ie p.407; Greenwood 16^{m} Ie p. 350]***

• Hard tick→ Tick typhus, viral encephalitis, viral hemorrhagic fever, KFD, Tularemia, tick paralysis, human habesiosis, Lyme's disease. • Soft tick→ Q fever, relapsing fever, KFD.

70. Barrel shaped eggs is/are seen in -

a) Hookworm

b) Pin worm

c) Roundworm

d) Whipworn

e) Strongyloides stercoralis

Correct Answer - D

Ans. is 'd' i.e., Whipworm ***[Ref Rajesh karykarte 1"/e p. 1661***

- Eggs of Trichuris-trichura (whipworm) are barrel-shaped with mucous plug at each pole. Shell is yellow to brow (bile-stained) and plugs are colourless. They float in saturated solution of common salt. When freshly passed, they contain unsegmented ova and are not infective to man.

71. Which of the following is true about malaria -

a) Chloroquine resistance occurs in India

b) Relapses is usual for vivax and ovale malaria

c) Sexual cycle occurs in mosquito

d) Not a public problem in India

e) None

Correct Answer - A:B:C

Ans. is 'a' i.e.,Chloroquine resistance occurs in India; 'b' i.e., Relapses is usual for vivax and ovale malaria; & 'c' i.e., Sexual cycle occurs in mosquito ***[Ref KDT 7Ve*** **p.** ***822; Park 24th Ie p. 272-75]***

- Malaria contiues to pose a major public health problem in India, especially due to P. falciparum.
- Chloroquine - resistant P. falciparum malaria in India is widespread.

72. True about tapeworm is/are -

a) Taenia saginata is beef tapeworm

b) Taenia solium is more prevalent

c) Infection is acquired by ingestion of cysticercus in raw *beef*

d) Infectious form to animal is egg

e) None

Correct Answer - A:C:D

Ans. is 'a' i.e., Taenia saginata is beef tapeworm; 'c' i.e., Infection is acquired by ingestion of cysticercus in raw beef;`d' i.e., Infectious form to animal is egg *[Ref Medical microbiology E-book 215]*

Two species of Taenia infect man *:?*

. Taenia saginata : The beef tapeworm.

. Taenia solium : The pork tapeworm.

Mode of infection of tapeworms

. T. saginata - Under cooked beef containg cysticercus bovis.

. T. solium Undercooked pork containg cysticercus cellulosae & rarely by ingestion of egg (autoinfection).

- Occasionally man gets infected in the same way as pig, by ingestion of eggs (either by drinking contaminated water or by eating uncooked vegetables infected with eggs). In this cycle man acts both as definitive as well as intermediate host.

73. Which of the following Nanoparticle(s) inhibit both E coli and Staph aureus ?

a) Zinc oxide

b) Silver nanoparticle (SNP)

c) Copper oxide

d) Aluminum oxide

e) None

Correct Answer - A:C

Ans. is 'a' i.e., Zinc oxide; 'c' i.e., Copper oxide *[Ref Clinical Nanomedicine handbook]*

- A number of nanoscale metals, metal oxides, oral natural & synthetic polymers possers antimicrobial properties.
- ZnO → Staphylococcus, Escherichia coli
- ZnO ions→ Pseudomonas aeruginosa, S aureus Candida albleari
- SNP→ E. coli, Vibrio cholera, Salmonella lyphi, P. aeruginosa
- $Al_2 0_3$ →E. coli, B. subtilis, Pseudomonas fluorescens

74. True about aspergillus infection -

a) Forms hyphae

b) Branched at 90°

c) Nonseptate

d) Septate

e) Causes subcutaneous infections

Correct Answer - A:D

Ans. is 'a' i.e., Forms hyphae; 'd' i.e., Septate ***[Ref Ananthnarayan 8th/e p. 613; Harrison 19'Ve p. 1346]***

75. Most common cause of non-gonococcal urethritis -

a) Mycoplasma hominis

b) Mycoplasma genitalium

c) Ureoplasma urealyticum

d) Chlamydia trachomatis

e) Haemophilus ducrey

Correct Answer - D

Ans. is 'd' i.e., Chlamydia trachomatis ***[Ref: Essentials of microbiology 3rd le*** **p.** ***786]***

Gonococcal urethritis	**Nongonococcal**
Neisseria gonorrhea	Chlamydia Trachomatis (most common) Ureoplasmaurealyticum Mycoplasmagenitalium Bacterioides Haemophilus species Candida albicans T.vaginalis

76. Lesions caused by spirochetes are -

a) Syphilis

b) Yaws

c) Legionella pneumonia

d) Pinta

e) Lyme's disease

Correct Answer - A:B:D:E

Ans. is 'a' i.e., Syphilis; 'b' i.e., Yaws; 'd' i.e., Pinta; 'e' i.e., Lyme's disease

- Spirochetes are elongated, spirally coiled, flexible bacteria.
- Characteristic feature of spirochetes is presence of endoflagella which do not protrude outside.
- Pathogenic spirochetes belong to three genera : Treponema, Borrelia And Leptospira.

Spirochete species		disease
Treponema	Pallidum	Syphilis
	Endemicum	Bejel
	Pertunae	Yaws
	Carateum	Pinta
Borrelia	Burgdorferi	Lyme disease
	Recurrentis	Relapsing fever
	Vincenti	Vincent angina
Leptospira	Interrogans	Weil's disease

77. Not true about candida albicans -

a) Dimorphic fungus

b) Yeast like fungus

c) Reynolds-Braude phenomenon

d) Forms true hyphae

e) Forms pseudohyphae

Correct Answer - A:B:C:D:E

Ans. is 'None' i.e., All options are correct [Ref Ananthnarayan Stile p. 607; Essentials of Microbiology p. 717

- Candida is a yeast like fungus.
  - All candida species pathogenic for humans are also encountered as commensals of humans, particularly in the mouth, stool and vagina.
- They grow rapidly on simple media as oval budding cells at 25° to 37°C.
- In tissue, both yeasts and pseudohyphae are present.
- Candida albicans is differentiated by other candida :
- It forms true hyphae (mycelia) or germ tubes when grown in serum.
- It forms thick walled large spores called chlamydospores when grown in corn meal agar.
- It is dimorphic. Candida albicans can produce yeast, true hyphae and pseudohyphae.
- A rapid method of identifying C. albicans is based on its ability to form germ tubes within two hours when incubated in human serum at 37°C —> Reynolds - Braude phenomenon (Also known as germ tube test).
- Candida yeast cells and pseudohyphae are the only fungi that are usually gram - positive on smears.

78. True about streptococcus agalactiae -

a) Catalase positive

b) Catalase negative

c) Beta hemolytic

d) Alpha hemolytic

e) Bacitracin resistant

Correct Answer - B:C:E

Ans. is 'b' i.e., Catalase negative; 'c' i.e., Beta hemolytic; 'e' i.e., Bacitracin resistant

- Streptococcus agalactiae is bacitracin resistant. Only streptococcus sensitive to bacitracin is streptococcus pyogenes.
- Sensitivity to bacitracin is employed as a convenient method for differentiating str. pyogenes from other hemolytic streptococci (Maxted's observation).
- Streptococcus agalactiae (also known as group B streptococcus or GBS) is a gram-positive coccus (round bacterium) with a tendency to form chains (as reflected by the genus name Streptococcus). It is a beta-hemolytic, catalase-negative, and facultative anaerobe.

79. True about cellulitis Vs erysipelas -

a) Cellulitis is deep

b) Erysipelas is deep

c) Both caused by streptococcus pyogenes

d) Cellulitis starts abruptly

e) Erysipelas starts slowly

Correct Answer - A:C

Ans. is 'a' i.e., Cellulitis is deep; 'c' i.e., Both caused by streptococcus pyogenes ***[Ref Text book of Dermatology p. 1531***

- Erysepelas and cellulitis are caused mostly by streptococcus pyogenes
- Cellulitis affects the deeper loose subcutaneous tissue. As in any continum of disease, some overlap can occur. Despite their common etiology, significant differences in presentation, signs, and clinical course are noted.
- Almost all cases erysipelas are caused by Str pyogenes. Whereas cellulitis is caused most commonly by Str pyogenes, rarely it can also be caused by staphylococcus, Idebsiella, H influenzae

80. Painful penile ulcer with suppurative lymphadenopathy is seen in ?

a) Syphilis

b) Hard chancre

c) Soft chancre

d) Haemophilus ducreyi

e) Donovanosis

Correct Answer - C:D

Ans. is 'c' i.e., Soft chancre; 'd' i.e., Haemophilus ducreyi •

Chancroid (Soft chancre), Haemophilus Ducreyi*, 1-14 days, ·

Painful non indurated ulcer (soft chancre), Painful lymphadenopathy

81. True about treatment of leprosy ?

a) Multibacillary leprosy is treated by 3 drugs

b) Paucibacillary leprosy is treated by 1 drug

c) Paucibacillary leprosy is treated for 1 year

d) Post-treatment surviellance for multibacillary leprosy is for 5 years

e) Clofazimine is first line drug

Correct Answer - D:E

Ans- d) Post-treatment surviellance for multibacillaryleprosy is for 5 years; 'e' i.e., Clofazimine is first line drug *[Ref Harrison 19th Ie p. 11261 .*

- Paucibacillary : Bacteriological index is less than 2 with 5 or less skin lesions. It includes Borderline tuberculoid (BT), Tuberculoid (TT) and Indeterminate leprosy.
- Multibacillary : Bacteriological index is 2 or more with 6 or more skin lesions. It includes Borderline (BB). Borderline lepromatous (BL) and Lepromatous (LL) leprosy.

Drugs used for leprosy are :-

- First line : Rifampicin, dapsone and clofazimine.
- Other : Minocycline, Quinolones (oxacilin), ethionamide, clarithromycin, rifapentine and moxifloxacin.
- Rifampicin is the most active (rapidly acting and bactericidal drug) for leprosy

82. Deficiency of both B and T lymphocytes is seen in ?

a) Wiskott Aldrich syndrome

b) Digeorge syndrome

c) Ataxia telangiectasia

d) Common variable immunodeficiency

e) Chronic mucocutaneous candidiasis

Correct Answer - A:C

Ans. is 'a' i.e., Wiskott Aldrich syndrome; 'c' i.e., Ataxia telengectasia [Ref Atlas of immunology p. 537]

Combined immunodeficiencies (B and T cell defects)

- Cellular immunodeficiency with abnormal immunoglobulin synthesis (Nezelof syndrome)
- Ataxia telangiectasia
- Wiskott-Aldrich syndrome
- Immunodeficiency with thymoma
- Immunodeficiency with short-limbed dwarfism 0 Episodic lymphopenia with lymphocytotoxin
- Severe combined immunodeficiencies
- 'Swiss type' agammaglobulinemia
- Reticular dysgenesis of de Vaal •

Adenosine deaminase (ADA) deficiency

83. True regarding erysipelas are -

a) Caused by S pyogenes

b) Superficial skin lesion

c) More seen on face than trunk

d) Has history of recent sore throat infection

e) None

Correct Answer - A:B:C:D

Ans. is 'a' i.e., Caused by S pyogenes; 'b' i.e., Superficial skin lesion; 'c' i.e., More seen on face than trunk; i.d., Has history of recent sore throat infection *[Ref Text book* of *Dermatology p. 1531*

- Erysipelas is a superficial skin infection affecting upper dermis and extends into the superficial lymphatics.
- It is caused mostly by streptococcus pyogenes (group A Beta hemolytic streptococcus).
- Symptoms and signs of erysipelas are usually abrupt in onset and often accompanied by fevers, chills and shivering.
- Erysipelas predominantly affects the skin of the lower limbs, but when it involves the face it can have a characteristic butterfly distribution on the cheeks and across the bridge of the nose.
- The affected skin has a very sharp, raised border.
- It is bright red, firm and swollen. It may be finely dimpled (like an orange skin).
- It may be blisthered, and in severe cases may become necrotic.
- Bleeding into the skin may cause purpura.

84. Most common route of transmission of tuberculosis to neonate -

a) Aerosol infection

b) Skin contact

c) Transplacental infection

d) Venous route

e) Haematogenous infection

Correct Answer - C:D:E

Ans. is 'c' i.e., Transplacental infection; 'd' i.e., Venous route; 'e' i.e., Haematogenous infection *[Ref Clinical neonatology 4th ie p. 153]*

Transplacental spread:

• It is the most common mode of transmission

• Tubercle bacilli cross the placenta through the umbilical vein and a primary focus develops in the fetal liver with involvement of periportal lymph nodes and the bacilli infect secondarily the lung. • It is a hematogenous infection and is called congenital infection by vertical transmission of TB.

Aspiration or ingestion

• Neonate may acquire the disease in utero or during child birth (intrapartum) by aspiration or ingestion of infected aminiotic fluid. • It causes primary infection of fetal lungs and gut.

85. CD marker on natural killer cells ?

a) CD-16

b) CD-56

c) CD-3

d) CD-4

e) CD-8

Correct Answer - A:B:C

Ans. is 'a' i.e.,CD-16; `b' i.e., CD-56; 'c' i.e., CD-3 ***[Ref Anantanarayan S^{o}le p. 137; Harrison 19th/e p. 372]***

- Null cells are called so because they lack features of surface markers of both B and T lymphocytes. The account for 5 to 10% of peripheral blood lymphocytes.
- They are also called *"large granular lymphocytes (LGL)"* as they contain large *azurophilic cytoplasmic granules.* They express CD16 and CD56 markers. They *proliferate in response to IL-2.*
- LGLs arise in *both bone marrow and thymic microenvironment.* In contrast to T-cells, they are *not MHC restricted.*
- NK-cells are *positive for CD16 and CD56.*
- NK cells are usually *negative for CD3,* but a *subset is positive for CD3* called NK/T-cells.
- *IL-2* acts as a growth factor for NK cells. NK cells activity is augmented by interferon. NK cells secrete peroforin (resembles comlement C9) which causes transmembrane pores through which cytotoxic factors (e.g. TNF-(3) enters the cells and induce apoptosis.

86. Incorrect statement(s) regarding HPV is are -

a) DNA virus

b) RNA virus

c) 16, 18 types cause carcinoma

d) Verrucus vulgaris is most common

e) Recently approved vaccine is trivalent

Correct Answer - B:E

Ans. is 'b' i.e., RNA virus; 'e' i.e., Recently approved vaccine is trivalent

- HPV is a non-enveloped DNA virus (ds DNA), belongs to Papovaviridae.
- 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.
- HPV infects only human skin and grows only in organ cultures of human skin.
- Warts are benign extra growth of skin and mucous membrane resulting from infection with human papilloma virus (HPV). They are common in children and young adults

There are two types of HPV vaccines :-

- **Quadrivalent** :- containing HPV types 6,11,16,18
- **Bivalent** :- containing HPV types **16,18**

- Efficacy of vaccine has varied according to immunologic and virological characteristics of study populations at baseline and according to the endpoints evaluated. Most of the time, rates of vaccine efficacy exceed 90%.
- Vaccine is recommended for girls and young women 9-26 years of age.

87. Correct about adenovirus -

a) Causes conjunctivitis

b) Diarrhea is caused by serotype 40

c) Single stranded DNA virus

d) Causes intussusception

e) Type 14 causes most severe disease

Correct Answer - A:B:D:E

Ans. is 'a' i.e., Causes conjunctivitis; 'b' i.e., Diarrhea is caused by serotype 40; 'd' i.e., Causes intussusception & `e' i.e., Type 14 causes most severe disease.

- Non-enveloped, DNA (ds DNA) Virus
- Has characteristic morphology consisting of an icosahedral shell composed of 20 equilateral triangular faces and 12 vertices -3 space vehicle appearance.
- Human adenovirus **grows only in tissue culture of human origin,** such as human embryonic kidney, HeLa or HEP-2.
- Cytopathic effects in tissue culture ---> cell rounding and aggregation into **grape like clusters.**
- Adenovirus has been used as a vector for gene therapy.
- Adenovirus cause infections of the respiratory tract and eyes and less often of the intestine and urinary tract.
- Most frequently affect infants and children
- Most common manifestation in children is an acute upper respiratory tract infection with prominent rhinitis.
- Most common manifestation in adult ARDS.
- Adenovirus serotype 14 has been associated with severe and potentially fatal outbreak of pneumonia.

88. Griffith experiment was done on ?

a) Salmonella

b) Streptococcus pneumoniae

c) Enterococcus

d) Staphylococcus

e) None

Correct Answer - B

Ans. is 'b' i.e., Streptococcus pneumoniae *[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.
- It is transfer of genetic information through the agency of free DNA.
- It was the first example of genetic exchange in bacteria to be been discovered Griffith in 1928 found that mice died when injected with a mixture of live non-capsulated (R) Streptococcus pneumoniae & heat killed capsulated (S) S.pneumoniae, neither of which separately proved fatal

89. True about chancroid:

a) Bacilli causing the disease shows School of fish appearance

b) Painful ulcer

c) Incubation period is 10-90 day

d) Presents as painless lymphadenopathy

e) Sharply demarcated & elevated edge

Correct Answer - A:B:D

Ans: a. Bacilli causing..., b. Painful..., d. Presents.*[Ref Ananthanarayan 9th/ 331;Harrison 19th/880,1012-13]*

- Chancroid or soft sore is a venereal disease characterized by
- tender non-indurated irregular ulcers on the genitalia
- The bacilli may be arranged in small groups or whorls or in parallel chains, giving a 'school of fish' or 'rail road track' appearance
- The infection remains localized, spreading only to the regional lymph nodes which are enlarged & painful
- Infection is acquired as the result of a break in the epithelium during sexual contact with an infected individual.
- Approximately half of patients develop enlarged, tender inguinal lymph nodes, which frequently become fluctuant and spontaneously rupture.

90. Which of the following spread by ingestion of eggs:

a) Strongyloides

b) Trichinella

c) Trichuris

d) Ascaris

e) Ancylostoma duodenale

Correct Answer - C:D

Ans: c. Trichuris d. Ascaris

- Strongyloides: Infective form is *filariform larva (Panikar 7th/178)*
- "Trichinella: Infective form is *encysted larva* found in muscles of pigs & other animals" *(Panikar 7th/168)*
- "Ancylostoma duodenale- Infective form is third stage filariform larva" *(Panikar 7th/168)*

. By ingestion
. Eggs: Ascaris, enterobius, Trichuris
. Larva within intermediate host: Dracunculus
. Encysted larvae in muscle: Trichinella
. By penetration of skin: Ancylostoma, Necator, Strongyloides
. By blood sucking insects: Filariae
. By inhalation of dust containing eggs: Ascaris, enterobius

91. To check the efficiency of the heat sterilization, which of the following microbe is/are used :

a) Geobacillus stearothermophilus

b) Bacillus subtilis

c) Salmonella

d) Pneumococcus

e) Bacillus stearothermophilus

Correct Answer - A:B:E

Ans: a. Geobacillus stearothermophilus b. Bacillus subtilis e. Bacillus stearothermophilus*[Ref Ananthanarayan 9th/30,32 ; Greenwood 16th/771*

Sterilisation Control (Dry Heat)

- The spores of a non-toxigenic strain of clostridium tetani or Bacillus subtilis subspecies niger are used as a microbial test of dry heat efficiency.
- For determining the efficacy of moist heat sterilization, spores of Bacillus stearothermophilus are used as the test organism
- "Geobacillus stearothermophilus (or Bacillus stearothermophilus) is constantly used in the biotech industry to test the success of sterilization cycles of equipment.
  - Due to the bacteria's high resistance to heat, it is a suitable biological Indicator of microbe life after a sterilization cycle.

92. All are true about cytomegalovirus except:

a) May be transmitted from pregnant mother to foetus

b) Type 5 Human herpes virus

c) Lymphocyte enlargement

d) Cause congenital diseases

e) May lead to fetal death

Correct Answer - C

Ans: c. Lymphocyte enlargement ***[Ref Harrison 19th/1190-91; Ananthanarayan 9th/473-74 ; Jawetz 27th/470-74]***

Cytomegalovirus (Human Herpes Virus Type 5)

- It is cytomegalic (not lymphoproliferative, which occur in HHV4, 6 & 7)
- Characterized by enlargement of infected cells
- Congenital infection- Intrauterine infection leads to fetal death or cytomegalic inclusion disease of newborn which is often fatal • The hallmark of such infection is the appearance of atypical lymphocytes in the peripheral blood; these cells are predominantly activated CD8+ T lymphocyte***s.***

93. True about bacteriorhodopsin:

a) Present in the cell membrane

b) It acts as proton pump

c) Generate ATP

d) Use light energy

e) Same as rhodopsin found in human

Correct Answer - A:B:C:E

Ans: a. Present in the cell membrane b. It acts as proton pump c. Generate ATP d. Same as rhodopsin found in human

- Bacteriorhodopsin is a protein used by Archaea, most notably by Halobacteria, a class of the Euryarchaeota.
- It acts as a proton pump; that is, it captures light energy and uses it to move protons across the membrane out of the cell. The resulting proton gradient is subsequently converted into chemical energy.
- Bacteriorhodopsin is a trans-membrane protein found in the cellular membrane of Halobacterium salinarium, which functions as a light-driven proton pump.
- Bacteriorhodopsin is a proton pump found in Archaea, it takes light energy and coverts it into chemical energy i.e. ATP, that can be used by the cell for cellular functions.

94. Burkdholeria cepacia infection is/are typically associated with:

a) Cystic fibrosis

b) Chronic bronchitis

c) Chronic granulomatous disease

d) Multiple myeloma

e) Myeloperoxidase deficiency

Correct Answer - A:C

Ans: a. Cystic fibrosis & c. Chronic granulomatous disease

[Ref Ananthanarayan 9th/316; Medical microbiology by Greenwood 16th/286-88; Jawetz Microbiology 27th/248-49]

- Burkholderia cepacia is increasingly being recognized as an opportunist environmental pathogen, particularly in those with cystic fibrosis or chronic granulomatous disease, in whom it causes fatal necrotizing pneumonia" (Ananthanarayan 9th/316; Greenwood 16th/286-88)
- Burkholderia cepacia is an environmental organism that is able to grow in water, soil, plants, animals, and decaying vegetable materials.
- B cepacia grows on most media used in culturing patients' specimens for gram-negative bacteria. Selective media containing colistin also can be used. B cepacia grows more slowly than enteric gram-negative rods, and it may take 3 days before colonies are visible

95. T. saginata is differentiated from T. solium by presence of:

a) Hooks in scolex (head)

b) 4 large pigmented sucker

c) Uterus is thin & dichotomous

d) Short neck

e) Egg is not infective to man

Correct Answer - B:C:E

Ans: b. 4 large pigmented sucker , c. Uterus is thin & dichotomous & e. Egg is not infective to man. ***[Ref Paniker's Parasitology 7th/121; Medical microbiology by Greenwood 16th/610-11]***

	Taenia saginata	**Taenia solium**
Length	**5-10 Medical Transcriptionists**	**2-3 m**
Scolex	Large quadrate, Rostellum and hooks are Absent, Suckers may be Pigmented	Small and globular, Rostellum and hooks are present, Suckers not pigmented
Neck	Long	Short
Proglottids	1, 000-2, 000	Below 1, 000
Measurement	20 mm x 5 mm	12 mm x 6 mm
Expulsion	Expelled singly	Expelled passively in chains of 5 or 6
Uterus	Lateral branchesl5-30 on each side; thin	Lateral branches 5-10 on each side; thick and

	anddichotomous	dendritic
Vagina	Present	Absent
Accessary lobe of ovary	Absent	Present
Testes	300-400 follicles	150-200 follicles
Larva	Cysticercus bovis;present in cow not in man	Cysticercus cellulosae; present in pig and also in man
Egg	Not infective to man	Infective to man

96. Laboratory finding (s) of a patient having chronic hepatitis B infection with low viral load:

a) HBsAg

b) Anti-HBs

c) Anti-HBe

d) Anti-HBc IgG

e) HBeAg

Correct Answer - A:C:D

Ans: a. HBsAg , c. Anti-HBe & d. Anti-HBc IgG [Ref Ananthanarayan 9th/546-48; Park 23rd/215; Harrison 19th/2016-181

- The first virologic marker detectable in serum within 1-12 weeksQ, usually between 8-12 weeks, is HBsAg. Q
- In typical case, HBsAg becomes undetectable 1-2 months after the onset of jaundice and rarely persists beyond 6 months. After HBsAg disappears, antibody to HBsAg (anti-HBs) detectable in serum and remains detectable indefinitely thereafter.
- Testing for IgM anti-HBc may be useful to distinguish between acute or recent infection (IgM anti-HBc-positive) and chronic HBV infection (IgM anti-HBc-negative, IgG anti-HBc-positive).
- Another serologic marker that may be of value in patients with hepatitis B is HBeAg. Its principal clinical usefulness is as an indicator of relative infectivity. Because HBeAg is invariably present during early acute hepatitis B, HBeAg testing is indicated primarily during follow-up of chronic infection.

- Anti-HBs is rarely detectable in the presence of HBsAg in patients with acute hepatitis B, but 10-20% of persons with chronic HBV infection may harbor low-level anti-HBs

97. True about Botulinum toxin:

a) Interfere with adrenergic transmission

b) Interfere with Cholinergic transmission

c) Increase release of synaptic vesicles

d) Inhibit release from synaptic vesicles

e) Act also on CNS

Correct Answer - B:D:E

Ans: b. Interfere with Cholinergic transmission, d. Inhibit release from synaptic vesicles & e. Act also on CNS *[Ref K. D. T 7th/99-100, 121; Ananthanarayan 9th/264]*

- **"**Two toxins interfere with cholinergic transmission by affecting release: botulinum toxin inhibit release, while black widow spider toxin induces massive release er depletion"- K.D. T 7th/99
- A localized injection can be used in treatment of a number of spastic & other neurological conditions due to overactivity of cholinergic nerves like blepharospasm, spastic cerebral palsy, strabismus, spasmodic torticollis, nystagmus, hemifacial spasm, poststroke spasticity, spasmodic dysphonia, axillary hyperhydrosis etc
- It acts by blocking the production or release of acetylcholine at the synapses & neuromuscular junctions
- Onset is marked by diplopia, dysphagia & dysarthria due to cranial nerve involvement
- A symmetric descending paralysis is the characteristic pattern, ending in death by respiratory paralysis

98. True about Swine flu:

a) Older bird influenza vaccine is equally effective in swine flu

b) Oseltamivir is effective in prevention

c) Zanamivir can be used for treatment

d) Influenza vaccine provides immunity just after vaccination.

e) None

Correct Answer - B:C

Ans: b. Oseltamivir is effective in prevention & c. Zanamivir can be used for treatment [Ref Park 23rd/156-59; Ananthanarayan 9th/503]

- **Swine influenza-** emerged in march 2009 as new H1N1 virus disease, Also called as swine origin influenza, It spread from person to person & caused a pandemic.
- **Pandemic influenza A (H1N1) 2009-** Currently susceptible to oseltamivir zanamivir but resistant to amantadine or rimantadine, Treatment: oseltamivir adult oral dose is 75 mg twice daily for 5 days. Zanamivir dose is two inhalation (2 x 5 mg) twice daily for 5 days
- Chemoprophylaxis: Oseltamivir is drug of choice for chemoprophylaxis. It should be given till 10 days after last exposure, Influenza vaccine only become effective about 14 days after vaccination. Those infected shortly before (1-3 days) or shortly after immunization can still get the disease., Vaccinated individuals can also get influenza caused by a different strain of influenza virus, for which the vaccine does not provide protection

99. True statement regarding NK cells are all except:

a) Also called as Large granular lymphocyte

b) Can kill viral infected cell

c) Forms first line of defence

d) Can kill tumour cell

e) No role in cell mediated immunity

Correct Answer - E

Ans: e. No role in cell mediated immunity [Ref Ananthanarayan 9th/137; Robbins 9th/192; Medical microbiology by Greenwood 16th/129; Harrison 19th/372e6-7]

- NK cells are endowed with the ability to kill a variety of virus-infected cells and tumor cells, without prior exposure to or activation by these microbes or tumors. This ability makes NK cells an early line of defense against viral infections and, perhaps, some tumors
- The function of NK cells is to destroy irreversibly stressed and abnormal cells, such as virus-infected cells and tumor cells. NK cells make up approximately 5% to 10% of peripheral blood lymphocytes.
- NK cell: They have CD 16 & CD 56Q on their surface. They release several cytolytic factors; one of these, perforins, which resembles complement C9, cause transmembrane pores through which cytotoxic factor enter the cell. NK cell activity is augmented by interferon0.
- N K cell: Form part of innate immunity as it does not require prior sensitisation by antigen. Their cytotoxicity is not antibody dependent or MHC restricted.

100. All are true about severe combined immunodeficiency except:

a) B & T cell deficiency

b) Adenosine deaminase deficiency may occur

c) Affected child can survives beyond adolescence without treatment

d) Can transmit either as X-linked or autosomal recessive defect

e) Person susceptible to recurrent & severe infections

Correct Answer - C

Ans: (C) Affected child can survives beyond adolescence without treatment [Ref Ananthanarayan 9th, 174-75; Robbins 9th/239-4

- Adenosine deaminase deficiency: This the first immunodeficiency disease associated with an enzyme deficiency, Deficiency of both humoral & CMI response.
- Persons with SCID are extremely susceptible to recurrent, severe infections by a wide range of pathogens, including Candida albicans, Pneumocystis jiroveci, Pseudomonas, cytomegalovirus, varicella, and a whole host of bacteria.
- The most common form, accounting for 50% to 60% of cases, is X-linked, and hence SCID is more common in boys than in girls. The genetic defect in the X-linked form is a mutation in the common y-chain (yc) subunit of cytokine receptors.
- Autosomal recessive SCID: The remaining forms of SCID are autosomal recessive disorders. The most common cause of autosomal recessive SCID is a deficiency of the enzyme adenosine

deaminase (ADA). Other is Mutations of an intracellular kinaseJak3 & Mutations in recombinaseactivating genes (RAG)

- The SCID syndrome is inherited either as an X-linked or autosomal recessive defect, and affected infants rarely survive beyond 1 year without treatment.

101. Which of the following is/are true about HIV-2:

a) HIV-2 first detected in West Africa in 1986

b) Donated blood is only screened for HIV-1, not HIV-2

c) More virulent than HIV 1

d) More closely related to simian immunodeficiency virus than HIV 1

e) Mode of transmission is like HIV1

Correct Answer - A:D:E

Ans: a. HIV-2 first detected in West Africa in 1986 , d. More closely related to simian immunodeficiency virus than HIV 1 & e. Mode of transmission is like HIV1,

[Ref Ananthanarayan 9th/573, 194-95; Harrison 19th/1216, 1222; Greenwood 16th/527]

- HIV strains first isolated from West Africa in 1986, which react with HIV type 1 antiserum very weakly or not at all have been termed HIV type 2, HIV 2 has only 40% genetic identity with HIV 1.
- It is more closely related to simian immunodeficiency virus than to HIV 1, It is much less virulent than HIV 1
- It is largely confined to West Africa, through isolations have been reported from some other areas, including western & southern India.
- HIV-2 is transmitted by the same routes as HIV-1- Greenwood 16th/535
- Line immune assays (LIAs): These assays allow for application of antigens from more than one virus, thereby allowing them to act as combination assays & to differentiate infection by HIV 1 & HIV 2.

102. Which of the following is picornaviridae:

a) Polio virus

b) Coxsackievirus

c) Rhinovirus

d) Coronavirus

e) Reovirus

Correct Answer - A:B:C

Ans: a. Polio virus , b. Coxsackievirus & c. Rhinovirus[Ref Ananthanarayan 9th/484-85, 440; Harrison 19th/1289-95; Jawetz 27th/5141

- Rheovirus belongs to reoviridae family ,Corona virus belongs to coronaviridae (Ananthanarayan 9th/441)
- Enteroviruses, members of the family Picornaviridae, are so designated because of their ability to multiply in the gastrointestinal tract.
- Despite their name, these viruses are not a prominent cause of gastroenteritis.
- Enteroviruses encompass more than 100 human serotypes: 3 serotypes of poliovirus, 21 serotypes of coxsackievirus A, 6 serotypes of coxsackievirus B, 28 serotypes of echovirus, enteroviruses 68-71, and multiple new enteroviruses (beginning with enterovirus 73) that have been identified by molecular techniques.
- Human enteroviruses have been reclassified into four species designated A-D. Echoviruses 22 and 23 have been reclassified as parechoviruses 1 and 2 on the basis of low nucleotide homology and differences in viral proteins.
- The Picornaviridae family contains 12 genera Rhinoviruses

historically were placed in separate genus but are now considered to be members of Enterovirus genus.

103. Features of stage III HIV infection is/are:

a) Fever > 38. 5 OC

b) Oral hairy leukoplakia

c) Candidiasis

d) Diarrhoea of >20 day duration

e) > 26% CD4 count in adults

Correct Answer - B:C

Ans: b. Oral hairy leukoplakia , c. Candidiasis *[Ref Park 23rd/349; Ananthanarayan 9th/575; Harrison 19th/1215-16, 1257]* We will answer on applying both criteria CDC & WHO as it is not specifically mentioned .

- The current U. S. CDC classification system for HIV infection and AIDS categorizes people on the basis of clinical conditions associated with HIV infection and CD4+ T lymphocyte measurement.
- A confirmed HIV case can be classified in one of five HIV infection stages (0, 1, 2, 3, or unknown).
- If there was a negative HIV test within 6 months of the first HIV infection diagnosis, the stage is 0, and remains 0 until 6 months after diagnosis.
- Advanced HIV disease (AIDS) is classified as stage 3 if one or more specific opportunistic illness has been diagnosed Otherwise, the stage is determined by CD4 test results and immunologic criteria
- If none of these criteria apply (e.g., because of missing information on CD4 test results), the stage is U (unknown).

104. Microbiological organism can be recoverd from:

a) Sulphur granules of actinomycetes

b) Streptococci from Valve leaflet lesion in rheumatic valvulitis

c) Petechial purpura for Meningococci

d) Corynebacterium in pseudomembrane in throat

e) None

Correct Answer - A:C:D

Ans: a. Sulphur granules of actinomycetes, c. Petechial purpura for Meningococci & d. Corynebacterium in pseudomembrane in throat,

[Ref Ananthanarayan 9th/392; Harrison 19th/979; Greenwood 16th/189-90]

- Isolation in culture: Sulphur granules or pus containing actinomycetes are washed & inoculated" (Ananthanarayan 9th/392)
- Petechial lesion: Meningococci may sometimes be demonstrated in petechial lesions by microscopy & culture" (Ananthanarayan 9th/230)
- Throat samples should be submitted to the laboratory for culture with the notation that diphtheria is being considered. This information should prompt cultivation on special selective medium and subsequent biochemical testing to differentiate C. diphtheriae from other nasopharyngeal commensal corynebacteria:' (Harrison 19th/979)
- The diphtheria bacilli within the membrane continue to produce toxin actively.

- Rheumatic valvulitis is manifestation of rheumatic heart disease. Rhematic fever is an acute, immunologically mediated, multisystem inflammatory disease classically occurring a few week after an episode of group A streptococcal infection.
- Acute rheumatic fever: This occur after 1-3 week after acute infection of S. pyogens so that organism may not be detectable when sequelae set in. Essential lesion is characterized by Aschoff nodules.

105. All are the feature (s) of chancorid except:

a) Ulcer bleed easily

b) Painful

c) Bubo formation

d) Typically indurated

e) Caused by H. ducreyi

Correct Answer - D

Ans: d. Typically indurated, ***[Ref Ananthanarayan 9th/331; Robbins 9th/370; Harrison 19th/101213; Greenwood 16th/309]***

- Chancroid or soft sore is characterized by tender non-indurated irregular ulcers on the genitalia
- The infection remains localized, spreading only to the regional lymph nodes which are enlarged & painful
- "Haemophilus ducreyi: After an incubation period of 4-7 days, the initial lesion—a papule with surrounding erythema—appears.
- In 2 or 3 days, the papule evolves into a pustule, which spontaneously ruptures and forms a sharply circumscribed ulcer that is generally not indurated. The ulcers are painful and bleed easily; little or no inflammation of the surrounding skin is evident. • Approximately half of patients develop enlarged, tender become fluctuant and spontaneously rupture" (Harrison 18th)

106. True about plague:

a) Seasonal spread

b) No vaccine is available

c) Tetracycline is used both for chemoprophylaxis & treatment

d) Caused by gram negative motile bacteria

e) All ages are equally affected

Correct Answer - A:C

Ans: a. Seasonal spread. , c. Tetracycline is used both for chemoprophylaxis & treatment

- Epidemic generally occur in cool, humid seasons that favour the multiplication of fleas, leading to higher flea index
- Fleas do not thrive in hot, dry weather & the transmission of infection is interrupted
- Two types of vaccine have been in use- Killed vaccine (prepared at the Haffkine Institute, Mumbai) & live vaccine (it is no longer recommended)
- Streptomycin, doxycycline & chloramphenicol are effective •• Park 23rd/292-97)
- Outbreaks of plague are usually seasonal in nature. In northern India, the plague season starts from September until may. The disease tends to die out with the onset of hot weather. On the contrary, in south india, there was no definite plague season
- Temperature & humidity: A mean temperature of 20 to 25 deg. C, & a relative humidity of 60% & above are considered favourable for spread of plague
- Agent: Y. pestis- a gram negative, non-motile, cocco-bacillus that exhibit bipolar staining with special stains (e. g Wayson'd stain)

- Source of infection: Infected rodents & fleas & case of pneumonic plague

107. All are true about Toxoplasma infection except:

a) May occur due to ingestion of oocyst from cat's faeces

b) May spread by organ transplantation

c) Toxoplasmosis is symptomatic in usually immunocompetent person

d) Infection is severe & progressive in immunocompromised host

e) Human infection is dead end for parasite

Correct Answer - C

Ans: c. Toxoplasmosis… *[Ref Paniker Parasitology 6th/100: Harrison 19th/1398-1405,*

- **Infective stage for man:** Oocyst with sporozoites **&** tissue cyst with bradyzoites
- Freshly passed oocyst is not infective (needs development in the soil)
- Human infection is **dead end for the parasite**
- The principal source of human Toxoplasma infection remains uncertain.
- Transmission usually takes place by the oral route and can be attributable to ingestion of either sporulated oocysts from contaminated soil or bradyzoites from undercooked meat • Intrauterine infection from infected mother to babies. Rarely by blood transfusion or transplantation from infected donors.

108. Which of the following disease (s) is/are not toxin mediated:

a) Diphtheria

b) Tetanus

c) Pertussis

d) Anthrax

e) Syphilis

Correct Answer - E

Ans: e. Syphilis...*[Ref Ananthanarayan 8th/233, 317; Greenwood Microbiology 16th/91]*

- Virulent strains of diphtheria bacilli produce a very powerful exotoxin. The pathogenic effects of the bacillus are due to toxin.
- Pertussis toxin (PT): This is present only in Bordetellae pertussis. It play an important role in the pathogenesis of whooping cough. PT toxoid is the major component of acellular pertussis vaccines
- The anthrax toxin is a complex of three fractions: the edema factor (OF or Factor I), the protective antigen factor (PA or Factor II) & the lethal factor (LF or Factor III)"
- Toxins inhibiting protein synthesis: 1) Shigella dysenteriae I (Shiga toxin) 2) Diphtheria 3) Pseudomonas 4) Verotoxin 1=Shiga like toxin of E.coli)

109. Commonly used stain (s) for identifying fungus include (s):

a) Periodic acid-Schiff (PAS) stain

b) Von Kossa stain

c) Muramine silver stain

d) Gomori's methenamine silver

e) Giemsa stain

Correct Answer - A:D

Ans: a. Periodic ..., d. Gomori's… ***[Ref: Ananthanarayan 8th/601: Harrison 19th/1330, 18th/1637]***

- The PAS & methenamine silver stains are valuable methods for the demonstration of fungal elements in tissue section. The commonest culture media used in mycology are Sabouraud's glucose agar, Czapek-Dox medium & Corn meal agar.
- The von Kossa stain is used to quantify mineralization in cell culture and tissue section.
- Giemsa stain is used in cytogenetics and for the histopathological diagnosis of malaria and other parasites.
- The stains most commonly used to identify fungi are periodic acid-Schiff and Gomori methenamine silver. Candida, unlike other fungi, is visible on gram-stained tissue smears. Hematoxylin and eosin stain is not sufficient to identify Candida in tissue specimens. • When positive, an India ink preparation of cerebrospinal fluid (CSF) is diagnostic for cryptococcosis. Most laboratories now use calcofluor white staining coupled with fluorescent microscopy to identify fungi in fluid specimens.

110. Verruga peruana is caused by:

a) B. Bacilliformis

b) B.Henselae

c) B.Quintana

d) B.Elizabethae

e) B. Grahamil

Correct Answer - A

Ans: (A) B bacilliformis..*[Ref Ananthanarayan 8th/411-12: Harrison 19th/1083, 1079, 18th/ 13191*

- Bartonellosis, or Carrion's disease, is caused by B. bacilliformis. The disease is characterized by two distinct phases: (1) an acute febrile hematic phase, known as Oroya fever; and (2) an eruptive phase manifested by cutaneous lesions, known as verruga peruana" (Harrison 19th/1083,18th/1319)
- Verruga Peruana or Peruvian Wart: It is characterized by an eruptive phase, in which the patients develop a cutaneous rash produced by a proliferation of endothelial cells and is known as "Peruvian warts" or "verruga peruana".

111. Non-treponemal test includes:

a) RPR

b) VDRL

c) FTA-ABS

d) TPHA

e) TPI

Correct Answer - A:B

Ans: a. RPR, b. VDRL *[Ref Ananthanarayan 8th/375-76: Harriosn 19th/1137-38, 18th/1384; CMDT 2016/1464; Greenwood Microbiology 16th/347]*

- There are two general categories of serologic tests for syphilis: (1) Nontreponemal tests detect antibodies to lipoidal antigens present in the host after modification by T pallidum. (2) Treponemal tests use live or killed T pallidum as antigen to detect antibodies specific for pathogenic treponemes.
- The RPR and VDRL tests are recommended for screening or for quantitation of serum antibody. The titer reflects disease activity, rising during the evolution of early syphilis and often exceeding 1: 32 in secondary syphilis. After therapy for early syphilis, a persistent fall by fourfold or more (e.g., a decline from 1: 32 to 1: 8) is considered an adequate response.
- Treponemal tests measure antibodies to native or recombinant T pallidum antigens and include the fluorescent treponemal antibody-absorbed (FTA-ABS) test and T. pallidum particle agglutination (TPPA) test, both of which are more sensitive for primary syphilis than the previously used hemagglutination tests.
- The most widely used nontreponemal antibody tests for syphilis are

the rapid plasma reagin (RPR) and Venereal Disease Research Laboratory (VDRL) tests, which measure IgG and IgM directed against a cardiolipin-lecithin cholesterol antigen complex.

112. Which of the following has incubation period of < 5 day:

a) Salmonella typhi

b) Vibrio parahaemolyticus

c) Campylobacter jejuni

d) Shigella dyseneteriae

e) Yersinia pestis

Correct Answer - B:C:D:E

Ans: b. Vibrio c. Campylobacter d. Shigella and e. Yersinia… [Ref Ananthanarayan 8th/293, 299, 506, 312; Harrison 18th/1294; Greenwood 16th/300;]

- Vibrio parahaemolyticus: After an incubation period of 4 hr to 4 days, symptoms develop & persists for a median period of 3 days" (Harrison 18th/1294)
- "Shigellae cause bacillary dysentery. It has a short incubation period (1-7 days, usually 48 hours)' (Ananthanarayan 8th/285)
  "Campylobacter jejuni: The incubation period is 1-7 days"?
- Ananthanarayan 8th/398
- "Enteric fever (Salmonella typhi): The incubation period is usually 7-14 days but may range 3-56 days" (Ananthanarayan 8th/293) • "Salmonella gastroenteritis (caused by any salmonella other than s.typhi): Clinically the disease develops after short incubation period of 24 hours or less, with diarrhea, vomiting, abdominal pain & fever".

113. Which of following Culture media combination is/are true except:

a) Thayer-Martin media: Gonorrhoea

b) Chocolate agar-: enriched media

c) Lowenstein-Jensen Medium: Mycobacterium tuberculosis

d) Muller-Hinton agar: Corynebacterium diphtheriae

e) Mac Conkey's agar: Non lactose fermenters formcolourless colonies

Correct Answer - D

Ans: d. Muller-Hinton...*[Ref Ananthanarayan 8th/39-43, 229]* • Thayer-Martin is a useful selective media for Neisseria gonorrhoeae".

- Mueller-Hinton is enriched media for Neisseria.
- C diphtheriae and other corynebacteria grow aerobically on most ordinary laboratory media. On Loeffler's serum medium, corynebacteria grow much more readily than other respiratory organisms, and the morphology of organisms is typical in smears.
- Lowenstein-Jensen Medium. It is used to culture tubercle bacilli. It contains egg, malachite green and glycerol.
- Chocolate Agar or Heated Blood agar: Prepared by heating blood agar. It is used for culture of pneumococcus, gonococcus, meningococcus and Haemophilus. Heating the blood inactivates inhibitor of growths.

114. All of the following are true regarding legionella except:

a) Cause pontiac fever

b) Aerobic gram negative bacilli

c) Can grow on simple medium

d) Grow on BCYE agar

e) Communicable from infected patients to others

Correct Answer - C:E

Ans: c. Can grow on…. e. Communicable… ***[Ref Ananthanarayan 8th/400-401: Harrison 19th/1014-17, 18th/1236 - 39; Greenwood 16th/320-21; CMDT 09/1278]***

• Members of the Legionellaceae are aerobic gram-negative bacilli that do not grow on routine microbiologic media. Buffered charcoal yeast extract (BCYE) agar is the medium used to grow Legionella. • Pontiac fever[Q], caused by Legionella Pneumophila, is a milder, nonfatal influenza-like illness with fever, chills, myalgia.

115. All are true about gonorrhea except:

a) Gonorrhoea means flow of seed

b) Discharge may contain neutrophil

c) Initially discharge is scanty & mucoid in urethritis

d) Caused by gram positive cocci

e) Symptom is more severe in female than males

Correct Answer - D:E

Ans: d. Caused ..., e. Symptom...*[Ref Harrison 19th/1005, 18th/1220-25; Ananthanaran 8th/227-30, 7th/227-229; Greenwood Microbiology 16th/247-248; CMDT 09/1287]*

- The name gonorrhea derives from the Greek words gonos (seed) & rhoia (flow) e.9- described a condition in which semen flowed from the male organ without erection.
- Acute urethritis[Q] is the most common clinical manifestation of gonorrhoea in males & although some men remain asymptomatic. Urethral discharge & dysuria, usually without urinary frequency or urgency, are the major symptoms.

116. Which of the following is/are true about pasteurerlla multiocuda:

a) May cause meningitis

b) Transmitted by unpasteurized milk

c) Cause disease exclusively in human

d) Gram-negative coccobacillus

e) None

Correct Answer - A:D

Ans: (A) May cause meningitis & (D) Gram-negative coccobacillus [Ref Ananthanarayan 8th/326: Greenwood Microbiology 16th/334- 35;Park 23rd/655;Harrison 19th/183e-3, 18th/12351

- P. multocida is a bipolar-staining, gram-negative coccobacillus that colonizes the respiratory and gastrointestinal tracts of domestic animals; oropharyngeal colonization rates are 70-90% in cats and 50-65% in dogs.
- Patients at the extremes of age or with serious underlying disorders (e.g., cirrhosis, diabetes) are at increased risk for systemic manifestations, including meningitis, peritonitis, osteomyelitis and septic arthritis, endocarditis, and septic shock, but cases have also occurred in healthy individuals.
- P multocida can be transmitted to humans through bites or scratches, via the respiratory tract from contact with contaminated dust or infectious droplets, or via deposition of the organism on injured skin or mucosal surfaces during licking.

117. Feature (s) of Taenia capitis is/are all except:

a) May presents as a boggy swelling

b) Most commonly occurs in elderly

c) May present as black dot

d) Caused by trichophyton & microsporum but not by epidermophyton

e) Scutulum formation

Correct Answer - B

Ans: (B) Most commonly occurs in elderly.*[Ref Neena khanna 3rd/244; Ananthanarayan 8th/604-06: Greenwood 16th/574]*

- T.capitis: Caused by microsporum any species cf. Trichophyton most species-Ananthanarayan 8th/606, Tinea capitis is dermatophytosis or ringworm of the scalp and hair. Age: Invariably a child.
- the chief cause of "black dot" Tinea capitis, produces spores within the hair shaft (endothrix). These hairs do not fluoresce; they are weakened and typically break easily at the follicular opening. In prepubescent children, epidemic tinea capitis is usually self-limiting.

f) All of the following is/are true regarding candidiasis:

3. Commonly involve mucosa & skin

4. Not involve nails

5. Caused by yeast like fungus

6. Diabetes is most important risk factor

7. Causes meningitis in immunocompromised persons

Correct Answer - B

Ans: (B) Not involve nails.*[Ref Ananthanarayan 8th/607-08: Harrison 19th/1342-44, 18th/165153]*

- It is an infection of skin, mucosa & rarely of internal organs
- It is caused by yeast like fungus, Candida albicans & occasionally by other candida species
- Ubiquitous in nature, these organisms are found on inanimate objects, in foods, and on animals and are normal commensals of humans. They inhabit the gastrointestinal tract (including the mouth and oropharynx), the female genital tract, and the skin.
- It is an opportunistic endogenous infection, the commonest predisposing factor being diabetes.

4. All statements are true about mycetoma except:

5. Eumycetoma is caused by bacteria

6. Surgery is important component of treatment

7. Usually painless

8. Diagnosis can be made by examination of lesion

9. Can affect lower & upper extremities

Correct Answer - A

Ans: a. Eumycetoma...*[Ref Ananthanarayan 8th/393, 608: Harrison 19th/1355, 18th/258, 1667, 1329, e34-16f; Neena khana Ist/228; Greenwood 16th/223-224, 578]*

- Treatment of eumycetoma involves both surgical extirpation of the lesion and use of antifungal agents. Surgical removal of the lesions of eumycetoma is most effective if performed before extensive spread has occurred.
- Mycetoma or Madura Mycosis or Madura Foot: Mycetomas are chronic, slowly progressive infections of the subcutaneous tissue, usually of the foot[S] & rarely of the other parts of the body like hands[Q], gluteal region & thigh.
- Maduromycosis (also known as eumycetoma) is the term used to describe mycetoma caused by the true fungi and by phylogenetically diverse organisms.Actinomycotic mycetoma is caused by Nocardia and Actinomadura species.

120. True about non-industrial anthrax:

6. May occur in butcher

7. Animal hair is a source of infection

8. Commonly occurs in factory worker

9. Stomoxys calcitrans insect may transmit the infection

10. It is a zoonosis

Correct Answer - A:B:D:E

Ans: (A) May occur in butcher, (B) Animal hair is a source of infection, (D) Stomoxys calcitrans insect may transmit the infection, (E) It is a zoonosis.

[Ref Ananthanarayan 8th/245: Greenwood Microbiology 16th/225-29; Harrison 19th/261e1-3, 18th/1768-70]

- Cutaneous anthrax generally occurs on exposed surfaces of the arms or hands, followed in frequency by the face and neck. A pruritic papule develops 1-7 days after entry of the organisms or spores through a scratch.
- Cutaneous anthrax used to be caused by shaving brushes made with animal hair
- Stomoxys calcitrans & other bitings insects may occasionally transmit infection mechanically

7. Which of the following is not niacin positive:

8. Mycobacterium bovis

9. Mycobacterium sonei

10. Mycobacterium chelonae

11. Mycobacterium tuberculosis

12. Mycobacterium simiae

Correct Answer - C:D:E

Ans: c. Mycobacterium..., d. Mycobacterium..., e. Mycobacterium..

[Ref Ananthanarayan 9th/347-48; Medical Microbiology by Greenwood 16th/201; Harrison 19th/1102-05]

- Human tubercle bacilli form niacin when grown on an egg medium
- The test is positive with human type (M.tuberculosis) negative with bovine type of the bacilli
- It can, however, be positive for M.simiae & a few strains of M.cheloneii

122. Feed oral transmission occur in :

9. Hepatitis A

10. Hepatitis B

11. Hepatitis E

12. Rotavirus

13. Herpes simplex

Correct Answer - A:C:D

Ans: a. Hepatitis A, c. Hepatitis E & d. Rota..*[Ref Ananthanarayan 9th/561; Harrison 19th/2013]*

Herpes simplex: Humans are the only natural hosts & the source of infection are *saliva, skin lesions* or *respiratory secretions.* Transmission occurs by close contact & may be venereal in genital herpes.

123. Which is not spirochetes:

10. Borrelia
11. Leptospira
12. Fusobacterium
13. Lactobacillus
14. Varicella

Correct Answer - C:D:E

Ans: c. Fusobacterium. d. Lactobacillus & e. Varicella
[Ref.Ananthanarayan 9th/j7 1; Hanison l9th/ l l 32.

• "Lactobacillus genus consists of anaerobic gram positive bacilli" • "Veillonella are anaerobic gram negative cocci" .

• Spirochetes are Elongated, motile, flexible bacteria twisted spirally along the long axis are termed spirochetes (from speira, meaning coil & chaite, meaning hair)

• Spirochetes belong to the order spirochaetales, comprising 2 families- spirochaetaceae & leptospiraceae • Spirochaetaceae contains genera spirochaeta, cristispira, treponema & borrelia, leptospiraceae containing the genus leptospira

124. Oroya fever is caused by:

f) B. bacilliformis

g) B. henselae

h) B. quintana

i) B. elizabethae

j) B. clarridgeiae

Correct Answer - A

Ans: a. B. bacilliformis ***[Ref Ananthanarayan 9th/412; Medical Microbiology by Greenwood 16th/325-26]***

- Bartonellosis, or Carrion's disease, is caused by B. bacilliformis
- Bartonellosis, or Carrion's disease, is caused by B. bacilliformis. The disease is characterized by two distinct phases:

. an acute febrile hematic phase, known as Oroya fever; and

f) an eruptive phase manifested by cutaneous lesions, known as verruga peruana

125. True about 8th pandemic of cholera:

. Caused by serotype 0 classical

. Caused by serotype 0 Eltor

. Caused by serotype 0 139

. It spread in Indonesia in 1961

. It spread in Bangladesh in 1992-93

Correct Answer - C:E

Ans: (C) Caused by serotype 0 139 & (E) It spread in Bangladesh in 1992-93

- As event of great significance was the sudden emergence of non-O-I V.cholera (formely NAG vibrio) as the cause of epidemic cholera (8th pandemic).
- In october 1992, a new non-O-| vibrio was isolated from a cholera outbreak in Madras (Chennai). Similar outbrealcs soon followed in dffirent parts of India. By January 1993,
- Some consider the cholera causedby the serotype Oli9 strain to be the eighth pandemic that began in the Indian subcontinent in 1992-1993, with spread to Asia. The disease has been rare in North America since the mid 1800s, but an endemic focus exists on the Gulf Coast of Louisiana and Texas.

126. Vector for O.tsugami is/are :

13. Chigger

14. L.deliensis larva

15. Xenopsylla cheopis

16. Pediculus humanus corporis

17. None

Correct Answer - A:B

Ans: a. Chigger, b. L.deliensis...*(Ref Ananthanarayan 9th/408; Medical Microbiology by Greenwood 16th/369-72; Harrison 19th/1155, 1159]*

- Scrub typhus is caused by orientia tsutsugamushi (formerly R. tsutsugamushi or R.orientalis). The vectors are trombiculid mites of genus Leptotrombidium- L.akamushi in Japan & L.deliensis in India. Humans are infected when are bitten by mite larvae (chiggers)"
- 0. tsutsugamushi differs substantially from Rickettsia species both genetically and in terms of cell wall composition (i.e., it lacks lipopolysaccharide). 0. tsutsugamushi is maintained by transovarian transmission in trombiculid mites.
- Illness varies from mild and self-limiting to fatal. After an incubation period of 6-21 days, onset is characterized by fever, headache, myalgia, cough, and gastrointestinal symptoms.
- Some patients recover spontaneously after a few days. The classic case description includes an eschar where the chigger has fed, regional lymphadenopathy, and a maculopapular rash—signs that are seldom seen in indigenous patients

f) Meningococcal infection is predisposed by which of the following deficiency of complement factor

14. C1-C3

15. C3-C4

16. C5-C9

17. C1-C4

18. Properdin

Correct Answer - C:E

Ans: (C) C5-C9 (E) Properdin[Ref: Ananthanarayan 9th/ 229; Harrison 19th/2 106-07

- Meningococcal disease is favoured by deficiency of the terminal complement components (C5-C9
- Deficiencies in the alternative pathway (factors D and properdin) are associated with the occurrence of invasive Neisseria infections.
- Lastly, deficiencies of any complement component involved in the lytic phase (C5, C6, C7, C8, and, to a l*ser extent, C9) predispose affected individuals to systemic infection by Neisseria. This is explained by the critical role of complement in the lysis of the thick cell wall possessed by this class of bacteria.

f) Weil felix reaction in scrub typhus is/are positive for:

15. OX -19

16. OX-2

17. Both OX -19 & OX-2

18. OX -K

19. OX -19, OX-2 & OX -K

Correct Answer - D

Ans: d. OX -K *[Ref Ananthanarayan 9th/410; Medical Microbiology by Greenwood 16th/373]*

- This reaction is an agglutination test in which sera are tested for agglutinins to the 0 antigens of certain non-motile Proteus strains OX-19, OX-2 & OX-X
- The basis of test is the sharing of an alkali-stable carbohydrate antigen by some rickettsiae & by certain strains of proteus, P. vulgaris OX 19 & OX 2 & P.mirabilis OX K.

disease	OX-19	OX-2	OX-K
Epidemic typhus	+++	+	–
Brill-Zinsser disease	Usually(–ve)or weakly (+ve)		-
Endemic typhus	+++	+/-	-
Tickborne spotted	++	++	-

fever Scrub typhus	-	-	+++

129. Minimum infective dose of shigella is :

f) 1-10

g) 10-100

h) 103-106

i) Same as enteric fever

j) Same as V.cholera

Correct Answer - B

Ans: b. 10-100 ***[Ref Ananthanarayan 9th/287, 307, 341]***

- It has been shown that 106 pathogenic vibrios administered to fasting normal chlorhydric volunteers, without food or buffer, did not produce infection, while the same dose along with food or sodium bicarbonate caused clinical cholera in 80-100 % of them.
- Shigella cause bacillary dysentery. Infection occurs by ingestion. The minimum infective dose is low- as few as 10-100 bacilli are capable of initiating the disease, probably because they survive gastric acidity better than other enterobacteria.

f) Acute hemorrhagic conjunctivitis is/are caused by:

17. Coxsackie virus type A 24

18. Corona virus

19. Enterovirus-70

20. Herpes simplex

21. Adeno virus

Correct Answer - A:C:E

Ans: a. Coxsackie..., c. Enterovirus-70 & e. Adeno..*[Ref Ananthanarayan 9th/491, 493; Greenwood 16th/459]*

- Acute hemorrhagic conjunctivitis is caused by enterovirus type 70: The symptoms are sudden swelling, congestion, watering & pain in the eyes. Subconjunctival hemorrhage is a characteristic feature.
  Coxsackievirus type A24 also produces the same disease
- Corona virus cause severe acute respiratory syndrome, Adenovirus 11 also causes Acute hemorrhagic conjunctivitis.

131. H.parainfluenzae requires factor:

f) V

g) VI

h) VII

i) X

j) XII

Correct Answer - A

Ans: (A) V [Ref Ananthanarayan 9th/328]

- Factor V &X are accessory growth factors which is present in blood- (Ananthanarayan 9th/327)

species	Growth requirement			Hemolysis on horse blood agar
	X	V	CO_2	
H influenzae	+	+	-	-
H aegyptius	+	+	-	-
H ducreyi	+		VARIABLE	VARIABLE
H. parainfluenzae	-	+	-	-
H. haemolyticus	+	+	-	+
H. parahaemolyticus	-	+	-	+
h aphrophilus	+	-	+	-
H paraphrophilus	-	+	+	-

18. Zones of operation theatre includes all except:

f) Septic zone

g) clean zone

h) Protective zone

i) Sterile zone

j) Disposal zone

Correct Answer - A

Ans: a-septic zone Protective Zone: Areas included in this zone are:

- Reception
- Waiting area
- Trolley bay
- Changing room

Clean Zone: Areas included in this zone are:

- Pre-op room
- Recovery room
- Plaster room
- Staff room
- Store

Sterile Zone: Areas included in this zone are:

- Operating Suite
- Scrub Room
- Anesthesia Induction Room
- Set up Room

Disposal Zone: Areas included in this zone are:

- Dirty Utility
- Disposal corridor

133. True about acanthamoeba infection :

f) Causes keratitis

g) Contact lens increases risk of keratitis

h) Cause keratitis in contact lens wearer

i) Also causes encephalitis

j) Immunodeficiency is a risk fact

Correct Answer - A:B:D:E

Ans: (A) Causes keratitis (B) Contact lens increases risk of keratitis (D) Also causes encephalitis (E) Immunodeficiency is a risk fact

[Ref Paniker's Parasitology 7th/27-28; Khurana 6th/112-13; Harrison 19th/1367-68, 245e; Greenwood 16th/595; Parson 22nd/208]

- **Acanthamoeba keratitis:** It has also been seen to occur in non-contact lens wearers & may be related to swimming or bathing in contaminated water.
- This is an opportunistic protozoan pathogen found worldwide in the environment in water & soil, Infection usually occur in patients with immunodeficiency, diabetes, malignancies, malnutrition, SLE or alcoholism, It presents chiefly as 2 chronic conditions- **keratitis** encephalitis
- Acanthamoeba keratitis: majority of such cases have **been associated with the use of contact lens.**