

MANIPAL UNIVERSITY**MBBS PHASE I STAGE II DEGREE EXAMINATION – FEBRUARY 2011****SUBJECT: MICROBIOLOGY – I (ESSAY)**

Wednesday, February 16, 2011

Time: 09:00 – 11:00 Hrs.

Max. Marks: 60

- ✍ **Answer ALL questions.**
- ✍ **Write brief, relevant and legible answers.**
- ✍ **Draw diagram, flow charts wherever appropriate.**
1. Draw and label a prokaryotic cell structure. Differentiate between the cell walls of gram positive and gram negative bacteria.
(2+3 = 5 marks)
 2. Classify viruses based on morphology with examples. List the steps involved in viral replication.
(3+2 = 5 marks)
 3. Explain the mechanism of activation of T lymphocytes.
(5 marks)
 4. Discuss the principle of ELISA used for screening of HIV infection.
(5 marks)
 5. A 40-year-old man was found to have clawing of the fourth and fifth digits of both hands with anesthetic patches over the body. A skin test done to assess his immunological status was found to be negative.
 - 5A. What is the probable diagnosis of the above clinical condition and name the causative agent?
 - 5B. Discuss the pathogenesis in relation to his immunological status.
(1+4 = 5 marks)
 6. A 35-year-old tree cutter bitten by treetop mosquitoes in the forests of South America develops fever, chills, headache and backache. Four days later he develops high fever and jaundice. Physician suspected a flavivirus infection.
 - 6A. What is your probable diagnosis?
 - 6B. Discuss the pathogenesis and prevention of the above condition.
(1+4 = 5 marks)

7. Discuss the pathogenesis and laboratory diagnosis of Cryptococcal meningitis. (2+3 = 5marks)
8. A 25 year old male was admitted to the hospital with bloody diarrhea and abdominal pain. His stool was foul smelling and sticky. Microscopic examination revealed the presence of Charcot- Leyden crystals. Wet mount showed motile structures that helped in diagnosis.
- 8A. Identify the etiological agent
- 8B. Discuss its pathogenicity (1+4 = 5 marks)
9. With the help of a graph discuss the important seromarkers during acute hepatitis B virus infection. (5 marks)
10. Discuss the serological diagnosis of enteric fever. (5 marks)
11. A 60 year old male was admitted to the hospital with fever, anorexia and weight loss. On examination the physician found splinter hemorrhages on his nail bed and an abnormal heart murmur. The patient had prosthetic aortic valve.
- 11A. List four bacteria associated with the afore mentioned condition.
- 11B. Discuss its laboratory diagnosis. (2+3 = 5 marks)
12. A 30 year-old woman who reports unprotected sex develops dysuria and mucopurulent urethral discharge. Gram-stained smear of the discharge revealed intracellular gram negative diplococci.
- 12A. Identify the clinical condition and name the causative agent.
- 12B. Discuss the pathogenesis of this condition with special emphasis on the virulence factors of the causative agent. (1+4 = 5 marks)



Robert Koch

101. Introduced solid culture media
102. Discovered *Vibrio cholerae*
103. Defined the criteria attributing the disease to an organism
104. Discovered small pox vaccine

The following pairs correctly match the phases with the events in a bacterial growth cycle

105. Lag phase: Vigorous metabolic activity
106. Log phase: Accumulation of toxic wastes
107. Stationary phase: Formation of peptidoglycan cell wall
108. Phase of decline: Liberation of autolytic enzymes

The following pairs correctly match the viruses with the outcome in the host cell

109. Influenza virus: Cell lysis
110. Rabies virus: Persistent infection
111. Human papilloma virus: Transformation
112. Hepatitis B virus: Inclusion body formation
113. Herpes simplex virus: Multinucleated giant cell

Bacterial conjugation

114. Occurs in plasmid free cells
115. Is responsible for the development of antibiotic resistance
116. Of high frequency recombination type transfers chromosomal DNA
117. Results in lysogenic conversion
118. Leads to transfection

Hospital associated infections

119. Are effectively controlled with functional CSSD
120. In an immunocompromised patient is prevented by active immunization
121. Are investigated beginning with monitoring of outbreaks

Complement

122. Proteins are synthesized in lymphoid tissues
123. Activation by classic pathway takes place during primary infection
124. Activation by alternative path way is regulated by factor H
125. Product C5a helps in opsonization
126. Factor C5-C8 deficiency leads to angioedema

Autoclave is used

127. At a temperature of 160°C
128. For the sterilization of antibiotic powder
129. To sterilize paraffin oil
130. With steam under pressure
131. With filter paper strips impregnated with Clostridial spores as sterilization controls

Anaphylaxis

132. Is mediated by IgE
133. Has familial predisposition
134. Of the systemic type leads to bronchoconstriction
135. Is a delayed type hypersensitivity reaction

Naegleria fowleri

136. Is a sporozoan parasite
137. Is transmitted through skin penetration
138. Infection gives rise to primary amebic meningoencephalitis
139. Causes keratoconjunctivitis
140. Is isolated using axenic culture

Clostridial toxins

141. Are exotoxins
142. That produce overactivity of the sympathetic nervous system is exemplified by tetanospasmin
143. Associated with tetanus act by inhibition of elongation factor
144. That block acetylcholine release at neuro muscular junction is exemplified by botulinum toxin
145. Like alpha toxin is demonstrated by Nagler's reaction

The following pairs correctly match the infectious condition with their causative agent

146. Myocarditis : Coxsackievirus B
147. Viral arthritis : Hepatitis B virus
148. Reactive arthritis : *Staphylococcus aureus*
149. Septic arthritis : *Neisseria gonorrhoeae*
150. Osteomyelitis : *Sporothrix schenckii*

In neonatal meningitis of early onset type

151. The clinical features manifest 3 weeks after the birth
152. Lack of maternal antibody is the risk factor
153. Due to group B *Streptococcus*, maternal genital tract is the source
154. Prevention is achieved by 'blind' treatment of sick baby

Regarding encephalitis

- 155. Japanese encephalitis is caused by a mosquito-borne togavirus
- 156. SSPE is the sequel of measles virus infection
- 157. Plasmodium falciparum infection complicates to cerebral malaria
- 158. Humoral immuno deficiency is a predisposing factor for Toxoplasma infection
- 159. Demonstration of intranuclear inclusion bodies are diagnostic in rabies

Leptospira interrogans

- 160. Grows best in anaerobic condition
- 201. Is transmitted through water contaminated with rat's urine
- 202. Causes damage to the blood vessel endothelium
- 203. Infection leads to decreased level of serum creatinine phosphokinase
- 204. Infection is diagnosed by microscopic agglutination test

Enterohemorrhagic Escherichia coli

- 205. Produces heat labile enterotoxin
- 206. Ferments sorbitol
- 207. Leads to traveller's diarrhea
- 208. Pathogenicity is determined by 'attaching-effacing' mechanism
- 209. Infections complicate to hemolytic uremic syndrome

Shigellosis is

- 210. An invasive infection of the mucosa of small intestine
- 211. Caused by a bacteria with peritrichous flagella
- 212. Manifested as diarrhea with rice water stool
- 213. Characterized by the presence of fecal leukocytes

Helicobacter pylori

- 214. Is associated with duodenal ulcer
- 215. Is a curved gram positive bacilli
- 216. Produces enzyme urease
- 217. Infections are diagnosed by specific fecal antigen detection
- 218. Is isolated using Skirrow's medium

Ancylostoma duodenale

- 219. Is known as pin worm
- 220. Causes cutaneous larva migrans

- 221. Ovum is non bile stained
- 222. Has rhabditiform larva as its infective form
- 223. Infections are diagnosed using enterotest

Streptococcus pyogenes

- 224. Is a gram positive diplococci
- 225. Infections complicate as peritonsillar abscess
- 226. Forms beta hemolytic colonies on blood agar
- 227. Is CAMP test positive
- 228. Is susceptible to bacitracin

Mycobacterium tuberculosis

- 229. Is facultative anaerobe
- 230. Produces exported repetitive protein
- 231. Infections manifest as delayed type hypersensitivity reaction
- 232. Attenuated strains are used in BCG vaccine

Mumps

- 233. Is caused by an enveloped RNA virus
- 234. Virus has a single serotype
- 235. In post pubertal males lead to sterility
- 236. Virus is a member of paramyxoviridae

Influenza virus

- 237. Type C causes pandemics
- 238. Has hemagglutinin and neuraminidase on the same spike
- 239. Typing is based on its internal ribonucleo protein

Vaccines

- 240. Of live type carry the risk of reverting to virulence
- 241. Against rubella is given during first trimester of pregnancy
- 242. Of the subcellular type is exemplified by pneumococcal vaccine
- 243. Employ adjuvants to enhance immune response

Treponema pallidum

- 244. Multiplies at the site of infection resulting in the development of primary chancre
- 245. Is demonstrated in the biopsy by silver impregnation method
- 246. Has a lipid rich covering that fails to induce host response
- 247. Infected person during early stage of disease is non contagious

The proteins coded by *pol* gene of HIV are

- 248. p 24
- 249. gp 120
- 250. p 18
- 251. Reverse transcriptase
- 252. gp 41

Histoplasmosis

- 253. Is an intracellular infection of the hemopoietic system
- 254. Has soil as its natural habitat
- 255. Is transmitted through inhalation
- 256. Disseminates via lymphatics in immunocompromised patients
- 257. Causing agent exists as mycelial form in host tissue

Candida albicans

- 258. Is a yeast like fungus
- 259. Forms zygospores on corn meal agar
- 260. Produces germ tube

