1. The following test is used to differentiate *Streptococcus* from *Staphylococcus*:
A. Coagulase test
B. Catalase test
C. Phosphatase
D. Indole test

2. Jumping gene is known as:
A. Transposon
B. Episome
C. Cosmid
D. Plasmid

3. *Staphylococcus* bacteria secrete all, EXCEPT:
A. Lipase
B. Cellulase
C. Coagulase
D. Lecithinase

4. Quellung reaction is due to _____ swelling.
A. Capsular
B. Flagellar
C. RBC
D. Ribosomal

5. Gram negative cocci is:
A. *Staphylococcus*
B. *Streptococcus*
C. *Neisseria*
D. *Salmonella*

6. Medusa head colony is found in:
A. *Clostridium*
B. *Bacillus*
C. *Pseudomonas*
D. *E. coli*

7. All of the following are acid fast bacteria EXCEPT:
A. *Cryptosporidium*
B. *Mycoplasma*
C. *Mycobacterium*
D. *Nocardia*

8. Widal test is an example of:
A. Flocculation
B. Precipitation
C. Agglutination
D. Both "A" and "B"

9. Genome of Herpes Simplex Virus comprises of:
A. ssDNA
B. dsDNA
C. ssRNA
D. dsRNA

10. All of the following methods are used for serological diagnosis, EXCEPT:
A. CFT
B. PCR
C. SRH
D. Western blot

11. Which of the following virus is not associated with respiratory infections?
A. *Rotavirus*
B. *Adenovirus*
C. Influenza virus
D. RSV

12. HCV belongs to genus:
A. *Togavirus*
B. *Flavivirus*
C. *Filovirus*
D. *Retrovirus*

13. Aflatoxin is produced by:
A. *Candida*
B. *Penicillium*
C. *Aspergillus flavus*
D. *Clostridium*

14. HIV infects most commonly:
A. CD4+ cells
B. CD8+ cells
C. B-lymphocytes
D. Basophils

15. Which one is an essential part of life cycle of *Toxoplasma gondii* is spread by:
A. Dog
B. Cat
C. Human
D. Sheep

16. Cell mediated immunity is mainly carried out by:
A. T cells
B. B cells
C. Macrophages
D. Monocytes

17. Vaccination is based on the principle of:
A. Agglutination
B. Phagocytosis
C. Immunological memory
D. Clonal deletion

18. Reaction of soluble antigen with antibody is _____.
A. Agglutination
B. Precipitation
C. Flocculation
D. CFT

19. Preliminary screening can be done by:
A. restriction enzyme
B. dyes
C. antibiotics
D. radiation

20. All of these are antigen presenting cells EXCEPT:
A. T cells
B. B cells
C. Dendritic cells
D. Langerhans cells

21. Which of the following is not included in intrinsic determinants of a disease?
A. Specie
B. Environment
C. Genetics
D. Both "A" and "B"

22. Which of the following substance can only induce immune response after binding to a larger molecule?
A. Antigen
B. Virus
C. Hapten
D. Antibody

23. To identify participants based on their disease / outcome status, compare presence of risk factor:
A. Case-control
B. Experimental
C. Cross-sectional
D. None of these

24. ___ is an example of arthropod vector borne disease?
A. Avian influenza
B. Tuberculosis
C. Spirochetosis
D. CRD

25. Latent infection is seen in viral infections EXCEPT:
A. HIV
B. EBV
C. *Rotavirus*
D. Cytomegalovirus (CMV)

26. Endotoxin for Gram-negative organism is:
A. Polysaccharide
B. Glycoprotein
C. Lipoprotein
D. Lipopolysaccharide

27. Which of the following is not an oncogenic virus?
A. HTLV-1
B. Adenovirus
C. Papilloma virus
D. HBV

28. Which of the following is obligate anaerobe?
A. *Clostridium*
B. *Bacillus*
C. *Staphylococcus*
D. *Klebsiella*

29. _____ refers only to the number of new cases of a disease occurring in a given period.
A. % positivity
B. Prevalence
C. Hyperendemic
D. Incidence

30. Fungi that possess a capsule is:
A. *Candida*
B. *Aspergillus*
C. *Cryptococcus*
D. *Mucor*

31. The dose required to kill 50% of the lab animals tested under standard called_____.
A. ID_{50}
B. MLD_{50}
C. $TCIC_{50}$
D. LD_{50}

32. All are used in Gram's staining, EXCEPT:
A. Methylene blue
B. Iodine
C. Safranin
D. Crystal violet

33. Viruses do not contain:
A. DNA
B. RNA
C. Enzyme
D. Cell wall

34. _____ is chain forming, & round shaped bacteria.
A. *Pneumococcus*
B. *Streptococcus*
C. *Staphylococcus*
D. *Diplococcus*

35. All the following can be zoonotic EXCEPT:
A. Influenza A H5N1
B. Hantaviruses
C. Poliomyelitis
D. Rabies

36. Presence of maternal Abs ____ the effect of vaccine.
A. Antagonize
B. Enhance
C. Synergize
D. Complement

37. A diagnostic test lacking in _____ results in false positive results.
A. Specificity
B. Predictive value
C. Sensitivity
D. Reproducibility

38. Which one of the following is NOT included in innate immune response?
A. phagocytosis
B. complement activation
C. antibodies production
D. NK cells activation

39. Viruses are:
A. Obligate intracellular parasites
B. Have their own metabolism
C. Divide by binary fission
D. Have both DNA and RNA

40. The vector of plague is:
A. Flies
B. Mosquitoes
C. Ticks
D. Fleas

41. Positive tuberculin test is an example of:
A. hypersensitivity type-I
B. hypersensitivity type-II
C. hypersensitivity type-III
D. hypersensitivity type-IV

42. Process of binding primer to DNA template is called:
A. Denaturation
B. Annealing
C. Extension
D. Bounding

43. _____ reagent is used to precipitate DNA.
A. Isopropanol
B. SDS
C. Phenol
D. Chloroform

44. _____ enzyme is used to synthesize DNA using an mRNA template.
A. Taq polymerase
B. Alkaline Phosphatase
C. Reverse transcriptase
D. Nuclease

45. Making routine observations on health, productivity & environment is called as:
A. GIS
B. Monitoring
C. Surveillance
D. Cohort studies

46. _____ disease is transmitted from parrot to human.
A. Typhoid
B. Bird flu
C. Psittacosis
D. Cholera

47. The ability of the immune system to recognize self-antigens versus non-self-antigen is an example of:
A. Specific immunity
B. Humoral immunity
C. Cell mediated immunity
D. Tolerance

48. The coagulase test is used to differentiate between *Staphylococcus aureus* from:
A. *Streptococci*
B. *Micrococci*
C. *Enterococci*
D. other staphylococci

49. All are antigen-antibody interaction in living host EXCEPT:
A. Neutralization
B. Precipitation
C. Opsonization
D. Agglutination

50. Which of the following is a type of leukocytes and are included in agranulocytes?
A. Neutrophils
B. Basophils
C. Monocytes
D. Eosinophils

51. Which one is NOT protective mechanism of body:
A. Fever
B. Necrosis
C. Phagocytosis
D. Inflammation

52. Bioterrorism microbial agents are classified based upon:
A. Pathogenicity
B. Spread
C. Availability
D. Both "A" and "B"

53. Which one of the following immunoglobulins can cross the blood placental barrier?
A. Ig G
B. Ig M
C. Ig A
D. Ig D

54. Hematopoietic stem cells are precursor cells for all of the following EXCEPT:
A. Lymphocytes
B. Monocytes
C. Erythrocytes
D. Vascular smooth muscle cells

55. Macrophages present in liver are called:
A. microglial cells
B. alveolar macrophages
C. Kupffer cells
D. wondering macrophages

56. Antibiotic penicillin was introduced by:
A. Pasteur
B. Fleming
C. Jenner
D. Lister

57. Prokaryotic cell lacks:
A. DNA
B. Ribosomes
C. Mitochondria
D. Plasma membrane

58. Immunity against yellow fever in newborn is an example of:
A. Active naturally acquired
B. passive artificially acquired
C. passive naturally acquired
D. artificial immunity

59. All structures are external to cell wall EXCEPT:
A. Glycocalyx
B. Flagella
C. Pilli
D. Spores

60. A typical bacterial cell has only _____ volume of a typical eukaryotic cell.
A. 1/10
B. 1/100
C. 1/1000
D. 1/10000

61. PCR reaction includes all, EXCEPT:
A. DNA ligase
B. four DNTPs
C. DNA template
D. DNA polymerase

62. If disease is endemic, prevalence equals to:
A. C x I
B. I x D
C. P x D
D. C x D

63. Southern hybridization is used to identify:
A. A specific protein
B. A specific RNA seq
C. A specific DNA sequence
D. Both "A" and "B"

64. All of the following bacteria are members of family *Enterobacteriaceae* EXCEPT:
A. *E. coli*
B. Shigella
C. *Staphylococcus*
D. *Salmonella*

65. A library of DNA fragments results from the use of:
A. Viruses
B. Restriction endonucleases
C. DNA ligases
D. Plasmids

66. Swarming growth is the characteristic of Gram-negative bacteria known as:

A. *Clostridium*
B. *Proteus*
C. *Pasteurella*
D. *Pseudomonas*

67. Mesophilic bacteria CANNOT grow at temperature:

A. 16ºC
B. 25ºC
C. 35ºC
D. 38ºC

68. Facultative anaerobic bacteria grow in presence of:

A. only O_2
B. O_2 and also CO_2
C. only CO_2
D. N_2

69. Mannitol salt agar is an example of:

A. Selective medium
B. Differential medium
C. Both "A" and "B"
D. Enrichment medium

70. Translation occurs in:

A. Nucleus
B. Cytoplasm
C. Ribosomes
D. Both "A" and "B"

71. An intron is found in:

A. DNA
B. RNA
C. mRNA
D. tRNA

72. Signal responsible for the end of transcription is:

A. Stop codon
B. RNA polymerase run out
C. End of DNA chain
D. Terminator

73. Plasmids are inserted in bacterial cell from environment:

A. Transformation
B. DNA ligase
C. Transfection
D. Transduction

74. Which of following could NOT be a portal of entry?

A. Meninges
B. Skin
C. Placenta
D. Small intestine

75. Highly communicable pathogen, especially via direct contact is known as:

A. Zoonotic
B. Contagious
C. Nosocomial
D. Communicable

76. Motility of the bacteria can be observed by:

A. Hanging drop method
B. Soft agar method
C. Both "A" and "B"
D. Pour plate method

77. O157:H7 is pathogenic type of:

A. *Salmonella typhi*
B. *E. coli*
C. *S. aureus*
D. *Streptococcus*

78. All of the following bacteria are non-spore forming bacteria EXCEPT:

A. *E. coli*
B. *Clostridium*
C. *Streptococcus*
D. *Leptospira*

79. The ability of Microscope to distinguish two objects into two separate objects, is called:

A. Magnification power
B. Wavelength
C. Resolving power
D. None of these

80. A sudden outbreak of disease in which number of cases increase beyond expected trends is known as:

A. Endemic
B. Epidemic
C. Sporadic
D. Pandemic

81. Serum is collected from_____ blood.

A. Heparinized
B. Unclotted
C. Clotted
D. All of these

82. Amboceptors are Abs raised against RBCs of:

A. Sheep
B. Cow
C. Goat
D. Horse

83. GET buffer in plasmid isolation of bacteria contains:

A. Glucose
B. EDTA
C. Tris
D. All of these

84. Majority of the antigens are:

A. Protein
B. Nucleic acid
C. Lipids
D. Carbohydrates

85. RNAi' stands for which of the following:

A. RNA inducer
B. RNA insertion
C. RNA interference
D. RNA intron

86. The botulism intoxication occurs due to:

A. An enterotoxin
B. A neurotoxin
C. A mycotoxin
D. All of these

87. An animal that only acts as short-term transmitter:

A. Passive carrier
B. Mechanical carrier
C. Biological carrier
D. Asymptomatic carrier

88. Adenine and guanine are example of which class of nitrogen base:

A. Large
B. Pyrimidines
C. Small
D. Purines

89. Which of the following is not a function of capsule?

A. Attachment
B. Motility
C. Biofilm
D. Used as nutrition

90. Whiff test is used for the diagnosis of:

A. *Entamoeba*
B. Giardia
C. *E. coli*
D. *Trichomonas*

91. _____is Gram positive rod & spore forming bacteria.

A. *Pseudomonas*
B. *Staphylococcus*
C. *Salmonella*
D. *Bacillus*

92. Which of the following vaccine is recommended for pregnant women?

A. Tetanus
B. Tuberculosis
C. AIDS
D. Poliomyelitis

93. Natural competence was first time described in:

A. *E. coli*
B. Streptococcus
C. *Staphylococcus*
D. *Bacillus*

94. In genomic DNA isolation, TE buffer functions as:

A. Block endonucleases
B. Maintain pH
C. Denature protein
D. Both "A" and "B"

95. An example of non-communicable disease is:

A. Measles
B. Tuberculosis
C. Leprosy
D. Tetanus

96. *E. coli* O157:H7 produces _____.

A. Colon toxin
B. Neurotoxin
C. Exotoxin
D. Shiga toxin

97. Treatment with which salt gives properties of competency to bacterial cells?

A. NaCl
B. HgCl
C. $NaHCO_3$
D. $CaCl_2$

98. Lyophilization means:

A. Sterilization
B. Burning to ashes
C. Exposure to formation
D. Freeze-drying

99. _____ is NOT an example of inflammation?

A. Pain
B. Sweating
C. Heat
D. Swelling

100. Typhoid is usually diagnosed by:

A. Typhidot test
B. Widal test
C. Precipitation test
D. Typhidot and widal tests

101. *Clostridium* bacillus is:

A. Facultative anaerobe
B. Facultative aerobe
C. Obligate anaerobe
D. Obligate aerobe

102. α-hemolytic streptococci are also known as_____.

A. Streptococcus pyogenes
B. Virulence group
C. Viridans group
D. CoNS

103. _____ is/are used to determine glucose fermentation by bacteria?

A. Methyl red test
B. TSI test
C. Urease test
D. MR test and TSI test

104. Protein particles which can cause disease are:

A. Virions
B. Nucleoida
C. Bacteriophages
D. Prions

105. Bacteria are more sensitive to antibiotics at which phase of growth curve?

A. Decline phase
B. Lag phase
C. Log phase
D. Stationary phase

106. Syphilis is a bacterial STD, caused by_____.

A. *Trichomonas vaginalis*
B. *Treponema pallidum*
C. *Leptospira*
D. *Neisseria gonorrhea*

107. Staining material of Gram-negative bacteria is

A. Crystal violet
B. Safranin
C. Carbol fuchsin
D. Methylene blue

108. The bacterium that is most commonly used in genetic engineering is:

A. *Staphylococcus*
B. *Klebsiella*
C. *Proteus*
D. *Escherichia*

109. In autoclave, the principle involved is:

A. Dry heat
B. Moist heat
C. Steam under pressure
D. Moist heat and steam under pressure

110. ____ is NOT an example of immuno-diagnostic test.
- A. PCR
- B. Serum plate agglutination test
- C. ELISA
- D. FAT

111. Staph-110 used for the isolation of *Staphylococcus*, is an example of _____ medium.
- A. Selective
- B. Enrichment
- C. Differential
- D. General purpose

112. Production of RNA from DNA is called:
- A. Translation
- B. Transcription
- C. RNA splicing
- D. Replication

113. Metachromatic granules are found in:
- A. *Mycoplasma*
- B. Tuberculosis
- C. Diphtheria
- D. Tetanus

114. Example of anaerobic medium is:
- A. Nutrient agar
- B. Selenite F broth
- C. Robertson cooked-meat medium
- D. MacConkey agar

115. All of following are waterborne diseases EXCEPT:
- A. Cholera
- B. Scabies
- C. Giardiasis
- D. Salmonellosis

116. Existence of Tuberculosis in population of Faisalabad is an example of:
- A. Epidemic
- B. Endemic
- C. Pandemic
- D. Sporadic

117. Mycotoxins are produced by:
- A. Bacteria
- B. Viruses
- C. Fungi
- D. Protozoa

118. In polymerase chain reaction, extension step is done at temperature:
- A. 50-60 ºC
- B. 95 ºC
- C. 37 ºC
- D. 72 ºC

119. Basophils have receptors for _____ antibodies.
- A. IgG
- B. IgE
- C. IgA
- D. IgD

120. Enzymes are chemically:
- A. Lipids
- B. Proteins
- C. Carbohydrates
- D. Lipoproteins

121. Which of the following has optimum growth temperature greater than 45ºC?
- A. Mesophilic
- B. Psychrophiles
- C. Psychrophilic
- D. Thermophiles

122. The enzyme _____ unzips and unwinds the DNA.
- A. DNA polymerase
- B. Helicase
- C. Primase
- D. Reverse transcriptase

123. *Helicobacter pylori* possesses _____ that helps to neutralize stomach acid (HCl).
- A. Coagulase
- B. Urease
- C. Hyaluronidase
- D. Catalase

124. Capnophiles bacteria grow at optimum in:
- A. Small percentage of CO_2
- B. Excess CO_2
- C. Excess of O_2
- D. Absence of O_2

125. First line of body defense is:
- A. Antibody molecules
- B. Antigen molecules
- C. Phagocytic cells
- D. Unbroken skin

126. 'Toxic shock syndrome' is caused by the toxin of:
- A. *Staphylococcus aureus*
- B. *Streptococcus pyogenes*
- C. *Vibrio cholerae*
- D. *Proteus vulgaris*

127. _____ reagent is used to precipitate DNA.
- A. SDS
- B. Isopropanol
- C. Phenol
- D. EDTA

128. The nosocomial infections are acquired from:
- A. Plants
- B. Hospitals
- C. Animals
- D. Community

129. Virus family causing mumps is also responsible for:
- A. Hepatitis
- B. Rabies
- C. Measles
- D. Smallpox

130. Carcinoma refers to
- A. Malignant tumors of the connective tissue
- B. Malignant tumors of the colon
- C. Malignant tumors of skin or mucus membrane
- D. Malignant tumors of the lungs

131. Batch fermentation is also called:
- A. Open system
- B. Closed system
- C. Sub-merger system
- D. Continuous system

132. Live bacterial cells can be examined:
- A. In dark field microscope
- B. After Gram staining
- C. After special staining
- D. Acid-fast staining

133. IgM type of antibodies has been found to occur in:
- A. Monomer
- B. Dimer
- C. Trimer
- D. Pentamer

134. Which sequence is a palindrome?
- A. 5'-GATTA-3'
- B. 5'-GACTTT-3'
- C. 5'-GACCAA-3'
- D. 5' AGGCCT 3'

135. Bacterial cells are at their metabolic peak during:
- A. Lag phase
- B. Log phase
- C. Stationary Phase
- D. Decline Phase

136. The antibiotic acting on cell was is:
- A. Chloramphenicol
- B. Rifampin
- C. Polymyxins
- D. Penicillin

137. Which of the following is a motile bacterium?
- A. *Klebsiella pneumoniae*
- B. *Bacillus anthracis*
- C. *Proteus vulgaris*
- D. *Shigella flexneri*

138. Migration of leukocytes in response to specific chemicals towards the site of injury or infection:
- A. Specific immunity
- B. Phagocytosis
- C. Inflammation
- D. Chemotaxis

139. _____ is a vector to transmit Dengue virus to man.
- A. Male Culex
- B. Male Aedes
- C. Female Aedes
- D. Female Culex

140. The organisms which grow best in the presence of a low concentration of oxygen:
- A. Microaerophilic
- B. Anaerobic
- C. Facultative anaerobic
- D. Obligate aerobes

141. Which one the following blood cells primarily functions as phagocytic cells?
- A. B-lymphocytes
- B. T-lymphocytes
- C. Eosinophils
- D. Neutrophils

142. Acquired immunity is:
- A. Natural
- B. Artificial
- C. Active
- D. All of these

143. Formation of nitrate from ammonia is called:
- A. Ammonification
- B. Denitrification
- C. Nitrogen fixation
- D. Nitrification

144. Main site of action of tetanus toxin:
- A. Muscle fibers
- B. Neuromuscular junction
- C. Postsynaptic terminal of spinal cord
- D. Presynaptic terminal of spinal cord

145. Which of the following is a start codon?
- A. GUG
- B. UGA
- C. GAA
- D. AUG

146. Acquisition of naked DNA by intact bacteria is:
- A. Transduction
- B. Transcription
- C. Conjugation
- D. Transformation

147. T4 enzyme is an example of:
- A. Restriction enzyme
- B. Polymerase
- C. Ligase
- D. Integrase

148. _____ are thin and help in attachment and colonization.
- A. Fimbriae
- B. Sex pilli
- C. Capsule
- D. Cell wall

149. _____ is the killing of all microorganisms both in vegetative and sporing states.
- A. Disinfection
- B. Pasteurization
- C. Sterilization
- D. Antisepsis

150. _____ technique requires previously diluted samples carpeted over agar plate.
- A. Streak plate
- B. Spread plate
- C. Pour plate
- D. Stab tube

151. _____ is Gram positive spherical & chain forming.
- *A. Streptococcus*
- *B. Staphylococcus*
- *C. Bacillus*
- D. Diplococcus

152. Negri bodies are observed in cells infected by:
- A. Cytomegalovirus
- B. Rabies virus
- C. Herpes simplex virus
- D. Pox virus

153. Temperature of autoclave at 15 psi will be_____.
- A. 110°C
- B. 115°C
- C. 121°C
- D. 125°C

154. ___ is a culture medium having liquid consistency.
A. Broth
B. Agar
C. Soft agar
D. All of these

155. Which of the following is an example acid-fast bacterium?
A. *Vibrio*
B. *Staphylococcus*
C. *Mycobacterium*
D. *Leptospira*

156. _____ is a pigment giving golden color to colonies.
A. Catalase
B. Staphyloxanthin
C. Coagulase
D. Hemolysin

157. Streptolysin O is inactivated by _____.
A. CO_2
B. Nitrogen
C. Oxygen
D. Serum

158. Influenza virus genome is _____?
A. dsRNA
B. ssRNA
C. dsDNA
D. ssDNA

159. All are accessory proteins of HIV EXCEPT?
A. Vif
B. Tat
C. Vpu
D. Vpr

160. Trichomoniasis can be diagnosed by _____.
A. Demonstration of cysts by fecal examination
B. Acidic vaginal pH
C. Whiff test
D. Demonstration of oocysts by fecal examination

161. All Gram-Negative bacilli have _____?
A. Capsule
B. Exotoxin
C. Endotoxin
D. DNase

162. _____ can cause food INTOXICATION?
A. *Staphylococcus aureus*
B. *Streptococcus pyogenes*
C. *E. coli*
D. *Salmonella*

163. Enhancement of size using ocular and objective lens is called _____.
A. Magnification
B. Resolution
C. Contrast
D. All of these

164. _____contains substances favoring the growth of organism being sought.
A. Selective
B. Enrichment
C. Differential
D. General purpose

165. Which of the following is an example general purpose medium is _____?
A. Selenite F broth
B. Mannitol salt agar
C. MacConkey agar
D. Nutrient agar

166. MacConkey agar, it differentiates b/w _____ fermenting and non-fermenting bacteria.
A. glucose
B. lactose
C. mannitol
D. sucrose

167. BCG vaccine is used for the prevention of ____.
A. Botulism
B. Tuberculosis
C. Cholera
D. Anthrax

168. What is the reservoir for *Treponema pallidum*?
A. Humans
B. Wild rodents
C. Soil
D. Domestic Animals

169. All protozoan pathogens have a _____ phase?
A. Cyst
B. Sexual
C. Trophozoite
D. latent

170. All are correct for *Giardia lamblia* EXCEPT?
A. It has only trophozoite stage.
B. It is transmitted by the fecal oral route.
C. It can be diagnosed by the string test
D. It is a heart shape protozoan.

171. Cholera toxin is a form of _____.
A. Exotoxin
B. Endotoxin
C. Neurotoxin
D. Hemolytic toxin

172. If viral 'DNA' integrates in host cell chromosomes, with no progeny production, process is called:
A. Lytic cycle
B. Lysogenic cycle
C. Replicative cycle
D. Translational cycle

173. Cell-mediated immune response is mediated by:
A. B-lymphocytes
B. Endothelial cells
C. T-lymphocytes
D. Granulocytes

174. Passive immunity lasts for the period of:
A. About 10-days
B. 6-9 months
C. 9-10 years
D. All of the above

175. _____ is an endospore forming AEROBIC bacteria.
A. *Bacillus anthracis*
B. *Clostridium botulinum*
C. *Bacillus and Clostridium*
D. *Staphylococcus aureus*

176. Sporulation is a process of _____.
A. Reproduction
B. Preservation
C. Replication
D. None of these

177. Thickest layer of spore envelope is _____.
A. Core
B. Spore wall
C. Cortex
D. Spore coat

178. India ink is an example of_____.
A. Principle stain
B. Basic stain
C. Counter stain
D. Acidic stain

179. 100X objective lens is also known as _____.
A. Dry lens
B. High dry lens
C. Scanning lens
D. Oil immersion lens

180. Rod shaped bacteria are known as_____.
A. Cocci
B. Bacilli
C. Vibrio
D. Coco-bacilli

181. Mordant used in Gram's staining is _____.
A. Acid alcohol
B. Safranin
C. Gram's iodine
D. Crystal violet

182. _____ is an instrument effectively used to sterilize metals, glassware, powders, oils, and waxes.
A. Autoclave
B. Hot air oven
C. Water bath
D. Seitz filter

183. Bacteria that can only be grown in the absence of oxygen, are commonly cultivated in _____.
A. Deep agar tube
B. Anaerobic jar
C. Both "A" and "B"
D. Broth culture

184. Visible growth of bacteria on solid medium is ____.
A. colony
B. turbidity
C. sediment
D. None of these

185. Immune individuals will not harbor it thus reducing occurrence of pathogens is concept of _____.
A. Innate immunity
B. Herd immunity
C. cell mediated immunity
D. Autoimmunity

186. Sugar solution is commonly sterilized by_____.
A. Autoclave
B. Hot air oven
C. Filtration
D. X-rays

187. A culture containing a single kind of microorganisms is known as _____.
A. Colony culture
B. Liquid culture
C. Mixed culture
D. Pure culture

188. ____ is major Ig present in human serum & can provide naturally acquired immunity for new born?
A. IgA
B. IgG
C. IgE
D. IgM

189. Failure to eliminate self-reactive cells results in___.
A. Negative selection
B. Autoimmunity
C. Positive Selection
D. Tolerance

190. Active immunity is induced by:
A. Injection of γ-globulins
B. Placental transfer of Abs
C. Injection of antibodies
D. Infection

191. T-cells are produced from:
A. Bone marrow
B. Thymus
C. Spleen
D. Thyroid gland

192. Antibodies are produced from:
A. T lymphocytes
B. Plasma Cells
C. NK cells
D. Eosinophils

193. Immunological memory is provided by:
A. B lymphocytes
B. T lymphocytes
C. B cells and T cells
D. Phagocytes

194. In human body "*Brucella*" resides in the:
A. Reticuloendothelial system
B. Respiratory tract
C. Genital Tract
D. Gastrointestinal tract

195. Light chain does not originate from _____ region.
A. variable
B. diversity
C. joining
D. constant

196. Vaccine used against viral infection is:
A. Mumps vaccine
B. Cholera vaccine
C. Sub-cellular vaccine
D. Typhoid vaccine

197. _____ immune cells mainly act against helminth worm?
A. Lymphocytes
B. Eosinophils
C. Basophils
D. Neutrophils

198. Monoclonal antibodies recognize a single:
A. Antigen
B. Bacterium
C. Epitope
D. B cell

199. Which of the following cells do not have MHC class II surface molecules?
A. Ig producing plasma cells
B. Dendritic cells
C. Cytotoxic T cells
D. Macrophages

200. Small chemical groups on the antigen molecule that can react with antibody:
A. Epitope
B. Paratope
C. Isotope
D. Allotope

201. To be antigen, the chemical molecule (protein) needs:
A. High molecular weight
B. Chemical complexity
C. High MW and chemical complexity
D. Nucleic acid

202. The immunity acquired by inoculation of living organism of attenuated virulence is:
A. Artificial active immunity
B. Passive immunity
C. Natural active immunity
D. Local immunity

203. Fluid extruded from clotted blood is known as ____.
A. Plasma
B. Serum
C. buffy coat
D. Lymph

204. Which PRR recognizes distinct molecular structures, abundant to many cells and there is ten in humans?
A. Nod-like receptors
B. RIG-like receptors
C. Toll-like receptors
D. PAMP of neutrophils

205. A signaling molecule from microbes recognized by phagocytes is:
A. Complement
B. PAMP
C. Pyrogen
D. Lectin

206. Which of the following is NOT produced by phagocytes?
A. Hydroxyl radical
B. Superoxide anion
C. Hydrogen peroxide
D. Bradykinin

207. Acquired / adaptive immune cells include?
A. Lymphocytes
B. Eosinophils
C. Basophils
D. Neutrophils

208. Reproduction in bacteria occurs by:
A. Budding
B. Bursting
C. Binary Fission
D. Fragmentation

209. Bacteria eating viruses are known as:
A. Phagocytes
B. Viricides
C. Prophages
D. Bacteriophages

210. Which of the following is Gram-positive bacteria?
A. *Staphylococcus*
B. *E. coli*
C. *Salmonella*
D. *Pseudomonas*

211. In plasmid DNA isolation, _____ is used to neutralize the solution, enabling DNA to renature.
A. NaCl
B. potassium acetate
C. acetic acid
D. All of these

212. In genomic DNA isolation, disruption of nucleoproteins and degradation of proteins is carried out by:
A. SDS
B. proteinase K
C. isopropanol
D. Alcohol

213. "Cryptococcus" is transmitted in form of:
A. Endospores
B. Yeast
C. Conidia
D. Spores

214. Selective media for TB bacilli is:
A. NNN media
B. Lowenstein–Jensen (LJ) medium
C. Mannitol Salt Agar (MSA)
D. MacConkey media

215. Widal test is used for:
A. Typhoid fever
B. Salmonella
C. Brucellosis
D. All of these

216. Cell wall of 'fungi' is made up of:
A. Peptidoglycan
B. Murine
C. Chitin
D. Cellulose

217. Ascoli's test helps to confirm lab diagnosis of _____.
A. Tetanus
B. Anthrax
C. Typhoid
D. Cholera

218. Transfection is insertion of DNA into _____ cells.
A. bacterial
B. eukaryotic
C. Viruses
D. Both "A" and "B"

219. In agarose gel electrophoresis, loading buffer gives _____ to sample.

A. Color
B. Density
C. Shade
D. Color and density

220. The virulence factor of botulism is a/an_____.

A. Endotoxin
B. Enterotoxin
C. Neurotoxin
D. Hemolysin enzyme

221. Which of the following is a spirochete?

A. Gonococci
B. *Treponema*
C. *Staphylococcus*
D. *Streptococcus*

222. Once the Phagosome and lysosome fuse, the structure is known as:

A. Lysophagosome
B. Macrophage
C. Membrane attack complex
D. Phagolysosome

223. T-lymphocytes mature in which tissue/organ?

A. Thyroid
B. Bone marrow
C. Thymus
D. Tonsils

224. Place following events of phagocytosis in the order. 1.Chemotaxis 2.Ingestion 3.Digestion 4.Attachment

A. 1,2,4,3.
B. 4,1,2,3.
C. 1,4,2,3.
D. 4,2,3,1.

225. An enzyme found in our tears, saliva, serum, and mucus that degrades the peptidoglycan of the cell wall of Gram-positive bacteria is called?

A. Amylase
B. Lysozyme
C. Keratinase
D. Peptidase

226. Internalization of the pathogen via endocytosis encase the pathogen in a membrane vacuole known as a?

A. Lipid bilayer
B. Lysosome
C. Phagosome
D. Phagolysosome

227. Which of the following is primarily human pathogenic bacteria?

A. *S. typhi*
B. *E. coli*
C. *S. aureus*
D. *Mycobacterium*

228. An enrichment medium for *Salmonella* is _____.

A. Alkaline peptone water
B. MacConkey broth
C. Nutrient broth
D. Selenite F broth

229. TE buffer functions as:

A. Maintain pH
B. Block endonucleases
C. Both "A" and "B"
D. Denature proteins

230. Agarose gel electrophoresis is a widely used method that separates molecules based on:

A. Electrical charge
B. Size
C. Shape
D. All of these

231. A 25-year-old medical technology student interning in a clinical microbiology laboratory is diagnosed with brucellosis. How could accidental exposure in a laboratory setting occur?

A. Working with *Brucella* on an open bench
B. Direct contact with abraded skin
C. Ingestion
D. All of these

232. 0.7% agarose gel provides good resolution for _____ DNA, while 2% gel for _____ DNA.

A. Large, small
B. small, large
C. Both 'A' & 'B'
D. None of these

233. Innate immunity involves all EXCEPT?

A. Anatomical barriers
B. Phagocytosis
C. Inflammatory mechanisms
D. Antibody production

234. You enter a dusty room, feel an itch in your nose, and sneeze. This is an example of the operation of which of the following innate immune mechanism?

A. The low pH of the environment.
B. The physical barrier produced by hairs.
C. Phagocytosis by macrophages.
D. Mucus joint with movement of cilia of lining cells.

235. Which of the following is a distinction between the innate and adaptive immune systems?

A. Only one system to produce cytokines.
B. Antigenic specificity in only one system.
C. Only one system to recognize virally infected cells.
D. Only one system to mediate cell cytotoxicity.

236. Stomach clears out pathogens by?

A. Secreting HCl
B. Normal microflora
C. Phagocytosis
D. All of these

237. Kupffer cells are macrophages found in_____.

A. Lung
B. Bone
C. Kidney
D. Liver

238. Temperature rising chemicals are?

A. Thermogens
B. Pyrogens
C. Pyogenic
D. All of these

239. Physical barriers of immune system are:

A. Skin and the mucosal membranes.
B. Skin, body temperature and mucosal membranes.
C. Skin, inflammation and the mucosal membranes.
D. The bones and the mucosal membranes.

240. Chemical barriers include:

A. Tears, sweat, saliva, stomach acid and feces.
B. Tears, breast milk, sweat, saliva, stomach acid.
C. Hair, breast milk, sweat, saliva, stomach acid.
D. Tears and urine.

241. Interferons protect which of the following?

A. Only viral infected cells
B. Only bacterial infected cells
C. Healthy host cells
D. Blood cells

242. RNA contains:

A. Alanine
B. Thymidine
C. Uracil
D. Arginine

243. Time taken for a bacterium to multiple from 1 to 2?

A. Incubation time
B. Growth rate
C. Generation time
D. Both "B" and "C"

244. Self-replicating, small circular DNA molecules present in bacterial cell are known:

A. Plasmids
B. Cosmids
C. Plasmomeros
D. Plastids

245. Some of the dust particles are not expelled by sneeze and make their way further down the respiratory tract but not yet into the alveolar space. Here their elimination is the job of which of the following?

A. Released granular contents of your granulocytes.
B. The low pH of the environment.
C. The physical barrier produced by hairs.
D. Mucus joint with movement of cilia of lining cells

246. Formation of proteins in ribosomes occur through process known as:

A. Central dogma
B. Transcription
C. Translation
D. Both "A" and "C"

247. Mostly bacteria grow in aerobic conditions, but some require more CO_2 for their growth, these are known as:

A. Halophiles
B. Acidophiles
C. Capnophiles
D. Hyperthermophiles

248. Transfer of antibodies from mother to her baby through breast milk is example of:

A. Active natural acquired immunity
B. Passive artificial acquired immunity
C. Passive natural acquired immunity
D. Active artificial acquired immunity

249. Penicillin is an antibiotic obtained from:

A. A capsular bacterium
B. A yeast
C. A fungus
D. An alga

250. Viruses that infect bacteria are known as _____.

A. virons
B. bacteroids
C. bacteriophages
D. retrovirurses

251. The Kingdom of recyclers is known as _____.

A. Algae
B. Bacteria
C. Fungi
D. Embryophata

252. Unicellular yeast cells reproduce by _____.

A. Sporing
B. Conidiation
C. Budding
D. Both "A" and "B"

253. Interferons protect healthy cells by production of?

A. Antibacterial proteins
B. Antifungal proteins
C. Antiviral proteins
D. Antiprotozoal proteins

254. Branch of Microbiology related with study of fungi:

A. Protozoology
B. Phycology
C. Mycology
D. Biotechnology

255. Penicillin acts by inhibiting:

A. Cell wall synthesis
B. RNA synthesis
C. Folate synthesis
D. DNA gyrase

256. Schizogony is mode of reproduction in:

A. Algae
B. Protozoa
C. Fungi
D. Embryophata

257. Disease that effects many people at different countries is termed as:

A. Sporadic
B. Epidemic
C. Pandemic
D. Endemic

258. Some bacteria form dormant structure during harsh environmental conditions is known as:

A. Endospore
B. Capsule
C. Cyst
D. Bud

259. Many clostridial diseases require a/an _____ environment for their development.

A. living tissue
B. anaerobic
C. aerobic
D. low-pH

260. Bacterial cells multiply rapidly during:
- A. Lag phase
- B. Log phase
- C. Death phase
- D. Stationary phase

261. A group of fungal hyphae are called _____.
- A. Filtering body
- B. Mycelia
- C. Conidia
- D. Yeast

262. Most human pathogenic bacteria are:
- A. Psychrophiles
- B. Psychrotrophes
- C. Thermophiles
- D. Mesophiles

263. DNA contains:
- A. Alanine
- B. Thymine
- C. Uracil
- D. Arginine

264. Type of immunity through vaccination is:
- A. Active natural acquired immunity
- B. Passive artificial acquired immunity
- C. Passive natural acquired immunity
- D. Active artificial acquired immunity

265. Shrinkage of the cell occur in _____ environment.
- A. Hypotonic
- B. Hypertonic
- C. Isotonic
- D. None of these

266. Bacterium is _____ type of organism.
- A. Prokaryotic
- B. Eukaryotic
- C. Acellular
- D. May be prokaryotic or eukaryotic

267. Botulin toxin prevents release of what chemical that initiates the signal for muscle contraction?
- A. Serotonin
- B. Acetylcholine
- C. Dopamine
- D. Norepinephrine

268. An infection peculiar to swine causes _____ when transmitted to humans.
- A. Anthrax
- B. Diphtheria
- C. Tuberculosis
- D. Erysipeloid

269. ____ DOES NOT predispose to gas gangrene?
- A. Surgical incisions
- B. Compound fractures
- C. Puncture wounds
- D. Dislocated shoulder

270. In general, humans are rather prone to ____ with tubercle bacillus but are resistant to ____?
- A. disease, infection
- B. infection, disease
- C. TB, Leprosy
- D. Leprosy, TB

271. Malaria is caused by pathogen known as _____.
- A. *Plasmodium*
- B. *Paramecium*
- C. *Pseudomonas*
- D. *Pasteurella*

272. First phase of a bacterial growth curve is
- A. Log phase
- B. Lag phase
- C. γ phase
- D. Exponential

273. Spirochete bacteria move with the help of:
- A. Pseudopodia
- B. Axial filament
- C. Endoflagella
- D. Both "B" and "C"

274. Viruses are:
- A. Living
- B. Non-Living
- C. Only living inside cells
- D. Capsular

275. All of the following prokaryotes are bounded by a cell wall EXCEPT:
- A. *Spirochetes*
- B. *Actinomycetes*
- C. *Mycoplasma*
- D. *Streptococcus*

276. Tubercles are granulomas with a central core containing TB bacilli and enlarged _____.
- A. Neutrophils
- B. Lymphocytes
- C. Eosinophils
- D. Macrophages

277. Conversion of DNA to RNA is:
- A. Transcription
- B. Transduction
- C. Translation
- D. Replication

278. The bases Adenine and Thymine are paired with:
- A. Double hydrogen bonds
- B. Single hydrogen bonds
- C. Triple hydrogen bonds
- D. Both "B" and "C"

279. Fungi reproduce by:
- A. Sexual Spores
- B. Fragmentation
- C. Asexual spores
- D. All of these

280. For TB control, vaccine is based on attenuated "Bacille Calmette-Guérin" (BCG) strain of _____.
- A. *Mycobacterium tuberculosis*
- B. *Mycobacterium avium complex*
- C. *Mycobacterium bovis*
- D. *Mycobacterium paratuberculosis*

281. Antibiotics are the drugs which commonly kill?
- A. Bacteria
- B. Virus
- C. Algae
- D. Protozoa

282. Genital herpes is caused by?
A. HSV-1
B. HSV-2
C. HSV-3
D. HSV-4

283. Blood agar is an example of:
A. Enrichment media
B. Selective media
C. Enriched media
D. General purpose media

284. A mutation that produces termination codon is:
A. Mis-sense mutation
B. Reverse mutation
C. Non-sense mutation
D. Frame shift mutation

285. Gas gangrene bacillus is:
A. Facultative anaerobe
B. Obligate aerobe
C. Facultative aerobe
D. Obligate anaerobe

286. If vector ONLY transmits pathogen is called:
A. Biological vector
B. Biological reservoir
C. Biological carrier
D. Mechanical vector

287. What genus of organisms is important as decomposers and involve in bioremediation?
A. *Pseudomonas*
B. *Brucella*
C. *Francisella*
D. *Bordetella*

288. Brucellosis is spread from human-to-human contact with ALL BUT which of the following?
A. Blood
B. Urine
C. Placenta
D. Cerebrospinal fluid

289. What enzyme possessed by *Helicobacter pylori* helps to neutralize stomach acid?
A. Coagulase
B. Urease
C. Hyaluronidase
D. DNase

290. The technique used to kill all microorganisms is:
A. Disinfection
B. Sterilization
C. Antisepsis
D. Pasteurization

291. Glassware are sterilized by:
A. Hot air oven
B. Autoclave
C. Incineration
D. Boiling

292. _____ CAN NOT be found in the lymph node?
A. Lymphoid follicle
B. B cells
C. Red pulp
D. T cells

293. Virulence of tubercle bacillus is due to _____ that avoid destruction by lysosomes/macrophages.
A. Exotoxin
B. Cord factor
C. Enterotoxin
D. Endotoxin

294. The form of leprosy associated with severe disfigurement of the face is:
A. Tuberculoid
B. Lepromatous
C. Borderline
D. Papular

295. Diphtheria is caused by:
A. *Staphylococcus*
B. *Corynebacterium*
C. *Bacillus*
D. *Clostridium*

296. _____ reside in sebaceous glands in human skin?
A. *Bacillus*
B. *Propionibacterium*
C. *Erysipelothrix*
D. *Corynebacterium*

297. The largest virus is:
A. Parvo virus
B. Picorna virus
C. Pox virus
D. HIV

298. Endospores can be stained with:
A. Malachite green
B. Safranin
C. Methylene blue
D. Crystal Violet

299. All of the following are DNA viruses EXCEPT:
A. Parvo virus
B. Pox virus
C. Polio virus
D. Hepatitis B Virus

300. Comparing the two, *Actinomyces* _____ sulfur granules and *Nocardia* is _____.
A. Form; Acid-fast
B. Form; Not acid-fast
C. Does not form; Acid-fast
D. Does not form; Not acid-fast

301. _____fungi that can exist as a mold as well as yeast.
A. Hyphae
B. Tinea pedis
C. Dimorphic
D. Spore forming

302. The viruses that attack bacteria are:
A. Bacteriophages
B. Bacterial viruses
C. Bacterial pathogens
D. Virions

303. Fungal hyphae may be:
A. Septate
B. Non-septate
C. Branched
D. All of these

304. Where are target cells of diphtherotoxin located?
A. The skin
B. The skeletal muscles
C. The lungs
D. The heart and nervous system

305. Fusion of nuclei in fungi is:
A. Karyogamy
B. Progamy
C. Microgamy
D. Pregamy

306. Which of the following is a purine?
A. Adenine
B. Thymine
C. Uracil
D. Cytosin

307. Substitutions that prematurely stops synthesis of protein, by generating stop codon, called as:
A. Missense mutation
B. Nonsense mutation
C. Frameshift mutation
D. Alternation

308. What type of vaccine is the anthrax vaccine?
A. Attenuated bacteria
B. Toxoid
C. Killed whole bacterial cells
D. Recombinant

309. Tuberculosis is spread by:
A. Contaminated fomites
B. Food
C. Respiratory droplets
D. Vectors

310. What causes the major symptoms of tetanus?
A. Production of tetanospasmin
B. Multiplication of organisms at the site of infection
C. Production of botulin toxin
D. Superinfection due to antibiotic therapy

311. *Clostridium difficile* is associated with:
A. Myonecrosis
B. Food poisoning
C. Antibiotic-induced colitis
D. Gas gangrene

312. Which of the following can swarm on a plate, making it difficult to distinguish colonies?
A. *E. coli*
B. *Shigella dysenteriae*
C. *Salmonella typhi*
D. *Proteus vulgaris*

313. Only one of the followings is characteristic of B-cell but not T-cells:
A. Class I MHC
B. CD3
C. Polyclonal activation by concanavalin A
D. Surface immunoglobulin

314. Robert Koch developed his postulates using _____.
A. *Bacillus cereus*
B. *Clostridium tetani*
C. *Bacillus anthracis*
D. *Staphylococcus aureus*

315. How are most cases of listeriosis transmitted?
A. Insect vectors
B. Respiratory secretions
C. Transplacental
D. Contaminated food

316. Which infectious agent is an obligate parasite?
A. *Mycobacterium tuberculosis*
B. *Corynebacterium diphtheriae*
C. *Mycobacterium leprae*
D. *Clostridium difficile*

317. Which infection can be considered as zoonosis?
A. Anthrax
B. Gas gangrene
C. Diphtheria
D. leprosy

318. Bacterial cells divide by:
A. Budding
B. Binary Fission
C. Spores
D. Sexual reproduction

319. A classic symptom of pertussis is:
A. Diarrhea
B. Paroxysmal coughing
C. Convulsions
D. Headache

320. Complications of typhoid fever are:
A. Neurological damage
B. Intestinal perforation
C. Liver abscesses
D. Both "B" and "C"

321. How are *Leptospira* species transmitted from their animal reservoirs to humans?
A. Animal bites
B. Arthropod vectors
C. Contact with urine from an infected animal
D. Inhalation

322. Coliforms are used as indicator organisms of sewage pollution because _____.
A. They are pathogens
B. They ferment lactose
C. They are abundant in human intestines
D. All of the above

323. A patient with nausea, vomiting, and diarrhea within 5 hours after eating most likely has:
A. Shigellosis
B. *E. coli* gastroenteritis
C. Salmonellosis
D. Intoxication

324. The bubo of bubonic plague is a/an:
A. Ulcer where the flea bite occurred
B. Granuloma in the skin
C. Enlarged lymph node
D. Infected sebaceous gland

325. *Escherichia coli* displays which antigens?
A. Capsular
B. Flagellar
C. Somatic
D. All of these

326. Cardinal manifestation of human brucellosis is:
A. Vomiting and diarrhea
B. A pseudo-membrane in the throat
C. A fluctuating pattern of fever
D. Peeling of the skin on the palms and soles

327. Which is not a characteristic of coliform group?
A. Non-glucose fermenting
B. Lactose fermenting
C. Oxidase negative
D. Gram negative rods

328. Which one is NOT discovered by Robert Koch?
A. *Bacillus anthracis*
B. *Mycobacterium tuberculosis*
C. *Salmonella typhi*
D. *Vibrio cholerae*

329. What stage of syphilis has disseminating rash, alopecia, lymphadenopathy, & flulike symptoms?
A. Primary syphilis
B. Secondary syphilis
C. Tertiary syphilis
D. Congenital syphilis

330. Which one would be unsusceptible to penicillin?
A. *Leptospira*
B. *Mycoplasma*
C. *Chlamydia*
D. *Rickettsia*

331. Lyme disease is caused by _____ & spread by _____.
A. *Borrelia recurrentis*, lice
B. *Borrelia hermsii*, ticks
C. *Borrelia burgdorferi*, chiggers
D. *Borrelia burgdorferi*, ticks

332. Which of following cells do not have MHC II molecules?
A. Antibody producing B cells
B. Cytotoxic T cells
C. Dendritic cells
D. Macrophages

333. Indole test indicates the cleavage of _____.
A. Lactose
B. Tryptophan
C. Glucose
D. Tyrosine

334. What is the most common human disease?
A. Walking pneumonia
B. Strep throat
C. Tuberculosis
D. Dental caries

335. Which of following is related with *Ureaplasma*?
A. Genitourinary tract infection
B. Atypical pneumonia
C. Tracheobronchitis
D. Influenza-like illness

336. 'Penicillin' is a drug, destroying cells, if they are in a growing stage, so penicillin is known to be a:
A. Bacteriocins
B. Bactericidal
C. Bacteriostatic
D. Bacteria inhibiting

337. Primary virulence factor for *E. coli* is _____.
A. Inflammatory response
B. cAMP inducing toxin
C. Toxin disrupts protein synthesis
D. Superantigen

338. Sweat glands produces enzymes like lysozymes, which is more effective against _____.
A. Gram Negative Cell Wall
B. Gram Positive Cell Wall
C. Viruses
D. Parasites

339. *Mycoplasmas* attack the _____ of host cells.
A. Nucleus
B. Ribosomes
C. Mitochondria
D. Cell membranes

340. Rickettsia and chlamydia are similar in being:
A. Free of a cell wall
B. The cause of eye infections
C. Carried by arthropod vectors
D. Obligate intracellular bacteria

341. What stage(s) of Chlamydia is/are infectious?
A. Reticulate body
B. Vegetative cell
C. Elementary body
D. Both "A" and "B"

342. Endotoxin is responsible for symptoms caused by which of the following organisms?
A. *Neisseria meningitidis*
B. *Streptococcus pyogenes*
C. *Clostridium. tetani*
D. *Bacillus anthracis*

343. Which of the following blood cells function primarily as phagocytes in parasitic infections?
A. Lymphocytes
B. Eosinophils
C. Basophils
D. Neutrophils

344. What is characteristic of primary syphilis?
A. Painful chancre
B. Painless chancre
C. Several painful ulcers in genital region
D. Several painless ulcers in genital region

345. _____ can recognize MHC I molecules.
A. B-lymphocyte
B. CD4 + lymphocyte
C. CD8 + T lymphocytes
D. Monocytes

346. APCs can be all but which of the following?
A. B-cells
B. Dendritic cells
C. Macrophages
D. T-helper cells

347. Light chains and heavy chains are joined by:
A. Covalent bond
B. Hydrogen bond
C. di-sulphide bond
D. ionic bond

348. Which one of the following is NOT a structural chain in class I MHC?
A. Alpha-1
B. Alpha-2
C. Beta-1
D. Beta-2

349. Complement component C3 can be cleaved by:
A. C3b
B. C3bBb
C. Factor B
D. Factor D

350. At what age does thymus reach its maximal size?
A. During the first year of life
B. Teenage years (puberty)
C. Between 40 and 50 years of age
D. After 70 years of age

351. Which of following mediates an initial response to viral infections by the innate immune system?
A. Complement components
B. T and B lymphocytes
C. Cytokines
D. Interferons

352. Which one is a messenger that mediates connection between the innate and adaptive immune systems?
A. Complement components
B. T and B lymphocytes
C. Cytokines
D. Interferons

353. _____ are resident macrophages present in CNS.
A. Kupffer cells
B. Alveolar cells
C. Microglial cells
D. Langerhans

354. If you were a neutrophil recruited to an anaerobic site to kill such a bacterium, which of the following substances would you most likely use?
A. IL-12
B. Nitric oxide
C. Cathelicidin
D. Respiratory burst oxidase

355. Which of the following is a "pattern recognition receptor"?
A. BCR
B. Interleukin-1 receptor
C. Mannose receptor
D. Fc receptor

356. A molecule that reacts with specific antibody but is not immunogenic by itself is called:
A. Carrier
B. Antigen
C. Hapten
D. Immunogen

357. What type of vaccine is used to protect vulnerable individuals from influenza?
A. It is an example of a subunit vaccine
B. It is an example of a live attenuated vaccine
C. It is an example of passive immunization
D. It is an example of a recombinant vaccine

358. The initial complement component that is bound by complement-fixing antibodies is:
A. C1q
B. C1s
C. C3b
D. C5a

359. The _____ immune system uses ____ as well as antigen recognition molecules and the _____ immune system uses _____ as well as molecules (e.g., interferons).
A. Adaptive; Phagocytes; Innate; Lymphocytes
B. Adaptive; Lymphocytes; Innate; Phagocytes
C. Innate; Phagocytes; Adaptive; Lymphocytes
D. Innate; Lymphocytes; Adaptive; Phagocytes

360. Which of the following immune cells uses antibodies as membrane bound receptors?
A. T-helper cell
B. Cytotoxic T-cell
C. B-lymphocyte
D. Macrophage

361. Which of the complement pathway among various pathways will activate first?
A. Classical pathway
B. Alternate pathway
C. Lectin pathway
D. All act simultaneously

362. Which one of the following is NOT usually included in physical barriers?
A. Sweat glands
B. Salivary glands
C. Meibomian glands
D. Lacrimal glands

363. Which of the following is NOT lymphoid tissue?
A. Thyroid gland
B. Spleen
C. Lymph node
D. GALT

364. Toll-like receptors are proteins on _____.
A. skin cells that provide barriers to infection
B. viruses that stimulate immune reactions
C. phagocytes that recognize foreign molecules
D. lymphocytes that damage parasitic worms

365. _____is NOT produced by phagocytes?
A. hydroxyl radical
B. superoxide anion
C. hydrogen peroxide
D. bradykinin

366. _____ increases chemotaxis, phagocytosis & blood coagulation and serves as endogenous pyrogen.
A. Interferon gamma
B. Histamine
C. Prostaglandin
D. Tumor Necrosis Factor

A. Major Ig present in the human serum is
A. IgG
B. IgA
C. IgE
D. IgM

367. _____ is an immune regulator of macrophage, B & T cells.
A. Interferon Alpha
B. Interferon Beta
C. Interferon Gamma
D. All of these

368. T-cell antigen receptors are distinguished from antibodies by which of the following?
A. TCRs are glycosylated
B. TCRs cannot interact with free antigen
C. T-Cell receptors bind various cytokines
D. T-Cell receptors bind complement to lyse cells

369. Which is LEAST likely to be involved in cell-mediated immunity?
A. Macrophage
B. Eosinophils
C. Antibodies
D. T-lymphocytes

370. Which of the following can provide naturally acquired passive immunity for the newborn?
A. IgA
B. IgG
C. IgE
D. IgM

371. The major molecules responsible for rejection of transplant is:
A. Cytokine
B. Interferon
C. MHC molecule
D. Antibodies

372. Self-renew and ability to differentiate into diverse cell types are two capacities of?
A. Pluripotent stem cell
B. Adult stem cell
C. Immature blood cells
D. None of these

373. Which of the following pathogen can counter stomach pH and produce infection in stomach?
A. *Mycobacterium tuberculosis*
B. *Campylobacter jejuni*
C. *Helicobacter pylori*
D. *Salmonella typhi*

374. Natural infection will produce_____ acquired immunity.
A. Natural passive
B. Artificial active
C. Natural active
D. Artificial passive

375. Interferon is composed of:
A. Lipids
B. Lipoprotein
C. Glycoprotein
D. Nucleic acid

376. Delayed type of hypersensitivity is seen in:
A. Penicillin allergy
B. Contact dermatitis
C. Arthus reaction
D. Anaphylaxis

377. MHC class I is a cell surface molecule present on:
A. B cells
B. all nucleated cells
C. APCs
D. T cells

378. MHC class II is a cell surface molecule present on:
A. B cells
B. all nucleated cells
C. APCs
D. T cells

379. Humoral immunity involves all the following EXCEPT:
A. Tc cells
B. B cells
C. Antibodies
D. Plasma cells

380. _____ is artificial passive acquired immunity.
A. γ-globulin injection
B. Inactivated vaccine
C. Ingestion of colostrum
D. Having infection

381. Antibodies
A. are carbohydrates
B. are made from α & β chains
C. contain no CHOs
D. contain heavy & light chains

382. B-lymphocytes are involved in
A. Humoral immunity_____
B. Cell-mediated immunity
C. Active immunity
D. Passive immunity

383. Hybridoma technique is used for:
A. Monoclonal antibodies
B. Polyclonal antibodies
C. Both "A" and "B"
D. None of these

384. Example for cell-mediated immunity is/are:
A. Tuberculin type
B. Contact dermatitis
C. Granulomatous
D. All of these

385. In _____ repair, first enzyme complex removes incorrect bases and second enzyme places with correct bases.
A. Light repair
B. Back mutation
C. Excision repair
D. All of these

386. Antitoxin is used for _____ immunization.
A. Active
B. Passive
C. Both "A" and "B"
D. None of these

387. The cell-mediated immune response is produced by:
A. B lymphocytes
B. T lymphocytes
C. B & T lymphocytes
D. Endothelial cells

388. Which of the following DOES NOT kill endospores?
A. Autoclaving
B. Incineration
C. Hot-air sterilization
D. Pasteurization

389. Virus mediated transfer of host DNA from one cell to another is known as:
A. Transduction
B. Transformation
C. Conjugation
D. Integration

390. Acquirement and expression genetic material by eukaryotic cells from the environment is known as:
A. Transformation
B. DNA ligase
C. Transfection
D. Transduction

391. Genes of a pathogen is inserted into a live carrier non-pathogen; recombinant expresses foreign genes:
A. Subunit vaccine
B. Killed vaccine
C. Trojan horse vaccine
D. Acellular vaccine

392. Class II MHC proteins are:
A. Recognized by the CD8 protein
B. Used to mark a cell for killing by cytotoxic T-cells
C. Used to participate in helper function
D. Not able to carry an antigen fragment

393. Active immunity can be induced by:
A. Toxoids
B. Subclinical infection
C. Both "A" and "B"
D. Antitoxin

394. _____is the least abundant Igs in normal adult.
A. IgA
B. IgM
C. IgD
D. IgG.

395. Which of following is most resistant to antiseptics?
A. Spore
B. Prion
C. Cyst
D. Fungus

396. Which of the following is enrichment media?
A. Selenite F broth
B. Chocolate media
C. Egg media
D. Meat extract media

397. Lyophilization is:
A. Holding at 72° C for 15 seconds
B. Competitive inhibition
C. Freeze-drying
D. Sterility testing

398. Gene mutation occurs at the time of:
A. DNA repair
B. DNA replication
C. Translation
D. RNA transcription

399. All of the following can be part of innate immune responses EXCEPT:
A. B-cells
B. Alternative pathway of complement system
C. Natural killer cells
D. Macrophages

400. The cellular immune response is mediated by:
A. B cells
B. T cell
C. B & T cells
D. Endothelial cells

401. To influence microbes, mutation must be:
A. Inheritable
B. Permanent
C. Beneficial
D. Both 'A' & 'B'

402. Which of following features is NOT true for plasmid?
A. It is a circular piece of DNA.
B. It is required for normal cell function.
C. It is found in bacteria.
D. It can be transferred from cell to cell.

403. What is the smallest unit of heredity?
A. Chromosome
B. Gene
C. Codon
D. Nucleotide

404. _____ is 'general feeling of illness and discomfort'.
A. Cystitis
B. Malaise
C. Arthritis
D. Lymphopenia

405. Point mutation involves
A. Deletion
B. Insertion
C. Duplication
D. Change in single base pair

406. _____ does not have any normal microbiota.
A. Upper respiratory tract
B. Ovary
C. External genitalia
D. Skin

407. Salt and sugar preserve food because they:
A. Make them acid
B. Produce a hypotonic environment
C. Produce a hypertonic environment
D. Deplete nutrients

408. An infant with neonatal meningitis has a positive CAMP test, the causative agent is:
A. *Staphylococcus aureus*
B. E. coli
C. *Streptococcus agalactiae*
D. *Haemophilus*

409. ___ two hallmarks of the adaptive immune system?
A. Immediate and Broad
B. Innate and Short
C. Specificity and Memory
D. Non-specific and Fast

410. Which of the following mutations would likely to cause the greatest impact?
A. Silent
B. Missense
C. Nonsense
D. Inversion

411. X-rays causes mutation by:
A. Deletion
B. Transition
C. Transversion
D. Base substitution

412. All Gram-Negative bacilli have _____?
A. Capsule
B. Exotoxin
C. Coagulase
D. Endotoxin

413. _____enzyme of HIV-1 converts RNA to DNA.
A. Protease
B. Integrase
C. Reverse transcriptase
D. RNase

414. *Leptospira* is transmitted (animal to human) by?
A. Animal scratch
B. Contact with urine from infected animal
C. Animal bite
D. Arthropod vector

415. Which causes food INTOXICATION?
A. *Clostridium tetani*
B. *Staphylococcus aureus*
C. *Streptococcus pyogenes*
D. *Salmonella*

416. Crimean-Congo hemorrhagic fever (CCHF) is transmitted by a vector i.e. _____.
A. Mosquitoes
B. Ticks
C. Fleas
D. Sand-fly

417. All are correct for *Giardia lamblia* EXCEPT?
A. It is transmitted by the fecal oral route.
B. It has only trophozoite stage.
C. It can be diagnosed by the string test
D. It can divide by binary fission.

418. All are correct for anthrax bacilli EXCEPT?
A. They are spore forming.
B. They are non-fastidious.
C. They produce endotoxin.
D. They have polypeptide capsule.

419. Culture media are commonly sterilized by:
A. Autoclaving
B. β-radiation
C. Hot air oven
D. Tyndallization

420. All of the following are functions of IgG EXCEPT:
A. Opsonize bacteria
B. Be secreted into mucus
C. Activate complement
D. Cross the placenta

421. Those mutations that arise in the absence of known mutagen are known:
A. Induced mutations
B. Fused mutations
C. Spontaneous mutations
D. None of the above

422. DNA is copied during a process called:
A. Transformation
B. Replication
C. Translation
D. Transcription

423. An example/examples of a nonspecific chemical barrier to infection is/are:
A. Unbroken skin
B. Cilia in respiratory tract
C. Lysozyme in saliva
D. All of these

424. _____is nonspecific host defense related to trachea?
A. Lacrimation
B. Ciliary Lining
C. Desquamation
D. Lactic acid

425. Autoclaving is done in:
A. Dry air at 121ºC and 15 lbs pressure
B. Steam at 100ºC for 30 minutes
C. Steam at 121ºC for 30 minutes
D. Dry air at 160 ºC for 30 minutes

426. Culture media are sterilized by:
A. Autoclaving
B. β-radiation
C. Hot air oven
D. Tyndallization

427. pH of Sabouraud dextrose agar is adjusted to:
A. 1-2
B. 4-6
C. 6-8
D. 8-10

428. Monocytes are _____ leukocytes that develop into _____?
A. granular, phagocytes
B. agranular, mast cells
C. agranular, macrophages
D. granular, T cells

429. Which of the following is a sterilizing agent?
A. Dry heat
B. Ether
C. Ethanol
D. Chlorohexidine

430. _____ is included in GALT.
A. Thymus
B. Tonsils
C. Peyer's patches
D. Breast lymph nodes

431. _____ is the MOST resistant to antiseptics?
A. Spore
B. Prion
C. Cyst
D. Fungus

432. Which of the following inflammatory signs specifies pain?
A. Tumor
B. Calor
C. Dolor
D. Rubor

433. An example of an exogenous pyrogen is _____.
A. Interleukin-1
B. Complement
C. Interferon
D. Endotoxin

434. _____ is an example of an inflammatory mediator that stimulates vasodilation.
A. Collagen
B. Histamine
C. Complement C5a
D. Interferon

435. _____ is an example of an inflammatory mediator that stimulates chemotaxis.
A. Tumor necrosis factor
B. Serotonin
C. Granulocyte-colony stimulating factor
D. Interleukin-2

436. _____interferon, produced by T lymphocytes, activates cells called _____and is involved in destroying viruses.
A. Beta, lymphocytes
B. Gamma, fibroblasts
C. Alpha, natural killer cells
D. Beta, fibroblasts

437. Which of the following is the end-product of the complement system?
A. Properdin
B. Cascade reaction
C. Membrane attack complex
D. Complement factor C9

438. TNF is NOT involved in the which process?
A. Chemotaxis of phagocytes
B. Fever
C. The inflammatory response
D. The classic complement pathway

439. Which of the following statement is true?
A. Solid media are enrichment media
B. Nutrient broth is basal media
C. Agar adds nutrient to media
D. Chocolate agar is selective media

440. Choose the correct ones for the decreasing order of resistance to sterilization:
A. Prions, bacterial spores, bacteria
B. Bacterial spores, bacteria, Prions
C. Bacteria, Prions, Bacterial spores
D. Prions, bacteria, bacterial spores

441. A signaling molecule from microbes recognized by phagocytes is:
A. Pyrogen
B. Pathogen Associated Molecular Patterns
C. Complement
D. Lectin

442. Which of the following microorganism is used as indicator in autoclave?
A. *Clostridium tetani*
B. *Bacillus stereothermophilus*
C. *Bacillus anthracis*
D. *Clostridium botulinum*

443. MacConkey agar is an example of:
A. Enrichment medium
B. Selective medium
C. Differential medium
D. Both "B" and "C"

444. Virus mediated transfer of DNA from one cell to another is known as:
A. Transfection
B. Transduction
C. Transformation
D. Transcription

445. Bacterial may acquire characteristics by all of the following EXCEPT:
A. Taking up soluble DNA from the environment
B. Through bacteriophages
C. Through conjugation
D. Incorporating part of host DNA

446. The _____ is responsible for antibiotic resistance is bacteria due to slime production.
A. Co-aggregation
B. Biofilm formation
C. Mutation evolving in altered target site for antibiotic
D. Mutation evolving a target bypass mechanism

447. Which one statement is correct regarding functions of plasmid?
A. Involved in multidrug resistance transfer
B. Imparts capsule formation
C. Imparts pilli formation
D. All of these

448. Phage typing is useful as an epidemiological tool in all, EXCEPT:
A. *Salmonella*
B. *Staphylococcus aureus*
C. *Vibrio cholerae*
D. *Shigella dysenteriae*

449. The segment of DNA between chromosomal and extrachromosomal DNA molecules within cells are:
A. Cosmids
B. Plasmids
C. Transposons
D. Episomes

450. True about bacteriophage is:
A. Can transmit toxin to bacteria
B. Bacterial which transmits DNA to another bacteria
C. Causes transformation of bacteria
D. Is a virus which invades bacteria

451. Drug resistance transfer by bacteriophage involves:
A. Transformation
B. Conjugation
C. Convocation
D. Transduction

452. *S. aureus* differs from *S. epidermidis* by:
- A. Is coagulase positive
- B. Forms white colonies
- C. A common cause of UTI
- D. Causes endocarditis of prosthetic valve

453. A cook prepared sandwiches for 10 people going for picnic. Eight out of them develop sever gastroenteritis within 4-6 hrs of consumption of the sandwiches. It is likely that on study the cook is found to be carrier of:
- A. *Salmonella typhi*
- B. *Entamoeba histolytica*
- C. *Vibrio cholerae*
- D. *Staphylococcus aureus*

454. Methicillin resistance in *S. aureus* is due to:
- A. β-lactamase
- B. MECA gene
- C. AMPC gene
- D. Porin develop

455. Acute hematogenous osteomyelitis is commonly caused by:
- A. *S. aureus*
- B. *Streptococcus pneumoniae*
- *C. E. coli*
- D. Pneumococcus

456. *Staphylococcus aureus* remains in the skin for longer period because of:
- A. Catalase
- B. Coagulase
- C. DNAase
- D. Hyaluronidase

457. Eight months after prosthetic valve replacement, which of the following pathogen can cause infective endocarditis?
- A. *Staphylococcus aureus*
- B. *Staphylococcus epidermidis*
- C. *Streptococcus* viridans
- D. All of these

458. *Staphylococcus aureus* secretes all, EXCEPT:
- A. Lipase
- B. Cellulose
- C. Coagulase
- D. Lecithinase

459. Lancefield grouping of streptococci is done using:
- A. M protein
- B. Group C carbohydrate antigen
- C. Group C peptidoglycan cell wall
- D. M antigen

460. Streptococci causing dental caries:
- A. *Streptococcus pyogenes*
- B. *Streptococcus mutans*
- C. *Streptococcus pneumoniae*
- D. *Streptococcus bovis*

461. Quelling phenomenon is seen in:
- A. *Pneumococcus*
- B. *Streptococcus*
- C. *Staphylococcus*
- D. *Hemophilus*

462. A person from village is complaining of development of pustules. Extract from pus has shown Gram-positive cocci, showing hemolysis, catalase negative, identified as a group of streptococci. Following test is used:
- A. Bacitracin sensitivity
- B. Novobiocin sensitivity
- C. Optochin sensitivity
- D. Hemolysis test

463. Hot cold phenomenon is seen due to which toxin of staphylococci:
- A. Alpha hemolysin
- B. Beta hemolysin
- C. Gamma hemolysin
- D. Theta hemolysin

464. *Staphylococcus* differs from *Streptococcus* by:
- A. Coagulase test
- B. Phosphatase test
- C. Catalase test
- D. Gram-negative

465. Which of the following statements is correct regarding non-coagulase Staphylococci?
- A. They are non-pathogenic
- B. They commonly infect indwelling prosthesis
- C. They may cause scarlet fever
- D. They are separated by Gram's staining

466. Catalase positive, β-hemolytic Staphylococci is:
- A. *S. aureus*
- B. *S. epidermidis*
- C. *S. saprophyticus*
- D. Pneumococci

467. An infant with neonatal meningitis has a positive CAMP test, the causative agent is:
- A. *Staphylococcus aureus*
- B. *Streptococcus agalactiae*
- C. *E. coli*
- D. *Hemophilus influenzae*

468. Most common organism responsible for post-splenectomy infections include:
- A. *Streptococcus*
- B. *Staphylococcus*
- C. *Pseudomonas*
- D. Influenza Virus

469. In a case of neonatal meningitis, pathogen was found to have properties of β-hemolysis, bacitracin resistance, CAMP positive. Which of following is most likely causative agent?
- A. *Streptococcus pyogenes*
- B. *Streptococcus pneumoniae*
- C. *Streptococcus agalactiae*
- D. *Enterococcus faecalis*

470. A β-hemolytic bacterial isolate is resistant to vancomycin, shows growth in 6.5 % NaCl, is non-bile sensitive. It is likely to be:
- A. *Streptococcus agalactiae*
- B. *Streptococcus pneumoniae*
- C. *Streptococcus bovis*
- D. *Enterococcus faecalis*

471. Sputum specimen of a 70 years old male culture showed α-hemolytic colonies on blood agar. Further processing of this organism is most likely to yield:
A. *Staphylococcus aureus*
B. *Streptococcus pneumoniae*
C. *Legionella*
D. *Streptococcus pyogenes*

472. Most common organism causing sore throat:
A. *Staphylococcus*
B. *Hemophilus*
C. *Bacillus*
D. *Streptococcus*

473. Quellung reaction is due to:
A. Mitochondrial swelling
B. Capsular swelling
C. RBC swelling
D. Cell wall swelling

474. Griffith demonstrated biotransformation with:
A. *Enterococcus*
B. *Gonococcus*
C. *Pneumococcus*
D. *Staphylococcus*

475. A person has received complete immunization against tetanus 10years ago. Now he presents with a clean wound without any lacerations from an injury sustained 2.5 hours ago. He should now be given:
A. Full course of tetanus toxoid
B. Single dose of tetanus toxoid
C. Human tetanus globulin
D. Human tetanus globulin and single dose of toxoid

476. All of the following bacteria are most often associated with acute neonatal meningitis EXCEPT:
A. *Escherichia coli*
B. *Streptococcus agalactiae*
C. *Neisseria meningitidis*
D. *Listeria monocytogenes*

477. Which deficiency would cause *Neisseria* infection?
A. C9
B. C5
C. C7
D. All of the above

478. Differentiation of *Neisseria gonorrheae* and *Neisseria meningitidis* is by:
A. Glucose fermentation
B. VP reaction
C. Indole test
D. Maltose fermentation

479. _____ is catalase positive but coagulase negative.
A. *Streptococcus pyogenes*
B. *Staphylococcus aureus*
C. *Staphylococcus epidermidis*
D. Enterococci

480. A pus cultured on chocolate agar shows Gram-negative cocci, most likely organisms is:
A. *Hemophilus*
B. *Streptococcus*
C. *Staphylococcus*
D. *Neisseria*

481. CSF in meningococcal meningitis shows:
A. Gram-positive diplococci, in pus cells
B. Gram-negative diplococci, in pus cells
C. Gram-negative bacilli, in pus cells
D. Gram-positive bacilli, in pus cells

482. Regarding gas gangrene one of the following is correct:
A. It is due to *Clostridium botulinum* infection.
B. Clostridia are Gram-negative anaerobes
C. Clinical features are due to protein endotoxin
D. Gas is invariable present in muscle compartments

483. Which of the following cause/s of Gas gangrene?
A. *Clostridium novyi*
B. *Clostridium septicum*
C. *Clostridium perfringens*
D. All of the above

484. Necrotizing gastrointestinal enteritis is caused by?
A. *Clostridium difficile*
B. *Clostridium perfringens*
C. *Clostridium tetani*
D. *Clostridium botulinum*

485. Nagler's reaction is shown by:
A. *Clostridium septicum*
B. *Clostridium botulinum*
C. *Clostridium perfringens*
D. *Clostridium tetani*

486. A 10-year-old boy following a road traffic accident presents to the causality with contaminated wound over the left leg. He has received his complete primary immunization before preschool age and received a booster of DT at school entry age. All of the following can be done EXCEPT:
A. Injection of tetanus toxoid
B. Broad spectrum antibiotics
C. Wound debridement and cleaning
D. Injection of human antiserum

487. What types of viruses contain the enzyme lysozyme to aid in their infection?
A. Bacteriophage
B. Animal viruses
C. Plant viruses
D. Human viruses

488. All are correct regarding *Cl. tetani*, EXCEPT:
A. Soil & intestine of human / animals are reservoirs
B. Predominantly seen in dry and winter season
C. Transmission through contaminated wounds
D. No heard immunity is seen

489. Viruses that can remain latent (usually in neurons) for many years are most likely:
A. Togaviruses
B. Herpesviruses
C. Enteroviruses
D. Rhinoviruses

490. The most effective way of preventing tetanus is:
A. Surgical debridement and toilet
B. hyperbaric oxygen
C. Antibiotics
D. Tetanus toxoid

491. An 18-year-old male presented with acute onset descending paralysis of 3 days duration. There is also a history of blurring of vision for the same duration. Both pupils are non-reactive. The most probable diagnosis is:

A. Poliomyelitis
B. Botulism
C. Diphtheria
D. Porphyria

492. A patient of acute lymphocytic leukemia with fever and neutropenia develops diarrhea after amoxicillin therapy, which of the following organism is most likely to be the causative agent?

A. *Salmonella typhi*
B. *Clostridium perfringens*
C. *Clostridium difficile*
D. *Shigella flexneri*

493. Swarming growth on culture is characteristic of which Gram-negative organism:

A. *Clostridium tetani*
B. *Clostridium botulinum*
C. *Bacillus cereus*
D. *Proteus mirabilis*

494. Viruses range in size from

A. 1-100 nm
B. 25-300 nm
C. 10-100 µm
D. 400-1000 nm

495. Structural component that is found in all viruses is:

A. The envelope
B. DNA
C. Capsid
D. Spikes

496. Chemical component that is found in all viruses is:

A. Protein
B. Lipid
C. DNA
D. RNA

497. A common polyhedral capsid shape of viruses is a:

A. Pentagon
B. Cube
C. Icosahedron
D. Pyramid

498. Which of the following is the cause of smallpox?

A. Varicella zoster
B. Variola virus
C. Vaccinia virus
D. Cowpox virus

499. The following are cell culture types EXCEPT:

A. Semi-continuous
B. Primary
C. Continuous
D. Hemagglutination

500. Enteroviruses differ from rhinoviruses mainly by:

A. Type of nucleic acid
B. Size
C. Capsid shape
D. Ability to survive in acidic conditions

501. A boy with skin ulcer on leg, culture revealed β-hemolysis. School physician said that similar hemolysis was seen in organism from sore throat, what is the similarity between both pathogens?

A. Protein-A is same for both
B. C-carbohydrate antigen is different
C. C-carbohydrate antigen is the same
D. Strain causing both are same

502. A type of cell culture that can reproduce for an extended number of generations and is used to support viral replication is a:

A. Primary cell culture
B. Continuous cell line
C. Secondary cell culture
D. Diploid fibroblast cell

503. Bacteriophages are readily counted by process of:

A. Immunoassays
B. ELISA
C. Tissue culture
D. Plaque assays

504. Non-motile clostridium is:

A. *Clostridium perfringens*
B. *Clostridium novyi*
C. *Clostridium botulinum*
D. *Clostridium difficile*

505. Which of the following is not an RNA virus?

A. Retrovirus
B. Enterovirus
C. Rhabdovirus
D. Adenovirus

506. In name of family Reovirus, word 'reo' refers to:

A. Respiratory enteric orphans
B. Respiratory
C. Enteric
D. Orphans

507. Virus that is well known in causing 'latent infection' is:

A. Adenovirus
B. Hepatitis B Virus
C. Influenza virus
D. Herpesvirus

508. Which one of the following statements is NOT true about viral infections?

A. Virus infections are all life threatening
B. number of viruses cause similar symptoms
C. Virus infection may cause immunosuppression
D. Some viruses require other viruses for replication

509. Which one of following viruses is not oncogenic?

A. Adenoviruses
B. HSV-2
C. HCV
D. EBV

510. Laboratory diagnosis of HIV infection is usually made by which of the following:

A. Biochemical tests
B. Growth of virus in chicken embryo
C. Detection of antigen and antibodies
D. Light microscopy

511. What is a primer?
A. A short DNA sequence
B. A short RNA sequence
C. A short sequence of oligonucleotide
D. A promoter sequence

512. Direct viral diagnostic techniques include all of the following EXCEPT:
A. Electron microscopy
B. Antibodies detection
C. Light microscopy
D. Viral genome detection

513. The first step in all virus infection is:
A. Uncoating
B. Migration to nucleus
C. Attachment to cell receptor
D. Transcription

514. The first step in virus replication after uncoating of the positive-sense, single-stranded RNA viruses is which of the following?
A. Transcription
B. Translation
C. Genome replication
D. Assembly

515. Rubella has the most serious consequences in:
A. Children
B. Pregnant Women
C. Summer months
D. Years with heavy rainfall

516. Immunopathology (immune-mediated disease) may be involved with a severe form of which of the following *Flavivirus* infections?
A. Yellow fever
B. West Nile
C. Hepatitis C
D. Dengue fever

517. Infectious bursal disease of chickens leads to loss of which of the following cell types?
A. Thymic cells
B. B-lymphocytes
C. Neurons
D. Neutrophils

518. Deltavirus infection is always associated with coinfection with:
A. Hepatitis C
B. Dengue fever
C. Hepatitis B
D. Influenza

519. Hemagglutination inhibition assay is used for detection of_____ in the sample.
A. Antigen titer
B. Virus titer
C. Antibody titer
D. 4HA titer

520. Rabies virus reaches brain and salivary glands via:
A. Blood
B. Lymph
C. SQ tissue
D. Nerves

521. An important paramyxovirus of poultry is:
A. Infectious bursal disease virus
B. Newcastle disease virus
C. Avian influenza virus
D. Avian leukosis virus

522. Which of following produces life-threating disease that can be well treated by fluid replacement?
A. *Mycoplasma pneumoniae*
B. *Mycobacterium tuberculosis*
C. *Treponema pallidum*
D. *Vibrio cholerae*

523. Which of the following are trace elements?
A. Potassium ion
B. Sodium ion
C. Copper ion
D. Magnesium ion

524. NDV is cultivated via _____ in embryonated Eggs.
A. Allantoic inoculation
B. Yolk sac inoculation
C. Intra-cerebral inoculation
D. Chorioallantoic membrane inoculation

525. Viral diagnostic techniques include all EXCEPT:
A. Electron microscopy
B. Antigen detection
C. Antibodies detection
D. Light microscopy

526. Transfection is insertion of DNA into _____ cells.
A. Eukaryotic
B. Bacterial
C. Parasitic
D. Both "A" and "B"

527. In Gram-staining, iodine is used as a_____.
A. Fixative
B. Mordant
C. Solublizer
D. Stain

528. Diagnosis of rabies is commonly done by _____.
A. Direct Sandwich ELISA
B. Florescent Antibody Technique
C. Hemagglutination assay
D. Hemagglutination inhibition assay

529. In _____ vaccine, genetic material from a pathogen is inserted into a live carrier non-pathogen.
A. Subunit
B. Acellular
C. Trojan horse
D. Live attenuated

530. 1% or 0.8% dilution of washed RBCs is prepared for use in HA assays by diluting washed RBCs in___.
A. Distilled H2O
B. Double distilled H2O
C. Double distilled deionized H2O
D. Normal Saline

531. Lag phase is also known as _____.
A. Period of initial adjustment
B. Transitional period
C. Generation time
D. Period of rapid growth

532. Cell culture that can reproduce for an extended number of generations and is used to support viral replication is:
A. Primary cell culture
B. Secondary cell culture
C. Continuous cell culture
D. Diploid fibroblast cell culture

533. _____ is the causative agent of PLAGUE.
A. *Y. enterocolitica*
B. *Y. pestis*
C. *P. mirabilis*
D. *E. coli*

534. Cells that use antibodies to recognize their targets:
A. CD4+ T cells
B. CD8+ T cells
C. Macrophages
D. B lymphocytes

535. B-lymphocytes bind and respond to:
A. Soluble antigens
B. Virus-infected host cell
C. Bacteria
D. Particulate matter

536. _____ complement pathway/s will activate first.
A. Classical
B. Alternative
C. Lectin
D. All act simultaneously.

537. Sample of choice in Marek's disease is _____.
A. Liver tissue
B. Feather follicle
C. Pieces of lymph node
D. Bursa of fabricius

538. In AGPT, precipitation band will appear if:
A. Antigen antibody reaction is specific
B. Antigen is soluble
C. Conc. of antigen and antibody are optimum
D. All of the above

539. If LD_{50} is $10^{-5.6}$ using 100µl of sample, then what will be the virus titer.
A. $10^{-4.6}$
B. $10^{-5.6}$
C. $10^{6.6}$
D. $10^{-6.6}$

540. Which one of following is CORRECT about T-cell?
A. Has both MHC-I and MHC-II molecules.
B. Can kill infected host cells.
C. Does not require antigen processing/presentation
D. Differentiate into plasma cells

541. Stick method of virus inoculation is used for:
A. Newcastle disease virus
B. Fowl pox virus
C. FMD virus
D. Avian influenza virus

542. A T-cell that has the CD8+ marker can be a:
A. Cytotoxic T cell
B. Natural Killer T cell
C. Helper T cell
D. T Regulatory cell

543. Regarding MHC-I, which statement is FALSE?
A. Ag. presented by MHC-I is recognized by CTL.
B. It typically processes antigens exogenously.
C. Peptide binding cleft is formed by α 1/α2.
D. It is present on all nucleated host cells.

544. Treatment with _____ is required for isolation of viruses from tissues; it precipitates _____ present in the sample.
A. Formalin, lipids
B. Chloroform, lipids
C. Chloroform, proteins
D. Formalin, proteins

545. _____ is an example of suspension cell line?
A. Vero cell line (Monkey Kidney cells)
B. Hela cell line (Human Cervix cells)
C. HEK 293 cell line (Human kidney cells)
D. YAC-1 cell line (Mouse Lymphoma cells)

546. Which one of the following is NOT the desired property for enzyme in ELISA?
A. High turnover rate
B. Readily coupled to proteins
C. Resistant to high salt concentration
D. Cheap

547. Light chain DOES NOT originate from ____region.
A. Variable
B. Joining
C. Diversity
D. Constant

548. With respect to lymphocyte antigen receptors, which of the following statements is FALSE?
A. The pool of lymphocytes can express several million different antigen receptors.
B. A single lymphocyte can express several thousand antigen receptors.
C. A single lymphocyte can only recognize a single antigenic epitope.
D. A single lymphocyte can express several thousand different antigen receptors.

549. Autoclave standards for decontamination of most microbiological materials is:
A. 100°C at 15 psi for 10 minutes
B. 121°C at 15 psi for 10 minutes
C. 100°C at 10 psi for 60 minutes
D. 121°C at 15 psi for 60 minutes

550. Which is true for immunogenicity & antigenicity?
A. An antigenic particle is always immunogenic, but the reverse is not true.
B. The terms are synonymous.
C. A particle that is immunogenic will trigger an adaptive immune response.
D. A particle that is antigenic will trigger an adaptive immune response.

551. Which one of the followings is INCORECT for live vaccine?
A. Require larger dose / more boosters
B. Require special storage (cold chain)
C. Can conceivably mutate back to virulent stain
D. Confer long-lasting protection

552. Endoflagellum is present in which class of bacteria?
A. Spirilla
B. Spirochetes
C. Bacillus
D. Coccus

553. _____ provokes an overwhelming T-cell response.
A. Autoantigen
B. Autoantigen
C. Allergen
D. Superantigen

554. Indirect protection of unimmunized animals is___.
A. Artificial active immunity
B. Herd immunity
C. Artificial passive immunity
D. Natural active immunity

555. Which of the following statements regarding clonal selection theory is INCORRECR?
A. Specificity for Ag of T cells produced is identical to the specificity of the TCR on initial T cell.
B. The body is equipped with billions of lymphocytes. Each is devoted to respond to one specific epitope.
C. An epitope triggers the production of a number of lymphocytes, each with different receptors.
D. Antigen binding to a TCR triggers proliferation and differentiation of T cells into effector cells.

556. Which one of the following properties is NOT required for vaccine?
A. Should protect against natural exposure
B. Should be cheaper.
C. Should have relatively longer shelf life.
D. Should be less immunogenic

557. In a host, virus-infected host cells are killed by:
A. Activated cytotoxic T lymphocytes
B. Activated B lymphocytes
C. Activated T helper cells
D. Monoclonal antibodies

558. The Petroff-Hausser chamber is used for _____.
A. Incubation of culture medium
B. Direct microscopic count
C. Viable count
D. To grow anaerobic bacteria

559. Toxoid injection to protect future tetanus infection is an example of:
A. Natural passive immunity
B. Artificial active immunity
C. Natural active immunity
D. Artificial passive immunity

560. _____has the ability induce a malignant tumor.
A. Toxic
B. Carcinogenic
C. Corrosive
D. Ignitable

561. Secretory component that facilitates to move across the mucus membrane is present in:
A. Ig M
B. Ig G
C. Ig A
D. Ig E

562. Biosafety level that includes most common laboratory microorganisms & involves organisms such as HBV, *Staphylococcus* & enteric pathogen is:
A. BSL 1
B. BSL 2
C. BSL 3
D. BSL4

563. Which of the following open biological safety cabinets sterilize both the air entering and leaving the cabinet and utilizes a HEPA filter?
A. Class I
B. Class II
C. Class III
D. Class IV

564. Which of the following hazardous chemicals causes serious biological effects following inhalation, ingestion or skin contact with even small amounts?
A. Corrosive
B. Toxic
C. Carcinogenic
D. Ignitable

565. Bacterial fimbriae present on the outer cell surface are used for:
A. Cellular activity
B. Sexual reproduction
C. Adherence to surfaces
D. Adherence and exchange of genetic information

566. An infection that may occur as a result of accidental needle sticks or through broken glass is classified as which of the following routes?
A. Direct inoculation
B. Airborne
C. Ingestion
D. Mucous membrane contact

567. What is the total magnification if the eyepiece is 10X and the objective lens is 40X?
A. 40 times bigger
B. 4 times bigger
C. 14 times bigger
D. 400 times bigger

568. _____ is intended to destroy all microorganism and their spores on inanimate surfaces?
A. Disinfectant
B. Sterilizer
C. Antiseptic
D. Antibiotic

569. What part of the microscope is used to change the amount of light entering the stage?
A. Eyepiece
B. Nosepiece
C. Diaphragm
D. Coarse adjustment knob

570. _____ is used for microorganism that have no known pathogenic potential like *Bacillus subtilis*.
A. BSL-I
B. BSL-II
C. BSL-III
D. BSL-IV

571. Membrane filtration method has all the following advantages EXCEPT:
A. More turbid samples can be processed easily.
B. Results are available in a shorter period of time.
C. Larger volumes of sample can be processed.
D. The results are readily reproducible.

572. _____ is used as chemical germicide used on skin.
A. Disinfectant
B. Antiseptic
C. Sterilizer
D. Moist heat

573. _____ causes visible destruction or irreversible damage to human skin on contact.
A. Toxic
B. Carcinogenic
C. Explosive
D. Corrosive

574. Any chemical that can burn and includes both combustible and flammable liquids is called _____.
A. Corrosive
B. Toxic
C. Ignitable
D. Explosive

575. _____ are reactive and unstable substances that readily undergo violent chemical changes.
A. Toxic
B. Corrosive
C. Explosive
D. Ignitable

576. What is the purpose of a biosafety cabinet in a microbiology laboratory?
A. To sterilize materials, such as media and glassware
B. To provide a proper temp. for microbes to grow
C. To prevent sample from contamination
D. For long term storage of microbes at low temp.

577. What lab equipment is used to accurately measure the volume of liquids?
A. Balance
B. Erlenmeyer flask
C. Ruler
D. Graduated cylinder

578. What lab equipment is used to measure the amount of matter in an object?
A. Balance
B. Graduated cylinder
C. Thermometer
D. Autoclave

579. ____ is used to culture microbes at a specific temp.
A. Incubator
B. Autoclave
C. Hot air oven
D. Desiccator

580. ____ is an example of indicator coliform bacterial species used to check quality of drinking water.
A. *Staphylococcus aureus*
B. *Escherichia coli*
C. *Salmonella typhimurium*
D. *Mycobacterium tuberculosis*

581. ____ contains many different species in a sample.
A. Broth culture
B. Pure culture
C. Mixed culture
D. Streak plate culture

582. _____ culture medium is supplemented with highly nutritious material such as serum.
A. Differential medium
B. General purpose medium
C. Enrichment medium
D. Enriched medium

583. Crystal violet agar is an example of _____.
A. General purpose medium
B. Enriched medium
C. Selective medium
D. Differential medium

584. In microbiology lab, mouth pipetting is done for:
A. Dispensing liquid culture medium
B. Dispensing water to wash glass slide
C. To transfer bacterial culture to fresh medium
D. Strictly prohibited for any use

585. The temperature at which the rate of reproduction is most rapid is known as _____.
A. Optimum growth temperature
B. Minimum growth temperature
C. Maximum growth temperature
D. None of the above

586. What will be CFU/ml if colonies per plate = 75, Dilution = 10^{-7} and volume added per plate 0.5ml.
A. 1.5×10^{7}
B. 1.5×10^{9}
C. 1.5×10^{8}
D. 7.5×10^{9}

587. Oldest eukaryotic organisms are considered to be:
A. Archaea
B. Diplomonads like Giardia
C. Fungi
D. Animals

588. MacConkey agar is an example of:
A. Enriched medium
B. Selective medium
C. Differential medium
D. Both 'B' and 'C'

589. Petri dish/plate is commonly labeled:
A. On the bottom-side of plate
B. On the top of plate
C. On the side of plate
D. On the inside of plate

590. Isolation of pure culture refers to _____.
A. Purification of culture
B. Separation of a single colony
C. Introduction of inoculum
D. To grow microorganism on a surface

591. *Salmonella* from fecal sample is isolated using:
A. Crowded-plate technique
B. Pour plate technique
C. Enrichment culture technique
D. Gradient-plate technique

592. _____is best used for long term storage of microbial samples when carried out properly?
A. storage in a freezer
B. storage in a refrigerator on an agar slant
C. storage on a petri plate at room temperature
D. storage in a freezer at ultra-low temperatures

593. Which of the following method is used for viable count of a culture?
A. Plate-count method
B. Membrane-filter count
C. Plate-count method and membrane-filter count
D. Direct microscopic count

594. Soil microbes serially degrade nitrogenous organic compounds derived from dead plants and animals to coverts them finally into NH_3, the process is ____.
A. Denitrification
B. Nitrogen fixation
C. Nitrification
D. Ammonification

595. The process of killing all microorganisms along with their spores is _____.
A. Sterilization
B. Sanitization
C. Disinfection
D. Antisepsis

596. Antimicrobial activity of a NEW compound is checked against all the bacteria EXCEPT:
A. *Staphylococcus aureus*
B. *Salmonella typhimurium*
C. *Pseudomonas aeruginosa*
D. *Escherichia coli*

597. _____ technique is used for isolation of antibiotic-producing microorganism from soil samples.
A. Enrichment culture
B. Pour plate
C. Crowded-plate
D. Streak plate

598. All of followings are the sugars used in Triple sugar iron test to check their fermentation EXCEPT:
A. Sucrose
B. Glucose
C. Lactose
D. Dextrose

599. Triple sugar iron test can be used for all EXCEPT:
A. To differentiate b/w fermentation of lactose and sucrose
B. To observe H_2S production
C. To observe gas production from glucose fermentation
D. To differentiate b/w fermentation of glucose and lactose

600. Which of the following may account for the small size of the cells?
A. The rate of diffusion
B. The surface area/volume ratio
C. The number of mRNAs that can be produced by the nucleus
D. All of the above

601. 20 grams of food sample are mixed with 180 ml of water. What will be the dilution?
A. 10^{-2}
B. 10^{-1}
C. 10^{-3}
D. 10^{-4}

602. Which were the scientist lived at the same time?
A. Koch and Pasteur
B. Darwin and Woese
C. Van Leeuenhoek and Ricketts
D. Berg and Hooke

603. The feature of the archaea that distinguishes them from the bacteria is:
A. Habitats which are extreme environments
B. Absence of a nuclear membrane
C. Presence of a cell wall
D. Cytoplasmic ribosomes that are 70S

604. Gram staining was introduced by:
A. Christian Gram
B. Alfred Gram
C. Robert Cooke
D. Louis Pasteur

605. Which of the following is considered the most unifying concept in biology?
A. Taxonomy
B. Anatomy
C. Genetics
D. Evolution

606. Various bacterial species can be subdivided into:
A. Subspecies
B. Bio-varieties
C. Sero-varieties
D. All of these

607. A characteristic of protein synthesis in both the archaea and eukarya is:
A. Transcription and translation are coupled
B. Translation is inhibited by diphtheria toxin
C. Proteins are synthesized from D-, rather than L-, isomers of amino acids
D. The initiator tRNA is charged with N-formyl-methionine

608. Which of the following show the maximum resistance to physical and chemical agents?
A. Viruses
B. Mold spores
C. Bacterial spores
D. *E. coli*

609. The virulence of _____ is linked to its cell wall, an exotoxin (PLD) and a protective antigen (CP40).
A. *Mycobacterium*
B. *Campylobacter*
C. *Brucella*
D. *Corynebacterium*

610. *E. coli* O157:H7 is an example of:
A. Enterotoxigenic *E. coli* (ETEC)
B. Enterohemorrhagic *E. coli* (EHEC)
C. Enteropathogenic *E. coli* (EPEC)
D. Enteroinvasive *E. coli* (EIEC)

611. Genetic and biochemical similarities between contemporary cyanobacteria and eukaryotic chloroplasts are accepted to mean that:
A. Eukaryotes evolved from bacteria
B. Eukaryotes evolved from archaea
C. Oxygenic photosynthesis first evolved in eukaryotes
D. Cyanobacteria arose from chloroplasts which escaped from plant cells

612. *Staph. aureus* differs from *S. epidermidis* by:
A. Is coagulase positive
B. Forms white colonies
C. A common cause of UTI
D. Causes endocarditis of prosthetic valve

613. A cook prepares snacks from 10 people going for a picnic. 08 out of them develop severe gastroenteritis within 4-6 hours of consumption of snacks. It is likely that on investigations cook is found to be carrier of:
A. *Salmonella typhi*
B. *Vibrio cholerae*
C. *E. coli*
D. *Staphylococcus aureus*

614. Ahmad comes from dinner, he complained about diarrhea, vomiting after 4 hours of meal. Most likely causative agent:
A. *Salmonella typhi*
B. *Vibrio cholerae*
C. *E. coli*
D. *Staphylococcus aureus*

615. _____ is capsulated and shows positive Negler's reaction due to presence of α-toxin.
A. *Clostridium tetani*
B. *Clostridium botulinum*
C. *Clostridium perfringens*
D. *Clostridium difficile*

616. Giemsa-stained blood smear with bipolar-staining pathogens indicates involvement of:
A. *Bacillus anthracis*
B. *Pasteurella multocida*
C. *Brucella abortus*
D. *Mycobacterium bovis*

617. Primary differences between cilia and flagella are:
A. Arrangement of microtubules
B. Length and location of basal bodies
C. Number, length and direction of force
D. How the microtubules are fused to each other?

618. All Gram-Negative bacilli have _____?
A. Capsule
B. Endotoxin
C. Exotoxin
D. Coagulase

619. Causative agent of lockjaw disease is hemolytic on blood agar due to the production of _____.
A. tetanolysin
B. tetanospasmin
C. endotoxin
D. beta-hemolysin

620. Which of the following is opportunistic pathogen?
A. *Salmonella Typhimurium*
B. *Escherichia coli*
C. *Proteus mirabilis*
D. *Yersinia pestis*

621. If result of TSI test show, Red/Yellow with bubbles and black precipitate, what is your interpretation?
A. Glucose fermentation and H_2S production
B. Lactose fermentation with gas and H_2S production
C. Glucose fermentation with gas and H_2S production
D. Glucose fermentation and H_2S production

622. Which one of these is extremely resistant to antibiotics and disinfectants?
A. *Bacillus anthracis*
B. *Pseudomonas aeruginosa*
C. *Clostridium tetani*
D. *Salmonella Typhimurium*

623. Which one of these is NOT correct about *B. mallei*?
A. *B. mallei* can grow at 42°C
B. *B. mallei* is non-motile
C. *B. mallei* is non-hemolytic
D. *B. mallei* can ferment glucose

624. *Brucella mallei* is classified as Category B bioterrorist agent because:
A. It causes chronic disease in equines
B. It presents as nasal, and cutaneous forms
C. Disease leads to formation of nodules on the skin
D. Infection by inhalation requires small number of pathogens

625. Infection with ____ can lead to abortion in pregnant women & can be life-threatening in neonates, elderly, and immunocompromised patients.
A. *Clostridium tetani*
B. *Klebsiella pneumoniae*
C. *Listeria monocytogenes*
D. *Mycoplasma mycoides*

626. Lumpy jaw disease with yellowish 'sulfur granules' is caused by:
A. *Actinomyces bovis*
B. *Borrelia anserina*
C. *Actinobacillus lignieresii*
D. *Mycoplasma bovis*

627. Which of the followings is NOT a predisposing factor for enterotoxaemia in elder sheep?
A. Incomplete establishment of normal microbiota
B. Abrupt change to a rich diet
C. Gorging on energy-rich diet
D. Intestinal hypomotility

628. _____ is used to determine glucose fermentation.
A. Voges Proskauer test
B. TSI test
C. Catalase test
D. Coagulase test

629. Zoonotic cases of TB are usually associated with?
A. *Mycobacterium bovis*
B. *Mycobacterium tuberculosis*
C. *Mycobacterium avium*
D. *Mycobacterium caprae*

630. Causative agent of bovine reproductive disease is?
A. *Campylobacter fetus* subsp. fetus
B. *Campylobacter fetus* subsp. venerealis
C. *Campylobacter coli*
D. *Campylobacter jejuni*

631. All are correct for anthrax bacilli EXCEPT?
A. They produce endotoxin.
B. They are spore forming.
C. They have polypeptide capsule.
D. They produce non-hemolytic colonies.

632. Shiga toxin is a form of?
A. Exotoxin
B. Endotoxin
C. Neurotoxin
D. Exfoliative toxin

633. Which of the following drug is NOT used to treat dermatophytosis (fungal disease) in cats and dogs?
A. Itraconazole
B. Ciprofloxacin
C. Fluconazole
D. Terbinafine

634. Which of the following is NOT the characteristic of all members of *Enterobacteriaceae*?
A. Motile
B. Gram-negative
C. Catalase positive
D. Facultative anaerobes

635. *Borrelia burgdorferi* is transmitted by:
A. *Ixodes*
B. *Aedes*
C. *Anapholes*
D. *Argus*

636. Addition of glycerol in the culture medium enhances the growth of:
A. *Mycobacterium tuberculosis*
B. *Mycobacterium avium*
C. *Mycobacterium bovis*
D. *Both 'A' & 'B'*

637. Which causes food INTOXICATION?
A. *Clostridium botulinum*
B. *Clostridium tetani*
C. *Streptococcus pyogenes*
D. *Salmonella Typhimurium*

638. Colonies of _____ give egg-fried appearance.
A. *Klebsiella pneumoniae*
B. *Bacillus anthracis*
C. *Mycobacterium bovis*
D. *Mycoplasma bovis*

639. Fowl typhoid is caused by:
A. *Salmonella Typhimurium*
B. *Salmonella Pullorum*
C. *Salmonella Gallinarum*
D. *Salmonella Enteritidis*

640. ____ is a property *of Listeria monocytogenes*:
A. It is an extracellular pathogen
B. It can grow at refrigerator temperatures (4°C)
C. It is non-motile
D. After Gram-staining, it exhibits G+ large bacilli

641. Dermatophytosis in human is caused by _____ contracted from infected cats.
A. *Microsporum capri*
B. *Trychophyton canis*
C. *Microsporum canis*
D. *Epidermyphyton canis*

642. Which of the following is NOT a SEROLOGICAL test used for diagnosis of bovine brucellosis?
A. Rose-Bengal plate test
B. Polymerase chain reaction
C. Brucella milk ring test
D. Complement fixation test

643. Wooden tongue or timber tongue with history of grazing rough pasture indicates the infection by:
A. *Borrelia anserina*
B. *Actinomyces bovis*
C. *Actinobacillus lignieresii*
D. *Mycoplasma bovis*

644. Fungi can cause disease by:
A. Tissue invasion
B. Toxin production
C. Induction of hypersensitivity
D. All of these

645. Virulence factor/s of *C. neoformans* include?
A. Capsule
B. Ability to grow at mammalian body temp.
C. Production of phenol oxidase
D. All of these

646. All are bounded by a cell wall EXCEPT:
A. *Actinomyces bovis*
B. *Mycobacterium bovis*
C. *Mycoplasma bovis*
D. *Borrelia anserina*

647. Gas gangrene causing bacillus is:
A. Facultative anaerobe
B. Microaerophilic
C. Obligate anaerobe
D. Obligate aerobe

648. Leptospira is transmitted (animal to human) by?
A. Animal scratch
B. Contact with urine from infected animal
C. Animal bite
D. Arthropod vector

649. Zearalenone (mycotoxin) is produced by:
A. *Aspergillus* species
B. *Fusarium* species
C. *Penicillium* species
D. *Claviceps* species

650. Example of anaerobic medium is
A. Robertson cooked-meat medium
B. Sabouraud dextrose agar
C. MacConkey agar
D. Mannitol salt agar

651. MacConkey agar is an example of?
A. General purpose medium
B. Enrichment medium
C. Differential medium
D. Enriched medium

652. Which of the following is the most commonly affected non-pulmonary site by *Mycoplasma*?

A. Meningitis
B. Prosthetic heart valve
C. Septic arthritis
D. Urethritis

653. Which of the following is the current preferred antimicrobial treatment of cutaneous anthrax?

A. Aminoglycosides
B. Ciprofloxacin
C. Penicillin
D. Tetracycline

654. *Bacillus anthracis* is unique to other bacteria. It is the only bacteria to possess which of the following?

A. An endotoxin
B. A polypeptide capsule
C. A polysaccharide capsule
D. Teichoic acid in its outer cell wall

655. Which of the following diseases could also be transmitted by ticks?

A. Q fever
B. Leptospirosis
C. Ehrlichiosis
D. Yellow fever

656. Which of the following are the special laboratory conditions needed to recover *C. jejuni*?

A. 98.6 ºF (37 ºC) aerobic blood agar plates
B. 98.6 ºF (37 ºC) anaerobic blood agar plates
C. 107.6 ºF (42 ºC) microaerophilic Skirrow medium
D. 107.6 ºF (42 ºC) anaerobic Skirrow medium

657. Testing of blood culture revealed Gram-positive cocci, vancomycin-resistant, PYR-positive and the presence of Lancefield group D antigen. Which of the following is the most likely isolate identification?

A. *Enterococcus faecalis*
B. *Staphylococcus aureus*
C. *Streptococcus pneumoniae*
D. *Streptococcus agalactiae*

658. Verotoxin producing *E. coli* O157:H7 serotype belongs to which group?

A. Enteroaggregative *E. coli* (EAEC)
B. Enterhemorrhagic *E. coli* (EHEC)
C. Enteroinvasive *E. coli* (EIEC)
D. Enterotocigenic *E. coli* (ETEC)

659. Which of the following is a key typical characteristic of *H. pylori* as compared to *Campylobacter* species?

A. Coagulase production
B. Catalase production
C. Urease production
D. Curved shape

660. A 4-year-old has fever and diarrhea. Blood culture grows a Gram-negative rod. This is most likely to be which of the following?

A. Group B *Streptococcus*
B. *Listeria* species
C. *Salmonella* species
D. *Neisseria* species

661. The O antigen used to help characterize members of *Enterobacteriaceae* are found on:

A. Capsules
B. Endotoxins
C. Exotoxins
D. Flagella

662. The most frequent source of *L. monocytogenes* infection is through which of the following?

A. Human feces
B. Soil
C. Raw milk
D. Ticks

663. The ability of the *Neisseria meningitidis* to colonize the respiratory mucosa is associated with its ability to synthesize:

A. Coagulase
B. Collagenase
C. Lipases
D. Pilli

664. UTI as a result of *Proteus mirabilis* facilitates the formation of kidney stones because the organism does which of the following?

A. Destroys blood vessels in the kidney
B. Exhibits 'swarming' motility
C. Ferments many sugars
D. Produces a potent urease

665. A woman is noted to have pyelonephritis with shaking chills and fever. Blood cultures are obtained and the Gram-negative is read preliminary as consistent with *Proteus* species. Which of the following bacteria also may be the etiology?

A. *Escherichia coli*
B. Group B *Streptococcus*
C. *Staphylococcus aureus*
D. *Streptococcus pyogenes*

666. A man is diagnosed with meningitis. CSF grows out Gram-positive diplococci. This is most likely to be:

A. *Neisseria meningitidis*
B. *Staphylococcus aureus*
C. *Salmonella typhi*
D. *Streptococcus pneumoniae*

667. Which of the following viral families is known to be causally associated with tumor formation?

A. Flavivirus
B. Papovavirus
C. Paramyxovirus
D. Polyoma virus

668. In which of the following sites is *Salmonella typhi* most likely to be found during the carrier state?

A. Blood
B. Gallbladder
C. Kidney
D. Lungs

669. Which of the following is mismatched?

A. Halophilic – *Salmonella typhi*
B. Severe dehydration – *Vibrio choleae*
C. Multi-drug resistance – *Pseudomonas aeruginosa*
D. Coagulase positive – *Staphylococcus aureus*

670. A 12-hour-old newborn has a temperature of 103ºF. Blood culture grows Gram-positive cocci in chains. This is most likely to be:
A. Group A *Streptococcus* (*S. pyogenes*)
B. *Staphylococcus aureus*
C. *Neisseria meningitidis*
D. *Mycobacterium tuberculosis*

671. _____ is primary factor of *S. pneumoniae*?
A. Pilli
B. Polypeptide capsule
C. Polysaccharide capsule
D. Coagulase

672. Virulence factors of *Staphylococcus aureus* include all of the following EXCEPT:
A. Coagulase
B. Enterotoxin
C. Protein A
D. M protein

673. Short incubation food poisoning caused by ingestion of preformed enterotoxin, is caused by:
A. *Staphylococcus aureus*
B. *Staphylococcus epidermidis*
C. *Staphylococcus saprophyticus*
D. *Streptococcus pneumoniae*

674. A nurse experienced a needle stick injury. The patient used illicit intravenous drugs. One month later, nurse develops jaundice. Which of following findings would implicate hepatitis B as the etiology?
A. Positive anti-hepatitis B surface antibody
B. Positive anti-hepatitis B-core antibody
C. Positive hepatitis B surface antigen
D. Positive anti-hepatitis A antibody

675. A man tests positive for HCV infection. Which of following is the most likely method of transmission?
A. Fecal-oral
B. Fomite
C. Intravenous drug (needles)
D. Sexual transmission

676. In an HIV-1 patient, which of following is the most predictive of the patient's prognosis?
A. Degree of lymphadenopathy
B. CD4+:CD8+ cell ratio
C. Level of HIV-1 RNA in plasma
D. Rate of decline in anti-HIV antibody

677. Which of the following is the pathogen responsible for blindness in advanced HIV infection?
A. *Cytomegalovirus*
B. *Candida albicans*
C. *Mycobacterium tuberculosis*
D. *Neisseria meningitidis*

678. A seconds-year MPhil student is researching the role of HPV in causing cancer. Which of the following types of cancer is HPV most commonly associated with?
A. Anogenital
B. Breast
C. Lung
D. Prostate

679. The primary pathologic effect of polio viral infection is a result of which of the following?
A. Destruction of infected cells
B. Persistent viremia
C. Immune complex formation
D. Aseptic meningitis

680. Which of the following statements best describes an advantage of the oral polio vaccine when compared to inactivated polio vaccine?
A. It can be given to immunocompromised patients.
B. It is not associated with vaccine-related cases of poliomyelitis.
C. It induces local intestinal immunity.
D. It is easily administered as a series of multiple injections.

681. Which of the following paramyxoviruses lacks an envelope viral attachment protein with HA activity?
A. Parainfluenza virus
B. Mumps virus
C. Measles virus
D. Respiratory syncytial virus

682. *Escherichia coli* differs from Klebsiella by:
A. Gram- negative
B. Motile
C. Non- sporogenous
D. Non lactose fermenting

683. Which of the following morphological structures is not associated with *Candida albicans*?
A. Yeast
B. Hyphae
C. Pseudohyphae
D. Sporangium

684. A definitive diagnosis of ascariasis can be made by observing which of the following?
A. An eosinophilia in a differential WBC count
B. Motile larvae in a stool sample
C. Larvae in radiography of lungs
D. An adult worm passed during a bowl movement

685. Polymyxin inhibits the growth of the microbes by carrying out which of the following actions?
A. Inhibition of cell-wall synthesis
B. Damage to cytoplasmic membrane
C. Inhibition of nucleic acid and protein synthesis
D. Inhibition of specific enzyme systems

686. An immunocompromised woman is diagnosed as having meningitis. A latex agglutination test on the CSF for capsular polysaccharide antigen is positive. Which of the following is the most likely the cause?
A. *Aspergillus fumigatus*
B. *Cryptococcus neoformans*
C. *Toxoplasma gondii*
D. *Nocoradia asteroides*

687. Ascariasis is most effectively treated with which of the following drugs?
A. Mebendazole
B. Metronidazole
C. Penicillin
D. Niclosamide

688. A woman has chronic diarrhea. Identification of which of the following stages of the organism would provide evidence for cryptosporidiosis?
A. Cyst
B. Oocyst
C. Merozoites
D. Egg

689. Which of the following is a host in the life cycle of all trematodes that infect humans?
A. Flea
B. Mosquito
C. Snail
D. Sand fly

690. If 35 colonies were counted on a 10^{-2} dilution plate inoculated with a loop calibrated to deliver 0.01 ml of urine, what will be the bacteria/ml in the urine?
A. 35,000
B. 350,000
C. 3,500
D. 350

691. What will be your result interpretation, if MPN results shows 0,1,3 after presumptive test?
A. Water is potable
B. Error in collecting water sample
C. Dilution of media is incorrect
D. Water is not polluted with *E. coli*

692. Ability to ferment ____ is used to detect coliforms?
A. Lactose
B. Glucose
C. Mannitol
D. Dextrose

693. Ames test general requires addition of ____ to make bacterial system comparable to mammalian system.
A. Liver homogenate
B. Kidney homogenate
C. Spleen homogenate
D. Blood homogenate

694. Acid fastness of tubercle bacilli is attributed to:
A. A. Presence of mycolic acid
B. Integrity of cell wall
C. Both of above
D. Cell Membrane

695. The majority of non-immunized patients infected with poliovirus would be expected to experience which of the following symptoms?
A. Flaccid paralysis of ≥1 extremities
B. Aseptic meningitis
C. Muscle spasms and pain
D. Asymptomatic infection

696. _____ protect pneumococci against phagocytosis.
A. Haemolysin
B. Hyaluronidase
C. Necrotizing toxin
D. Capsular polysaccharides

697. Routine sugar bacterial culture medium contain:
A. 2 % sugar
B. 0.5 -1 % sugar
C. 0.1 – 0.5 % sugar
D. <0.1 % sugar

698. Antigen becomes more potent because of:
A. Increased number of epitopes
B. Larger antigen determinants
C. Repetitive occurrence of antigenic determinants
D. None of the above

699. Fungus is cultured on:
A. Nutrient broth
B. Nutrient agar
C. MaConkey medium
D. Sabouraud agar

700. After overnight incubation, the lowest concentration of the drug that restricts the growth of bacterium inoculated is called:
A. Minimum inhibitory concentration (MIC)
B. Minimum bacterial concentration (MBC)
C. Lf dose
D. LD50

701. The commonest infectious viral disease of man is:
A. Rabies
B. Chicken pox
C. Measles
D. Common cold

702. Chemical contaminants in water can lead to teratogenicity, which can be defined as:
A. Ability to cause abortion in pregnant women
B. Ability to cause heritable changes in DNA
C. Ability to cause cancerous growth
D. Ability to cause abnormalities in developing fetus

703. The therapy for genetic disorders which is aimed at mutant gene, to replace it with normal function gene by use of DNA/RNA tumor viruses is known as:
A. Active Immunotherpy
B. Genetic counseling
C. Gene therapy
D. Interferon therapy

704. Intracytoplasmic inclusion bodies are seen for:
A. Echovirus
B. Rabies virus
C. Cytomegalovirus
D. Influenza virus

705. Transformation is defined as:
A. Transfer of DNA into bacterium
B. Infection of bacterium with phage
C. Transfer of phage from one bacterium to another
D. Transfer of DNA to mammalian cell

706. The total number of viable bacteria present in a sample is better determined by:
A. Direct microscopic count
B. Colony count or pore plate method
C. Photometeric measurement of turbidity
D. Agglutination with specific antiserum

707. The organisms which are devoid of their own metabolic system and obtain energy from the host cell are called:
A. Autotrophs
B. Hypotrophs
C. Heterotrophs
D. L-forms

708. Which of the following antibiotic dose not act on cell membrane?
A. Colistin
B. Polymyxin
C. Nystatin
D. Chloromycetin

709. 'Epitopes' is the:
A. Effective number of reacting sites on the antigen
B. Precipitate formed when both antigen and antibody react in appropriate proportions
C. Distinct combining sites on the surface of a given antigen which is responsible for the specificity of the immune response
D. Three dimensional lattice structures formed by antigen antibody reaction

710. Number of domains in IgM is:
A. Four
B. Tow
C. One
D. Five

711. The immunoglobulin which can cross placenta is:
A. IgG
B. IgM
C. IgA
D. IgD

712. 1 definite host and 2 intermediate hosts are seen in:
A. *Schistosoma haematobium*
B. *Diphyllobothrium latum*
C. *Echinococcus*
D. *Ascariasis*

713. Which of the following can be prevented by filtering water?
A. Tapeworm
B. Roudworm
C. Pinworm
D. Guineaworm

714. Cutaneous larva migrant is caused by:
A. *Ankylostoma braziliensis*
B. *Ankylostoma duodenale*
C. *Toxocara canis*
D. *Toxoplasma gondii*

715. Which of the following crosses placenta?
A. Malarial parasite
B. Tuberculosis
C. Toxoplasmosis
D. Amoebiasis

716. The best route of administering Anti-lymphocytic globulin is:
A. Oral
B. S/C
C. I/M
D. I/V

717. All of the following human interferons are mainly induced by viral infections except:
A. Alpha
B. Beta
C. Gamma
D. Delta

718. Killed vaccines are characterized by all of the following EXCEPT:
A. Less immunogenic
B. Protection lasts for a short period
C. Repeated doses (booster) required
D. Are given by injection only

719. The correct match is:
A. Small pox : Guarnieri bodies
B. *Streptococcus* : Coagulase test
C. *Corynebacterium* : Paul Bunnel test
D. *Vibrio* : Schick test

720. The following penicillins are penicillinase resistant EXCEPT:
A. Methicillin
B. Ampicillin
C. Oxacillin
D. Cloxacillin

721. Carbol fuchsin (used for Zeihl Neelsen staining) consists of all the following EXCEPT:
A. Basic fuchsin
B. Absolute alcohol
C. Formaldehyde
D. Aqueous phenol

722. "Step-wise" mutation for drug resistance is seen with:
A. Penicillin
B. Strepromycin
C. Garamycin
D. Kanamycin.

723. Blood groups were first discovered by:
A. Landsteiner
B. Richet
C. Metchnikoff
D. Jenner

724. Which of the following, regarding acid-fastness of the two Mycobacteria is true?
A. *Mycobacterium tuberculosis* is more acid-fast than *Mycobacterium leprae*
B. *Mycobacterium leprae* is more acid-fast than *Mycobacterium tuberculosis*
C. Bothe are equally acid-fast
D. Both are acid-fast but not acid-alcohol-fast

725. Bacterial resistance to antibiotics is transmitted by:
A. Transduction
B. Transformation
C. Mutation
D. Plasmids

726. Ramsay Hunt Syndrome is caused by:
A. Virus
B. Bacteria
C. Chlamydia
D. Fungus

727. Which of the following virus has double stranded RNA?
A. Hepatitis A
B. Hepatiris B
C. Polio
D. Reovirus

728. In electron microscope, wavelength of electrons is:
A. 0.005 nm
B. 0.005 μ
C. 0.5 μ
D. 0.05 nm

729. Gram positive bacteria are characterized by all of the following EXCEPT:
A. Thicker
B. Absent lipids
C. Absent Teichoic acid
D. Absence of aromatic amino acids

730. Organelles with hydrolytic enzymes are:
A. Mitochondria
B. Lysosomes
C. Golgi bodies
D. Ribosomes

731. Mesosomes are:
A. A kind of Ribosome
B. A part of cell wall
C. Formed during cell lysis
D. Principle sites of respiratory enzymes

732. BSE was first reported from:
A. France
B. Canada
C. United Kingdom
D. Pakistan

733. COFAL test is used for the diagnosis of:
A. Equine infectious anemia
B. AIDS
C. Avian leukosis
D. Bovine leukosis

734. The following retroviruses produce tumors, EXCEPT:
A. Caprine arthritis encephalitis virus
B. Bovine leukemia virus
C. Avian leukosis virus
D. Feline leukemia virus

735. Predilection site for parvovirus is
A. Bone marrow
B. Enteric epithelium
C. Fetus
D. All the above

736. Following Immunoglobulin classes manifest antiviral activity except:
A. Ig M
B. Ig G
C. Ig A
D. Ig E and Ig D

737. Term vaccine was coined by:
A. Robert Koch
B. Louis Pasteur
C. Needham
D. F. Redi

738. The following bacteria have a single curve:
A. *Borrelia*
B. *Vibrio*
C. *Treponema*
D. *Pasteurella*

739. Albert's stain (used for metachromatic granules staining) consists of all of the following except:
A. Toludine blue
B. Carbol fuchsin
C. Malachite green
D. Acetic acid

740. The cell wall of bacteria can be visualized by all of the following EXCEPT:
A. Azure II staining
B. Silver impregnation technique
C. Ultraviolet microscopy
D. Electron microscopy

741. Gram positive bacteria are more susceptible to all of the following EXCEPT:
A. Sulfas and penicillin
B. Basic dyes
C. Anionic detergents
D. None of the above

742. Which of the following is not absent in prokaryotes?
A. Mitochondria
B. Nucleolus
C. Muramic acid
D. Sterols

743. Genotypic variations are not:
A. Stable
B. Heritable
C. Influenced by environment
D. Not influenced by environment

744. The fungi which do not a sexual stage are called:
A. Phycomycetes
B. Ascomycetes
C. Basidiomycetes
D. Fungi imperfecti

745. The counter stain used in Zeihl Nielsen staining is:
A. Carbol fuchsin
B. Gentian violet
C. Gram's iodine
D. Loeffler's methylene blue

746. Hepatitis A virus is:
A. Double stranded DNA
B. Single stranded DNA
C. Double stranded RNA
D. Single stranded RNA

747. *Staphylococcus* bacteria are:
A. Chemosynthetic autotrophs
B. Photosynthetic autotrophs
C. Chemosynthetic heterotrophs
D. Photosynthetic heterotrophs

748. Viruses come under the category:
A. Autotrophs
B. Hypotrophs
C. Heterotrophs
D. L-forms

749. Rhinovirus has:
A. Double stranded DNA
B. Single stranded DNA
C. Double stranded RNA
D. Single stranded RNA

750. _____ form of water is the most contaminated.
A. Underground water
B. Rainwater
C. Surface water
D. Water stored in ice caps

751. Rubber catheters are best sterilized by:
A. Formalin vapor
B. Glutaraldehyde
C. Gamma radiation
D. Autoclaving

752. Which of the following is highly sensitive to heat?
A. *Staphylococcus*
B. *Pseudomonas*
C. Clostridia
D. *Treponema*

753. Soiled dressings are destroyed by:
A. Hot air oven
B. Autoclaving
C. Boiling
D. Incineration

754. Spores of which of the following are used as a microbiological test of dry heat efficiency:
A. Toxigenic strains of *E. coli*
B. Toxigenic strains of *Clostridium tetani*
C. Non-toxigenic strains of *Clostridium tetani*
D. Non-toxigenic strains of *Proteus*

755. The following is the direct stain for capsule:
A. Fleming's Nigrosin method
B. Dry India ink film method
C. Welch method
D. Both "A" and "B"

756. The major mechanism of the lethal effect of UV light on bacteria is attributed to its effect on:
A. Ribosome
B. Lysosome
C. Mesosome
D. DNA

757. Koch's old tuberculin is preserved in:
A. 70% formalin
B. 50% glycerine
C. 2% phenol
D. Absolute alcohol

758. "Turbidity test" for milk is used to detect its:
A. Pasteurization
B. Sterilization
C. Contamination
D. *Lactobacillus* contents

759. Microorganisms can be phagocytosed after
A. Opsonization
B. Hydrolysis
C. Cytolysis
D. Ingestion

760. The colors of acid fast and non-acid fast bacteria are respectively:
A. Blue, red
B. Red, blue
C. Red, black
D. Black, purple

761. In Albert's staining, the volutin granules are stained _____ against a _____ background:
A. Bluish black, green
B. Pink, green
C. Green, black
D. Bluish, purple

762. _____ %age of ethanol is used for disinfection.
A. 30
B. 70
C. 80
D. 90

763. Most effective practical way of sterilization is:
A. Boiling
B. Autoclaving
C. Alpha rays
D. Gamma rays

764. Due to acidic nature of their protoplasm, bacteria have affinity for:
A. Basic dyes
B. Acidic dyes
C. Neutral dyes
D. All of the above

765. _____ does not stimulate phagocytes.
A. Cytokines
B. C3b
C. Histamine
D. γ-IFN

766. Immunogenicity of an antigen is related with
A. Foreignness
B. Chemical nature
C. Immune response
D. None of these

767. Helper T cell does not activate
A. B-cells
B. Macrophages
C. T-cytotoxic cells
D. Mast cells

768. _____ is NOT sign of inflammation?
A. Sweating
B. Pain
C. Swelling
D. Redness

769. Natural transfer of Igs from mother to fetus is
A. Active immunity
B. Passive immunity
C. Non-specific
D. Artificial immunity

770. The most common antibody in the serum is
A. IgA
B. IgD
C. IgM
D. IgG

771. Which of the following is NOT involved in non-specific defense?
A. Lacrimal apparatus
B. Sweat gland
C. Mucus
D. IgM

772. According to clonal deletion theory, self-reacting lymphoid cells become

A. Normal
B. Destroyed
C. Amplified
D. Activated

773. Which one of the following is not related to Hypersensitivity Type I?

A. Histamine
B. Prostaglandins
C. Perforins
D. Leukotrienes

774. _____ is NOT related with Antigens?

A. Epitopes
B. Globulins
C. Hapten
D. Lipoproteins

775. IgM antibodies has been found to occur in

A. Pentamer
B. Monomer
C. Dimer
D. All forms

776. Autoimmunity develops due to

A. Immunological tolerance
B. Self-tolerance
C. Clonal deletion
D. None of the above

777. Tetanus is caused by the spread of

A. Exotoxin in sympathetic system
B. Exotoxin in parasympathetic system
C. Endotoxin in Sympathetic system
D. Endotoxin in parasympathetic system

778. All of the following cause gas gangrene EXCEPT:

A. *Clostridium botulinum*
B. *Clostridium welchii*
C. *Clostridium oedemaiens*
D. *Clostridium septicum*

779. Following are anaerobic bacteria EXCEPT:

A. *Nocardia asteroids*
B. *Actinomyces bovis*
C. *Clostridium tetani*
D. None of the above

780. Spirocheates are motile by

A. Flagella
B. Cilia
C. Pseudopodia
D. all of above

781. Kauffman-White scheme is for classification of *Salmonella?*

A. Biochemically
B. Antigenically
C. Chemotyping
D. Phage typing

782. All of the following produce hemolysin EXCEPT:

A. *Clostridium tetani*
B. *Streptococcus hemolyticus*
C. *Staphylococcus aureus*
D. *E. coli*

783. The following are characteristics of *Pseudomonas aeruginosa* EXCEPT:

A. Produce pigment
B. Obligate anaerobe
C. Produce local suppurative lesions
D. Spore forming and capsulated

784. The following antibodies CANNOT cross placenta EXCEPT:

A. IgA
B. IgD
C. IgM
D. IgG

785. All of the following are true about interferons EXCEPT:

A. Virus specific
B. Antiviral
C. Host cell specific
D. Class of proteins

786. The following statements regarding varicella and zoster are true EXCEPT ONE:

A. They are two diseases caused by one virus
B. Varicella is the primary illness, whereas zoster is the recurrent form of the disease
C. They have the same clinical picture
D. Varicella can be prevented by vaccination

787. The following statements about herpesviruses are true EXCEPT ONE:

A. There are eight human herpes viruses
B. All are morphologically identical
C. All are DNA-viruses
D. All cause vesicular rash

788. Chlamydia have the following properties EXCEPT:

A. Possess cell wall
B. Possess DNA as well as RNA
C. Are susceptible to antibiotics
D. Are not filterable

789. Regarding viral pathogenesis, which is WRONG:

A. Spread of virus in the body through different route
B. Humoral immunity but not cell mediated immunity (CMI) act against viruses
C. In cytocidal infection, cell usually die
D. Several RNA viruses can cause persistent infection

790. The following diseases are caused by enteroviruses EXCEPT ONE:

A. Pleurodynea
B. Glomerulonephritis
C. Paralysis
D. Meningitis

791. Spirocheates are

A. Gram positive rods
B. Gram negative rods
C. Gram negative cocci
D. Acid Fast rods

792. Lyme disease is transmitted by

A. Flea
B. Ticks
C. *Aedes*
D. *Culex*

793. For virus, choose the WRONG STATEMENT:
A. The viral envelope contains lipoprotein
B. Viruses can replicate in non-living media
C. Viruses need live cells to grow
D. Viruses have no ribosome

794. Regarding Poliovirus, the WRONG statement is:
A. Two vaccine are available
B. There is no vaccine for polio
C. Can be isolated from throat swab or stool
D. Sub-clinical infections are common

795. In structure and classification of viruses, circle the WRONG STATEMENT:
A. Icosahedral symmetry has 12 vertices
B. Helical symmetry such as Othomyxo virus
C. Transcription is the formation of protein
D. Translation is the formation of protein

796. Regarding HCV & HBV, circle the correct answer:
A. HBV is dsRNA
B. HCV is ssRNA
C. Both viruses can grow in cell culture
D. HBV has not chronicity complication

797. Regarding viral hepatitis, circle the WRONG:
A. HCV-Abs can't be diagnosed in lab by EIA test
B. The risk factor for hepatocellular carcinoma by HCV are: underlying liver disease, alcohol, age
C. HCV-DNA integrate into liver cell chromosomes in most HCC patients.
D. The RNA and protein of HDV is surrounded by HBsAg

798. An abortive infection is one in which:
A. The infected cells are killed
B. Progeny virus is not produced
C. Transplacental infection of the fetus occurs
D. Cell multiplication is stopped

799. The human diploid cell vaccine is used for prevention of:
A. Rabies
B. Varicella
C. Hepatitis A
D. Yellow fever

800. The following viral diseases are characterized by maculopapular rash EXCEPT ONE:
A. Measles
B. Rubella
C. Erythema
D. Herpangina

801. All of the following are true about cytokines EXCEPT:
A. Communicators
B. Interleukine-I
C. TNF
D. Perforin

802. The following viruses are associated with congenital infection EXCEPT ONE:
A. Rubella virus
B. CMV
C. Varicella
D. RSV

803. The following statements regarding HIV are true EXCEPT ONE:
A. It belongs to the family *Reteroviridae*
B. It is an oncogenic virus
C. The virus is present in all body fluids
D. The sexual route is the main mode of transmission

804. The following viruses are transmitted by the fecal-oral route EXCEPT ONE:
A. HAV
B. HEV
C. HDV
D. Entero

805. All of the following viruses can be transmitted sexually EXCEPT ONE:
A. HIV
B. HBV
C. HSV-2
D. Rubella

806. Which of following is a segmented ds-RNA virus?
A. Togavirus
B. HAV
C. Rotavirus
D. Parvovirus

807. All the following viruses are transmitted by respiratory routes EXCEPT ONE:
A. Human papilloma virus
B. Rhinovirus
C. Adenovirus
D. Measles virus

808. All the following viruses are disseminated throughout the body EXCEPT ONE:
A. HIV
B. HBV
C. Rabies virus
D. Human papilloma virus

809. An important defense function of cytotoxic T lymphocytes in viral infection is to:
A. Lyse virus infected cells
B. Fragment viral nucleic acid by nucleases
C. Neutralize free virus particles
D. Lyse viral capsid

810. All of the following association are true EXCEPT ONE:
A. CMV causes heterophil-negative mononucleosis
B. Mumps virus can cause meningitis
C. Poliovirus can cause paralytic disease
D. Astrovirus causes gastroenteritis only in adults

811. The bacterial flagellin is detected by which TLR?
A. TLR2
B. TLR6
C. TLR5
D. TLR9

812. Each of the following diseases is associated with infection by picornaviruses EXCEPT ONE:
A. Myocarditis
B. Hepatitis
C. Meningitis
D. Mononucleosis

813. Certain viruses have been associated with birth defects; these teratogenic viruses include EXCEPT:
A. Rubella virus
B. CMV
C. VZV
D. Rhinovirus

814. Which one of the following statements concerning mumps is CORRECT?
A. The testes, ovaries and pancreas can be involved
B. There is no vaccine against mumps
C. Passive immunization is the only means of preventing the disease
D. Second episodes of mumps can occur, since there are 2 serotypes

815. Each of the following statements concerning HAV is correct EXCEPT ONE:
A. The initial site of viral replication is the GIT
B. The diagnosis is usually made by isolating the virus in cell culture
C. HAV commonly causes asymptomatic infection in children
D. It is a member of the family picornaviridae

816. All the following viruses belong to the *Picornaviridae* EXCEPT ONE:
A. Rhinoviruses
B. Poliovirus
C. Rabies virus
D. Echovirus

817. Acute hemorrhagic conjunctivitis is caused by which of the following viruses:
A. Coronovirus
B. Reovirus
C. Rhinovirus
D. Enterovirus

818. Epidemic pleurodynia and mycarditis are both caused by:
A. Group B Coxsackievirus
B. Polymavirus
C. RSV
D. Reovirus

819. All the following are acceptable specimens for the isolation enterovirus EXCEPT ONE:
A. Feces
B. CSF
C. Throat secretions
D. Urine

820. When infectious mononucleosis is suspected, all the following tests can be useful EXCEPT ONE:
A. IgM antibody to EB-VCA
B. IgG antibody to EB-VCA
C. Antibody to EB-NAs
D. Culture

821. Which of the following statements best describes rotavirus?
A. It is an RNA virus
B. Tests for detection of antigen are rarely useful
C. It is rarely a nosocomial pathogen
D. Person-to-person transmission is rare

822. Infectious mononucleosis is characterized by which of the following statements?
A. It is cause by rhabdovirus
B. The causative pathogen is an EBV
C. Affected person respond to treatment with the production of heterophil antibodies
D. Ribavirin is the treatment of choice

823. The most sensitive method of detecting infection by CMV in the newborn is:
A. Isolation of virus
B. Detection of IgM antibody by IF
C. Direct detection of antigen by ELISA
D. Detection of complement fixing antibodies

824. All the following statements about cytomegalovirus infection are true EXCEPT:
A. It can be cultured from RBCs of infected persons
B. It can be transmitted transplacently
C. It can be activated by immunosuppressive agents
D. It can cause retinitis

825. All the following statements about human rotaviruses are true EXCEPT that they:
A. Produce an infection that is seasonally distributed peaking in fall and winter
B. Produce cytopathic effects in many conventional cell culture systems
C. Can be sensitively and rapidly detected in stools by the ELISA technique
D. Have been implicated as a major etiologic agent of infantile gastroenteritis.

826. A gene for insulin has been inserted into a vector for the purpose of obtaining its protein product only. Such a vector is called
A. Expression vector
B. Suppression vector
C. Storage vector for genomic library
D. None of the above

827. MHC-I molecules make complex with which immune cells to kill intracellular antigens.
A. Neutrophils
B. TH cells
C. CD68 cells
D. Tc or cytotoxic T-cells

828. The development, maturation and differentiation of T-lymphocytes occur in which organ?
A. Bursa of Fabricious
B. Liver
C. Thymus
D. Tonsils

829. Birna viruses destroy which organ in chicken
A. Heart
B. Bursa of Fabricious
C. Lungs
D. Thymus

830. Example of an obligate anaerobic bacterium is
A. *Bacillus anthracis*
B. *Brucella abortus*
C. *Clostridium tetani*
D. *Salmonella*

831. Which antibody class is mainly involved in mucosal immunity?
A. IgY
B. IgA
C. IgD
D. IgE

832. The oldest and traditionally used adjuvant in vaccines is:
A. BCG
B. ISCOMS
C. Alum
D. Montanide

833. A plasmid consisting of its own DNA with a foreign DNA inserted into it is called
A. Recombinant plasmid
B. Non-coding DNA
C. Junk DNA
D. None of the above

834. The extra chromosomal, self-replicating, double stranded, closed, circular DNA molecules are called:
A. Plasmids
B. Phages
C. Viruses
D. Chloroplasts

835. The jumping genes in bacterial DNA are called as
A. Volutin
B. Endosomes
C. Histones
D. Transposons

836. TTS is used against tetanus and is an example of
A. DNA vaccine
B. Attenuated vaccine
C. Sub-unit vaccine
D. Autogenous vaccine

837. A gene produced for rDNA technology contains a gene from one organism joined to the regulatory sequence of another gene. Such a gene is called:
A. Oncogene
B. Junk gene
C. Chimeric gene
D. Oncogene

838. Which Ab class is not present in chicken?
A. IgY
B. IgG
C. IgM
D. IgD

839. A recombinant DNA molecule is produced by joining together
A. One mRNA with a DNA segment
B. One mRNA with a tRNA segment
C. Two mRNA molecules
D. Two DNA segments

840. A group of genetically similar organisms obtained by a sexual reproduction is called
A. Clone
B. Population
C. Assembly
D. None of these

841. After Gram's staining, Gram positive bacteria are:
A. Green
B. Yellow
C. Red
D. Blue/violet

842. Example of yeast is
A. Mucor
B. Rhizopus
C. Candida albicans
D. Penecillium

843. Mycolic acid is present in cell wall _____.
A. *Listeria*
B. *Mycoplasma*
C. *Staphylococcus*
D. *Mycobacterium*

844. To be useful in the preparation of recombinant DNA, a plasmid must have
A. No origin of replication
B. An origin of replication
C. The ability to alternate between the linear and circular forms
D. Restriction endonuclease activity

845. The first human protein produced through recombinant DNA technology is
A. Insulin
B. Erythropoitin
C. Interferon
D. Somatostatin

846. Humulin, a genetically engineered insulin was produced and marketed for the first time by
A. Biocon India Limited
B. Glaxo
C. Eli Lilly and Company
D. Cipla

847. In one of the techniques of recombinant insulin production the genes for α and β polypeptides were inserted into the plasmid by the side of
A. Ori
B. β-galactosidase gene
C. Antibiotic resistant gene
D. Restriction endonuclease gene

848. Endonucleases, a group of enzymes cleave DNA.
A. Externally
B. Internally
C. Both 'A' and 'B'
D. Neither 'A' nor 'B'

849. Insulin, a protein, consisting of
A. 2 Polypeptide chains
B. 3 Polypeptide chains
C. 4 Polypeptide chains
D. More than 4 Polypeptides chains

850. Before the production of recombinant insulin, insulin for the treatment of diabetes in human was obtained from:
A. Healthy humans
B. Dead human body
C. Cows and pigs
D. Dogs and cats

851. The first licensed drug produced through genetic engineering is:
A. Interferon
B. Insulin
C. Penicillin
D. Somatotropin

852. The plasmid generally used for the production of recombinant insulin is:
A. RK 646
B. Ti plasmid
C. ACY 17
D. pUC 18

853. *Rauolfia serpentine*, to save this plant under the threat of extinction, which of the following techniques is useful?
A. Genetic engineering
B. DNA finger printing
C. Hybridoma technology
D. In vitro culture

854. _____ are popularly called "Molecular stichers".
A. Restriction Endonuclease
B. Ligases
C. RNA polymerase
D. DNA polymerase

855. Restriction endonucleases have ability of cutting:
A. DNA at random sites
B. DNA at specific sites
C. Both 'A' and 'B'
D. DNA and RNA at random sites

856. A clone is a group of organisms produced by:
A. Asexual method and genetically similar
B. Asexual method and genetically dissimilar
C. Sexual method and genetically similar
D. Sexual method and genetically dissimilar

857. Expression vectors are those:
A. Produce protein products
B. Used for genomic libraries
C. Used for chromosome synthesis
D. Used for finger printing

858. *E. coli* is generally used for gene cloning because:
A. It supports the replication of recombinant DNA
B. It is easy to transform
C. It is free from elements that interferes with replication and recombination of DNA
D. All of these

859. An ideal plasmid to be used for recombinant DNA technology must have:
A. Minimum amount of DNA
B. Relaxed replication control
C. One recognition site for one restriction endonuclease
D. All of these

860. Restriction endonucleases cut DNA at a specific site that is known as:
A. Ligation site
B. ori
C. Restriction site
D. Replication site

861. Transfer of recombinant plasmid into *E. coli* needs:
A. Heat treatment
B. UV-rays treatment
C. $MgCl_2$ treatment
D. lysis

862. During recombinant insulin synthesis, the bond between insulin polypeptide and galactosidase can be removed by using:
A. Cyanogen bromide
B. Chymotrypsin
C. Carboxy peptidase
D. Amylase

863. Which of the following statement about a vector is correct?
A. All vectors are plasmids only
B. Plasmids, phages can be used as vectors
C. Fungi can also be used as vectors
D. Cyanobacteria can also be used as vectors

864. Which of the following statement about plasmids is correct?
A. Plasmids are present in bacteria only
B. Plasmids are present in all organisms
C. Plasmids present in bacteria and phages
D. Plasmids present in plants and animals

865. ____is autonomously replicating minichromosome.
A. Virus
B. Phage
C. Plasmid
D. Lichen

866. Which one of the following statement are NOT attributed to plasmids?
A. They are circular DNA molecule
B. They have antibiotic resistant genes
C. They have the ability of autonomous replication
D. They have DNA that is as long as chromosomal DNA

867. DNA finger printing was first developed by:
A. David Suzuki
B. Khorana
C. Alec Jaffreys
D. Gilbert

868. Which one of the following statements about plasmids is correct?
A. Plasmids are mobile.
B. Plasmids are made up of RNA and proteins.
C. Plasmids are present in eukaryotes.
D. Plasmids are present in fungi.

869. Which one of the following statements about Restriction Endonuclease (RE) is TRUE?
A. All "RE" cut DNA at specific sites
B. All "RE" cut DNA at random sites
C. All "RE" join DNA segments at specific sites
D. All "RE" join DNA at random sites

870. Transgenic organisms are:
A. Produced by gene transfer technology
B. Extinct organisms
C. Naturally occurring and endemic
D. Produced by traditional plant breeding technique

871. Restriction endonucleases, when present in a host cell act on foreign DNA molecule and cleave them, but they do not act on host DNA molecule. It happens because:

A. Restriction endonuclease cannot act on host DNA
B. Host DNA is packed into chromosomes
C. Host DNA is methylated hence restriction endonucleases can't act.
D. Restriction endonucleases become inactive when they reach host DNA

872. The presence of Restriction endonucleases was postulated in 1960 by:

A. Khorana
B. Watson
C. Crick
D. Arber

873. The scientists who won Nobel prize for physiology for their discovery of restriction endonucleases are:

A. Jacob and Monad
B. Smith, Nathans and Arber
C. Watson and Crick
D. Alec Jaffreys and Milstein

874. Restriction endonucleases are also called:

A. Molecular scissors
B. Molecular stichers
C. DNA synthesis
D. Polymerases

875. In restriction endonuclease EcoR1, "E" stands for

A. Extraction
B. The first letter of the genus in which it is present
C. Endonuclease
D. Endangered

876. VNTR stands for:

A. Variable nucleotide triplet repeat
B. Variable nucleoside tandem repeat
C. Variable nucleoside triplet repeat
D. Variable number tandem repeats

877. Restriction endonucleases recognize specific sequences on DNA called:

A. Non-coding sequences
B. Satellites
C. Palindromes with rotational symmetry
D. Tandem repeats

878. Main tools required for recombinant DNA technology are:

A. Vector, desired gene
B. Vector, desired gene, mRNA of desired gene, host, restriction enzymes, ligases
C. Desired gene, host, vector
D. Vector, desired gene, mRNA of desired gene, host

879. Prior to the production of recombinant insulin, insulin obtained from cows and pigs were given to patients. Some of the problems faced by this treatment was:

A. The insulin was not active
B. In some humans it induced antibody production
C. It reduces the weight of patients
D. Loss of memory power

880. DNA Ligase, used in recombinant DNA technology is obtained from:

A. *E. coli* only
B. *E. coli* and also Ligase encoded by T_4 phage
C. *Saccharomyces*
D. Retroviruses

881. Using genetic technique in forensic science is:

A. Genetic finger printing
B. In vitro culture
C. Hybridoma technology
D. Gene therapy

882. A technique called southern blotting is used in:

A. Monoclonal antibody production
B. In vitro culture
C. Genetic finger printing
D. Polymerase chain reaction

883. Genetic finger printing is useful in:

A. Identifying criminals involved in rape, murder etc.
B. Establishing the parentage of a disputed child
C. Identifying illegal immigrants
D. All of these

884. RFLP stands for:

A. Restriction fragment length polymorphism
B. Repeated fragment length polymorphism
C. Renewed fragment length polymorphism
D. Required fragment length polymorphism

885. Gene therapy, a technique that helps in

A. Saving endangered species
B. Curing genetic disorders
C. Clonal propagation
D. Producing monoclonal antibodies

886. A small, 15-30 bases long nucleotide sequences used to detect the presence of complementary sequences in DNA sample during DNA finger printing is called

A. RFLP
B. Probe
C. VNTR
D. Reporter gene

887. A radioactive probe used in DNA finger printing contains

A. 32 P
B. 14 C
C. 12 N
D. pUC18

888. Electrophoresis, a technique used in DNA fingerprinting helps to separate:

A. DNA segments
B. Cells from DNA
C. Tissues
D. RNA from DNA

889. In DNA finger printing, even a smallest amount of DNA obtained from samples collected at crime place, can be multiplied into millions of copies by using a technique called:

A. Autoradiography
B. Southern blotting
C. Polymerase chain reaction
D. Electrophoresis

890. Southern blotting is a technique used in genetic finger printing is called so because:
A. The blotting is done from the south side.
B. It was discovered by a scientist, E.M. Southern.
C. It was popular in South-America.
D. It was popular in southern countries.

891. In DNA finger printing, the DNA from the gel is transferred to _____ for hybridization.
A. Nitrocellulose membrane
B. Agarose
C. Autoradiogram
D. PCR

892. During DNA finger printing, DNA nucleotides hybridized with probe can be detected through:
A. Electrophoresis
B. Polymerase chain reaction
C. Autoradiography
D. Hybridoma

893. In somatic cell gene therapy, the functional genes can be introduced into:
A. Sperm
B. Egg
C. Any body cells
D. Germinal cells

894. During the recent tsunami disaster, a child was separated from its parents in Sri lanka. Later with the help of technique the child was made to reunite with its true parents. The technique is:
A. DNA finger printing
B. Gene therapy
C. Tissue culture
D. Hybridoma technology

895. Genes have been transferred into animals with a view to obtain a large-scale production of the proteins encoded by these genes in the milk, blood etc. This approach is also referred generally as
A. In vitro culture
B. Molecular farming
C. Gene therapy
D. Hybridoma technology

896. RFLP, VNTR, Probe are some of the terminologies associated with:
A. Hybridoma technology
B. Tissue culture
C. DNA finger printing
D. CFT

897. In 1990, the first gene-therapy was conducted on a 4-year-old girl in US. The girl was suffering:
A. AIDS
B. CANCER
C. SCID
D. Malaria

898. SCID, a disease can be cured by Gene therapy is due to the deficiency of:
A. ADA enzyme
B. Insulin
C. Glucagon
D. Dystrophin

899. A device in which a substrate of low value is utilized by living cells or enzymes to generate a product of higher value is called
A. Bioreactor
B. Test tube culture
C. Electrophoresis
D. Chromatography

900. Gene therapy, a method to cure inherited disease by
A. Repairing the faulty gene
B. Introducing the correct copy of the gene
C. Adding new cells to the body
D. Polymerase chain reaction

901. During gene therapy, the possible ways through which the genes can be introduced into the cell are:
A. Micro injection
B. Some viruses
C. Both "A" and "B"
D. Erythrocytes

902. DNA finger printing helps in:
A. Identifying illegal immigrants
B. Detecting the real parent of child
C. Detecting the suspect involved in crime
D. All of these

903. In one type of gene therapy, functional genes are introduced into the sperm or the egg. This is called:
A. Somatic cell gene therapy
B. Germline gene therapy
C. Vegetative cell gene therapy
D. Gametic gene therapy

904. Glucose is added to the tissue culture media as:
A. Growth regulator
B. Carbon source
C. Solidifying agent
D. An antibiotic

905. Explant is
A. Any cut part of the plant used in tissue culture
B. A plant extract used in tissue culture
C. A source of growth regulators added to media
D. Solidifying agent

906. The work 'Hybridization' in DNA finger printing means:
A. Pairing b/w nucleotides of DNA sample with probe
B. Pairing b/w the nucleotides of DNA and mRNA
C. Pairing b/w the nucleotides of probe with mRNA
D. Pairing between the nucleosides with mRNA

907. Dolly, the first animal produced through cloning is:
A. Camel
B. Rat
C. Cow
D. Sheep

908. Fearing that the child to be born may have a genetic disorder, a couple goes to a doctor. Which one of the techniques will be suggested by the doctor cure genetic disorder?
A. Hybridoma technology
B. Gene therapy
C. ELISA
D. DNA finger printing

909. The genes introduced through somatic cell gene therapy are:
A. Heritable
B. Non-heritable
C. Partially heritable
D. None of these

910. In biotechnology, mass culturing of cells / microbes can be achieved by using
A. Test tube culture
B. Bioreactor
C. Autoclave
D. Electrophoresis

911. A bioreactor known for mass culturing of cells / microbes must have
A. Agitation for mixing of cells and medium
B. Sterile conditions
C. Regulation of temperature, aeration, etc.,
D. All of these

912. In vitro culture of plant parts need
A. Controlled environmental condition
B. Aseptic condition
C. Maintenance of pH
D. All of these

913. Bioreactors are used for
A. Large scale production of desired substances by using cells / microbes
B. Kill bacteria
C. To store viruses
D. To get chemicals

914. The basic components of tissue culture media are
A. Micro and macro nutrients, glucose
B. Micro and macro nutrients, vitamins, agar
C. Micro and macro nutrients and growth regulators, glucose
D. Micro and macro nutrients, growth regulators, agar, vitamins, glucose

915. Agar is added to tissue culture media as:
A. Carbon source
B. A growth regulator
C. Nitrogen source
D. Solidifying agent

916. Stem cells found in umbilical cord blood is
A. Totipotent
B. Pluripotent
C. Omnipotent
D. Multipotent

917. Which one of the following statements about plant tissue culture is correct?
A. The culturing of root is not possible
B. Any cell that is totipotent can be cultured
C. The pH of the media need not be maintained
D. Fruit juices are added to media as carbon source

918. With reference to biotechnology, microinjection is a method of:
A. Injecting a solution of DNA into nucleus of a cell
B. Injecting nutrients into a cell culture media
C. Injecting microbes into a cell culture media
D. Injecting medicine to human beings

919. Agar, used in plant tissue culture is extracted from:
A. A fungus
B. A bacterium
C. An alga
D. A virus

920. Totipotency refers to:
A. The ability of a plant cell to arrest growth of a plant
B. The ability of a plant cell to develop disease
C. The ability of a plant cell to develop into a complete plant
D. The ability of a plant cell to develop into a callus

921. The main aim of human genome project is:
A. To identify and sequence of all the genes present in the human body
B. To introduce new genes to human beings
C. To remove disease causing genes from humans
D. To improve techniques of finger printing

922. Bt cotton is a:
A. A cotton variety obtained by crossing two different cotton plants
B. A cotton variety brought from South America
C. An insecticide sprayed on cotton plant
D. A transgenic cotton variety

923. Somatic embryos are:
A. Embryos developed from zygote after fertilization
B. Embryos developed from egg without fertilization
C. Embryo like structure settled from cells of callus
D. Embryo developed by ovules

924. An amorphous mass of loosely arranged thin-walled parenchyma cells developing from explant is called:
A. Thallus
B. Callus
C. Callose
D. Embryoids

925. The name "Golden rice" is given to a rice variety because:
A. It contains traces of gold
B. It is obtained from areas where gold mining is done
C. The seeds are golden yellow in color because of the presence of β–carotene
D. It is made of gold

926. Fruit juice or coconut milk is added to plant tissue culture media because:
A. It is a source of micronutrients
B. It is a source of macronutrients
C. It is a source of growth regulators
D. It helps in maintaining pH of the media

927. pUC 18 is a
A. Phage used as a vector
B. Bacteria used for transformation
C. Restriction endonuclease
D. A plasmid

928. The process of introduction of foreign DNA into an animal cells is called
A. Transversion
B. Conversion
C. Inversion
D. Transfection

929. The cloned sheep "Dolly" had a genotype which is:
- A. Haploid and identical to that of mother's egg cell
- B. Diploid & alike to that of mother's somatic cells
- C. Diploid with the haploid set of chromosomes from the father and other from the mother
- D. Diploid & alike to that of the donor's somatic cells

930. Pluripotent cells derived from the early pre implantation of an embryo in mice are called:
- A. Stem cells
- B. Organ culture
- C. Somatic cell hybridization
- D. Hybridoma

931. A segment of DNA that reads from the same forward and backward is called:
- A. Palindromic DNA
- B. Complementary DNA
- C. Plasmid DNA
- D. Copy DNA

932. The chemical nature of 'humulin' produced by recombinant DNA technology is:
- A. Lipid
- B. Protein
- C. Monosaccharide
- D. Vitamin

933. Which of the following is associated with DNA finger printing?
- A. Hybridoma
- B. Site specific mutagenesis
- C. Shotgun cloning
- D. RFLP

934. Which technique would most likely to be used to produce a large number of genetically identical offspring?
- A. Cloning and in vitro culture
- B. Polymerase chain reaction
- C. Chromatography
- D. Electrophoresis

935. The restriction endonucleases are called so because:
- A. They have a very restrictive or site specific endonuclease activity
- B. They cut DNA at a few restricted sites
- C. They restrict the entry of foreign DNA into the cell by cleaving the DNA due to endonuclease activity
- D. Their distribution is restricted to only some bacterial cells

936. A hybridoma cell:
- A. Produces different types of antibodies against different types of antigens
- B. Produces only specific antibodies only against a specific antigen
- C. Produces different types of antibodies but only one type of antigen
- D. None of the above

937. A cancerous / myeloma cell in hybridoma helps in:
- A. Continuous growth of hybridoma
- B. Production of antibodies
- C. Both "A" and "B"
- D. Neither "A" nor "B"

938. Which one of the following organism is used for the large scale production of recombinant insulin?
- A. *Plasmodium*
- B. *Agrobacterium*
- C. *Rhizobium*
- D. *E. coli*

939. The unique feature of monoclonal antibody is that:
- A. It is specific to a single antigenic determinant of a single antigen
- B. It is non-specific
- C. It is specific to a few antigenic determinants
- D. Restricted growth

940. 'Thermal Cycler' is used in the reaction:
- A. Enzyme linked immune-sorbant assay
- B. Ligation reaction
- C. Polymerase chain reaction
- D. Immobilization reaction

941. Construction of a recombinant DNA involves:
- A. Cleaving DNA with restriction endonuclease and joining with ligase
- B. Cleaving DNA with ligase and joining with endonuclease
- C. Cleaving and joining DNA with restriction endonuclease
- D. Cleaving DNA with restriction endonuclease and joining with polymerase

942. ECOR1 is a:
- A. DNA ligase enzyme
- B. Restriction endonuclease
- C. A vector used for insulin synthesis
- D. A plasmid used as a vector

943. Which one of the following techniques is successfully used to compare two DNA samples?
- A. Hybridoma technology
- B. ELISA
- C. Genetic finger printing
- D. Gene therapy

944. The unique feature of pluripotent stem cells is:
- A. They can develop into any tissue of the body
- B. They can develop into whole individuals
- C. They help in production of monoclonal antibodies
- D. All of these

945. Stem cells can be obtained from:
- A. Embryo only
- B. Any part of the body
- C. Blood only
- D. Embryo, bone marrow, umbilical cord blood etc

946. All antibodies produced through hybridoma are:
- A. Polyclonal
- B. Monoclonal
- C. Non-active
- D. Over-active

947. Which of the following codons is NOT a termination codon for protein synthesis?
- A. UUU
- B. UAG
- C. UAA
- D. UGA

948. A type of β–lymphocyte that produces antibody is:
- A. Plasma cell
- B. Memory cell
- C. Adipocyte
- D. Erythrocyte

949. Which of the following are the two methods of screening?
- A. Hybridization and PCR
- B. ELISA and blotting
- C. ELISA and PCR
- D. PCR and RFLP

950. Monoclonal antibodies are usually produced from:
- A. Myeloma cells
- B. Hybridoma cells
- C. Monocytes
- D. Adipocytes

951. To produce monoclonal antibodies in large scale, the techniques that can be used are:
- A. In vivo in the peritoneal cavity of mice
- B. In vitro in large scale culture vessels
- C. Both "A" and "B"
- D. Neither "A" nor "B"

952. Which one of the following therapies can be suggested to cure a person who is suffering from spinal cord injuries?
- A. Hybridoma
- B. Gene therapy
- C. Stem cell therapy
- D. Recombinant DNA technology

953. cDNA, a term used in recombinant DNA technology means:
- A. Competitive DNA
- B. Chemical DNA
- C. Complex DNA
- D. Complementary DNA

954. Which of the following enzyme is used in PCR?
- A. Taq DNA polymerase
- B. HRP
- C. EcoRI
- D. EcoRII

955. Which of the following enzyme is used in ELISA?
- A. Taq DNA polymerase
- B. HRP
- C. EcoRI
- D. EcoRII

956. Which of the following is helpful in distinguishing DNA of one individual from another?
- A. PCR
- B. Reverse transcriptase
- C. cDNA
- D. RFLP

957. Which of the following is the correct order of organization of genetic material from largest to smallest?
- A. Genome, chromosome, gene, nucleotide
- B. Nucleotide, gene, chromosome, genome
- C. Gene, nucleotide, chromosome, genome
- D. Chromosome, genome, nucleotide, gene

958. A hybridoma is:
- A. A hybrid cell obtained by fusing a β–lymphocyte with a myeloma cell in vitro
- B. A hybrid cell obtained by fusing a β–lymphocyte with a myeloma cell in vivo
- C. A hybrid cell obtained by fusing 2 β–lymphocyte cells in vitro
- D. A hybrid cell obtained by fusing any 2 body cells in vitro

959. Monoclonal antibodies are nowadays used in:
- A. Disease diagnosis
- B. Detection of specific type of pathogen
- C. Very early and accurate detection of cancer
- D. All of these

960. _____ is a non-essential amino acid.
- A. Serine
- B. Threonine
- C. Lysine
- D. Histidine

961. Which of the following is an essential amino acid?
- A. Cysteine
- B. Asparagine
- C. Glutamine
- D. Phenylalanine

962. Peptide bond is a:
- A. Covalent bond
- B. Ionic bond
- C. Metallic bond
- D. Hydrogen bond

963. A tripeptide has:
- A. 3 amino acids and 1 peptide bond
- B. 3 amino acids and 2 peptide bonds
- C. 3 amino acids and 3 peptide bonds
- D. 3 amino acids and 4 peptide bonds

964. Immunoglobulin consists of:
- A. A light chain and two heavy chains joined by disulfide bond
- B. Two light chains and a heavy chain joined by disulfide bond
- C. Two light chains and two heavy chains joined by disulfide bond
- D. Two light chains and two heavy chains joined by hydrogen bond

965. The pattern on paper in chromatography is called:
- A. Chroming
- B. Chroma
- C. Chromatograph
- D. Chromatogram

966. Antibody present in secretions like tears & saliva is:
- A. IgA
- B. IgE
- C. IgG
- D. IgM

967. Unfolding of a protein can be termed as:
- A. Renaturation
- B. Denaturation
- C. Oxidation
- D. Reduction

968. A process by which a protein structure assumes its functional shape or conformation is

A. Denaturing
B. Folding
C. Synthesis
D. Hydrolysis

969. Which of the following is an IMINO ACID (Secondary amino acid)?

A. Alanine
B. Glycine
C. Proline
D. Serine

970. Which of the following is a true statement?

A. IgG is involved in primary immune response
B. IgM is involved in primary immune response
C. IgG is involved only in secondary immune response
D. IgG and IgM both are involved in primary immune response

971. Which of the following enzyme is responsible for the regulation of biological nitrogen fixation?

A. Dinitrogenase reductase
B. Dinitrogenase oxidase
C. Phosphatase
D. Kinase

972. Which of following is a function of macrophages?

A. Ingest large particles and cells by phagocytes
B. Produce and secrete antibodies
C. Interact with infected host cells through receptors on T-cell surface
D. Interact with macrophages and secrete cytokines

973. Which of the following is a function of B lymphocytes?

A. Ingest large particles and cells by phagocytes
B. Produce and secrete antibodies
C. Interact with infected host cells through receptors on T-cell surface
D. Interact with macrophages and secrete cytokines

974. Which of the following is a function of T lymphocytes?

A. Ingest large particles and cells by phagocytes
B. Produce and secrete antibodies
C. Interact with infected host cells through receptors on TCR
D. Interact with macrophages and secrete cytokines

975. The extra chromosomal, self-replicating, closed, double stranded and circular DNA molecule is generally termed as:

A. Chromosome
B. Plasmid
C. Genomic DNA
D. Bacteriophage

976. Which of the following is the largest immunoglobulin?

A. IgA
B. IgE
C. IgG
D. IgM

977. Which of the following antibody first reaches the site of infection?

A. IgA
B. IgE
C. IgG
D. IgM

978. Where do T-lymphocytes develop into fully competent but not activated T-cells?

A. The thymus gland
B. The lymph nodes
C. The thyroid gland
D. The bone marrow

979. Which of the following is an example of monosaccharide?

A. Galactose
B. Sucrose
C. Lactose
D. Maltose

980. The allosteric inhibitor of an enzyme:

A. Causes the enzyme to work faster
B. Binds to the active site
C. Participates in feedback regulation
D. Denatures the enzyme

981. What is the composition of nucleoside?

A. a sugar + a phosphate
B. a base + a sugar
C. a base + a phosphate
D. a base + a sugar + phosphate

982. Which of the following is an example of disaccharide?

A. Glucose
B. Fructose
C. Galactose
D. Maltose

983. Lactose is a disaccharide of which of the following sugar units?

A. Glucose and fructose
B. Glucose and galactose
C. Glucose and sucrose
D. Glucose and ribose

984. Which of the following is an example of bacterial and yeast polysaccharide?

A. Starch
B. Glycogen
C. Cellulose
D. Dextran

985. When all monosaccharides in a polysaccharide are same type, such type of a polysaccharide is called a

A. Glycogen
B. Homoglycan
C. Heteroglycan
D. Oligosaccharide

986. Which of the following are the storage polysaccharides?

A. Glycogen
B. Cellulose
C. Chitin
D. Glucose

987. The most abundant immunoglobulin is:

A. IgA
B. IgE
C. IgG
D. IgM

988. Glucose is stored in plants as _____.

A. Glycogen
B. Starch
C. Dextrin
D. Cellulose

989. Glucose is stored in liver as _____.

A. Glycogen
B. Starch
C. Dextrin
D. Cellulose

990. Which of the following are the structural polysaccharides?

A. Glycogen
B. Starch
C. Chitin
D. Glucose

991. Which of the following is an analogous to starch?

A. Cellulose
B. Glycogen
C. Sucrose
D. Chitin

992. Identify the purine base of nucleic acids in the following:

A. Cytosine
B. Thymine
C. Uracil
D. Adenine

993. Which of the following are not the components of RNA?

A. Thymine
B. Adenine
C. Guanine
D. Cytosine

994. What is the composition of nucleotide?

A. a sugar + a phosphate
B. a base + a sugar
C. a base + a phosphate
D. a base + a sugar + phosphate

995. Group of adjacent nucleotides are joined by:

A. Phosphodiester bond
B. Peptide bond
C. Ionic bond
D. Covalent bond

996. The sugar molecule in a nucleotide is:

A. Pentose
B. Hexose
C. Tetrose
D. Triose

997. Building blocks of nucleic acids are:

A. Nucleotides
B. Nucleosides
C. Amino acids
D. Histones

998. Number of hydrogen bonds between adenine and thymine?

A. One
B. Two
C. Three
D. Four

999. Number of hydrogen bonds between guanine and cytosine?

A. One
B. Two
C. Three
D. Four

1000. Arrangement of nucleotides in DNA can be seen by

A. Ultracentrifuge
B. X-Ray crystallography
C. Light microscope
D. Electron microscope