

PROVISIONAL ANSWER KEY

NAME OF THE POST

Assistant Professor Microbiology, Class II, Advt No. 85/2016-17(AFJ)

Preliminary Test on 02-04-2017

Subjeect Que : 101-300

Publish Date : 04-04-2017

Last Date to send suggestion(s) :11-04-2017

Note: Candidate must ensure the compliance to send all suggestion in the given format with reference to this paper with provisional answer key only.

101. A sample with a bacterial load of  $10^3$  cells was disinfected with a UV dose of D10. The number of bacteria that would remain alive after the treatment is
- (A) 1 cell (B) 10 cells  
**(C) 100 cells** (D) 900 cells
102. A component of MacConkey's agar that makes it possible to distinguish between lactose fermenters and non-fermenters is
- (A) Bile salt (B) Crystal violet  
**(C) Neutral red** (D) Lactic acid
103. Metachromatic granules consist of
- (A) Poly  $\beta$ -hydroxy butyrate **(B) Polyphosphate**  
 (C) glycogen (D) starch
104. Adding untreated sewage to a water body would
- (A) Decrease BOD and increase Dissolved Oxygen (DO)  
**(B) Increase BOD and decrease DO**  
 (C) Increase BOD and DO  
 (D) Decrease BOD and DO
105. A technique for purification of proteins based on their size is
- (A) Affinity chromatography (B) Ion exchange chromatography  
**(C) Gel exclusion chromatography** (D) Hydrophobic chromatography
106. Which is a water borne disease caused by a bacterium?
- (A) Schistosomiasis (B) Giardiasis  
**(C) Leptospirosis** (D) Hepatitis
107. A metal pollutant that can be removed from soil or water by microbially mediated process of volatilization is
- (A) Lead **(B) Mercury**  
 (C) Chromium (D) Cadmium
108. The site on prokaryotic mRNAs that facilitates ribosome assembly by binding to 16S rRNA is known as
- (A) Pribnow Box **(B) Shine-Dalgarno sequence**  
 (C) Kozak site (D) TATA box
109. In two dimensional electrophoresis, the first dimension is \_\_\_\_\_ and second dimension is \_\_\_\_\_ respectively
- (A) SDS PAGE, Isoelectric focussing (B) Native PAGE, Isoelectric focussing  
**(C) Isoelectric focussing, SDS PAGE** (D) Isoelectric focussing, Native PAGE

110. A double stranded DNA molecule has 20% Adenine. It will have how much Guanine?  
(A) 20% (B) 30%  
(C) 60% (D) 80%
111. The enzyme phosphofructokinase belongs to the class  
(A) Lyase (B) Isomerase  
(C) Transferase (D) Hydrolase
112. In the genetic code, one amino acid may be coded by more than one triplet code. This is referred to as  
(A) Wobble hypothesis (B) Degeneracy of the code  
(C) Universality of the code (D) Non-overlapping nature of the code
113. A technique in which a short fluorescently labelled nucleic acid probe binds to the complementary DNA in the microbial cell and allows the microscopic detection of fluorescent cells is  
(A) Autoradiography (B) FISH  
(C) Stable isotope probing (D) CHIP assay
114. Which of the following is true about metagenomics?  
(A) It is the same as whole genome sequencing  
(B) It is the analysis of genomes of the entire community  
(C) It requires isolation and cultivation of diverse organisms from a sample  
(D) It gives only phylogenetic information but not functional information
115. The first bacterial genome that was sequenced was of  
(A) *Escherichia coli* (B) *Bacillus subtilis*  
(C) *Haemophilus influenzae* (D) *Mycoplasma genitalium*
116. BLAST is  
(A) A local alignment tool (B) A multiple alignment tool  
(C) A database of similar sequences (D) A phylogenetic clustering tool
117. A marine sample A has about 100 bacterial species in it while sample B has about 1000 bacterial species. Therefore environment B has a greater  
(A) Species richness (B) Species evenness  
(C) Species (D) Species abundance
118. An organism that has evolved recently would be represented in a phylogenetic tree at the  
(A) Root (B) Node  
(C) Tip of the branch (D) Base of the branch

119. Individuals belonging to the same species present and in the same geographical location form a
- (A) Family (B) Population  
(C) Guild (D) Community
120. Which of the following is considered secondary structure of proteins?
- (A) Alpha helix (B) Peptide sequence  
(C) Subunit arrangement (D) Covalent modification
121. Increasing specificity of PCR can be done by
- (A) Increasing annealing temperature (B) Decreasing annealing temperature  
(C) Increasing elongation temperature (D) Decreasing elongation temperature
122. Which of the following fuels CANNOT be produced by microorganisms in the lab?
- (A) Hydrogen (B) Methane  
(C) Ethanol (D) Crude oil
123. After conjugation with an Hfr strain, the F minus
- (A) becomes F plus (B) becomes Hfr  
(C) becomes F prime (D) remains F minus
124. Antibiotics that affect prokaryotic translation when used to treat humans have side effects because
- (A) They also kill normal flora  
(B) They affect digestion of proteins  
(C) They affect 70S ribosomal machinery of human cell organelles  
(D) They cause breakdown of muscle protein
125. Interaction between two organisms in which one is harmed but the other is NOT benefitted is known as
- (A) Amensalism (B) Commensalism  
(C) Syntrophism (D) Parasitism
126. The human microbiome is correctly defined as
- (A) Microorganisms found in human faeces  
(B) Microorganisms residing on human surface (skin)  
(C) All microorganisms found on any part of the human body  
(D) Bacteria and Archea found in the human intestine
127. A compost pile would most likely harbour
- (A) Alkaliphiles (B) Halophiles  
(C) Acidophiles (D) Thermophiles

128. Nod factors are produced by  
(A) Leguminous plants in response to signals from Nodule forming bacteria  
(B) Nodule forming bacteria in response to signals from leguminous plants  
(C) Constitutively by leguminous plants  
(D) Constitutively by nodule forming bacteria
129. Filamentous bacteria that fix nitrogen in symbiotic association with plants are  
(A) Mycorrhiza (B) Frankia  
(C) Azolla (D) Rhizobia
130. Methanotrophs  
(A) produce methane  
(B) belong to archaeobacteria  
(C) use methane as carbon and energy source  
(D) assimilate methylated compounds
131. The Irish potato famine in the 1840s was caused by the pathogen  
(A) *Ustilago maydis* (B) *Phytophthora infestans*  
(C) *Alternaria solani* (D) *Ralstonia solanacearum*
132. Systemic acquired resistance is a type of plant defense response that  
(A) Is localised around site of pathogen attack  
(B) Is long lasting throughout the plant  
(C) Involves production of reactive oxygen species  
(D) Is specific against the pathogen
133. Ames test detects mutagens on the basis of their effect on  
(A) live bacteria (B) bacterial extracts  
(C) liver cells (D) liver extracts
134. Which one of the following is a primary lymphoid organ:  
(A) Lymph nodes (B) Spleen  
(C) Thyroid (D) Thymus
135. Professional antigen presenting cells include all except  
(A) Macrophages (B) Dendritic cells  
(C) B lymphocytes (D) Neutrophils
136. Which of the following is a neurotoxin?  
(A) Diphtheria toxin (B) Cholera toxin  
(C) Botulinum toxin (D) Shiga toxin

137. Genetically modified cotton in India has been engineered for  
(A) Higher yield (B) Drought resistance  
(C) Insect resistance (D) Salt resistance
138. A bioreactor/fermenter designed for adequate supply of oxygen without agitation is  
(A) Stirred tank bioreactors (B) Air-lift fermenter  
(C) Packed bed reactor (D) Photo bioreactor
139. Quantity of DNA in a sample can be measured by absorbance at  
(A) 280 nm (B) 260 nm  
(C) 230 nm (D) 240 nm
140. According to the endosymbiotic theory, mitochondria have evolved from  
(A) Proteobacteria (B) Actinobacteria  
(C) Firmicutes (D) Cyanobacteria
141. Among the three domains of life, the two which are more related are  
(A) Eubacteria and Archaeobacteria (B) Eubacteria and Eukaryotes  
(C) Archaeobacteria and Eukaryotes (D) All three are equally related
142. Stromatolites are  
(A) Structures made up of minerals hanging from cave roofs  
(B) A type of sedimentary rocks with fossilized bacteria  
(C) A type of coral  
(D) A type siliceous sponge
143. V3-V4 sequencing for identification of bacteria involves  
(A) rRNA (B) tRNA  
(C) snRNA (D) microRNA
144. R plasmids encode genes for  
(A) Colicins (B) Antibiotic resistance  
(C) Hydrocarbon degradation (D) Nitrogen fixation
145. HEPA filters are related to  
(A) Water purification systems (B) Biological safety hoods  
(C) Sewage treatment plants (D) Industrial bioreactors
146. A bacteriophage that has single stranded DNA is  
(A) Lambda (B) T4  
(C) phiX174 (D) Mu

147. Beta-mercaptoethanol breaks which bonds in proteins?  
(A) Peptide bonds (B) Disulphide linkages  
(C) Hydrogen bond (D) Ionic interactions
148. An antibody that is associated with J chain is  
(A) IgA (B) IgE  
(C) IgG (D) IgM
149. An amino acid whose R group can form cyclic structure is  
(A) Alanine (B) Arginine  
(C) Glutamine (D) Proline
150. An enzyme that displays Michaelis Menten kinetics will show 50% of its maximal velocity when substrate concentration is equal to  
(A)  $K_M / 0.5$  (B)  $K_M$   
(C)  $K_M / 2$  (D)  $K_M / 50$
151. A competitive inhibitor  
(A) Increases  $K_M$  (B) Increases  $V_{max}$   
(C) Decreases  $K_M$  (D) Decreases  $V_{max}$
152. Which form of plasmid DNA runs quickest in an agarose gel?  
(A) Open circle (B) Linear  
(C) Nicked circle (D) Supercoiled
153. FACS analysis can be used for separating  
(A) Cells from different stages of the cell cycle  
(B) Different types of T lymphocytes  
(C) Cells of different size  
(D) All of the above
154. Microarray analysis is used for analysis of  
(A) Transcriptome (B) Proteome  
(C) Interactome (D) Metabolome
155. Which of the following cloning vectors accommodates the largest size DNA insert?  
(A) Plasmid (B) Phagemid  
(C) Cosmid (D) YAC
156. Codon usage in different organisms is determined by  
(A) The size of the genome (B) The G+C content of the genome  
(C) The number of genes in a genome (D) The gene density in the genome

157. With 20 amino acids the possible number of different tripeptides with leucine at the C-terminal are  
 (A) 20 (B) 40  
 (C) 400 (D) 8000
158. Bacterial growth yield is biomass produced  
 (A) In a specified time (B) Per mass of substrate consumed  
 (C) At the end of fermentation (D) Per litre of the fermentation broth
159. An open system in which the growth rate is maintained by the removal and addition of media at such a rate as to maintain a constant cell density is called a  
 (A) Manostat (B) Chemostat  
 (C) Turbidostat (D) Culturostat
160. Which of the following is the most commonly used multiple sequence alignment tool?  
 (A) FASTA (B) PDB  
 (C) CLUSTAL-W (D) KEGG
161. The main function of the centrosome is  
 (A) Protein secretion (B) Osmoregulation  
 (C) Chromosome segregation (D) Cell migration
162. Which of the following is NOT a source of stem cells?  
 (A) Certain adult tissues (B) Umbilical cord blood  
 (C) Early embryos (D) Sperms and eggs
163. An HIV test that DOES NOT monitor viral load is  
 (A) Reverse transcriptase assay (B) CD4 lymphocyte count  
 (C) HIV RNA qPCR (D) HIV p24 antigen testing
164. Sabouraud's agar contains  
 (A) Starch (B) Sucrose  
 (C) Dextrose (D) Gelatin
165. Acid fast staining technique used to stain *Mycobacterium tuberculosis* uses  
 (A) Giemsa (B) Carbol fuchsin  
 (C) Toluidine blue (D) Lugols iodine
166. Animal viruses can be cultivated on all of the following EXCEPT  
 (A) Mueller-Hinton medium (B) Embryonated hen's egg  
 (C) Live animals (D) Tissue culture

167. Oral Polio vaccine contains  
(A) Live attenuated virus  
(B) Inactivated (killed) virus  
(C) Live virulent virus at very low titre  
(D) Incomplete virus
168. Positive complement fixation test results in  
(A) Lysis of RBCs (B) Agglutination of RBCs  
(C) Prevention of lysis of RBCs (D) Prevention of hemagglutination
169. In ELISA the enzyme is attached to  
(A) The microtiter plate (B) The antigen  
(C) Primary antibody (D) Secondary antibody
170. Household bleach disinfectant contains  
(A) Hydrogen peroxide (B) Formaldehyde  
(C) Hypochlorite (D) Phenol
171. A technique based on sedimentation is  
(A) Electrophoresis (B) Centrifugation  
(C) Chromatography (D) Spectrophotometry
172. Which is a correct match between the PCR step and the temperature used?  
(A) Annealing : 94-96° C (B) Denaturation : 60-65° C  
(C) Extension : 70-72° C (D) Hold : 37° C
173. A technique for detecting chromosome number abnormalities in cancer is  
(A) Pedigree analysis (B) Karyotyping  
(C) PCR (D) ELISA
174. MALDI TOF is useful for  
(A) DNA fingerprinting (B) Peptide fingerprinting  
(C) Studying protein DNA interactions (D) Analysis of DNA methylation
175. Two bacteria show DNA:DNA hybridization of 75% . It may be concluded that  
(A) They are same strains  
(B) They are same species  
(C) They are same genus but different species  
(D) They are neither same genus nor same species

176. Which of the following trace element is particularly essential for nitrogen fixation?  
 (A) Nickel (B) Molybdenum  
 (C) Zinc (D) Copper
177. Which of the following techniques DOES NOT involve PCR?  
 (A) ARISA (B) T-RFLP  
 (C) FAME (D) DGGE
178. Which of the following is mycorrhizal biofertilizer?  
 (A) *Nostoc* (B) *Anabaena*  
 (C) *Glomus* (D) *Rhizobium*
179. "Avirulence" genes are  
 (A) Present in the plant pathogen and cause disease in plants  
 (B) Present in the plant pathogen and cause defense induction in plants  
 (C) Present in the plant and cause resistance to pathogen attack  
 (D) Present in the plant and make them susceptible to pathogen attack
180. Which is an INCORRECT match between the scientist and their contribution I the field of Microbiology?  
 (A) Robert Hooke : discovery of causative agents for TB and anthrax  
 (B) Joseph Lister : Antiseptic methods during surgery  
 (C) Antoni van Leeuwenhoek : discovery of bacteria  
 (D) Martinus Beijerinck : Discovery of Nitrogen fixation
181. The fluorescence dye DAPI can stain cells because it binds to  
 (A) Cell wall (B) Proteins  
 (C) DNA (D) Cell membrane
182. A Nobel Laureate who received the prize for discovery of prions is  
 (A) David Baltimore (B) Stanley Prusiner  
 (C) Harold Varmus (D) Barry Marshall
183. A process by which introduction of excess mineral nutrients in a water body leads to dense growth of plants and algae leading to environmental deterioration is  
 (A) Biomagnification (B) Eutrophication  
 (C) Bioaccumulation (D) Bioconcentration
184. Which group of microorganisms was responsible for generation of molecular oxygen in the primitive Earth atmosphere?  
 (A) Proteobacteria (B) Cyanobacteria  
 (C) Actinomycetes (D) Methanogens

185. Confocal Microscopy involves  
(A) Laser beams (B) Fluorescence dyes  
(C) Live specimens (D) All of the above
186. Which is an example of a retrovirus?  
(A) Herpesvirus (B) HIV  
(C) Influenza virus (D) Polio virus
187. CRISPR sequences are  
(A) Located on the bacterial genome  
(B) Present in viral genome  
(C) Encode various functional proteins that help viral replication  
(D) Derived by lateral transfer
188. The common feature of CRISPR-Cas9 and TALENS is that  
(A) They originate from viruses (B) They act through guide RNA  
(C) They can be used for genome editing (D) All of the above
189. What is the earliest step in the entry of HIV into the target human cell?  
(A) Fusion of envelope with cell membrane  
(B) Binding of env protein to CD4 receptor  
(C) Phagocytosis of the viral particle  
(D) Binding of coreceptor with env protein
190. RNA-dependent RNA polymerase is found in  
(A) Double stranded DNA viruses (B) Single stranded DNA viruses  
(C) RNA viruses (D) Retroviruses
191. A cluster of genes under a common promoter is known as  
(A) Regulon (B) Operator  
(C) Transposon (D) Operon
192. Mutations in lac repressor can lead to  
(A) Constitutive expression (B) Uninducible phenotype  
(C) Super repressor (D) Any of the above
193. IPTG is a gratuitous inducer. This means  
(A) It is artificial and not natural  
(B) It is transported freely across the membrane  
(C) It causes induction but does not get metabolized  
(D) It was discovered by chance

194. When *E.coli* is grown in the presence of both Glucose and Lactose, glucose is first metabolised followed by lactose. This is referred to as  
(A) Positive induction (B) Catabolite repression  
(C) Cometabolism (D) Constitutive gene expression
195. A sequence that can be located at large distances away from the promoter but still causes transcriptional activation is known as  
(A) Insulator (B) Enhancer  
(C) Silencer (D) Activator
196. A common property of proteins that have helix-turn-helix motif, zinc finger domain and leucine zipper domain is that they are  
(A) Transcriptional activators (B) Receptor molecules  
(C) DNA binding proteins (D) Repressor molecules
197. RNAi is associated with  
(A) RNA insertion (B) Gene silencing  
(C) Gene editing (D) Removal of introns from pre-mRNA
198. A mutagen that causes insertion of a single base in a nucleotide sequence would lead to  
(A) Mismatch errors (B) Transition mutations  
(C) Transversion mutations (D) Frameshift mutations
199. Quorum sensing in bacteria is mediated by signalling molecules known as  
(A) Secondary messengers (B) Autoinducers  
(C) Pheromones (D) Elicitors
200. In *Bacillus subtilis* differential gene expression during sporulation is controlled by  
(A) ppGpp (B) cAMP  
(C) alternative sigma factors (D) MAP kinase signalling
201. A feature that accounts for resolution in microscopes is  
(A) condenser (B) wavelength of light  
(C) intensity of light (D) illumination source
202. A mixed culture is  
(A) one that contains two or more known species  
(B) one that has been adequately stirred  
(C) the same as a contaminated culture  
(D) a natural water sample containing bacteria, algae and protozoa

203. Gram staining differentiates cells on the basis of  
(A) Cell wall composition (B) Cell membrane structure  
(C) Cell inclusion bodies (D) Cell shape
204. Most fungi derive nutrition through  
(A) digesting organic substrates (B) engulfing bacteria  
(C) photosynthesis (D) engulfing protozoa
205. Prions are made of  
(A) DNA and protein (B) RNA and protein  
(C) only protein (D) only RNA
206. Viral genome is covered in a protein coat made up of  
(A) spikes (B) virions  
(C) capsomeres (D) envelope
207. Oxygen is toxic for obligate anaerobes because they lack  
(A) superoxide dismutase (B) TCA cycle  
(C) glycolysis (D) electron transport chain
208. Active transport of a substance across a membrane requires  
(A) a high concentration of substance outside  
(B) ATP  
(C) high osmotic pressure  
(D) ability of substance to diffuse across the membrane
209. Chemolithotrophs utilize \_\_\_\_ as energy source  
(A) reduced inorganic compounds such as sulphide, ammonia  
(B) oxidized inorganic compounds such as nitrate, sulfate  
(C) CO<sub>2</sub>  
(D) organic compounds
210. Denitrifiers can help mitigate green house emission by reducing the levels of  
(A) Ammonia (B) nitrous oxide  
(C) Nitrates (D) Methane
211. Atmospheric nitrogen enters the biosphere through  
(A) Ammonification (B) Nitrogen fixation  
(C) Denitrification (D) Ammoxification

212. The primary natural sources of energy on the planet is/are  
(A) Solar and geothermal (B) Solar and electrical  
(C) Solar and mechanical (D) Solar and hydrothermal
213. Number of ATPs that can be generated by the oxidation of one NADH that enters electron transport is approximately  
(A) 1 (B) 3  
(C) 5 (D) 7
214. Exergonic reactions  
(A) release free energy  
(B) consume free energy  
(C) require ATP  
(D) are thermodynamically unfavourable
215. In the bacterial genetic map obtained by conjugation the distance between genes is in  
(A) kilobase pairs (B) minutes  
(C) centimorgans (D) micrometers
216. The lagging strand of DNA is replicated in short pieces  
(A) because of limitation of DNA unwinding  
(B) because of unavailability of dNTPs  
(C) because the DNA polymerase can synthesize in only one direction  
(D) to make proof reading easier
217. Among the fragments listed below, the DNA fragment that will be close to the top (negative electrode) of an electrophoretic gel will be  
(A) 450 bp (B) 1500 bp  
(C) 3560 bp (D) 5000 bp
218. The temperature-pressure combination for an autoclave is  
(A) 100° C and 4 psi (B) 121° C and 15 psi  
(C) 131° C and 9 psi (D) 115° C and 3 psi
219. Ionizing radiation removes from atoms  
(A) protons (B) waves  
(C) electrons (D) neutrons
220. Apoptosis term is related to  
(A) Abnormal cell growth (B) Cell death  
(C) Cell morphogenesis (D) Cell differentiation

221. Drugs that inhibit the formation of the bacterial cell wall are  
(A) quinines (B) beta-lactams  
(C) tetracyclines (D) aminoglycosides
222. Antiviral drug that prevents viral nucleic acid replication is  
(A) azidothymidine (B) rifampicin  
(C) amantadine (D) cycloheximide
223. An appropriate term for resident flora is  
(A) commensals (B) parasites  
(C) pathogens (D) mutualists
224. An example of an inflammatory mediator that stimulates vasodilation is  
(A) a histamine (B) complement C5a  
(C) collagen (D) interferon
225. An example of an exogenous pyrogen is  
(A) interleukin-1 (B) complement  
(C) fibrin clot (D) endotoxin
226. The end product of the complement system is  
(A) properdin (B) cascade reaction  
(C) membrane attack complex (D) complement factor C9
227. The “one gene – one enzyme” hypothesis was proposed on the basis of work with  
(A) *Neurospora crassa* (B) *Drosophila melanogaster*  
(C) *Escherichia coli* (D) *Bacteriophage lambda*
228. A vaccine that contains only antigenic protein of viruses is called  
(A) acellular (B) recombinant  
(C) subunit (D) attenuated
229. The cell that secretes antibodies are  
(A) T cell (B) macrophage  
(C) plasma cell (D) monocyte
230. The purpose of an adjuvant in a vaccine is  
(A) to kill the microbe  
(B) to suppress allergic reactions  
(C) to enhance the immunological response to the antigen  
(D) to prevent antigen from proteases

231. A positive tuberculin skin test is an example of  
 (A) a delayed hypersensitivity reaction (B) acute contact dermatitis  
 (C) autoimmune reaction (D) eczema
232. The western blot test can be used to identify  
 (A) unknown antibodies and antigens (B) unknown phospholipids  
 (C) specific DNA (D) specific RNA
233. Dermatophytes are fungi that infect the epidermal tissue by invading and attacking  
 (A) collagen (B) keratin  
 (C) fibroblasts (D) sebaceous glands
234. Creutzfeldt-Jacob disease (CJD) is caused by  
 (A) arbovirus (B) protozoan  
 (C) prion (D) bacterium
235. A common reservoir for rabies virus is  
 (A) pigeons (B) humans  
 (C) raccoons (D) mosquitoes
236. Zika Virus disease is spread through  
 (A) Mosquito (B) Termite  
 (C) Tse tse fly (D) Dragon fly
237. The plague bacterium *Yersinia pestis* is transmitted mainly by  
 (A) dogs (B) mosquitoes  
 (C) fleas (D) birds
238. The common stain used in identifying *Mycobacterium tuberculosis* is  
 (A) Gram stain (B) acid-fast stain  
 (C) negative stain (D) spore stain
239. Gastric ulcers are caused by  
 (A) *Treponema vincentii* (B) *Prevotella intermedia*  
 (C) *Helicobacter pylori* (D) *Vibrio cholera*
240. Syphilis is caused by  
 (A) *Treponema palladium* (B) *Neisseria gonorrhoea*  
 (C) *Trichomonas vaginalis* (D) *Haemophilus influenza*
241. The most accurate indicator of faecal contamination is  
 (A) *Enterobacter* (B) *Thiobacillus*  
 (C) *Staphylococcus* (D) *Escherichia*

242. The dried, pre-sprouted barley grain is soaked to activate enzymes in beer manufacture is called  
(A) hops (B) malt  
(C) wort (D) mash
243. Secondary metabolites such as antibiotics are produced by microbes during which growth phase  
(A) lag (B) exponential  
(C) stationary (D) death
244. Lysozyme was discovered by  
(A) Waksman (B) Ehrlich  
(C) Watson (D) Fleming
245. More than 80% of the known antibiotics are produced by  
(A) Firmicutes (B) Actinobacteria  
(C) Halobacteria (D) Cyanobacteria
246. How many times a carbonated drink of pH 3.0 will be more acidic than distilled water?  
(A) 4 (B) 100  
(C) 1000 (D) 10,000
247. If *E. coli* cells are grown in a medium containing radioactive  $^{32}\text{P}$ , the radiolabel would be found in all except  
(A) DNA (B) RNA  
(C) ATP (D) proteins
248. The magnification of a microscope when observed through the 15x ocular and high power 45x objective is  
(A) 1500 (B) 150  
(C) 675 (D) 60
249. If *Bacillus subtilis* cells are stained with malachite green with heat and then counterstained with safranin, the green structures found under microscope are  
(A) cell walls (B) endospores  
(C) flagella (D) capsule
250. In genetics, amber, ochre and opal are  
(A) Types of mutations (B) Recombination units  
(C) Names of stop codons (D) Names of phages

251. The biological definition of species was proposed by  
(A) Charles Darwin (B) Jean-Baptiste Lamarck  
(C) Theodosius Dobzhansky (D) Ernst Mayr
252. Which of the following compound has defined molecular weight?  
(A) Starch (B) Xylan  
(C) Insulin (D) Inulin
253. Teichoic acid is a part of the cell wall of which of the following bacteria?  
(A) *Escherichia coli* (B) *Streptococcus lactis*  
(C) *Shigella sonnei* (D) *Salmonella typhi*
254. A treatment that does not kill endospores is  
(A) autoclaving (B) pasteurization  
(C) hot-air sterilization (D) incineration
255. The Open reading Frame (ORF) refers to  
(A) any fragment of DNA  
(B) a fragment of DNA with stop codon  
(C) a fragment of DNA with start codon  
(D) a fragment of DNA with start and stop codons
256. The criteria used to place organisms into the kingdom Fungi is  
(A) photosynthesis, possess a cell wall  
(B) unicellular, possess cell wall, eukaryotic  
(C) unicellular, lacking cell wall, eukaryotic  
(D) absorptive, possess cell wall, eukaryotic
257. Bergey's Manual of Systematic Bacteriology differs from Bergey's Manual of Determinative Bacteriology in that the former  
(A) groups bacteria according to phenotypic differences  
(B) groups bacteria according to phylogenetic relationships  
(C) groups bacteria according to pathogenic properties  
(D) groups bacteria according to environmental habitat
258. Illumina Hi Seq is a type of  
(A) Microscope  
(B) Advanced illumination system  
(C) Next generation sequencing Machine  
(D) Gel documentation system

259. Agar agar is produced from  
(A) green algae (B) red algae  
(C) brown algae (D) blue green algae
260. Conidiospores are produced in  
(A) *Mucor* (B) *Absidia*  
(C) *Phytophthora* (D) *Neurospora*
261. Ribozyme was first discovered in  
(A) *Entamoeba histolytica* (B) *Plasmodium falcifarum*  
(C) *Tetrahymena thermophila* (D) *Leishmania major*
262. *Saccharomyces cerevisiae* grows by  
(A) binary fission  
(B) budding  
(C) hyphal growth  
(D) hyphal growth followed by fragmentation
263. An encapsulated bacterium can be virulent because the capsule  
(A) resists phagocytosis (B) is an endotoxin  
(C) destroys host tissue  
(D) is an exotoxin
264. *Helicobacter pylori* uses urease to counteract a chemical defense in the human organ in which it lives. This chemical defense is against  
(A) lysozyme (B) hydrochloric acid  
(C) superoxide radicals (D) sebum
265. Worldwide, the primary method for transmitting HIV is  
(A) homosexual sex (B) heterosexual sex  
(C) use of injecting drugs (D) blood transfusions
266. Bacteria without cell wall belong to  
(A) *Mycoplasma* (B) *Rickettsia*  
(C) *Bacteroidetes* (D) *Halophiles*
267. The enzyme useful in the conversion of penicillin G to 6-aminopenicillanic acid (6-APA)  
(A) penicillin acylase (B) penicillinase  
(C) carboxypeptidase (D) aminopeptidase

268. Penicillin is not effective against  
(A) *Bacillus cereus* (B) *Staphylococcus aureus*  
(C) *Streptococcus pyogenes* (D) *Mycoplasma genitalis*
269. Endotoxin is responsible for symptoms caused by  
(A) *Neisseria meningitidis* (B) *Streptococcus pyogenes*  
(C) *Listeria monocytogenes* (D) *Clostridium tetani*
270. A patient with nausea, vomiting and diarrhea within 5 hours after eating most likely has  
(A) shigellosis (B) cholera  
(C) *E. coli* gastroenteritis (D) staphylococcal food poisoning
271. Dolipore septa and clamp connections are found in  
(A) *Aspergillus niger* (B) *Agaricus bisporus*  
(C) *Absidia corymbifera* (D) *Acremonium alabamensis*
272. A bacterium used in the transfer of genes into plant cells is  
(A) *Agrobacterium tumefaciens* (B) *Allorhizobium undicola*  
(C) *Azotobacter vinelandii* (D) *Azospirillum brasilense*
273. Archaeal cell walls contain  
(A) murein (B) pseudomurein  
(C) peptidoglycan (D) chitin
274. In cellulose, D-glucose units are linked by  
(A)  $\alpha$ -1,4- glycosidic linkage (B)  $\beta$ -1,4- glycosidic linkage  
(C)  $\alpha$ -1,3- glycosidic linkage (D)  $\alpha$ -1,6-glycosidic linkage
275. The source of Taq DNA polymerase is *Thermus aquaticus* that belong to  
(A) Archaea (B) Bacteria  
(C) Actinobacteria (D) Firmicutes
276. The most important region in the atmosphere for microbial dispersal is  
(A) stratosphere (B) troposphere  
(C) ionosphere (D) strato-ionosphere
277. Raffinose is a trisaccharide made of  
(A) glucose, fructose and galactose (B) fructose, fructose, glucose  
(C) fructose, glucose, glucose (D) galactose, glucose, fructose

278. When one mole of glucose is metabolized through anaerobic metabolism, moles of ATP formed are  
 (A) 36-38 (B) 16-18  
 (C) 1-2 (D) 24-36
279. Lignin is made of  
 (A) sugar units (B) phenylpropanoid units  
 (C) amino sugar units (D) benzene units
280. Paper is made of  
 (A) hemicellulose (B) lignin  
 (C) cellulose (D) hemicellulose and lignin
281. Thermophiles are found in  
 (A) bacteria only (B) archaea only  
 (C) bacteria and archaea only (D) prokaryotes as well as eucaryotes
282. The enzyme  $\beta$ -galactosidase hydrolyzes  
 (A) lactose to glucose and galactose (B) sucrose to glucose and fructose  
 (C) maltose to two moles of glucose (D) cellobiose to two moles of glucose
283. The enzyme used in the manufacture of cheese for milk coagulation is  
 (A) neutral protease (B) acidic protease  
 (C) alkaline protease (D) metalloprotease
284. The first recombinant therapeutic protein commercialized was  
 (A) interferon (B) streptokinase  
 (C) somatostatin (D) insulin
285. An example of aminoglycoside antibiotic is  
 (A) streptomycin (B) penicillin  
 (C) amphoterecin (D) rifampicin
286. The microbes found in the atmosphere are  
 (A) autochthonous  
 (B) allochthonous  
 (C) allochthonous as well as autochthonous  
 (D) neither allochthonous nor allochthnous
287. Thermal vents are found in  
 (A) lakes (B) rivers  
 (C) oceans (D) streams

288. An example of bacterium that displays Chinese letter like arrangement of cells is  
 (A) *Pseudomonas aeruginosa* (B) *Klebsiella pneumoniae*  
 (C) *Corynebacterium diphtheriae* (D) *Bacillus subtilis*
289. Magnetotaxis in certain bacteria is due to the presence of  
 (A) Manganese granules (B) Magnesium granules  
 (C) Magnetite particles (D) polyphosphate granules
290. If the specific growth rate of a bacterium is  $0.15 \text{ h}^{-1}$ , its generation time would be  
 (A) 4 h 37 min (B) 1 h 37 min  
 (C) 2 h 37 min (D) 3 h 37 min
291. *Pichia pastoris* belongs to  
 (A) Basidiomycetes (B) Ascomycetes  
 (C) Chytridiomycetes (D) Zygomycetes
292. Root-inducing plasmid (Ri-plasmid) is found in  
 (A) *Agrobacterium tumefaciens* (B) *A. rhizogenes*  
 (C) *A. atlanticum* (D) *A. stellatum*
293. Mycoprotein 'Quorn<sup>R</sup>' is manufactured using  
 (A) *Fusarium venenatum* (B) *F. oxysporum*  
 (C) *F. culmorum* (D) *F. tricinctum*
294. The most commonly used substrate for solid state fermentation is  
 (A) wheat straw (B) rice straw  
 (C) corn cobs (D) wheat bran
295. The dirt blasters in detergents refer to  
 (A) enzymes such as alkaline protease (B) builders that act as water softeners  
 (C) sequestering agents (D) bleaches
296. The most common edible button mushroom is  
 (A) *Marcella deliciosa* (B) *Tuber melanosporum*  
 (C) *Pleurotus ostreatus* (D) *Agaricus bisporus*
297. The typhoid causing bacterium *Salmonella typhi* is spread through  
 (A) Water and food (B) air  
 (C) soil (D) skin

298. *Lactobacillus plantarum* is  
(A) gram-positive (B) gram-negative  
(C) gram variable (D) gram insensitive
299. The wilt of pigeon pea is caused by  
(A) *Fusarium graminearum* (B) *F. udum*  
(C) *F. oxysporum* (D) *F. culmorum*
300. The exopolysaccharide xanthan gum is manufactured using  
(A) *Xanthomonas maltophila* (B) *X. oryzae*  
(C) *X. vasicola* (D) *X. campestris*