

**M.Phil./Ph.D. ADMISSION TEST, 2019 & 2020****Paper II****Subject : 132 - MICROBIOLOGY**

Roll No. (In figures) .....(In words) .....

OMR Sheet Barcode No. ....

Signature of Invigilators 1.....2. ....

Names of Invigilators 1.....2. ....

Time : 2 Hours

Max. Marks : 200

**GENERAL INSTRUCTIONS**

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| <p>1. Read the instructions given on the Question Booklet and OMR Sheet before starting the answers. All the entries should be filled by <b>blue or black ball point pen.</b></p> <p>2. The Question Booklet contains <b>100</b> questions and all questions are compulsory.</p> <p>3. Each question is of <b>2</b> marks. There is <b>no negative marking.</b></p> <p>4. Candidates must ensure that the Question Booklet issued to them has all the questions. Defective Question Booklet can be got changed within <b>10</b> minutes.</p> | <p>1. प्रश्नों के उत्तर लिखने से पूर्व प्रश्न-पुस्तिका और ओ. एम.आर.शीट पर दिये हुए निर्देश पढ़ें। सभी प्रविष्टियाँ नीले अथवा काले बॉल पॉइन्ट पेन से भरें।</p> <p>2. प्रश्न - पुस्तिका में <b>100</b> प्रश्न हैं और सभी प्रश्न अनिवार्य हैं।</p> <p>3. प्रत्येक प्रश्न <b>2</b> अंक का है। कोई नकारात्मक अंकन (<b>negative marking</b>) नहीं होगा।</p> <p>4. परीक्षार्थी सुनिश्चित कर लें कि उन्हें जो प्रश्न-पुस्तिका दी गई है उसमें सभी अंकित हैं। त्रुटिपूर्ण प्रश्न-पुस्तिका <b>10</b> मिनट की अवधि में बदलवाई जा सकती है।</p> |
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- 1- The concept of "Three domains of life" was proposed by :
- (A) R.H. Whittaker  
(B) Carl Woese  
(C) T. Cavalier - Smith  
(D) H.F. Copeland
- 2- Buffering capacity of a buffer is maximum at pH equal to:
- (A) 2 pKa of the buffer  
(B) 0.5 pKa of the buffer  
(C) pKa of the buffer  
(D) pKa +1 of the buffer
- 3- Staphylococci are routinely differentiated from Streptococci by:
- (A) Catalase test  
(B) Coagulase test  
(C) Phosphatase test  
(D) Gram staining
- 4- Which of the following disaccharides does not show correct glycosidic bond between its monomer units?
- | <u>Dissachride</u> | <u>Glycosidic bond</u>    |
|--------------------|---------------------------|
| (A) Cellobiose     | $\beta(1 \rightarrow 4)$  |
| (B) Lactose        | $\beta(1 \rightarrow 4)$  |
| (C) Trehalose      | $\alpha(1 \rightarrow 1)$ |
| (D) Maltose        | $\beta(1 \rightarrow 4)$  |
- 5- Which of the following is not correctly matched?
- (A) Oleic acid : 18 carbon atom, monounsaturated fatty acid  
(B) Sphingomyelins : Glycolipids  
(C) Isoleucine : Amino acid with nonpolar side chain  
(D) L - Fucose : Hexose deoxysugar
- 6- The glycosidic bond conformation in 'Z'-DNA is:
- (A) "Syn" for both purines and pyrimidines  
(B) "Anti" for both purines and pyrimidines  
(C) "Anti" for purines and "Syn" for pyrimidines  
(D) "Syn" for purines and "anti" for pyrimidines
- 7- Common enzyme for glycolysis and gluconeogenesis is:
- (A) Pyruvate Kinase  
(B) Glyceraldehyde - 3 - phosphate dehydrogenase  
(C) Hexokinase  
(D) Pyruvate carboxylase
- 8- DPT vaccine is used for immunisation against which of the following diseases?
- (A) Diphtheria, Polio, tetanus  
(B) Diarrhoea, pertussis, typhoid  
(C) Diphtheria, plague, tuberculosis  
(D) Diphtheria, pertussis, tetanus

- 17- Which of the following is not true statement with regard to mycoplasmas?
- (A) They lack cell wall and are penicillin resistant.
- (B) They are one of the smallest bacteria capable of self reproduction.
- (C) They have high G+C content and are Gram positive.
- (D) When grown on agar, most species form colonies with a 'fried egg' appearance.
- 18- Which one of the following is not correct match between the bacteriophage and its' genetic material?
- (A) M13 bacteriophage : Circular, single stranded DNA
- (B)  $\lambda$  - Phage : Linear, double stranded DNA
- (C) T4 bacteriophage :  
Linear, double stranded DNA
- (D) Phage - Mu :  
Circular, double stranded DNA
- 19- Which of the following statement is true?
- (A) The  $\lambda$  - phage is a virulent phage
- (B) The phage - Mu is a transposon
- (C) M13 bacteriophage is an icosahedral phage
- (D) The T4 bacteriophage is a temperate phage
- 20- Beef extract in the biological culture media provides :
- (A) Vitamins and minerals
- (B) Amino acids and peptides
- (C) Nucleotides and organic acids
- (D) All of the above
- 21- Which of the following is not an autoimmune disease?
- (A) Lesch - Nyhan syndrome
- (B) Grave's disease
- (C) Insulin dependent diabetes mellitus (IDDM)
- (D) Rheumatoid arthritis
- 22- Which of the following classes of fungi is not correctly matched with their representative genus?
- (A) Oomycetes : Phytophthora
- (B) Zygomycetes : Aspergillus
- (C) Ascomycetes : Candida
- (D) Basidiomycetes : Agaricus
- 23- An algae having chlorophyll-a, as principal photosynthetic pigment, floridean starch as storage product and lacking flagellated motile cells, belongs to class:
- (A) Chlorophyceae
- (B) Xanthophyceae
- (C) Phaeophyceae
- (D) Rhodophyceae

- 32- The genome of SARS - COV - 2 (COVID-19/Corona) virus contains :
- (A) Single stranded (+) RNA
  - (B) Double stranded RNA
  - (C) Single stranded DNA
  - (D) Single stranded (-) RNA
- 33- Bundle sheath cells in  $C_4$  photosynthetic plants:
- (A) Are rich in PEP carboxylase enzyme
  - (B) Lack RuBP carboxylase - oxygenase (RuBisCO) enzyme
  - (C) Lack both PEP carboxylase and RuBP carboxylase- oxygenase (RuBisCO) enzymes
  - (D) Are rich in RuBP carboxylase - oxygenase (RuBisCO)
- 34- The exact point where nucleotides are being added to growing daughter strands during DNA replication are called :
- (A) The origin.
  - (B) The double helix.
  - (C) The replication fork.
  - (D) The template.
- 35- The conversion of a gene's nucleotide sequence into a protein is called:
- (A) Transcription
  - (B) Translation
  - (C) The genome
  - (D) Gene expression
- 36- Which of the following statements is TRUE?
- (A) Bacterial genes have a promoter region, but eukaryotic genes do not.
  - (B) Bacteria do not use an RNA polymerase enzyme, but eukaryotes do.
  - (C) Eukaryotes must splice introns out of RNA following transcription.
  - (D) Only bacteria use the RNA nucleotide Uracil.
- 37- What is the function of transfer RNA?
- (A) It carries amino acids into a growing protein chain, as specified by codons in the messenger RNA.
  - (B) It "transfers" the information encoded in a gene to a ribosome.
  - (C) It permits messenger RNA to detach from the ribosome when protein synthesis is complete.
  - (D) It forms part of a ribosome's structure.
- 38- Which of the following is not required when recombination is considered at the molecular level in *E. coli*?
- (A) Nicking of the sugar phosphate backbone
  - (B) RNA synthesis
  - (C) Strand displacement
  - (D) Ligation of the sugar-phosphate backbone
- 39- The wobble hypothesis states that
- (A) There are too many tRNAs present to account for the number of amino acids
  - (B) tRNAs wobble when attached to an mRNA
  - (C) Several mRNA codons may pair with a single transfer RNA
  - (D) An mRNA codon can pair with only a single transfer RNA

- 50- Which of the following type of vaccine did the Moderna and Pfizer-BioNtech companies designed for COVID-19?
- (A) Vector borne vaccine  
(B) Subunit vaccine  
(C) mRNA vaccine  
(D) Toxoid vaccine
- 51- The first successful active insulin was synthesized in \_\_\_\_\_
- (A) 1972 (B) 1975  
(C) 1977 (D) 1980
- 52- Which of the following bacteria cannot fix atmospheric nitrogen?
- (A) Oscillatoria (B) Anabaena  
(C) Nostoc (D) Lactobacillus
- 53- Which of the following is generally not considered a potential agent of bioterrorism and biologic warfare?
- (A) Bacillus anthracis  
(B) Streptococcus Pyogenes  
(C) Botulinum toxin  
(D) Yersinia pestis
- 54- Which of the following microbe is used in the production of blue cheese?
- (A) Penicillium roqueforti  
(B) Streptococcus thermophilus  
(C) Rhizopus stolonifer  
(D) Lactobacillus bulgaricus
- 55- Which of the following method is used for rapid detection of presence of food pathogens?
- (A) Swab method  
(B) Streak technique  
(C) PCR  
(D) Pour plate method
- 56- The optimum pH for the growth of most bacteria lies between \_\_\_\_\_
- (A) 2-3.5 (B) 6.5-7.5  
(C) 9-9.5 (D) 11-11.5
- 57- What type of substrate is required for growing oyster mushroom?
- (A) Wheat straw (B) Maize waste  
(C) Oil seed waste (D) All the above
- 58- Which of the bacteria is present in raw or undercooked meat, eggs, sea food and unpasteurized milk?
- (A) E. Coli  
(B) Salmonella  
(C) Staphylococcus  
(D) Pseudomonas
- 59- A deadly food-borne illness from improperly canned foods is caused by:
- (A) Salmonella typhi  
(B) Clostridium perfringens  
(C) Clostridium botulinum  
(D) Staphylococcus aureus

- 68- Which of this statement is correct for Coliform bacteria.
- (A) Grow in the intestines of people and warm-blooded animals.
- (B) Respond to water treatment differently than do most other pathogens
- (C) Exist only in water that contains pathogens
- (D) All of the above
- 69- Volcano disturbs mainly which of these cycles?
- (A) Carbon (B) Phosphorous
- (C) Nitrogen (D) Sulphur
- 70- Which of these microbes is capable of oxidising sulfur to sulfate?
- (A) Thiobascillus
- (B) Desulfotomaculum
- (C) Rhodosprillum
- (D) Rhodomicrobium
- 71- In which form is water the purest?
- (A) Solid ice
- (B) Clear liquid
- (C) Steam vapor
- (D) Combination of ice and water
- 72- What do we call the increase in concentration of heavy metals and pesticides in an organism?
- (A) biomagnification
- (B) Eutrophication
- (C) bioremediation
- (D) bioaccumulation
- 73- Using standard water sampling techniques, how would you verify the origin of point-source pollution in a stream?
- (A) Test for O<sub>2</sub>
- (B) Test downstream
- (C) Test upstream
- (D) Test above and below the suspected source
- 74- The test for turbidity describes what characteristics of water?
- (A) odor
- (B) suspended material in the water
- (C) mineral concentration of the water
- (D) metal concentration of the water
- 75- In Ex situ bioremediation?
- (A) degradation of pollutants occurs directly.
- (B) degradation of pollutants by genetically modified microorganism.
- (C) removal of pollutants and collection at a place to facilitate microbial degradation
- (D) degradation by hydrolysis of pollutants
- 76- A halophile ...
- (A) is heat-loving
- (B) grows at pH=0
- (C) thrives in high salt.
- (D) is cold-loving.

83. In a study subjects are randomly assigned to the three groups - control, experimental A and experimental B. After treatment the mean score for these three groups need to be compared. Which test will be appropriate for comparing these means?

- (A) ANOVA
- (B) Correlation coefficient.
- (C) Chi square test.
- (D) Paired t Test.

84. When you through two coins, find the probability of getting both heads?

- (A) 0/0                      (B) 1/2
- (C) 1/4                      (D) 3/4

85. What is mean deviation from the mean for given data?

156	206	198	156	117
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Correct answer is?

- (A) 0                      (B) 1/2
- (C) 1                      (D) 3

86. Which endonuclease cleaves both single and double stranded DNA molecules, in a non-specific manner?

- (A) S1                      (B) Bal31
- (C) DNase I              (D) BamHI

87. The restriction endonuclease Pvu I cuts DNA at which position?

- (A) Hexanucleotide CGATCG
- (B) Hexanucleotide AAGCTT
- (C) Hexanucleotide GGATTC
- (D) Hexanucleotide CAGCTG

88. There is a sequence region of 507 nucleotides in M13 where the foreign DNA can be inserted. This sequence is called?

- (A) Inverted repeat
- (B) Palindromic
- (C) Intergenic
- (D) Interstitial

89. A genomic library is a collection of?

- (A) Genes                  (B) Proteins
- (C) Vectors                (D) Recombinants

90. Which of these statements correctly define touch down PCR?

- (A) uses mRNA as a template to form mDNA
- (B) clones are analysed for correct ligation products
- (C) reduce nonspecific primer binding by decreasing the annealing temperature between two cycles
- (D) Use SNP containing 3' end

91. What will be the applied centrifugal field at the point 5cm from the centre of rotation when angular velocity is  $3000 \text{ rads}^{-1}$

- (A)  $4.5 \times 10^{-7} \text{ cmS}^{-2}$
- (B)  $5.4 \times 10^{-7} \text{ cmS}^{-2}$
- (C)  $3.4 \times 10^{-7} \text{ cmS}^{-2}$
- (D)  $6.5 \times 10^{-7} \text{ cmS}^{-2}$

SPACE FOR ROUGH WORK/ रफ कार्य के लिए जगह