P.G. ENTRANCE EXAMINATION-2017

SUBJECT : BIOTECHNOLOGY (SET-A)

Roll Number.....

Signature of the Candidate *Signature of the Invigilator*

Date..... Date.....

Full Marks : 100 **Time : 2 hours**

INSTRUCTIONS

1. Fill in your Roll No. in appropriate space provided in the question Booklet and OMR Answer Sheet. Fill in the subject code in the place provided in the OMR Answer Sheet.
2. Answer all questions. Darken the answers (A, B, C, D) in **Blue or Black ball point pen**.
3. Unless otherwise indicated, the questions are of equal value.
4. There is negative marking in the entrance test. For each wrong answer 0·25 marks will be deducted.
5. The questions are of multiple choice types. Darken the most appropriate answer out of four choices (A), (B), (C) and (D) given for the respective question on the answer sheet as shown in the example below.

Example :

Question 1 : Eight multiplied by eight is

(A) 32 (B) 64

(C) 48 (D) 56

Answer Sheet:

(A)	(B)	(C)	(D)
○	●	○	○

Important : Please write the answer exactly the way it is shown above in the example. Writing more than one answer will be treated as wrong/cancelled.

Space for rough work is given at the end of this booklet.

P.G. BIOTECHNOLOGY (SET-A)

1. Antibody which can cross placenta and are involved in allergic reaction, respectively are

   (A) IgG and IgA
   (B) IgM and IgE
   (C) IgG and IgE
   (D) IgD and IgM

2. Mast cells have receptor for

   (A) IgE
   (B) IgA
   (C) IgG
   (D) IgM

3. Which of the following does not provide life time protection

   (A) Polio
   (B) Tetanus
   (C) DPT
   (D) Small pox

4. Lymphatic system are primarily associated with

   (A) Lymph recycling
   (B) Phagocytosis
   (C) Aquired immunity
   (D) Innate immunity

5. Macrophages are classified as

   (A) APCs
   (B) Lymphocytes
   (C) CDs
   (D) Regulatory cells

6. Cyclosporine is used as

   (A) Allergic eczema
   (B) Immunosuppressant
   (C) Prophylactic for viruses
   (D) Prophylactic for marasmus

7. The segment of antigen that are specifically recognised by individual antibody is known as

   (A) Epitopes
   (B) Memory regions
   (C) Non-determinants
   (D) Self limitation

8. Hole forming proteins called perforins are produced by

(A) Helper T cells
(B) Regulatory cells
(C) Cytotoxic cells
(D) All of these

9. The movement of chloride ions into erythrocytes from the plasma to maintain osmotic balance during transport of gases is known as :

(A) Chlorination
(B) CO_2 transport
(C) Bicarbonate shift
(D) Hamburger phenomenon

10. During body activity or exercise, the burning of glucose or the expenditure of energy increases excessively due to which one goes out of breath. This is called :

(A) Fatigue
(B) Shivering
(C) Oxygen debt
(D) Muscular atropy

11. During diastole, the heart is filled with

(A) Mixed blood
(B) Venous blood
(C) Oxygenated blood
(D) Deoxygenated blood

12. Lymph vessels are united to form

(A) Lymph heart
(B) Jugular vein
(C) Cistern chyle
(D) Thoracic duct

13. The glomerular filtrate i.e. the liquid collected in the cavity of Bowman's capsule is :

(A) Blood minus protein
(B) Blood minus proteins and corpuscles
(C) Water
(D) Urine

(*Continued*)

14. Which vitamin is required for rhodopsin

(A) C (B) B_2 (C) D (D) A

15. Which part of the brain is involved in loss of control when a person drinks alcohol ?

(A) Thallamus (B) Cerebrum

(C) Pons varolli (D) Cerebellum

16. Koch's greatest accomplishment in medical bacteriology was his discovery of causal agent of

(A) Cholera (B) Anthrax

(C) Tuberculosis (D) Diptheria

17. The lipids of archea differs from eubacteria in having

(A) Ester linkages of fatty acid and glycerol

(B) Ether linkages of fatty acid and glycerol

(C) Ether linkages between glycerol and their hydrophobic side chains

(D) Both ester and ether linkages between glycerol and their hydrophobic side chains

18. Endotoxins produced by many Gram negative bacteria are associated with

(A) Peptidoglycan layer (B) LPS layer

(C) Periplasmic space (D) Teichoic acid layer

19. Antibiotic penicillin becomes catalytically inactive by binding to penicillin binding protein present

(A) in the periplasm of Gram negative bacteria

(B) in the cell membrane of Gram negative bacteria

(C) in the outer LPS layer

(D) None of the above

(*Turn Over*)

20. Polio virus is

(A) Negative strand RNA virus
(B) Positive strand RNA virus
(C) Double stranded DNA virus
(D) Single stranded DNA virus

21. Reverse electron flow during photosynthesis is a feature associated with

(A) Purple bacteria
(B) Green bacteria
(C) Helio bacteria
(D) Archae bacteria

22. Autotrophic prokaryotes that use Calvin cycle produce polyhedral cell inclusions called

(A) PHB granules
(B) Carboxysomes
(C) Liposomes
(D) Glyoxysomes

23. Nucleic acids in viriods is

(A) Circular single stranded RNA
(B) Linear single stranded RNA
(C) Circular single stranded DNA
(D) Linear double stranded DNA

24. A multinucleate cell is called

(A) Coenobium
(B) Thallus
(C) Synchytrium
(D) Coenocyte

25. Which of the following is an exception to cell theory

(A) Fungi (B) Virus (C) Bacteria (D) Lichen

26. The chemical substrate abundantly present in middle lamella is

(A) Suberin (B) Pectin (C) Cutin (D) Lignin

(*Continued*)

27. Fuelgen stain is used for staining

(A) DNA
(B) RNA
(C) Both DNA and RNA
(D) Histones

28. Cell organelles can be separated by the method of

(A) Autoradiography
(B) Microtomy
(C) Differential centrifugation
(D) X-ray diffraction

29. One molecule of ATP when hydrolysed yields energy

(A) 14·0 Kcal
(B) 3·5 Kcal
(C) 7·3 Kcal
(D) 11·0 Kcal

30. The structure of chromosome can be best seen at

(A) Prophase
(B) Metaphase
(C) Anaphase
(D) Telophase

31. A cross between F1 hybrid and recessive parent ($Tt \times tt$) gives offsprings in the ratio of

(A) 1:1
(B) 2:1
(C) 3:1
(D) None of these

32. 9:3:4 ratio obtained incase of

(A) Dominant epistasis
(B) Recessive epistasis
(C) Collaborator gene interaction
(D) Complementary gene interaction

33. A man homozygous for blood group A marries a woman with blood group AB. What type of blood group can be expected in the offspring

(A) AB
(B) A,AB
(C) B
(D) B,AB

(*Turn Over*)

34. In a biochemical reaction catalysed by enzymes A, B and C having K_m 12 μM, 25 μM and 100 μM respectively, the rate of reaction will primarily be limited by

(A) A
(B) B
(C) C
(D) Equally by all three enzymes

35. In a enzyme catalysed reaction operating at V_{max}, a 15% increase in substrate concentration will increase V_{max} by

(A) 15%
(B) 50%
(C) Slightly increase the rate
(D) No change in V_{max}

36. When both inhibitor and substrate are competing for the active site, increase in substrate concentration at a fixed concentration of inhibitor will

(A) Increase V_{max}
(B) Increase Km
(C) Increase V_0
(D) Decrease K_I

37. An enzyme catalysed reaction is faster than an uncatalysed reaction

(A) It can occur at low substrate concentration
(B) Presence of enzyme reduces ΔG
(C) Presence of enzyme reduces ΔG^+
(D) All of the above

38. Which of the following can be determined from a reciprocal plot of Michelis-Menten kinetic equation

(A) Km
(B) Vmax
(C) V with respect to [S]
(D) All the above

39. Increase in concentration of non-competitive inhibitor will

(A) Increase K_I
(B) Reduce Vmax
(C) Decrease K_I
(D) Reduce Km

(*Continued*)

40. In a sample of 100 data points, the standard error will be 0·2 when the variance is

(A) 2 (B) 4 (C) 20 (D) 0·002

41. The deviation between a normal frequency polygon and observed frequency polygon is called

(A) Skewness
(B) Type I-error
(C) Type II-error
(D) Dissimilarity

42. When there are ten sets of data, the variation among them can be calculated

(A) χ^2 test
(B) correlation
(C) regression
(D) F-test

43. The slope of linear regression is calculated from the equation (when d = variance, x & y are variables)

(A) d_{xy}/d_x^2 (B) d_{xy}/d_y^2 (C) d_x^2/d_y^2 (D) d_y^2/d_{xy}

44. When calculated t value between two samples is zero, it indicates that

(A) Both samples have same variance
(B) Both samples have same mean
(C) The pooled variance is zero
(D) None of the above

45. Two mutually exclusive events with equal probability of occurrence will obey the principles of

(A) Binomial distribution
(B) Exponential distribution
(C) Poisson distribution
(D) Sigmoid distribution

46. χ^2 test is a

(A) Parametric test
(B) Non-parametric test
(C) Accessibility test
(D) Deterministic test

(*Turn Over*)

47. The most important discovery that lead to the development of rDNA technology was

(A) Double helix model of Watson and Crick

(B) Discovery of restriction enzymes

(C) Discovery of ligase enzyme

(D) Discovery of plasmids

48. A recombinant DNA molecule is produced by Recombinant DNA Technology

(A) joining of two DNA fragments

(B) joining of two or more DNA fragments

(C) Both (A) and (B)

(D) joining of two or more DNA fragments originating from different organisms

49. Which of the following is a thermo stable DNA polymerase

(A) Taq polymerase

(B) Vent polymerase

(C) pfu polymerase

(D) All of these

50. The RNA strand in the RNA-DNA hybrid is removed by

(A) RNA se

(B) RNase-H

(C) Nuclease

(D) None of these

51. Which of the following technique is most suitable for gene product

(A) Dot blotting

(B) Southern blotting

(C) Plaque blotting

(D) Western Blotting

52. A non-directed physic chemical interaction between heavy metal ions and microbial surface is called

(A) Biotransformation

(B) Bioconversion

(C) Biosorption

(D) Biomining

(Continued)

53. Eukaryotes differ from prokaryote in mechanism of DNA replication due to

(A) Different enzyme for synthesis of lagging and leading strand

(B) Use of DNA primer rather than bidirectional replication

(C) Discontinuous rather than semi-discontinuous replication

(D) Unidirectional rather than bi-directional replication

54. Peptide bond formation between amino acids of growing polypeptide chain is catalysed by

(A) Peptidyl synthetase

(B) Peptidyl transferase

(C) Peptidyl polymerase

(D) Amino acyl-tRNA synthetase

55. Which of the following elongation factor is called as translocase

(A) EF2

(B) EFG

(C) Both (A) and (B)

(D) EF-Tu and EF-Ts

56. Which of the following release factor recognises stop codons UGA and UAA

(A) Sigma factor

(B) RF1

(C) RF2

(D) RF3

57. In prokaryotes, the ribosomal binding site on mRNA is called

(A) Hogness sequence

(B) Shine-Dalgarno sequence

(C) Pribnow sequence

(D) Palindromic sequence

58. HSP 60 and 70 are proteins involved in

(A) Initiation of translation

(B) Elongation of translation

(C) Termination of translation

(D) Protein folding

59. Probiotics are

(A) Cancer inducing microbes
(B) Safe antibiotics
(C) New kind of food allergens
(D) Live microbial food supplements

60. Elicitors are molecules that

(A) Induce cell division
(B) Stimulate production of secondary metabolites
(C) Stimulate hairy root formation that accumulate secondary metabolites
(D) None of these

61. DNA molecules, identical except for different numbers of superhelical turns are called

(A) Chain isomers
(B) Topoisomers
(C) Helical isomers
(D) Geometrical isomers

62. DNA repair mechanism is absent in

(A) Nuclear DNA
(B) Mitochondrial DNA
(C) Chloroplast DNA
(D) Both (B) and (C)

63. Climax communities :

(A) Are more diverse than pioneer communities
(B) Have greater entropy than pioneer communities
(C) Are less stable than pioneer communities
(D) Have a large number but fewer species of plants than pioneer communities

64. Which of the following matches is correct

(A) Succession on rock-Psammosere
(B) Succession on sand-Halosere
(C) Succession on water-Hydrosere
(D) Succession on Salt marsh-Lithosere

(Continued)

65. Which is the correct sequence of how nitrogen is passed through its cycle ?

(A) Denitrification, nitrate formation, fixation

(B) Fixation, nitrate formation, denitrification

(C) Fixation, denitrification, nitrate formation

(D) Nitrate formation, fixation, denitrification

66. Carbon dioxide makes up approximately what percentage of the atmosphere ?

(A) 0·03% (B) 0·47% (C) 21% (D) 78%

67. Water pollution is best assessed by determining :

(A) DO and BOD

(B) BOD and turbidity

(C) DO and acidity

(D) Hardness and alkalinity

68. Milk is deficient of which mineral ?

(A) Phosphorus

(B) Sodium

(C) Iron

(D) Potassium

69. All the following processes occur rapidly in the membrane lipid bilayer except

(A) Flexing of fatty acyl chains

(B) Lateral diffusion of phospholipids

(C) Transbilayer diffusion of phospholipids

(D) Rotation of phospholipids around their long axes

70. α-D-glucose and β-D-glucose are

(A) Stereoisomers

(B) Epimers

(C) Anomers

(D) Keto-aldo pairs

71. Proteins are soluble in

(A) Anhydrous acetone
(B) Aqueous alcohol
(C) Anhydrous alcohol
(D) Benzene

72. The a-helix of proteins is

(A) A pleated structure
(B) Made periodic by disulphide bridges
(C) A non-periodic structure
(D) Stabilised by hydrogen bonds between NH and CO groups of the main chain

73. Phospholipid acting as surfactant is

(A) Cephalin
(B) Phosphatidyl inositol
(C) Lecithin
(D) Phosphatidyl serine

74. The end products of saponification :

(A) Glycerol
(B) Acid
(C) Soap
(D) Both (A) and (C)

75. An inducer is absent in the type of enzyme :

(A) Allosteric enzyme
(B) Constitutive enzyme
(C) Co-operative enzyme
(D) Isoenzyme enzyme

76. A non-functional plasma enzyme is :

(A) Psudocholinestearse
(B) Lipoprotein lipase
(C) Proenzyme of blood coagulation
(D) Lipase

77. Vitamin B_2 is component of coenzyme :

(A) Pyridoxal phosphate
(B) TPP
(C) NAD
(D) FMN/FAD

(Continued)

78. The substrate for restriction enzyme is

(A) Single stranded RNA
(B) Cell wall proteins
(C) Double stranded DNA
(D) None of the above

79. Sanger method of sequencing involves use of

(A) Chemicals to cleave DNA
(B) ddNTP
(C) Pyridine
(D) Pyridoxine

80. Usually restriction mapping is done with

(A) Frequent cutters
(B) Restricted cutters
(C) Both of the above
(D) None of the above

81. Which of the following is used in transfection method ?

(A) PEG
(B) Lipofection
(C) Chemicals such as lithium acetate, calcium phosphate, DEAE-dextran
(D) All of the above

82. Dideoxy DNA sequencing exclusively depends on one of the following

(A) Termination
(B) ATP
(C) Plasmid vectors
(D) Vector primer

83. Which of the following is not component of yeast artificial chromosome

(A) Centromere
(B) Telomere
(C) Origin of replication
(D) Cos site

(*Turn Over*)

84. A multiple cloning site

(A) Contain many copies of a cloned gene

(B) Allows flexibility in the choice of restriction enzymes for cloning

(C) Allows flexibility in the choice of organism for cloning

(D) Contains many copies of the same restriction enzyme site

85. The unusual property of Taq polymerase that is critical to the PCR is its

(A) Ability to use dNTPs as substrate

(B) Ability to use ddNTPs as substrate

(C) Thermostability

(D) Ability to use RNA as template

86. Which of the following has been most successful for the introduction of DNA into human cells for the purposes of gene therapy ?

(A) Microinjection of DNA sequences

(B) Use of recombinant retroviruses as vectors

(C) Use of bacterial plasmids

(D) Use of yeast plasmids

87. In restriction endonuclease EcoR1, 'E' stands for

(A) Endonuclease

(B) Excision

(C) The first letter of the genus in which it is present

(D) Extraction

88. A plant cell volume is decreased if the external medium is

(A) Hypotonic

(B) Hypertonic

(C) Isotonic

(D) All of these

(Continued)

89. Osmosis can also be referred as

(A) Diffusion of solute
(B) Diffusion of solvent
(C) Diffusion of solution
(D) Imbibition of solution

90. Besides root, a plant can absorb water through

(A) Hydathodes
(B) Lenticels
(C) Leaves
(D) Cuticle

91. Wilting of plant occurs when

(A) Xylem is blocked
(B) Phloem is blocked
(C) Cambium is removed
(D) Cortex is removed

92. The herbicide DCMU kills weeds because it inhibits

(A) Inhibits respiration
(B) Inhibits cell division
(C) Inhibits carbon dioxide fixation
(D) Inhibits water breakdown

93. A facultative parasite is one which

(A) Normally a saprophyte but become a parasite also
(B) Normally a parasite but become a saprophyte also
(C) Always require dead organic matter
(D) Always require a living host

94. Epiphytes are plant which are dependent on other plants for

(A) Water only
(B) Food only
(C) Water and food only
(D) Support

(*Turn Over*)

95. In respiratory electron transport chain the hydrogen is dissociated by

(A) NAD
(B) Cytochrome b
(C) FMN
(D) Coenzyme Q

96. The number of fatty acid molecules condensing with glycerol to form the simple lipid

(A) Four
(B) Three
(C) Two
(D) One

97. The glyoxylate cycle enumerates steps for the conversion of

(A) Carbohydrates to lipids
(B) Proteins to lipids
(C) Lipids to proteins
(D) Lipids to carbohydrates

98. Denitrifying bacteria are those which can convert

(A) Atmospheric nitrogen to ammonia
(B) Ammonia to nitrates
(C) Nitrites to nitrates
(D) Nitrates into nitrogen

99. The nitrate reduction occurs

(A) In the cytoplasm
(B) Inside the chloroplast
(C) Inside the nucleus
(D) On the ER

100. The mechanism by which the concentration of sugars is increased in the cells adjoining to the mesophyll cells is called

(A) Phloem loading
(B) Phloem unloading
(C) Source loading
(D) Sink unloading