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PHDURS-EE-2013

Sr. No.10005

(Subject : Medical Biotechnology)

Time : 1¹/₄ Hours

Max. Marks : 100

Total Questions : 100

Candidate's Name Date of Birth

Father's Name Mother's Name

Roll No.(In Figure) in words)

Date of Examination :

(Signature of the Candidate)

(Signature of the Invigilator)

CANDIDATES MUST READ THE FOLLOWING INFORMATION/INSTRUCTIONS BEFORE STARTING THE QUESTION PAPER.

1. All questions are compulsory and carry equal marks.
2. All the candidates **MUST** return the Question book-let as well as OMR answer-sheet to the Invigilator concerned before leaving the Examination Hall, failing which a case of use of unfair-means / misbehaviour will be registered against him/her, in addition to lodging of an FIR with the police. Further the answer-sheet of such a candidate will not be evaluated.
3. In case there is any discrepancy in any question(s) in the Question Booklet, the same may be brought to the notice of the Controller of Examinations **in writing within two hours** after the test is over. No such complaint(s) will be entertained thereafter.
4. The candidate **MUST NOT** do any rough work or writing in the OMR Answer-Sheet. Rough work, if any, may be done in the question book-let itself. Answers **SHOULD NOT** be ticked in the Question book-let.
5. Use **Black or Blue BALL POINT PEN** only in the OMR Answer-Sheet.
6. For each correct answer, the candidate will get full credit. Cutting, erasing, overwriting and more than one answer in OMR Answer-Sheet will be treated as incorrect answer. There will be no negative marking
7. **BEFORE ANSWERING THE QUESTIONS, THE CANDIDATES SHOULD ENSURE THAT THEY HAVE BEEN SUPPLIED CORRECT AND COMPLETE BOOKLET. COMPLAINTS, IF ANY, REGARDING MISPRINTING ETC. WILL NOT BE ENTERTAINED 30 MINUTES AFTER STARTING OF THE EXAMINATION.**

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1. The Fab portion of Ig
 - (1) Binds to an Fc receptor
 - (2) Contains the J. Chain
 - (3) Contains the idiotype of the Ig
 - (4) Mediates biological effector functions of Ab molecules (e.g. complement fixation)

2. The sedimentation velocity of a protein in a centrifuge does not depend on
 - (1) Charge of the protein
 - (2) Density of the solution
 - (3) Shape of the protein
 - (4) Mass of the protein

3. Which of the following statement is false about lac operon
 - (1) It was discovered by Jacob and Monod
 - (2) It has three structural genes
 - (3) c AMP - CAP exerts a negative regulatory effect on lac operon
 - (4) Repressor bound to operator site does not allow expression of lac operon

4. Which of the following is an unsaturated fatty acids with two double bonds.
 - (1) Oleic acid
 - (2) Palmitic acid
 - (3) Linoleic acid
 - (4) Stearic acid

5. During post-translational modifications of proteins which amino acid does not get phosphorylated
 - (1) Glutamate
 - (2) Threonine
 - (3) Serine
 - (4) Tyrosine

6. Lactose
 - (1) Has a free anomeric carbon on the glucose residue
 - (2) Has a free anomeric carbon on the galactose residue
 - (3) Has a free anomeric carbon on the glucose and galactose residue
 - (4) Has no free anomeric carbon

7. In which of the following tissues, glycogen is not stored
 - (1) Brain
 - (2) Skeletal muscle
 - (3) Heart muscle
 - (4) Adipose tissue

8. Which of the following enzyme is most abundant
- (1) PEP carboxylase
 - (2) Riulose-1,5 bisphosphate carboxylase
 - (3) Cellulase
 - (4) Aldolase
9. Northern blotting differ from Southern blotting in that
- (1) RNA molecule is used as a probes in Northern while DNA is used as a probes in Southern
 - (2) RNA molecule are used as targets in Northern while DNA in Southern
 - (3) DNA is electrophoresed in presence of denaturing agents while RNA is electrophoresed under non-denaturing agents
 - (4) RNA molecule are used as both probes and targets in Northern while DNA in Southern
10. The innate immune system is differing with an immunogenic, it will produce antibodies against it. The antibodies that will be produced after first immunization will mostly be
- (1) Low affinity antibodies of IgM isotype
 - (2) Mixture of IgM, IgG, IgA and IgE types of antibodies of various affinities
 - (3) Very high affinity antibodies of IgG isotype
 - (4) The nature of antibody that will be produced will be difficult to predict
11. ELISA is a technique where enzyme is added to test sample
- (1) Separately
 - (2) Separately in a denatured form
 - (3) Conjugated to an antibody
 - (4) Conjugated to an denatured antibody
12. The protein which complex with DNA producing the beads on string or nucleosomes are called
- (1) Kinases
 - (2) Proteases
 - (3) Spindle fibres
 - (4) Histones

13. RNA can be converted to complementary DNA by
- (1) Reverse transcriptase
 - (2) RNA polymerase
 - (3) Terminal transferase
 - (4) Poly A polymerase
14. Many of the energy reactions in living systems are oxidation – reduction reactions. Which one of the following is always transferred in a redox reaction
- (1) Hydrogen
 - (2) Oxygen
 - (3) Electron
 - (4) Proton
15. Lysozyme kills bacteria by destroying the
- (1) Cell wall
 - (2) Mitochondria
 - (3) Lipid bilayer
 - (4) Machinery for DNA replication
16. Antibody molecules are produced by
- (1) Virgin B lymphocytes
 - (2) T cells
 - (3) Plasma cells
 - (4) Macrophages
17. Which technique would most likely be used to produce large number of genetically identical offspring from a new variety of plants
- (1) PCR
 - (2) Hybridization
 - (3) Cloning
 - (4) Chromatography
18. Individual exposed to smallpox virus are immune to same disease due to
- (1) Presence of larger quantities of antibodies
 - (2) Presence of long lived memory cells
 - (3) Healthy life cycle
 - (4) Generation of antigen specific macrophages
19. The central dogma specifies that
- (1) DNA sequence encodes RNA sequence which encodes proteins
 - (2) RNA sequence encodes DNA sequence which encodes proteins
 - (3) DNA sequence encodes proteins which encodes RNA sequence
 - (4) Reverse transcriptase converts RNA to DNA

20. Which form of DNA has left – handed helix

- (1) A – form of DNA
- (2) B – form of DNA
- (3) C – form of DNA
- (4) D – form of DNA

21. Choose the correct set of matches between group I and group II

Group I	Group II
P. One extra copy of chromosome 13	1. Edward syndrome
Q. XO	2. Klinefelter Syndrome
R. XXY	3. Patau Syndrome
S. One extra copy of chromosome	4. Dawn Syndrome
	5. Turner Syndrome

- (1) P-1, Q-5, R-3, S-2
- (2) P-3, Q-5, R-2, S-4
- (3) P-2, Q-1, R-3, S-4
- (4) P-4, Q-1, R-2, S-5

22. The shape of cholesterol is

- (1) Planer
- (2) Globular
- (3) Cylindrical
- (4) Helical

23. The primer of lagging strand during DNA replication is removed by

- (1) 3' to 5' exonuclease activity of DNA pol III
- (2) DNA primase
- (3) 5' to 3' exonuclease activity of DNA pol I
- (4) 3' to 5' exonuclease activity of DNA pol I

24. The isoelectric point of a protein is defined as

- (1) The pH at which net charge on the molecule is zero
- (2) The pH at which all groups are protonated
- (3) The pH at which all groups are unprotonated
- (4) The pH at which each acidic group is protonated and each base group is unprotonated

25. Which one of the following is the major force of attraction that stabilizes the 3 dimensional structure of globular proteins

- (1) Peptide bond
- (2) Vander waals interactions
- (3) Hydrogen bond
- (4) Hydrophobic bond

26. A prophage is

- (1) An auxotrophic mutant
- (2) A gene
- (3) A phage DNA incorporated into the host genome
- (4) Host DNA packed into viral heads

27. How many types of gametes will be produced by individuals of AABbcc genotype
- (1) Two (2) Four
(3) Six (4) Nine
28. The tertiary structure of proteins is detected by
- (1) X-rays crystallography
(2) Spectrophotometry
(3) Electrophoresis
(4) Chromatography
29. Positional cloning refers to
- (1) Using selection procedure to clone a cDNA
(2) Cloning position of gene using PCR
(3) Isolating a gene by PCR using primers from another species
(4) Mapping a gene to chromosomal region and then identifying and cloning the genomic copy of the gene from the region
30. Splicing of GU-AG intron
- (1) Involves trans esterification reaction
(2) Occurs in prokaryotic mRNA
(3) Form Y shaped branch structure
(4) Require maturase activity
31. The large (Klenow) fragment of *E. coli* DNA polymerase I contain which of the following activities
- (1) Reverse transcriptase activity and nick translation activity
(2) Polymerase activity and 3'-5' - exonuclease activity
(3) Polymerase activity and nick translation activity
(4) 3'-5' exonuclease activity
32. In the cAMP pathway, G protein stimulates
- (1) Phospholipase C
(2) Adenylate
(3) The endoplasmic reticulum
(4) Calmodulin
33. In bacterial RNA synthesis, which of the following is a function of factor rho
- (1) Allow proper initiation of transcription
(2) Eliminate the binding of RNA polymerase to the promoter
(3) Participate in the proper termination of transcription
(4) Increase the rate of RNA synthesis

34. DNA helicase in *E.Coli*

- (1) Moves in the direction opposite to replication fork
- (2) Binds with template of the leading strand
- (3) Is a hexameric protein with ATPase activity
- (4) Catalyzes formation of primer

35. The melting temperature of DNA is

- (1) Directly proportional to the length of the DNA chain
- (2) Directly proportional to the GC content
- (3) Directly proportional to the AT content
- (4) Not related to base composition

36. Choose the mismatch

- (1) D-glucose and D-fructose : anomer
- (2) D-glucose and D-mannose : epimer
- (3) α -D-glucose and β -D-glucose : anomer
- (4) D-glucose and L-glucose : enantiomer

37. Which of the following lipids have net negative charge

- (1) Phosphatidylcholine
- (2) Cholesterol
- (3) Phosphatidylserine
- (4) Phosphatidylethanolamine

38. Most abundant lipid in plasma membrane

- (1) Cholesterol
- (2) Phosphoglyceride
- (3) Cerebroside
- (4) Phospholipids

39. Zymogen is

- (1) The active form of enzyme
- (2) The complex formed between enzyme and its substrate
- (3) The inactivated form of enzyme activated by cleavage
- (4) The unfolded form of enzyme

40. Which of the following is a cofactor and not a coenzyme

- (1) Biotin
- (2) Tetrahydrofolic acid
- (3) Copper
- (4) Methylcobalmin

41. The enzyme following Michaelis-Menten kinetics show a characteristic graph when substrate conc. is plotted against velocity, the nature of graph will be
- (1) Sigmoidal
 - (2) Parabolic
 - (3) Hyperbolic
 - (4) Straight line
42. Which of the following regulatory action involve a reversible covalent modification of an enzyme ?
- (1) Allosteric modulation
 - (2) Competitive inhibition
 - (3) Conversion of zymogen to active enzyme
 - (4) Phosphorylation of serine hydroxyl on the enzyme
43. Which vitamin is necessary for coenzyme A synthesis ?
- (1) Ascorbic acid
 - (2) Pyridoxine
 - (3) Biotin
 - (4) Pantothenic acid
44. What property of biomembranes is responsible for their self-sealing nature ?
- (1) Hydrophilicity of the phospholipid head group
 - (2) Presence of protein in biomembranes
 - (3) Presence of cholesterol in biomembranes
 - (4) Hydrophobicity of the fatty acid side chains of phospholipids
45. If a man of blood group AB marries a woman of blood group A whose father was of blood group O, to what different blood groups can this man and woman expect their children to belong ?
- (1) A, AB, B
 - (2) A, AB
 - (3) AB, O
 - (4) A, O, B
46. Tears contain.
- (1) IgA
 - (2) IgG
 - (3) Lysozyme
 - (4) All of the above

47. In a trisomic individual the number of chromosomes is
- (1) $2n-1$ (2) $2n+1$
(3) $2n+3$ (4) $2n+2$
48. Retinoblastoma is caused by loss of both copies of RB gene in the chromosome band
- (1) 13p11 (2) 13q11
(3) 13q14 (4) 21q14
49. The presence of plasmid in a bacterial culture is usually determined by
- (1) Blue-white screening
(2) Growth in presence of an antibiotic
(3) A restriction enzyme digest
(4) Agarose gel electrophoresis
50. PCR is used to
- (1) Amplify small amount of DNA
(2) Cleave bacteria plasmids
(3) Seal sticky ends
(4) Identify target plasmids
51. Who demonstrated that open tubes to broth remained free of bacteria when air was free of dust
- (1) Spallanzani
(2) John Tyndall
(3) Francisco Redi
(4) Pasteur
52. Tumor immune surveillance may be mediated by
- (1) mast cells
(2) neutrophils
(3) Langerhans cells
(4) NK cells
53. Which of the following is associated with aging
- (1) Increase in antibody affinity
(2) Decrease in antibody affinity
(3) Increased response to vaccination
(4) Increased response to novel antigens
54. The light emitted by luminescent bacteria is mediated by the enzyme
- (1) Coenzyme Q
(2) Luciferase
(3) Lactose dehydrogenase
(4) Carboxylase reductase
55. Enzymes responsible for alcoholic fermentation
- (1) Ketolase
(2) Zymase
(3) Peroxidase
(4) Oxidase

56. The image obtained in a compound microscope is
- (1) Real
 - (2) Virtual
 - (3) Real inverted
 - (4) Virtual inverted
57. Macrophages :
- (1) Circulate in the blood stream
 - (2) Produce Nitric oxide
 - (3) Have receptors for IgM
 - (4) Are the first leukocytes to arrive at the site of a skin infection
58. Disease that affects many people at different countries is termed as
- (1) Sporadic (2) Pandemic
 - (3) Epidemic (4) Endemic
59. Direct microscopic count can be done with the aid of
- (1) Neuberg chamber
 - (2) Anaerobic chamber
 - (3) Mineral oil
 - (4) Olive oil
60. In electron microscope, what material is used as an objective lens ?
- (1) Magnetic coils
 - (2) Superfine glass
 - (3) Aluminium foils
 - (4) Electrons
61. The main feature of prokaryotic organism is
- (1) Absence of locomotion
 - (2) Absence of nuclear envelope
 - (3) Absence of nuclear material
 - (4) Absence of protein synthesis
62. Tuberculosis is a
- (1) Water borne disease
 - (2) Air borne disease
 - (3) Food borne disease
 - (4) Arthropod borne disease
63. Griffith (1928) reported the phenomenon of transformation first in
- (1) *H. influenzae*
 - (2) Bacillus species
 - (3) Pneumococci
 - (4) E.coli
64. During conjugation the genetic material will be transferred through
- (1) Cell wall
 - (2) Medium
 - (3) Pili
 - (4) Capsule
65. The resolution power of the compound microscope is
- (1) 0.2 micron
 - (2) 0.2 millimetre
 - (3) 0.2 Angstrom units
 - (4) 0.2 centimetre

66. Lederberg and Tatum (1946) described the phenomena of
- (1) Conjunction
 - (2) Transformation
 - (3) Mutation
 - (4) Plasmids
67. Hanging drop method for motility study was first introduced by
- (1) Robert Koch
 - (2) Louis Pasteur
 - (3) Jenner
 - (4) Leeuwenhock
68. Cold like symptoms are caused by which Bacteria
- (1) Pseudomonas
 - (2) *E. coli*
 - (3) *Haemophilus influenza*
 - (4) *Haemophilus streptococcus*
69. Mycoplasmas are bacterial cells that
- (1) Fail to reproduce on artificial media
 - (2) Have a rigid cell wall
 - (3) Are resistant to penicillin
 - (4) Stain well with Gram's stain
70. The bacterial cells are at their metabolic peak during
- (1) Lag phase
 - (2) Log
 - (3) Stationary
 - (4) Decline
71. The Bacterium that is most commonly used in genetic engineering is
- (1) Escherichia
 - (2) Klebsiella
 - (3) Proteus
 - (4) Serratia
72. Rancidity in spoiled foods is due to
- (1) Lipolytic organisms
 - (2) Proteolytic organisms
 - (3) Toxigenic microbes
 - (4) Saccharolytic microbes
73. Endotoxin produced by gram negative bacteria is present in
- (1) Peptidoglycan
 - (2) Lipopolysaccharide
 - (3) Teichoic acid
 - (4) Inner membrane
74. Molecules directly involved in NK cell mediated killing include :
- (1) Muramyl dipeptide
 - (2) Granzyme A and B
 - (3) Complement
 - (4) IFN

75. DNA vaccines can be effective if they
- (1) can be engineered to contain DNA motifs that have an adjuvant effect
 - (2) encode expression of antigen
 - (3) encode expression of appropriate cytokines
 - (4) All of the above
76. The receptor through which HIV infects is
- (1) CD2
 - (2) CD3
 - (3) CD4
 - (4) CD5
77. An organism that is osmophilic and has a specific requirements for Sodium chloride resembles
- (1) Halophile
 - (2) Basophile
 - (3) Barophile
 - (4) Xerophile
78. A population of cells derived from a single cell are called
- (1) Monoclonal cells
 - (2) Clones
 - (3) Protoplasts
 - (4) Sub culture
79. Cytokines that directly elevate body temperature include
- (1) TGF
 - (2) IL-4
 - (3) IL-5
 - (4) IL-6
80. Dendritic cells are characterized by
- (1) expression of CD3
 - (2) expression of IgM molecules
 - (3) their ability to release histamine
 - (4) their interface between the innate and adaptive immune systems
81. Both mast cells and basophils
- (1) circulate in the blood stream
 - (2) are found primarily in lymph nodes
 - (3) have receptors for IgM antibodies
 - (4) release histamine
82. Activation of the alternate pathway involves
- (1) C1
 - (2) C3
 - (3) C2
 - (4) C4

83. Control of the activated complement components results from
- (1) agglutination
 - (2) immune adherence
 - (3) instability and inactivation of some of
 - (4) mobility of phagocytes
84. All of the following are true about acute phase proteins EXCEPT
- (1) they include C-reactive protein
 - (2) they include complement proteins
 - (3) they are mainly produced in the liver
 - (4) they are not induced by cytokines
85. Complement inhibitory proteins include the following EXCEPT
- (1) decay accelerating factor (DAF)
 - (2) CD59 (protectin)
 - (3) membrane cofactor protein (MCP)
 - (4) ICAM-1
86. Maximum application of animal cell culture technology today is in the production of
- (1) Insulin
 - (2) Interferons
 - (3) Vaccines
 - (4) Edible proteins
87. IgE
- (1) is bound together by J chain
 - (2) binds to mast cells through its Fab region
 - (3) differs from IgG antibody because of its different H chains
 - (4) is present in high concentration in serum
88. Virulence of the micro-organisms can be reduced by
- (1) Attenuation
 - (2) A virulence
 - (3) Inactivation
 - (4) Freezing
89. The test used for detection of typhoid fever
- (1) WIDAL test
 - (2) ELISA
 - (3) Rosewaller test
 - (4) Westernblotting

90. The cells having F plasmid in the chromosomes were termed as
- (1) Hfr
 - (2) F-
 - (3) Hbr
 - (4) C+
91. A facultative anaerobic is
- (1) Only grow anaerobically
 - (2) Only grow in the presence of O₂
 - (3) Ordinarily an anaerobe but can grow with O₂
 - (4) Ordinarily an aerobe but can grow in absence of O₂
92. The difference between Gram positive and Gram negative bacteria is shown to reside in the
- (1) Cell wall
 - (2) Nucleus
 - (3) Cell membrane
 - (4) Mesosomes
93. Bacterial spores are
- (1) Weakly acid fast
 - (2) Strongly acid fast
 - (3) Alcohol fast
 - (4) Non acid fast
94. During staining for electron microscopy, the method which improves contrast of specimen is
- (1) Positive staining
 - (2) Negative staining
 - (3) Shadow staining
 - (4) Differential staining
95. Which one of the following has highest affinity for oxygen
- (1) Porphyrin
 - (2) Myoglobin
 - (3) Hemoglobin
 - (4) Methemoglobin
96. Human IgM
- (1) crosses the placenta
 - (2) consists of 3 subunits linked together by a J chain
 - (3) protects mucosal surfaces
 - (4) is largely restricted to the circulation

97. Immunoglobulin light chains

- (1) are joined to heavy chains by peptide bonds
- (2) can be present as both heavy and light chains as part of a single Ig molecule
- (3) are not found in every major immunoglobulin class
- (4) are present in the Fab fragment of IgG

98. The fixation of complement by an antigen-antibody reaction can lead to

- (1) formation of a factor chemotactic for mononuclear cells
- (2) enhanced phagocytosis
- (3) activation of T cells
- (4) increased synthesis of antibody

99. Both interleukin 1 and 2

- (1) are produced by the same cell
- (2) require complement for their biological activity
- (3) act on T cells
- (4) trigger histamine release

100. Tumor necrosis factor

- (1) decreases macrophage effector functions
- (2) increases expression of adhesion molecules on endothelial cells
- (3) decreases vascular permeability
- (4) decreases blood flow