



Gujarat Biotechnology Research Centre

Medical BT

Application No: _____

This question booklet contains 32 pages

Time: 2 Hours

Total Marks: 200

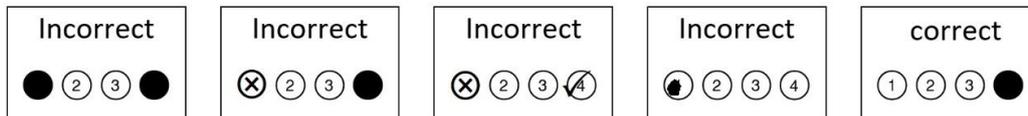
Total Questions: 200

Invigilator Signature :

Candidate Signature :

Instructions for Candidate

1. This question booklet contains 200 questions.
2. Each correct answer carries 1 mark.
3. Every attempted question with incorrect answer shall carry a negative mark of 0.25.
4. Use only Black Ball Point Pen to darken the appropriate circle in OMR.
5. Please darken the complete circle.
6. Darken ONLY ONE CIRCLE for each Question as shown below:



7. Answer once marked cannot be changed.
8. Please do not make any stray marks on the Question Booklet.
9. Rough works must be done on the blank page of Question Booklet.
10. Mark your answer in the appropriate space in the Answer Sheet against the Number corresponding to the question.
11. The Candidate has to submit Question booklet and OMR response sheet to the invigilator on conclusion of examination.

- 1 Which is the first-line drug for patients with type 2 diabetes and obesity?
 - (A) Acarbose
 - (B) Sulphonylureas
 - (C) Metformin
 - (D) Insulin

- 2 To prevent heart disease, how much exercise is recommended per person?
 - (A) 60 minutes on average
 - (B) 90 minutes on average
 - (C) 120 minutes on average
 - (D) 150 minutes on average

- 3 Which compound in chewing tobacco is carcinogenic?
 - (A) Nitroalkanes
 - (B) Organosulphates
 - (C) Nitromethane
 - (D) Nitrosoamines

- 4 What makes erythrocytes to accommodate more hemoglobin?
 - (A) Absence of Lipids
 - (B) Absence of Proteins
 - (C) Absence of Nucleus
 - (D) Absence of Carbohydrates

- 5 What is the genotype of 'O' blood group?
 - (A) ii
 - (B) IAi
 - (C) IBIB
 - (D) IiIi

- 6 Which size particulates are filtered through HEPA filter in the laminar flow?
 - (A) 0.1mm
 - (B) 0.2 mm
 - (C) 0.3 mm
 - (D) 0.4 mm

- 7 Disinfection of the surface area of laminar flow should be carried out by _____ or _____.
 - (A) 60% ethanol or 0.1% sodium hypochlorite
 - (B) 70% ethanol or 0.05% sodium hypochlorite
 - (C) 80% ethanol or 0.5% sodium hypochlorite
 - (D) 90% ethanol or 1% sodium hypochlorite

- 8 In which chromosome banding techniques, method involves treating of prepared slides to buffer at high temperatures followed by staining with either Acridine Orange or Giemsa.
 - (A) Q banding
 - (B) G banding
 - (C) Reverse banding
 - (D) C banding

- 9 An individual having two or more genetically different sets of cells in their body is called _____.
(A) Reciprocal translocation
(B) Balanced translocation
(C) Mosaicism
(D) Microdeletion syndrome
- 10 Why myeloma cells are used in hybridoma technology?
(A) Antibody producing cells
(B) Immortal cells
(C) Mortal Cells
(D) Do not fuse with other cells
- 11 *Helicobacter pylori* is a highly adapted organism that lives only on _____ mucosa.
(A) Gastric
(B) Nose
(C) Oral
(D) Lung
- 12 Which infected mosquito when bites to an individual spread Chikunguniya?
(A) *Aedes aegypti*
(B) *Culex pipiens*
(C) *Anopheles gambiae*
(D) *Anopheles stephensi*
- 13 Which of the following influence conversion of glycogen into glucose by the liver?
(A) Insulin
(B) Glucagon
(C) Trypsin
(D) Calciferol
- 14 Fluorescence in situ hybridization is a technique used for mapping of _____.
(A) Specific DNA sequence of the genome
(B) Specific protein sequence
(C) Specific amino acid sequence
(D) Specific peptide sequence
- 15 Which method is used to detect single protein on multiple tissues on a single slide?
(A) DNA Microarray
(B) Tissue Microarray
(C) SNP Microarray
(D) Protein Microarray
- 16 Which tumor virus carries a gene for the protein E1A which binds to retinoblastoma protein, pRb?
(A) Rota Virus
(B) Mokola Virus
(C) Adeno Virus
(D) Aichi Virus

- 17 DNA sequencing determines _____ in the DNA sequence.
- (A) Sugar sequence
 - (B) Phosphate sequence
 - (C) Base sequence
 - (D) Hydrogen bonds
- 18 Chain Termination Method is linked to _____ .
- (A) Protein sequencing
 - (B) DNA sequencing
 - (C) DNA quantification
 - (D) Protein quantification
- 19 What is the function of ddNTP in DNA sequencing?
- (A) Synthesize DNA strand
 - (B) Terminate DNA polymerization
 - (C) DNA isolation
 - (D) DNA quantification
- 20 In Sanger sequencing, after reaction, samples are separated by _____.
- (A) Agarose gel electrophoresis
 - (B) 2-D gel electrophoresis
 - (C) PAGE
 - (D) SAGE
- 21 High quality RNA contains RIN value of _____.
- (A) 2 to 5
 - (B) 6 to 8
 - (C) at least 8
 - (D) at least 10
- 22 GC clamp is the presence of a guanine (G) or cytosine (C) base in the last (the 3' end) _____ of a PCR primer.
- (A) 3 bases
 - (B) 4 bases
 - (C) 5 bases
 - (D) 6 bases
- 23 Which nucleotide base is methylated at the 5' position in human DNA?
- (A) Adenine
 - (B) Cytosine
 - (C) Guanine
 - (D) Thymine
- 24 Which pigment in the skin blocks UV radiation from damaging DNA?
- (A) Melanin
 - (B) Laminin
 - (C) Keratin
 - (D) Vimentin

- 25 The rate of spontaneous mutation per nucleotide per cell division has been estimated to be _____ in stem cells.
- (A) 10^{-9}
 - (B) 10^{-10}
 - (C) 10^{-11}
 - (D) 10^{-12}
- 26 Which antibodies are synthesized by a population of clonal B cells grown in cell culture?
- (A) Polyclonal
 - (B) Monoclonal
 - (C) Micro
 - (D) Neutralizing
- 27 When a protein has two or more polypeptide subunits, their arrangement in space is referred as _____.
- (A) Primary structure
 - (B) Secondary structure
 - (C) Tertiary structure
 - (D) Quaternary structure
- 28 Which technique generate ions using electrospray by applying a high voltage to a liquid to produce an aerosol?
- (A) MALDI MS
 - (B) ESI MS
 - (C) Tandem MS
 - (D) MS/MS
- 29 _____ is the main storage polysaccharide of animal cells.
- (A) Dextran
 - (B) Chitin
 - (C) Glycogen
 - (D) Cellulose
- 30 Which is the key enzyme in gene cloning?
- (A) DNA ligase
 - (B) DNA methyl transferase
 - (C) Trypsin
 - (D) Amylase
- 31 Transgenic mice have been produced with a _____ in many human diseases for development of gene therapy.
- (A) protein variations
 - (B) genetic variations
 - (C) lipid variations
 - (D) amino acid variations
- 32 _____ is normally formed in the skin from 7- dehydrocholesterol in a photochemical reaction driven by the UV component of the sunlight.
- (A) Vitamin A
 - (B) Vitamin D3
 - (C) Vitamin K
 - (D) Vitamin E

- 33 Which one is the key primary lymphoid organ of the immune system?
(A) Spleen
(B) Lymph node
(C) Tonsil
(D) Thymus
- 34 Which complement pathway does not require antibody for its activation?
(A) Classical pathway
(B) MBL pathway
(C) Alternative pathway
(D) MLB pathway
- 35 _____ are the structural analogues that bind to a receptor and mimic the effects of its natural ligand.
(A) Agonists
(B) Antagonists
(C) Transmembrane domain
(D) Extracellular domain
- 36 Which of the following is widely used biomarker for senescence?
(A) SA-Bgal
(B) Caspase-3
(C) Ki-67
(D) PCNA
- 37 Which type of enzyme is Telomerase?
(A) Terminal transferase
(B) Reverse transcriptase
(C) DNA polymerase 1
(D) RNA polymerase
- 38 For vertebrates, sequence of nucleotides in telomeres is .
(A) GGGTAA
(B) TTTAGG
(C) AAAGTT
(D) TTAGGG
- 39 What are Transcription factors?
(A) Membrane proteins
(B) Cytoplasmic proteins
(C) Nuclear proteins
(D) Ribosomal Proteins
- 40 Which cells serve as antigen presenting cells in autoimmune diseases?
(A) B lymphocytes
(B) T Lymphocytes
(C) Granulocytes
(D) Platelets

- 41 In a flow cytometer, cells lacking both the proteins are observed in _____ quadrant.
- (A) Lower left
 - (B) Upper left
 - (C) Upper right
 - (D) Lower right
- 42 Which of the following antibody is used to identify cytotoxic T cells by flow cytometer?
- (A) CD4
 - (B) CD4 FITC labelled
 - (C) CD8
 - (D) CD8 PE labelled
- 43 Which cells cause rejection of organ transplant?
- (A) Regulatory T cells
 - (B) Cytotoxic T cells
 - (C) Basophils
 - (D) Eosinophils
- 44 Among following four antibody, which one is largest antibody?
- (A) IgA
 - (B) IgE
 - (C) IgG
 - (D) IgM
- 45 _____ is an emerging practice of medicine that uses an individual's genetic profile to guide decisions made in regard to the prevention, diagnosis, and treatment of cancer.
- (A) Surgery
 - (B) Chemotherapy
 - (C) Radiotherapy
 - (D) Personalized medicine
- 46 Which media is used for density gradient?
- (A) Agarose
 - (B) Polyacrylamide
 - (C) Ficoll
 - (D) Glycerol
- 47 In flowcytometry, for determine the best antibody concentration the _____ can be used as a guide.
- (A) Biotic index
 - (B) Stain index
 - (C) Similarity index
 - (D) Refractory index
- 48 In Mass Spectrometer separation of ions is based on _____.
- (A) Molecular weight
 - (B) Charge
 - (C) Mass
 - (D) Mass to charge ratio

- 49 _____ is the most important gene family that contribute to the oxidative metabolism of a range of different drugs.
- (A) Hox
 - (B) Cytochromes P450
 - (C) POU
 - (D) SOX
- 50 Which one of the following enzymes completely lack in significant percentage of population due to presence of inactivating genetic polymorphism?
- (A) CYP2D6 and CYP2C19
 - (B) CYP2C9 and CYP3A4
 - (C) CYP12C9 and CYP3A4
 - (D) CYP2C9 and CYP13A4
- 51 Which of the following is anticoagulant?
- (A) Fibrinogen
 - (B) Calcium
 - (C) Prothrombin
 - (D) Warfarin
- 52 Which of the following drug act as a topoisomerase I inhibitor?
- (A) Irinotecan
 - (B) Tacrolimus
 - (C) Codeine
 - (D) Eliglustat
- 53 Since 1950s, _____ has been a key drug in the treatment of tuberculosis.
- (A) Succinylcholine
 - (B) Isoniazid
 - (C) Codeine
 - (D) Thiopurines
- 54 Which of the following biopharmaceuticals is used in the treatment of anaemia?
- (A) Interleukin
 - (B) Interferon alpha
 - (C) Erythropoietin
 - (D) Interferon beta
- 55 _____ are nanoparticles that consist entirely of molecules formed from carbon.
- (A) Titania
 - (B) Silica
 - (C) Vesicles
 - (D) Fullerenes
- 56 _____ are the synthetic vesicles of nanoscale size and a spherical form consisting of natural phospholipids and cholesterol.
- (A) Ribosomes
 - (B) Liposomes
 - (C) SWCNTs
 - (D) MWCNTs

- 57 Nanoparticles are scale-sized microscopic particles of _____ .
- (A) 1nm to 100nm
 - (B) 1nm to 1000nm
 - (C) 10nm to 100nm
 - (D) 10nm to 1000nm
- 58 Which of the following is a stem cell marker?
- (A) CD3
 - (B) CD19
 - (C) CD33
 - (D) CD34
- 59 A _____ is formed after the fusion of sperm and ovum fertilization.
- (A) Blastocyst
 - (B) Lymphoblast
 - (C) Myeloblast
 - (D) Chondroblast
- 60 Which test is required before transplantation surgery to determine the compatibility of MHC proteins between donar and recipient?
- (A) MHC Matching
 - (B) MHC Typing
 - (C) Tissue Typing
 - (D) Blood HLA Test
- 61 Which graft has the maximum transplantation success rate?
- (A) Allograft
 - (B) Autograft
 - (C) Xenograft
 - (D) Isograft
- 62 Which structure forms within the long helical DNA during DNA replication by helicases?
- (A) Replication forks
 - (B) Double stranded DNA breaks
 - (C) Single stranded DNA breaks
 - (D) Okazaki fragments
- 63 Which heterodimer protein recognize DSB and bind to the broken DNA ends in non-homologous end-joining pathway?
- (A) Ku
 - (B) MRN
 - (C) RAD51
 - (D) BLM
- 64 Germline mutations of Mismatch Repair genes cause susceptibility to a hereditary form of _____ .
- (A) Diabetes
 - (B) Colon Cancer
 - (C) Alzheimer
 - (D) Parkinson

- 65 Which genes identify DNA damage in Transcription- coupled repair a subpathway of Nucleotide Excision Repair pathway ?
- (A) CSA and CSB
 - (B) XPA-XPG
 - (C) P53 and Rb
 - (D) Ras and Myc
- 66 _____ involves cells exiting mitosis without proper chromosome segregation.
- (A) Mitotic slippage
 - (B) Homologous Recombination
 - (C) Non-Homologous end joining
 - (D) Senescence
- 67 _____ can involve addition, deletion or alteration of nucleotides in the RNA that affects transcript when it is translated.
- (A) DNA editing
 - (B) RNA editing
 - (C) Protein editing
 - (D) PCR editing
- 68 _____ is a class of RNA molecules, each of which combines covalently with a specific amino acid as the first step in protein synthesis.
- (A) rRNA
 - (B) mRNA
 - (C) tRNA
 - (D) miRNA
- 69 _____ is a genomic base pair change that helps distinguish one species from another or one subset of individuals in a population.
- (A) Single nucleotide polymorphism
 - (B) Germ line mutation
 - (C) Frame shift mutation
 - (D) Chromosomal alteration
- 70 _____ is the enzymatic formation of ATP from ADP coupled to the light-dependent transfer of electrons in photosynthetic cells.
- (A) Photorespiration
 - (B) Photoreduction
 - (C) Photosynthesis
 - (D) Photophosphorylation
- 71 Myoglobin and the subunits of haemoglobin have:
- (A) different primary structures, but very similar tertiary structures.
 - (B) different tertiary structures, but very similar primary structures.
 - (C) very different primary and tertiary structures.
 - (D) very similar primary and tertiary structures.

- 72 The amino acid substitution of Valine for Glutamic Acid in Hemoglobin S results in aggregation of the protein because of _____ interactions between molecules.
- (A) Ionic
 - (B) Disulfide
 - (C) Hydrogen bonding
 - (D) Hydrophobic
- 73 The steady state assumption, as applied to deriving the Michaelis-Menten equation is
- (A) $K_m = [S]$.
 - (B) The maximum velocity occurs when the enzyme is saturated
 - (C) The rate of ES breakdown to EP is k_2 .
 - (D) The ES complex is formed and broken down at equivalent rates
- 74 In an aqueous solution, protein conformation is determined by two major factors. One is the formation of the maximum number of hydrogen bonds, the other is the:
- (A) Formation of the maximum number of hydrophilic interactions.
 - (B) Maximization of ionic interactions.
 - (C) Placement of hydrophobic amino acid residues at the interior of the protein.
 - (D) Placement of polar amino acid residues around the exterior of the protein
- 75 An enzyme, aldolase, requires Zn^{2+} for catalysis. Under conditions of zinc deficiency, when the enzyme lacks zinc, it would be referred to as the:
- (A) Apoenzyme.
 - (B) Coenzyme.
 - (C) Holoenzyme.
 - (D) Prosthetic group.
- 76 Which of these statements about enzyme-catalyzed reactions is false?
- (A) At saturating levels of substrate, the rate of an enzyme-catalyzed reaction is proportional to the enzyme concentration.
 - (B) If enough substrate is added, the normal V_{max} of a reaction can be attained even in the presence of a competitive inhibitor.
 - (C) The activation energy for the catalyzed reaction is the same as for the uncatalyzed reaction
 - (D) The Michaelis-Menten constant K_m equals the $[S]$ at which $V = 1/2 V_{max}$
- 77 From the abbreviated name of the compound Gal($\beta 1 \rightarrow 4$)Glc, we know that:
- (A) C-4 of glucose is joined to C-1 of galactose by a glycosidic bond.
 - (B) the compound is a D-enantiomer.
 - (C) the galactose residue is at the reducing end.
 - (D) the glucose residue is the β anomer
- 78 Determining the precise spacing of atoms within a large protein is possible only through the use of:
- (A) Electron microscopy.
 - (B) Light microscopy.
 - (C) X-ray diffraction
 - (D) Ramachandran plots.

- 79 The concept of “induced fit” refers to the fact that:
- (A) Enzyme specificity is induced by enzyme-substrate binding.
 - (B) Enzyme-substrate binding induces an increase in the reaction entropy, thereby catalyzing the reaction.
 - (C) Enzyme-substrate binding induces movement along the reaction coordinate to the transition state.
 - (D) Substrate binding may induce a conformational change in the enzyme, which then brings catalytic groups into proper orientation.
- 80 A transition-state analogue:
- (A) Resembles the transition-state structure of the normal enzyme-substrate complex.
 - (B) Typically reacts more rapidly with an enzyme than the normal substrate.
 - (C) Is less stable when binding to an enzyme than the normal substrate.
 - (D) Stabilizes the transition state for the normal enzyme-substrate complex.
- 81 Which of the following statements about protein-lig and binding is correct?
- (A) The larger the K_a (association constant) the lower the affinity.
 - (B) The larger the K_a , the faster is the binding.
 - (C) The larger the K_a , the smaller the K_d (dissociation constant).
 - (D) The K_a is equal to the concentration of ligand when half of the binding sites are occupied.
- 82 The Henderson-Hasselbalch equation:
- (A) Allows the graphic determination of the molecular weight of a weak acid from its pH alone.
 - (B) Does not explain the behavior of di- or tri-basic weak acids
 - (C) Employs the same value for pK_a for all weak acids
 - (D) Relates the pH of a solution to the pK_a and the concentrations of acid and conjugate base
- 83 Two amino acids of the standard 20 contain sulfur atoms. They are:
- (A) Cysteine and serine
 - (B) Cysteine and threonine
 - (C) Methionine and cysteine
 - (D) Methionine and serine
- 84 The first step in two-dimensional gel electrophoresis generates a series of protein bands by isoelectric focusing. In a second step, a strip of this gel is turned 90 degrees, placed on another gel containing SDS, and electric current is again applied. In the second step:
- (A) Proteins with similar isoelectric points become further separated according to their molecular weights.
 - (B) The individual bands become stained so that the isoelectric focus pattern can be visualized
 - (C) The individual bands become visualized by interacting with protein-specific antibodies in the second gel
 - (D) The individual bands undergo a second, more intense isoelectric focusing
- 85 What best summarizes the MALDI method by which gas phase ions are produced for mass spectrometry?
- (A) Sample is hit by a low energy xenon beam.
 - (B) Sample is forced through a narrow capillary tube and solvent rapidly evaporates.
 - (C) Sample is embedded in a crystalline matrix and bombarded by laser beams.
 - (D) Sample is heated and then bombarded by electrons
- 86 Which of the following is true for any endothermic reaction?
- (A) $\Delta H < 0$
 - (B) $\Delta H > 0$
 - (C) $\Delta G < 0$
 - (D) $\Delta G > 0$

- 87 Which of the following techniques can be used to decipher the structures of biological macromolecules?
- (A) UV-Visible absorption spectroscopy
 - (B) X-ray crystallography
 - (C) Surface Plasmon Resonance
 - (D) Fluorescence microscopy
- 88 A mutation has changed a Leucine residue of a protein to Glutamic acid, which statement best describes its location in a hydrophilic exterior-
- (A) On the surface since it is hydrophilic in nature
 - (B) Inside the core of the protein since it is hydrophobic in nature
 - (C) Anywhere inside or outside
 - (D) Inside the core of protein since it has a polar but uncharged side chain
- 89 A useful technique when one wants to predict the tertiary structure of a protein in silico _____
- (A) CD spectroscopy
 - (B) Homology modeling
 - (C) UV visible spectroscopy
 - (D) NMR spectroscopy
- 90 In most of the nucleotides, the phosphate group is attached to which carbon of pentose sugar?
- (A) C-1
 - (B) C-2
 - (C) C-4
 - (D) C-5
- 91 What modified base is at the 5' extremity of a capped eukaryotic m-RNA?
- (A) 1-methyl-guanosine
 - (B) 1-methyl-adenosine
 - (C) 2'-O-methyl-guanosine
 - (D) 7-methyl-guanosine
- 92 All of the following are examples of mutualistic relationships except:
- (A) Protozoan-termite interaction
 - (B) Algal-fungal interactions in lichens
 - (C) Zooxanthellae and corals in coral reefs
 - (D) Legionella infection of a lung
- 93 Which one of the following is not true regarding cAMP?
- (A) First discovered as a regulator of carbohydrate metabolism.
 - (B) It can diffuse between cells through gap junction
 - (C) First discovered by Earl Sutherland
 - (D) Produced by the action of adenyl cyclase on AMP
- 94 The connective tissue surrounding each individual axon is
- (A) Endoneurium.
 - (B) Epineurium
 - (C) Perineurium
 - (D) Fascicle

- 95 Which one of the following acts predominantly an inhibitory neurotransmitter?
(A) Acetylcholine
(B) Dopamine
(C) Epinephrine
(D) Glycine
- 96 NMDA receptors belongs to the _____ class of Receptors
(A) GABA
(B) Serotonin
(C) Cholinergic
(D) Ionotropic glutamate receptors
- 97 _____ is the major receptor involved in Long Term Potentiation during memory formation.
(A) Muscarinic M1
(B) 5HT3
(C) GABAA
(D) NMDA
- 98 The ability of *Vibrio fischeri* to produce bioluminescence chemicals only when a certain population density has been reached is an example of _____
(A) Liebig's Law of the minimum.
(B) Shelford's law of tolerance.
(C) The second law of thermodynamics
(D) Quorum sensing.
- 99 A culture of bacteria produces 5 generations in 2 hours. What is the generation time for this bacterium under those conditions?
(A) 15 minutes
(B) 24 minutes
(C) 30 minutes
(D) 75 hours
- 100 In bacterial cells, ribosomes are packed into the cytoplasmic matrix and also loosely attached to the plasma membrane. What is the function of ribosomes?
(A) Site of energy production
(B) Site of protein synthesis
(C) Site of genetic reproduction
(D) Site for lipid synthesis
- 101 The nuclear pores are passageways between the nuclear matrix and the cytoplasm which _____
(A) Allows DNA to reach the cytoplasm to be translated to RNA.
(B) Allows ribosomes to enter the nuclear matrix.
(C) Allows proteins synthesized in the cytoplasm to enter the nucleus.
(D) Structurally reinforces the nuclear membrane.
- 102 Which of the following statements is most correct about the differential Gram stain?
(A) Crystal violet differentially stains Gram positive cells.
(B) Gram's iodine differentially stains Gram positive cells.
(C) Acetone differentially destains Gram negative cells.
(D) Saffron red differentially stains Gram negative cells.

- 103 Which of the following genes synthesizes Nod factors in order to activate a plant to allow development of an infection thread?
(A) Agrobacterium
(B) Escherichia
(C) Pseudomonas
(D) Rhizobium
- 104 In relation to bacterium's optimal growth requirements, which group would you expect to be MOST likely involved in decomposition of compost piles?
(A) Acidophiles
(B) Extreme halophiles
(C) Mesophiles
(D) Thermophiles
- 105 The Mad Hatter of Lewis Carroll's Alice in Wonderland and the people surrounding Japan's Minamata Bay are linked by toxicity to which element?
(A) Manganese
(B) Magnesium
(C) Mercury
(D) Molybdenum
- 106 The genus Mycoplasma is resistant to the effects of _____
(A) Triclosan
(B) Streptomycin
(C) Sulfonamides
(D) Penicillin
- 107 Which of the following modes of cell division or DNA replication is not used by bacteria?
(A) Binary fission
(B) Rolling circle
(C) Theta replication
(D) Mitosis
- 108 A donor DNA that enters the bacterium by natural transformation is called a (an) _____
(A) Merozygote
(B) Exogenote
(C) Endogenote
(D) Partial diploid
- 109 The gram-positivity of bacteria depends upon _____
(A) Pore size of cell wall
(B) Presence of mycolic acid
(C) Presence of dipicolinic acid
(D) Presence of teichoic acid
- 110 Which of the following statements about endotoxins is false?
(A) They are heat stable.
(B) Protein-Polysaccharide-lipid complex in nature
(C) Action is often enzymatic
(D) Is produced by gram-negative bacteria

- 111 Which immunoglobulin can cross the placenta?
(A) Ig A
(B) Ig G
(C) Ig D
(D) Ig M
- 112 Interleukin-1 is produced by_____
(A) CD4+T-helper cells
(B) B-helper cells
(C) Monocytes
(D) CD8+ T cells
- 113 Which of the following is the transport medium for cholera?
(A) Tellurite medium
(B) Chacko-Nair medium
(C) Venkatraman-Ramakrishnan medium
(D) McLeod's medium
- 114 Which of the following conditions is of endogenous origin?
(A) Phycomycosis
(B) Aspergillosis
(C) Candidiasis
(D) Shigellosis
- 115 Which of the following is associated with dandruff?
(A) Candida albicans
(B) Malassezia furfur
(C) Propionibacterium acnes
(D) Clostridium botulinum
- 116 Which of the following is used to treat HIV infection?
(A) Tamiflu
(B) Zidovudine
(C) Sterptomycin
(D) Ketoconazole
- 117 Which of the following is most commonly associated with dental caries?
(A) Porphyromonas gingivalis
(B) Streptococcus mutans
(C) Alternaria alternata
(D) Malassezia furfur
- 118 Which of the following is a non-invasive mucosal pathogen of the gastrointestinal tract?
(A) Vibrio cholerae
(B) Candida albicans
(C) Helicobacter pylori
(D) Shigella

- 119 The major causative agent of traveler's diarrhea is:
- (A) Listeria
 - (B) Shigella
 - (C) Salmonella
 - (D) Escherichia
- 120 About 7.3 kcal/mole are released when _____
- (A) NAD⁺ is reduced to NADH.
 - (B) ATP hydrolysis is coupled to sucrose synthesis.
 - (C) the terminal phosphate bond of ATP is broken by hydrolysis.
 - (D) glucose is converted to CO₂ and H₂O.
- 121 Carrier proteins are involved in which of the following processes?
- (A) Passive diffusion
 - (B) Facilitated diffusion
 - (C) Endocytosis
 - (D) More than one of the above processes utilize carrier proteins.
- 122 What is being compared during DNA hybridization studies of two bacteria?
- (A) Rate of DNA replication
 - (B) Similarity of base sequences
 - (C) Nature of the 16S rRNA component
 - (D) Ratio of nitrogenous base to all other bases
- 123 The archaea lack which of the following that are normally found in gram-negative bacteria?
- (A) Outer membrane
 - (B) A complex peptidoglycan network
 - (C) They lack both outer membrane and a complex peptidoglycan network
 - (D) They lack neither outer membrane nor a complex peptidoglycan network
- 124 In a rumen the largest percentage of each carbohydrate is metabolized into _____
- (A) CO₂.
 - (B) Volatile fatty acids.
 - (C) Organic acids of the Krebs cycle.
 - (D) Nucleic acids.
- 125 Which of the following is the most complete definition of fermentation?
- (A) The reduction of glucose to pyruvic acid.
 - (B) The oxidation of glucose with organic molecules serving as electron acceptors.
 - (C) The complete catabolism of glucose to CO₂ and H₂O.
 - (D) The production of energy by substrate-level phosphorylation.
- 126 Which of the following best explains why the production of ethanol is important in yeast cells that are under anaerobic conditions?
- (A) Ethanol keeps the electron transport system functioning.
 - (B) Yeast would be unable to activate the enzymes of the Krebs cycle without ethanol.
 - (C) The process generates oxygen, which is required for glycolysis.
 - (D) The process regenerates NAD⁺, which is required for glycolysis.

- 127 Aerobic respiration differs from anaerobic respiration in which of the following respect?
- (A) The final electron acceptors are different.
 - (B) Anaerobic respiration is glycolysis.
 - (C) Aerobic respiration requires the electron transport chain.
 - (D) Aerobic respiration gets electrons from the Krebs cycle.
- 128 The function of growth promoting rhizobacteria is to
- (A) Decompose the organic materials secreted by the plant making the elements available to the plant again.
 - (B) Stimulate mineral uptake by inhibiting activities of other bacteria in the vicinity.
 - (C) Enhance mycorrhizal activity
 - (D) Enhance plant growth by producing chemical signals.
- 129 Nodulation and the development of an anaerobic environment to facilitate nitrogen fixation is characteristic of which genus?
- (A) Pseudomonas
 - (B) Rhizobium
 - (C) Escherichia
 - (D) Agrobacterium
- 130 Nitrogen fertilizers disrupt ecosystem structure and function by
- (A) Promoting heterotrophic growth causing an imbalance in CO₂ levels.
 - (B) Decreasing filamentous fungal development which causes loss of soil crumb structure and subsequent soil fertility.
 - (C) Causing more antibiotic producing bacteria to grow and produce antibiotics which stunt the growth of plants.
 - (D) Reducing the number of nitrogen fixing bacteria in soils.
- 131 The time required to kill 90% of the microorganisms in a sample at a specific temperature is the _____
- (A) Decimal reduction time
 - (B) D value
 - (C) F value
 - (D) Thermal death time
- 132 Which of the following disinfectant act by disrupting microbial membranes?
- (A) Cationic detergents
 - (B) Halogens
 - (C) Heavy metals
 - (D) Sterilizing gases
- 133 Which of the following hormone initiate biological actions by crossing the plasma membrane and then binding to a receptor?
- (A) Glucagon
 - (B) Estradiol
 - (C) Insulin
 - (D) Norepinephrine

- 134 In addition to proteins, major components of very low-density lipoproteins (VLDL) circulating in the blood of a normally fed mammals include
- (A) Triglycerides, cholesterol and phospholipids
 - (B) Triglycerides, squalene and phospholipids
 - (C) Triglycerides, squalene and sphingosine
 - (D) Monoacylglycerols, cholesterol and phospholipids
- 135 All of the following are true about heterotrimeric G Protein EXCEPT
- (A) They bind with GDP or GTP
 - (B) They have GTPase activity
 - (C) They act as binary (on-off) switches
 - (D) They phosphorylate proteins
- 136 If a subcellular fraction from liver tissue exhibits a high level of acid phosphatase activity, it most likely contains _____
- (A) Nuclei
 - (B) Lysosomes
 - (C) Endoplasmic reticulum
 - (D) Coated vesicles
- 137 All of the following processes occur in the mitochondria of mammalian cells EXCEPT
- (A) Fatty acid biosynthesis
 - (B) Protein synthesis
 - (C) DNA synthesis
 - (D) Beta oxidation of fatty acids
- 138 A person suffering from Night blindness when consulted doctor advised to take vitamin A supplements and found no differences, the doctor assume that this effect may be the defect in the following enzyme
- (A) Retinal dehydrogenase
 - (B) Retinal reductase
 - (C) Retinal isomerase
 - (D) Retinal synthase
- 139 A previously unknown organism that lacks a nuclear membrane and mitochondria has just been discovered. Which of the following would this organism most likely possess?
- (A) Lysosomes
 - (B) Cilia
 - (C) Ribosomes
 - (D) Endoplasmic reticulum
- 140 Membrane carrier proteins differ from membrane channel proteins by which of the following characteristics?
- (A) Carrier proteins are glycoproteins, while channel proteins are lipoproteins.
 - (B) Carrier proteins transport molecules down their electrochemical gradient, while channel proteins transport molecules against their electrochemical gradient.
 - (C) Carrier proteins can mediate active transport, while channel proteins cannot.
 - (D) Carrier proteins do not bind to the material transported, while channel proteins do.

- 141 The primary action of steroid hormones is at the level of _____
- (A) RNA export from the nucleus
 - (B) transcription
 - (C) pre-mRNA splicing
 - (D) mRNA degradation
- 142 Why do erythrocytes swell and burst when placed in water?
- (A) Since water concentration is higher outside the cell, water moves inward by passive diffusion.
 - (B) Since hemoglobin concentration is higher inside the cell, hemoglobin moves outward by exocytosis.
 - (C) Since potassium ions are more concentrated inside the cells, potassium ions move outward by osmosis.
 - (D) Erythrocytes pump water inward by active transport to balance osmotic gradients.
- 143 Endoplasmic reticulum (ER) is the site of all of the following EXCEPT
- (A) Drug detoxification by means of mixed function oxidases
 - (B) Synthesis of proteins that are secreted from the cell
 - (C) N-linked glycosylation of newly formed polypeptides
 - (D) Hydrolytic activities carried out by acid Hydrolases
- 144 Immediately after fertilization in animals, the first structural and biochemical changes in the egg are initiated by _____
- (A) New gene transcription
 - (B) The release of Ca^{2+} from internal reservoirs
 - (C) The initiation of DNA synthesis
 - (D) A lowering of cytosolic pH
- 145 What happens to the Cdk-cyclin A complex at metaphase _____
- (A) Both cyclin A and Cdk remain undegraded
 - (B) Only Cdk is degraded
 - (C) Only cyclin A is degraded
 - (D) Both cyclin A and Cdk are degraded
- 146 Which of the following pathways is most likely taken by newly synthesized histones?
- (A) Rough endoplasmic reticulum → Golgi complex → Secretory vesicle
 - (B) Rough endoplasmic reticulum → Golgi complex → Nucleus
 - (C) Rough endoplasmic reticulum → Smooth endoplasmic reticulum → Nucleus
 - (D) Cytoplasm → Nucleus
- 147 Increased calcium influx across the membranes of presynaptic neurons has which of the following effects on synaptic transmission?
- (A) Increased release of neurotransmitter
 - (B) Increase in voltage-dependent potassium efflux
 - (C) Decreased release of neurotransmitter
 - (D) Decrease in voltage-dependent potassium efflux
- 148 Which cell has CD19 as the cell surface marker?
- (A) NK cell
 - (B) T cell
 - (C) B cell
 - (D) Macrophages

- 149 The differences in the immune responses expected out of Covaxin compared to Covishield vaccination
- (A) Broad B cell repertoire
 - (B) Broad T cell repertoire
 - (C) Broad B and T cell repertoires
 - (D) Stronger NK cell response
- 150 An egg whose shell has been removed is dipped in a solution for few hours and the plasma membrane shrinks inside. What type of solution is that?
- (A) Isotonic
 - (B) Hypotonic
 - (C) Homotonic
 - (D) Hypertonic
- 151 Which microscope is best suited for imaging live cells.
- (A) Upright microscope
 - (B) Electron microscope
 - (C) Positron microscope
 - (D) Inverted microscope
- 152 Hematoxylin binds to;
- (A) Plasma membrane
 - (B) Proteins
 - (C) Lipids
 - (D) Nucleic acids
- 153 Where does DAPI binds strongly to DNA?
- (A) To region rich with histone protein
 - (B) To A:T rich region
 - (C) To region rich with transcription machinery
 - (D) To G:C rich region
- 154 Enzymatic activity of proteins is preserved in _____ type of sectioning procedure?
- (A) Frozen sectioning
 - (B) Paraffin embedding
 - (C) Glutaraldehyde fixation
 - (D) Formalin fixation
- 155 In an experiment on transposition in an eukaryotic system, an intron was cloned within a transposable element and allowed to transpose from a plasmid to genomic DNA. The intron was found to be absent in the transposable element in its new location. It is
- (A) not a case of transposition.
 - (B) a retroposon.
 - (C) a case of replicative mode of transposition.
 - (D) a case of conservative mode of transposition.
- 156 Which of the following is a mismatch between the plant drug and its source?
- (A) Quinine - *Cinchona ledgeriana*
 - (B) Codeine - *Papaver somniferum*
 - (C) Vinblastine - *Catharanthus roseus*
 - (D) Digitalin - *Artemisia annua*

- 157 In breeding for 5 generations led to production of homozygous transgenic mice. However, these homozygous males or females were infertile. Which of the following approach is most preferable and economical to obtain heterozygous transgenic animals continuously?
- (A) Crossing (breeding) of transgenic mice with wild type mice in earlier generations should be done for continued production of transgenic heterozygous offspring.
 - (B) Inbreeding should be avoided after 5th generation.
 - (C) Homozygous transgenic mice should be mated with wild type mice for continued production of transgenic heterozygous offspring.
 - (D) More transgenic founder (1st animal) should be generated.
- 158 Gram negative bacteria, *Klebsiella pneumoniae*, upon infecting humans, results in severe septic shock after a few hours of infection. Which of the following is not true for this type of infection?
- (A) Recombinant bacterial proteins can be used for the treatment of septic shock.
 - (B) Recombinant TNF α receptor antagonist can be used for the treatment of septic shock.
 - (C) Cell wall endotoxins cause overproduction of cytokines.
 - (D) Septic shock can be treated by anti-TNF α antibodies.
- 159 Which one of the following is the most appropriate technique to determine the relatedness of two bacterial species?
- (A) Biochemical characterization
 - (B) DNA hybridization
 - (C) Plasmid profiling
 - (D) Doubling time measurement
- 160 In a sample from an African population of 10,000, number of person suffering from sickle cell anemia is 100. What is expected frequency of individual who are sensitive to malaria?
- (A) 0.81
 - (B) 0.18
 - (C) 0.34
 - (D) 0.01
- 161 A researcher wants to set up a ligation reaction. The reaction mix should contain
- (A) one double-strand linear DNA with 3' OH, one double-strand DNA with 5' P₀4, T4 DNA ligase, and ATP at pH 7.5
 - (B) one double-strand linear DNA with 3' P₀4, one double-strand DNA with 5' OH, T4 DNA ligase and GTP at pH 7.5
 - (C) one double-strand linear DNA with 3' P₀4, one double-strand DNA with 5' OH, T4 DNA ligase and dATP at pH 7.5
 - (D) one double-strand linear DNA with 3' P₀4, one double-strand DNA with 5' OH, T4 DNA ligase and ATP at pH 7.5
- 162 The structure of a protein is known from X-ray diffraction studies which gave 30% α -helix, 50% β -sheet and 20% random coil. Circular dichroism (CD) measurements gave 50% α -helix, 40% β -sheet and 10% random coil. What could not be a possible explanation for these observations
- (A) Protein contains high content of disulphide bonds
 - (B) Protein structure in the crystal is different from that in the solution
 - (C) CD analysis for structural components is not appropriate for this protein
 - (D) Contributions from other chromophores also contribute to the CD spectrum of the protein

- 163 A mixture of Cytochrome-C (MW 11.7 KD) and Myoglobin (MW 17.2 KD) are to be separated by polyacrylamide gel electrophoresis. Their isoelectric pH (pI) values are 9.6 and 7.2 respectively. In which direction will each protein migrate at pH 8.5?
- (A) Both will migrate to cathode
 - (B) Both will migrate to anode
 - (C) Myoglobin will migrate to anode and Cytochrome-C will migrate to cathode
 - (D) Myoglobin will migrate to cathode and Cytochrome-C will migrate to anode
- 164 A group of six students has taken samples of their own cheek cells, purified the DNA, and used a restriction enzyme known to cut at zero, one, or two sites in a particular gene of interest. Why might they be conducting such an experiment?
- (A) To find the location of this gene in the human genome
 - (B) To prepare to isolate the chromosome on which the gene of interest is found
 - (C) To find which of the students has which alleles
 - (D) To collect population data that can be used to assess natural selection
- 165 What is the pH when 100 mL of 0.1 N NaOH is added to 150 mL of 0.2 M CH₃COOH if pK_a for acetic acid= 4.76?
- (A) 4.46
 - (B) 4.66
 - (C) 4.96
 - (D) 4.76
- 166 A red blood cell (RBC) requires a constant supply of NADPH and energy from the glucose entering the cell. Which of the following lists three enzymes necessary to meet the RBC's needs?
- (A) Hexokinase, transketolase, fructose 1,6- biphosphatase
 - (B) Glucose 6-phosphate dehydrogenase, 6- phosphogluconate dehydrogenase, phosphoglycerate kinase
 - (C) Phosphoglycerate mutase, transaldolase, phosphoenolpyruvate carboxykinase
 - (D) Phosphoglucomutase, glucose 6- phosphate dehydrogenase, glyceraldehyde 3-phosphate dehydrogenase
- 167 A twenty residue peptide composed of the sequence (L-Ala)²⁰ forms a right handed alpha helix in methanol. If every alternate L-Ala residue is replaced with D-Ala, the peptide will probably
- (A) form a left handed alpha helix
 - (B) form a right handed alpha helix
 - (C) form ten residues of right handed helix followed by ten residues of a left handed helix
 - (D) not form a helix of any kind
- 168 You are studying the binding of proteins to the cytoplasmic face of cultured liver cells and have found a method that gives a good yield of inside-out vesicles from the plasma membrane. Unfortunately, your preparations are contaminated with variable amounts of right-side-out vesicles. Nothing you have tried avoids this contamination. Somebody suggests that you pass the vesicles over an affinity column made of lectin coupled to Sepharose beads. What is the rationale of this suggestion?
- (A) Lectin will bind to only glycoproteins and glycolipids present on the inside-out vesicles
 - (B) Right-side-out-vesicles will simply bind to the lectin coupled Sepharose beads
 - (C) Right-side-out-vesicles will be lysed by lectin coupled to Sepharose beads
 - (D) Lectin will bind to the carbohydrate residues present only on the inside out vesicles

- 169 Nucleosomes are the structural unit of chromatin. In the formation of nucleosomes about 200 bp are wrapped around the histones. The nucleosomes (diameter about 11 nm) are folded into a second order structure to form a solenoid consisting of 6 nucleosomes per turn. Calculate the total packaging ratio of DNA at the level of solenoid. Further if the genome size of a eukaryotic microorganism is 2×10^7 bp and the size of its chromosome is 4 μm , what will be the final packaging ratio of DNA in the chromosome?
- (A) 8 and 6800
 - (B) 40 and 1700
 - (C) 40 and 6800
 - (D) 8 and 1700
- 170 Reassociation experiments revealed that eukaryotic DNA does not renature uniformly. These experiments are performed by fragmenting total DNA from an organism into pieces about 1000 base pairs long. The DNA is then melted into single strands and allowed to reform complementary basepaired double helices. Which class of DNA would be expected to have the most rapid rate of renaturation (reassociation)?
- (A) Small multigene families
 - (B) Pseudogenes
 - (C) Simple sequence repeat DNA
 - (D) Single-copy DNA
- 171 Which of the following components is found in all prokaryotic transcription terminators?
- (A) rho factor
 - (B) a poly-U region
 - (C) a hairpin structure
 - (D) a poly-A region
- 172 Cystic fibrosis is due to non-functional Cystic Fibrosis Transmembrane Conductance Regulator (CFTR) transporter for chlorine. To test this, both wild type and mutated type CFTR proteins were embedded in membrane of liposome in absence of protease or denaturants. It was observed that neither wild type nor mutant transporter on liposome were able to uptake chlorine from surrounding. The possible reason is
- (A) CFTR inserted in invert topology in membrane of liposome
 - (B) Wild type CFTR protein got mutated
 - (C) CFTR lost affinity for chlorine
 - (D) CFTR lost its functional conformation
- 173 Regulation of the cell cycle involves processes crucial to the survival of a cell, including the detection and repair of genetic damage as well as the prevention of uncontrolled cell division. The molecular events that control the cell cycle are ordered and directional; that is, each process occurs in a sequential fashion and it is impossible to "reverse" the cycle. Two key classes of regulatory molecules, cyclins and cyclin-dependent kinases (CDKs), determine a cell's progress through the cell cycle. Regulation of the eukaryotic cell cycle includes:
- (A) An S phase checkpoint where DNA replication is terminated if too much damage is encountered
 - (B) G1 checkpoint where the DNA is evaluated" and repaired, if possible, before beginning DNA replication
 - (C) G0 checkpoint to decide whether there are sufficient deoxynucleotides for DNA replication to begin
 - (D) G2 checkpoint to determine whether all the chromosomes are condensed
- 174 If you use immunofluorescence microscopy to examine the distribution of the cytoskeletal protein actin, you find it in the cytosol. You express a mutant actin that now ends in the sequence K-D-E-L. If you examine the distribution of mutant actin, where will you find the mutant actin?
- (A) The mutant actin has been secreted from the cell
 - (B) The mutant actin is in the ER
 - (C) The mutant actin is in the Golgi
 - (D) The mutant actin is in the cytosol

- 175 Patients with hereditary non-polyposis colon cancer [HNPCC] have genes with microsatellite instability, that is, many regions containing abnormal, small loops of unpaired DNA. This is a result of a mutation affecting _____
- (A) Mismatch repair
 - (B) Nucleotide excision repair
 - (C) Base excision repair
 - (D) Transcription coupled repair
- 176 Suppose you mix the following components of protein synthesis in a test tube: amino acids from a rabbit; ribosomes from a dog; tRNAs from a mouse; mRNA from a chimpanzee; and necessary enzymes plus an energy source from a giraffe. If protein synthesis occurs. which animal's protein will be made?
- (A) Rabbit
 - (B) Dog
 - (C) Chimpanzee
 - (D) Mouse
- 177 Through a microscope, you can see a cell plate beginning to develop across the middle of a cell and nuclei forming on either side of the cell plate. This cell is most likely _____
- (A) a bacterial cell dividing
 - (B) a plant cell in the process of cytokinesis
 - (C) an animal cell in the S phase of the cell cycle
 - (D) an animal cell in the process of cytokinesis
- 178 A 10-year-old Caucasian girl is brought in by her parents for evaluation of a skin disorder. The child has many freckles on her face, arms, and legs. The parents were told by previous physicians that she suffers from Xeroderma pigmentosum and that they should limit her exposure to sun light. What is the most likely etiology of this disorder?
- (A) Impaired DNA repair by nucleotide excision
 - (B) Impaired ribosomal protein translation
 - (C) Deficient DNA replication
 - (D) Defective RNA transcription from TATA-less promoter
- 179 It is theoretically possible for a gene from any organism to function in any other organism. Why is this possible?
- (A) All organisms have the same genetic code
 - (B) All organisms are made up of cells
 - (C) All organisms have transfer RNA
 - (D) All organisms have similar nuclei
- 180 True activators of transcription are transcription factors that bind to _____
- (A) Enhancers
 - (B) Promoters
 - (C) Promoters and enhancers
 - (D) Other proteins to enhance transcription

- 181 A scientist discovers a DNA-based test for one allele of a particular gene. This and only this allele, if homozygous, produces an effect that results in death at or about the time of birth. Of the following, which is the best use of this discovery?
- (A) Follow the segregation of the allele during meiosis
 - (B) Introduce a normal allele into deficient newborns
 - (C) Design a test for identifying heterozygous carriers of the allele
 - (D) Screen all newborns of an at-risk population
- 182 Males are more often affected by sex-linked traits than females because
- (A) Males are hemizygous for the X chromosome
 - (B) Female hormones such as estrogen often compensate for the effects of mutations on the X chromosome
 - (C) Male hormones such as testosterone often alter the effects of mutations on the X chromosome
 - (D) X chromosomes in males generally have more mutations than X chromosomes in females
- 183 What does a frequency of recombination of 50% indicate?
- (A) The genes are located on sex chromosomes
 - (B) The two genes are likely to be located on different chromosomes
 - (C) All of the offspring have combinations of traits that match one of the two parents
 - (D) Abnormal meiosis has occurred
- 184 Three genes at three loci are being mapped in a particular species. Each has two phenotypes, one of which is markedly different from the wild type. The unusual allele of the first gene is inherited with either of the others about 50% of the time. However, the unusual alleles of the other two genes are inherited together 14.4% of the time. Which of the following describes what is happening?
- (A) The first gene is linked but the other two are not
 - (B) The three genes are linked
 - (C) The first gene is assorting independently from the other two that are linked
 - (D) The genes are showing independent assortment
- 185 Sometimes the effect of gene interaction is that one gene masks (hides) the effect of another gene at a different locus, a phenomenon known as _____
- (A) Epistasis
 - (B) Anticipation
 - (C) Incomplete penetrance
 - (D) Variable expressivity
- 186 Plasmids that are capable of either freely replicating or integrating into the bacterial chromosomes are termed as _____
- (A) Replicative plasmids
 - (B) Prophage
 - (C) Episomes
 - (D) Col plasmids
- 187 What proportion of offspring of a male suffering from an X-linked recessive trait and carrier female, will be affected?
- (A) All daughters and no sons
 - (B) All sons and no daughters
 - (C) 1/2 sons and 1/2 daughters
 - (D) 3/4 daughters and 1/4 sons

- 188 Which of the following statements is not correct?
- (A) Transposons have no known direct function but they may have benefits in evolution
 - (B) Transposons occur only in eukaryotes
 - (C) The enzyme that retroviruses and retrotransposons use to synthesise DNA is known as reverse transcriptase
 - (D) Transposons are responsible for most of the repetitive DNA in human cells
- 189 Cystic fibrosis is due to _____
- (A) Defective chloride channel
 - (B) Defective LDL receptor
 - (C) Increased dopamine
 - (D) High levels of HDL
- 190 How could you best predict the maximum number of alleles for a single gene whose polypeptide product is known?
- (A) Mate all known genotypes and collect all possible offspring different from the parents
 - (B) Count the number of DNA nucleotides that are in the code for the polypeptides
 - (C) Count the number of amino acids in the polypeptide
 - (D) Search the population for all phenotypic variants of this polypeptide
- 191 If a person loses a large amount of water in a short period of time, he or she may die from dehydration. ADH can help reduce water loss through its interaction with its target cells in the _____
- (A) Posterior pituitary
 - (B) Adrenal gland
 - (C) Anterior pituitary
 - (D) Kidney
- 192 A significant increase in the amount of interstitial fluid surrounding the capillary beds of a human's lungs will cause
- (A) An increase in the amount of oxygen moving from the lungs into the blood
 - (B) An increase in the amount of carbondioxide moving from the blood to the lungs
 - (C) A decrease in the amount of oxygen moving from the lungs into the blood
 - (D) An increase of pressure that would cause the capillary beds to burst
- 193 Which of the following is not a member of the Immunoglobulin supergene family?
- (A) TCR
 - (B) Fc receptor on leukocytes
 - (C) Antibodies
 - (D) Lymphokines
- 194 Testosterone is an example of a chemical signal that affects the very cells that synthesize it, the neighboring cells in the testis, along with distant cells outside the gonads. Thus, testosterone is an example of
- (A) An autocrine signal
 - (B) An endocrine signal
 - (C) An autocrine signal, a paracrine signal, and an endocrine signal
 - (D) A paracrine signal

- 195 The anemia with increase in size of RBC with reduced hemoglobin concentration is termed as _____
- (A) Normocytic hypochromic anemia
 - (B) Microcytic hypochromic anemia
 - (C) Microcytic normochromic anemia
 - (D) Piglet anemia
- 196 After drinking alcoholic beverages, increased urine excretion is the result of _____
- (A) increased blood pressure
 - (B) increased reabsorption of water in the proximal tubule
 - (C) inhibited secretion of antidiuretic hormone (ADH)
 - (D) increased aldosterone production
- 197 Which of the following correctly displays the sequence of developmental milestones?
- (A) cleavage → blastula → gastrula → morula
 - (B) cleavage → gastrula → morula → blastula
 - (C) cleavage → morula → blastula → gastrula
 - (D) gastrula → morula → blastula → cleavage
- 198 Prokaryotes do not have the splicing machinery and thus fail to express eukaryotic genes with introns. However, such limitation is overcome by _____
- (A) genetically modifying *E. coli* so that it can splice mRNA
 - (B) generating an intron-free version of the gene by manipulating the mRNA isolated from the test organism
 - (C) generating an intron less gene in vitro by polymerase chain reaction using genomic DNA as template
 - (D) splicing the transcript in vitro and then putting it back to *E. coli* for translation
- 199 Which one of the following is NOT a neurotransmitter?
- (A) Adrenaline
 - (B) Histidine
 - (C) Histamine
 - (D) Glutamate
- 200 The type-II hypersensitivity reaction is mainly mediated by _____
- (A) IgM
 - (B) IgA
 - (C) IgE
 - (D) T cells

Medical Biotechnology
Provisional Answer Key

Q.No	Option		Q.No	Option		Q.No	Option		Q.No	Option
1	C		51	D		101	C		151	D
2	D		52	A		102	C		152	D
3	D		53	B		103	D		153	B
4	C		54	C		104	D		154	A
5	A		55	D		105	C		155	B
6	C		56	B		106	D		156	D
7	B		57	A		107	D		157	A
8	C		58	D		108	B		158	A
9	C		59	A		109	D		159	B
10	B		60	C		110	C		160	A
11	A		61	B		111	B		161	A
12	A		62	A		112	C		162	B
13	B		63	A		113	C		163	C
14	A		64	B		114	C		164	C
15	B		65	A		115	B		165	A
16	C		66	A		116	B		166	B
17	C		67	B		117	B		167	D
18	B		68	C		118	A		168	B
19	B		69	A		119	D		169	B
20	C		70	D		120	D		170	C
21	C		71	A		121	D		171	C
22	C		72	D		122	B		172	A
23	B		73	D		123	C		173	B
24	A		74	C		124	B		174	D
25	C		75	A		125	B		175	A
26	B		76	C		126	D		176	C
27	D		77	A		127	A		177	B
28	B		78	C		128	D		178	A
29	C		79	D		129	B		179	A
30	A		80	A		130	B		180	A
31	B		81	C		131	B		181	C
32	B		82	D		132	A		182	A
33	D		83	C		133	B		183	B
34	C		84	A		134	A		184	C
35	A		85	C		135	D		185	A
36	A		86	B		136	B		186	C
37	B		87	B		137	A		187	C
38	D		88	A		138	C		188	B
39	C		89	B		139	C		189	A
40	A		90	D		140	C		190	B
41	A		91	D		141	B		191	D
42	D		92	D		142	A		192	C
43	A		93	D		143	D		193	D
44	D		94	A		144	B		194	C
45	D		95	D		145	C		195	C
46	C		96	D		146	D		196	C
47	B		97	D		147	A		197	C
48	D		98	D		148	C		198	B
49	B		99	B		149	C		199	B
50	A		100	B		150	D		200	A