1. Which of the following statements is NOT true?
(A) enzymes mediate the transformation of energy from one form into another
(B) enzymes can accelerate the attainment of thermodynamic equilibrium for a reaction that has a positive ΔG
(C) enzymes cannot alter the free energy change of a reaction
(D) enzymes lower the activation barrier of a chemical reaction

2. Carboxyproline has three ionizable groups with the following properties

Group	*pKa*
α- carboxyl	2.0
α- amino	10.5
γ – carboxyl	3.8

The isoelectric point (pI) for this amino acid is
(A) 2.9 (B) 6.2
(C) 7.1 (D) 5.4

3. L-tyrosine serves as a precursor for
(A) acetylcholine
(B) dopamine
(C) bombesin
(D) spingosphine-1-phosphate

4. A nerve contains axons of different types. The velocity of action potential propagation will be
(A) the highest in an unmyelinated thin axon.
(B) the highest in a thick myelinated axon
(C) the highest in a thin myelinated axon
(D) the same in all axonal types.

5. Information is coded in the nervous system by
(A) the duration of action potentials .
(B) the amplitude of action potentials
(C) the location of action potentials in the neuron
(D) the frequency of action potentials

6. One of the following has a dramatic effect on the sequence of a protein.
(A) A three base insertion in an exon
(B) A single base substitution in a promoter
(C) A one base insertion just after the start codon
(D) A one base insertion just before the start codon

7. Every neuron in the body develops from the
(A) neural tube (B) neural crest
(C) ectoderm (D) endoderm

8. Transmitters are inactivated at synapses by all of the following mechanisms EXCEPT
(A) diffusion out of the synaptic gap
(B) re-uptake by the presynaptic terminal
(C) uptake by astrocytes that ensheath the synapse
(D) uptake by oligodendrocytes

9. A neuron makes three synapses on a muscle cell to produce a sudden movement. However, each synapse is unreliable and conveys a signal with a probability of 0.5. Successful propagation by any synapse will result in muscle contraction. What is the probability that muscle will contract when the neuron fires?
(A) 7/8 (B) 3/2
(C) 3/8 (D) 1/8

10. Which part of the brain is involved in motor control?
(A) amygdala (B) prefrontal cortex
(C) hippocampus (D) cerebellum

11. Identify the ring system with the highest perimeter
(A) Proline (B) Cyclopentane
(C) Ribose (D) Histidine

12. The amino acid whose side chain has the largest number of possible conformations is
(A) Glu (B) Thr
(C) Met (D) Lys

13. miRNAs
(A) act as templates for making tiny peptides
(B) originate from genomic loci that are transcribed by RNA polymerase II
(C) interfere with translation by inhibiting tRNA function
(D) originate from genomic loci that are transcribed by all RNA polymerase

14. An alpha-helical region of 20 residues in a protein contains predominantly non-polar residues. Such a helix is likely to be
(A) on the surface of the protein
(B) embedded in the lipid bilayer
(C) located in the cytosol
(D) exposed to the extracellular environment

15. A 3_{10} helix is formed when a series of hydrogen bonds occur between
(A) the C=O of residue i and the NH of residue i+10
(B) the C=O of residue i and the NH of residue i+3
(C) the C=O of residue i and the NH of residue i+4
(D) the C=O of residue i and the NH of residue i+5

16. A small circle is inside the big circle as shown below,

The diameter (d) of the small circle is the same as the radius of the big circle. The area of the shaded region is
(A) ¾ π d^2 (B) π d^2
(C) 3 π d^2 (D) ½ π d^2

17. The diffusion coefficient for a molecule at infinite dilution in a non-interacting solvent
(A) depends on the shape of the molecule
(B) depends on the viscosity and shape of the molecule
(C) depends on the viscosity, shape and temperature of the molecule
(D) is independent of these parameters

18. Chloroform is more miscible with water than carbon tetrachloride because
(A) chloroform has a lower dipole moment than carbon tetrachloride
(B) chloroform has a lower dielectric constant than carbon tetrachloride
(C) chloroform has a higher dipole moment than carbon tetrachloride
(D) chloroform has a higher order of symmetry than carbon tetrachloride

19. If a vesicle of 10 μm radius is broken into ten equal-sized vesicles, what would be their diameter?
(A) 6.32 μm (B) 1.0 μm
(C) 3.16 μm (D) 0.5 μm

20. A single step reaction starting from a naturally occurring amino acid that leads to the biosynthesis of histamine involves
(A) Removal of an amino group
(B) Removal of a carboxyl group
(C) Removal of a linker carbon
(D) Opening of the aromatic ring

21. The two strands of the *E. coli* chromosome were separated into plus (+) and minus (-) strands. Which of the following statements is correct?
(A) both the strands obey Chargaff's rule
(B) the (+) strand codes for mRNAs
(C) the (+) strand codes for r-RNA and t-RNA genes
(D) both the strands hybridize to Okazaki fragments

22. A sample of rRNA was degraded into its constituent nucleotides. The absorbance of this sample at 260 nm would
(A) decrease if the degradation was effected by alkaline digestion but increase if the same was effected by a ribonuclease
(B) increase if the degradation was effected by alkaline digestion but decrease if the same was effected by a ribonuclease
(C) remain the same irrespective of the chemical or the enzymatic method used
(D) increase irrespective of the chemical or the enzymatic method used

23. The highest concentration of calcium is present in
(A) cytosol
(B) mitochondria
(C) lysosomes
(D) endoplasmic reticulum

24. In cells producing HIV infectious particles, the RNA genomes of the viral progeny are produced by transcription of the
(A) viral RNA by HIV reverse transcriptase
(B) integrated viral genome by RNA polymerase II
(C) integrated viral genome by RNA polymerase III
(D) viral DNA by HIV reverse transcriptase

25. The 5' end of the mature tRNA contains a
(A) hydroxyl group
(B) triphosphate group
(C) monophosphate group
(D) diphosphate group

26. Using site-directed mutagenesis, a mutant form of chymotrypsin was created that has alanine substituted for the serine at position 195. Which of the following effects would be observed?
(A) no effect or a slight increase in affinity for substrate coupled with a complete loss of enzymatic activity
(B) a decrease in the affinity for substrate coupled with no change in enzymatic activity
(C) an increase in the rate of peptide-bond cleavage due to an increase in the rate of acid-base-catalysis.
(D) loss of enzymatic activity due to the inability to bind substrate

27. DNA topoisomerases
(A) unwind DNA by their helicase activity to allow progression of the replication fork
(B) recruit and/or assemble the components of replication
(C) bind and melt DNA to generate single stranded regions
(D) introduce negative supercoils to underwind DNA to allow progression of the replication fork

28. In *E. coli*, the catabolite activator protein (CAP) facilitates activation of the *lac* operon
(A) at low glucose levels
(B) at high glucose levels
(C) independent of the glucose level
(D) at-high lactose levels

29. In a cell treated with Brefeldin A, the appearance of which cellular of organelle is disturbed?
(A) Nucleus (B) Golgi complex
(C) Mitochondria (D) Lysosome

30. *E. coli* RNA polymerase is a multi-subunit protein consisting of alpha, beta, beta prime and sigma subunits. It recognizes promoter sequence through which one of the following
(A) Alpha subunits (B) Beta- beta prime complex
(C) Beta prime subunit (D) Sigma subunit

31. In a large and isolated population, what is the most likely reason for a change in allele frequencies across generations?
(A) drift (B) migration
(C) selection (D) mutation

32. Over 90% of all species that have ever existed are extinct today. This shows that
(A) evolution is inefficient
(B) evolution does not take long-term advantage into account
(C) extinction is inevitable
(D) a very long time has-passed since life began on earth.

33. In a study of tree dispersion in a forest, 50 grid cells of 1 sq km were chosen at random. The number of trees in each cell was counted. The ratio of the variance to mean was much less than 1. The spatial distribution of the trees can be described as
(A) randomly dispersed (B) highly aggregated
(C) highly dispersed (D) bimodally dispersed

34. Body size of lizards in a population are measured and mean body size calculated. Which of the following statistical parameters best describes the uncertainty in body size?
(A) Standard deviation
(B) Coefficient of variation
(C) 1.96 x Standard deviation (Which holds 95% of the data)
(D) Standard error

35. Which of the following plants with particular traits is most vulnerable in fragmented forest landscape?
(A) self-pollinated and wind-dispersed
(B) cross-pollinated and animal-dispersed
(C) self-pollinated and animal-dispersed
(D) cross-pollinated and wind dispersed

36. Female deer prefer to mate with males with the largest antlers. What kind of selection will such a female mating preference exert on antler size in males?
(A) directional selection (B) disruptive selection
(C) convergent selection (D) stabilizing selection

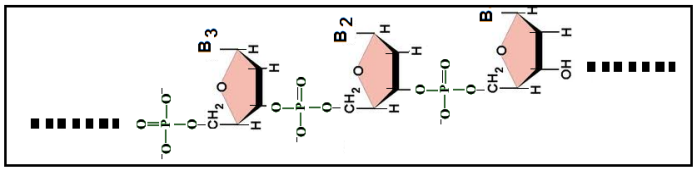
37. The hypothesis that dinosaurs originally evolved feathers for warmth, rather than flight would be best supported by
(A) the occurrence of feathers in flying dinosaur species
(B) flightlessness as a derived trait in the dinosaur clade
(C) flightlessness as an ancestral trait in the dinosaur clade
(D) feathers as an ancestral trait in the dinosaur clade

38. Two distantly related families of acoustically-orienting parasitoid flies possess ears that are similar in structure and located at similar positions on the body. This is most likely a case of
(A) adaptive radiation (B) evolutionary stasis
(C) convergent evolution (D) divergent evolution

39. Specialized antigen presenting cells are
(A) $CD4^+$ and $CD8^+$ T cells
(B) B cells, macrophages and dendritic cells
(C) neutrophils and $CD4^+$ cells
(D) natural killer cells and dendritic cells

40. A M 13 phage preparation from E. coli grown in a normal (containing ^{14}N as the sole nitrogen source) was used to infect a fresh culture of E. coli at a multiplicity of infection (m.o.i) of about 1 and grown in a medium containing ^{15}N the sole nitrogen source. The replicative form (RF) DNA of the phage was prepared after 4 generations of E. coli growth (a productive phase of mature phage release) and analyzed by CsCl density gradient ultracentrifugation. The M13 RF DNA will be seen predominantly as
(A) a single band migrating between the marker DNAs of M13 RF (^{15}N) and M13 RF (^{14}N)
(B) a single band migrating with the marker DNA of M13 RF (^{15}N)
(C) a single band migrating with the marker DNA of M13 RF (^{14}N)
(D) two bands, one migrating with the marker DNA of M 13 RF (^{14}N) and the other in between the marker DNAs of M13 RF (^{15}N) and M 13 RF (^{14}N)

41. The polymer shown below is a component of:



(A) DNA (B) RNA
(C) Either DNA or RNA (D) Polysaccharide

42. Which of the following is NOT INVOLVED in the quaternary association of hemoglobin molecules?
(A) Disulphide bond
(B) Hydrogen bond
(C) Hydrophobic interaction
(D) Electrostatic interaction

43. Aspirin can prevent heart attacks because
(A) increases the metabolic activity of heart
(B) prevents the formation of blood clots
(C) enhances lung activity
(D) decreases the formation of cholesterol

44. Which of the following occurs first during T cell activation?
(A) IL-2 production
(B) Cell surface expression of the high affinity IL-2 receptor
(C) Increase in cytosolic calcium
(D) Interferon-gamma production

45. Which organ is responsible for the development of mature T cells?
(A) Spleen (B) Lymph node
(C) Liver (D) Thymus

46. The immunoglobulin that can be transported across the placenta to confer immunity to the fetus in mammals is
(A) IgG (B) IgM
(C) IgE (D) IgD

47. After class switching, B cells can make antibodies
(A) with the same antigenic specificity but different effector functions
(B) with different antigenic specificities but same effector function
(C) with different variable region in the light chain
(D) with different variable regions in the heavy chain

48. Replication of the full length chromosome of *E. coli* takes
(A) exactly as long as it takes *E. coli* to divide
(B) longer than it takes *E. coli* to divide
(C) lesser time than it does *E. coli* to divide
(D) variable time dependent on the use of ^{15}N or ^{14}N nitrogen source in the medium.

49. The non-B DNA structure reported to be found at telomeres is
(A) Cruciform DNA (B) Z-DNA
(C) A-DNA (D) G-quadruplexes

50. The electrons for the reduction reaction in photosynthesis come from
(A) carbon dioxide (B) water
(C) carbohydrate (D) oxygen

51. Bacterial cells in liquid culture go through the lag phase because
(A) the rates of cell division and cell death are equal
(B) the cell density is too low to be detected
(C) DNA synthesis and cell division are not synchronous
(D) they are synthesizing new enzymes to utilize the nutrients in the medium

52. Which of the following bacterial species produces a toxin that can be used to inhibit protein synthesis in eukaryotic cells?
(A) *Vibrio cholera*
(B) *Corynebacterium diphtheria*
(C) *Mycobacterium tuberculosis*
(D) *Bordetella pertussis*

53. Which of the following statements is INCORRECT about mating F^+ and F^- *E. coli*?
(A) the F^- cell is converted to F^+ cell
(B) the F^+ cell is converted to F^- cell
(C) chromosomal genes are rarely transferred
(D) the genes involved in pilus formation are transferred at high frequency

54. The law of independent assortment of genes is violated in many instance due to
(A) linkage
(B) incomplete dominance
(C) the presence of multiple alleles
(D) imprinting

55. Phenotypic traits can exhibit a continuous variation if
(A) they are encoded by a single locus
(B) they are encoded by multiple loci
(C) there is co-dominance
(D) there is selection

56. The cross between a mutant mother and a normal father gives rise to offspring that are all mutant. The reciprocal cross gives rise to offspring that are all normal. This means that the mutation is likely to be
(A) in the mitochondrial genome
(B) in the nuclear genome
(C) dominant
(D) recessive

57. At one time the genetic code was believed to be universal, but today we know that there are some variations in the code. This implies that
(A) the word 'code' is inappropriate
(B) different codons can code for same amino acids
(C) different amino acids can encoded by same codon
(D) the genetic code can evolve

58. A change in the wavelength of excitation of the green fluorescent protein is explained by
(A) Strokes shift (B) Rayleigh effect
(C) Heisenberg's principle (D) de Broglie's principle

59. Type I diabetes mellitus is caused by
(A) destruction of pancreatic beta cells
(B) glucose intolerance
(C) defects in insulin secretion
(D) decreased synthesis of insulin receptors

60. You have a mixture of proteins properties
Protein 1=58,000 Daltons
Protein2 =28,000 Daltons
Protein 3 =17,000 Daltons
Protein 4 = 10,000 Daltons
Proteins 3 and 4 exist as hetero-dimer while proteins 1 and 2 exist as monomers in solution. What is the order of elution of these proteins on a gel-exclusion column?
(A) protein 1 will elute first and then proteins 2, 3 and 4 co-elute as a single peak (the chromatogram will depict 2 major peaks)
(B) proteins 3 and 4 will co-elute first followed by proteins 2 and 1 (the chromatogram will depict 3 major peaks)
(C) protein 1 will elute first followed by proteins 2, 3 and 4 (the chromatogram will depict 4 major peaks)
(D) protein 1 will elute first. Protein 2 will elute next followed by co-elution of proteins 3 and 4 (the chromatogram will depict 3 major peaks)

61. A solution of potassium acetate is prepared by dissolving it in water. Its pH will be between,
(A) between 5.0 and 6.8 (B) 7.0
(C) above 7.0 (D) 4.3

62. If the half-life of radioactive phosphorus (^{32}P) is 12 days, what will be the activity of one milli Curie of ^{32}P-labelled ATP after 60 days?
(A) 12.5 micro Curie (B) 250 micro Curie
(C) 62.5 micro Curie (D) 31.25 micro Curie

63. Gram positive bacteria
(A) have a thick capsule that traps the crystal violet stain
(B) have a periplasmic space that traps the crystal violet stain
(C) have multiple layers of peptidoglycan that help retain the crystal violet stain
(D) have two layers of outer membrane that help retain the crystal violet stain

64. Which compound links glycolysis, nucleotide synthesis and glycogen synthesis
(A) Acetyl-CoA (B) Oxaloacetate
(C) Citrate (D) Glucose 6-phosphate

65. Which pair correctly matches the enzyme with its allosteric activator?
(A) Hexokinase - ATP
(B) Phosphofructokinase I - AMP
(C) Pyruvate kinase - ATP
(D) Pyruvate dehydrogenase -NADH

66. Consider the following table regarding the photoperiods and flowering habits of plants and identify the correct statement

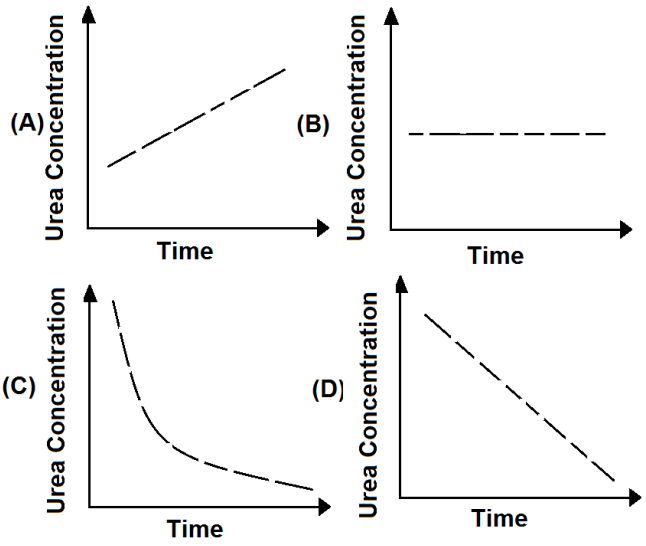
Plant Species	Photoperiod		
	8 hr of light	14 hr of light	20 hr of light
Xanthium	Flowers	Flowers	Does not flower
Hypocyanus	Does not flower	Flowers	Flowers
Sunflower	Flowers	Flowers	Flowers

(A) Xanthium is short-day plant; Hyoscyamus is long-day plant; Sunflower neutral plant
(B) Xanthium is long-day plant; Hyoscyamus is short-day plant; Sunflower is day neutral plant
(C) Xanthium is short-day plant; Hyoscyamus is day-neutral plant; Sunflower is long day plant
(D) Xanthium is long-day plant; Hyoscyamus is day-neutral plant; Sunflower is short day plant

67. If 'n' is the amount of DNA present in a cell at the end of G_2 phase, the amount of DNA per cell at the end of G_1 phase is
(A) 4n (B) 2n
(C) n (D) n/2

68. Cross-sections of cilia and flagella show nine equally spaced sets of microtubule structures. A similar organization is also seen in
(A) Nuclear Lamins (B) Connexins
(C) Centrosomes (d) Nuclear Pore

69. If a person starts fasting, which of the following graphs will be the correct representation of the urea content in his urine?



70. A non-sense mutation introduced into the GFP reporter gene cloned under a thiamine repressible promoter was transformed into yeast cells. As expected, these did not express GFP activity when grown in media with or without thiamine. It was brief exposure of log-phase cultures to ultraviolet light, a few cells expressed GFP but only when grown in media lacking thiamine. The inference is
(A) thiamine influences cell walls to give resistance to ultraviolet light
(B) ultraviolet light interferes with GFP reporter activity
(C) a low frequency mutation in the ultraviolet exposed cells allows for expression of this mutant GFP
(D) thiamine interferes with GFP activity

71. Which of the following phytohormones is produced under water deficit condition and plays an important role in the tolerance response of plants to drought and high salinity?
(A) Abscissic acid (B) Cytokinin
(C) Ethylene (D) Gibberellin

72. Isomerisation of 1, 3 bis-phosphoglycerate (BPG) to 2, 3 BPG
(A) Enhances the rate of glycolysis and increases ATP production for altered cellular requirements
(B) Enhances deoxygenation of hemoglobin
(C) Diverts ATP to secondary metabolite production
(D) Maintains CoA levels in cell

73. Strychnine, a convulsant poison, is an allosteric inhibitor of the glycine receptor. Which of the following indicates its mode of action?
(A) It binds and lowers the affinity of the glycine receptor for glycine
(B) It changes the conformation of glycine such that it recognizes other receptors
(C) It binds at the glycine site in the receptor acting as a partial antagonist
(D) It binds to a transcription factor to regulate expression of glycine receptor

74. Why is methanol poisoning treated with ethanol?
(A) Ethanol simply dilutes the concentration of methanol
(B) Ethanol complexes with methanol to form a non-toxic compound
(C) Ethanol binds competitively to the target protein of methanol
(D) Ethanol forms a covalent inactivating complex with methanol and target protein

75. Warming a suspension of yeast increases the rate at which sucrose is broken down into glucose and fructose because, warming
(A) increases concentration of the products
(B) increases density of sucrose on the exposed surfaces
(C) increases frequency of collisions between molecules
(D) stabilizes the enzyme-substrate complex

76. One of the following represents a poly-Ala protein
(A) $C_{180}\ O_{120}\ N_{180}\ H_{847}$ (B) $C_{240}\ O_{280}\ N_{158}\ H_{1120}$
(C) $C_{120}\ O_{360}\ N_{362}\ H_{689}$ (D) $C_{360}\ O_{123}\ N_{120}\ H_{602}$

77. The Tm of a double-stranded DNA molecule, when measured in 0.15 M NaCI was 60 ^{0}C. If measured in the presence of 0.15 M NaCI and 7 M Urea the Tm will be
(A) lower (B) higher
(C) the same (D) zero

78. When working maximally, mammalian muscles use approximately 10^{-3} moles of ATP per gram per minute. However, there is only about 5 x 10^{-6} moles of ATP present per gram of resting muscle. Through which one of the following means does the muscular system meet the demand for ATP for sudden intense muscular activity?
(A) Synthesis of ATP from ADP and phosphate
(B) Glycolysis
(C) Breakdown of phosphocreatine into creatine and AlP
(D) Utilisation of ATP pool from other tissues

79. Which one of the following enzyme catalyzes release of pyrophosphate from ATP?
(A) Protein kinase A (B) Polyphosphatase
(C) RNA polymerase (D) Glycogen phosphorylase

80. The set of amino acid residues that can be phosphorylated in proteins is
(A) histidine, serine, theronine
(B) histidine, lysine, phenyl alanine
(C) arginine, serine, tyrosine
(D) tyrosine, asparagine, glutamine

81. Which of the following statements about the enzyme complexes of the electron system is correct?
(A) They interact with one another via mobile carriers of electrons
(B) They are located in the mitochondrial matrix.
(C) They cannot be separated from one another in functional form
(D) They all have cytochromes.

82. The loop of Henle is likely to be longer in animals of this biome
(A) deserts (B) Rainforests
(C) temperate meadow (D) savannah woodlands

83. Acetyl CoA is
(A) a quinone (B) an isoprenoid
(C) a thioester (D) an ether

84. Which of the following statements describes the oxygen binding curve of hemoglobin?
(A) Each of the four oxygen molecules bind with equal affinity.
(B) The binding of the first oxygen molecule enhances the binding of the other three oxygen molecules
(C) The binding of the first oxygen molecule makes the binding of other three oxygen molecules more difficult
(D) The binding of the first oxygen molecule has no effect on the binding of the remaining three oxygen molecules

85. An optical density of 1 means
(A) 1% of the incident light is absorbed
(B) 1% of the incident light is transmitted
(C) 90% of the incident light is absorbed
(D) 90% of the incident light is transmitted

86. Of the two isolates of *Vibrio cholerae*, isolate A but not isolate B was found to be virulent. This is because
(A) isolate B was isolated in Germany where cholera is not prevalent
(B) unlike isolate A, isolate B was grown in minimal medium
(C) isolate A is Iysogenised by a bacteriophage
(D) isolate B is Iysogenised by a bacteriophage

87. Which of the following possesses the smallest genome?
(A) *Escherichia coli*
(B) *Mycobacterium leprae*
(C) *Mycoplasma genitalium*
(D) *Haemophilus influenzae*

88. When sub-cultured into a fresh medium, a bacterium grows with a lag phase of 4 hrs followed by a log phase and a stationary phase. If the bacterium was treated with ethidium bromide for 3 hours in these phases of growth to cure a plasmid, it is more likely to lose the plasmid in
(A) early stationary phase
(B) late stationary phase
(C) logarithmic growth phase
(D) lag phase

89. Which of the following statements is TRUE?
(A) Lysozyme inhibits cross-linking of peptidoglycan in eubacteria
(B) Penicillin inhibits cross-linking of peptidoglycan in eubacteria
(C) Lysozyme prevents transport of the building block of peptidoglycan units into periplasmic space
(D) Penicillin prevents transport of the building block of peptidoglycan units into periplasmic space

90. Populations A and B are two isolated populations of equal size. The sex ratio in these two populations is 1: 1. A new mutation arises in the X chromosome of an individual in population A, whereas in population B a new mutation arises in the Y chromosome. The probability of fixation of this mutation is
(A) higher in population A
(B) higher in population B
(C) same in both populations
(D) not dependent on the sex ratio

91. Gonadotropin releasing hormone is the key mediator of the reproductive processes in mammals. It is synthesized by
(A) gonadotrophs (B) hypothalamus
(C) medulla oblongata (D) gonads

92. An essential building block of phosphatidic acid and phosphatidylcholine is
(A) glycerol (B) sorbitol
(C) cholesterol (D) inositol

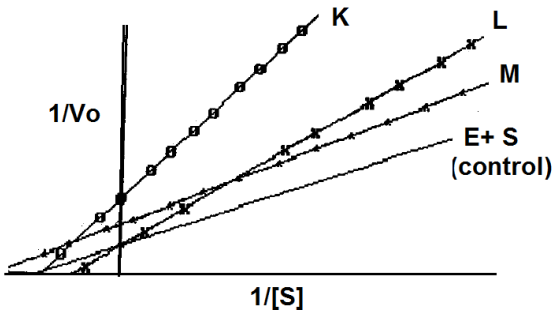
93. The rate of a biochemical reaction was determined experimentally to be $V_o=k [X] [Y]^2 [Z]$. What is the order of the reaction with respect to Z? What is number of molecules involved in the rate-limiting step of the reaction? What is the overall order of reaction?
(A) second order, four molecules, third order
(B) zero order, three molecules, fourth order
(C) first order, four molecules, fourth order
(D) first order, three molecules, fourth order

94. Which is the source of stem cells that can produce all the cells of the immune system?
(A) Spleen (B) Thymus
(C) Lymph node (D) Bone marrow

95. All of the following have a common alpha-subunits EXCEPT
(A) growth hormone
(B) thyroid-stimulating hormone
(C) leutinizing hormone
(D) follicle stimulating hormone

96. Which one of tile following enzymes brings about catabolism of cAMP?
(A) Adenylyl cyclase (B) Adenosine deaminase
(C) Phosphodiesterase (D) Nucleotide phosphatase

97. The Lineweaver-Burke plots for E + S only (control) and for three inhibitors K, L, M of this enzyme-substrate system are shown below.



What is the TRUE-FALSE sequence for the statements below?
1. The maximum velocity of the reaction is unchanged from the control value in the presence of inhibitor L.
2. At a given substrate concentration the reaction rate is higher for inhibitor L than for inhibitor K.
3. The enzyme is half-saturated at a lower concentration of substrate in the presence of inhibitor L than in the presence of inhibitor K.
(A) true, false, false (B) true, true, false
(C) false, true, false (D) false, false, true

98. Which of the following amino acid side chain is most frequently used for binding metal ion by protein molecules?
(A) Isoleucine (B) Arginine
(C) Aspartic Acid (D) Tryptophan

99. In addition to adjuvant, generation of anti-hapten antibodies will require
(A) addition of the hapten into the mice
(B) injection of mixture of hapten and proteins into mice
(C) injection of hapten covalently coupled with a protein into mice
(D) injection of a mixture of hapten and lipid into mice

100. A homogenate of liver cells is centrifuged at 100,000 g for 1 hours. Following this, the supernatant is separated from the pellet and the pellet is suspended in buffered medium. Assuming inclusion of substrates and cofactors, which of the following enzymatic activities can be measured in the supernatant?
(A) Succinate dehydrogenase
(B) Glyceraldehyde 3-phosphate dehydrogenase
(C) Glycogen synthase
(D) Aconitase

IISC 2013 ANSWER KEY: BIOLOGICAL SCIENCES RESEARCH (QUESTION PAPER- 'B')

1	B	21	D	41	A	61	C	81	A
2	A	22	D	42	A	62	D	82	A
3	B	23	D	43	B	63	C	83	C
4	B	24	B	44	C	64	D	84	B
5	D	25	C	45	D	65	B	85	C
6	C	26	A	46	A	66	A	86	C
7	C	27	D	47	A	67	D	87	C
8	D	28	A	48	B	68	C	88	C
9	A	29	B	49	D	69	A	89	B
10	B	30	D	50	B	70	C	90	B
11	B	31	C	51	D	71	A	91	B
12	B	32	B	52	B	72	B	92	A
13	B	33	C	53	B	73	A	93	C
14	B	34	C	54	A	74	C	94	D
15	B	35	B	55	B	75	C	95	A
16	A	36	A	56	A	76	D	96	C
17	C	37	C	57	C	77	A	97	B
18	C	38	C	58	A	78	C	98	C
19	A	39	B	59	A	79	C	99	C
20	B	40	C	60	D	80	A	100	B

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