HOMI BHABHA CENTRE FOR SCIENCE EDUCATION
&
INDIAN ASSOCIATION OF CHEMISTRY TEACHERS
NATIONAL STANDARD EXAMINATION IN BIOLOGY 2002 – 2003

Date of Exam: 17th Nov. 2002 **Time: 14:30 to 16:00 Hrs**

ONLY ONE OUT OF THE FOUR ALTERNATIVES IS CORRECT

1. The three dimensional structure of villi of small intestine can be best studied using:
a. Fluorescence microscopy.
b. Scanning electron microscopy.
c. Phase contrast microscopy.
d. Transmission electron microscopy.

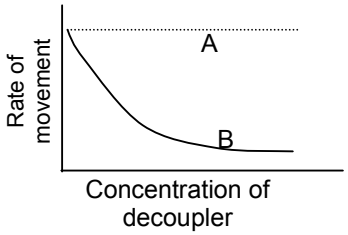
2. Which of the following structures is **not found** in an animal cell?
a. Microbodies
b. Heterochromatin
c. Plasmodesmata
d. Microfilaments

3. The correct order of increase in the size of the structures listed below is:
(i) Proteins (ii) Virus
(iii) Mitochondria (iv) Ribosomes
a. (i), (iv), (ii), (iii)
b. (ii), (i), [(iii) or (iv)]
c. (ii), (iii), (i), (iv)
d. (iii), (ii), (i), (iv)

4. Smooth endoplasmic reticulum is specialized for the synthesis of lipids and steroids. These organelles are found predominantly in:
a. Pancreas
b. Ovary
c. Reticular cells
d. Blood

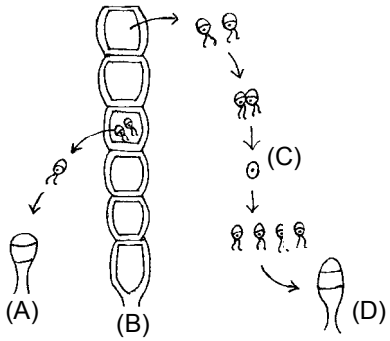
5. Which of the following statements about cellular respiration is **wrong**?
a. Substrate level phosphorylation occurs only in cytosol.
b. Glycolysis does not require membrane bound organelle.
c. NAD^+ is the first electron acceptor in glycolysis.
d. In prokaryotes, citric acid cycle takes place in cytoplasm.

6. The graph depicts the effect of decoupler on the movement of solutes across a membrane. A and B represent:



a. Facilitated diffusion and coupled transport respectively.
b. Active transport and diffusion respectively.
c. Coupled transport and facilitated diffusion respectively.
d. Diffusion and active transport respectively.

7. Life cycle of ulothrix is shown in the diagram. The correct ploidy levels at the four stages A, B, C and D are:



a. A: n B:n C:2n D:n
b. A: n B:n C:2n D:2n
c. A: 2n B:n C:2n D:n
d. A: n B:n C:n D:n

8. In the F_2 generation, the phenotypic and the genotypic ratios are the same in case of:
a. Mendelian monohybrids
b. Mendelian dihybrids
c. Incomplete dominance
d. Both a & b

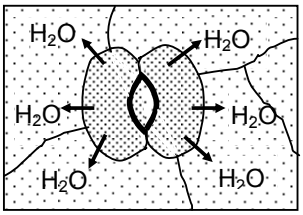
9. Which of the statements related to plant hormone auxin are true?
(i) Phototropism in plants is a result of movement of auxin towards light.
(ii) Auxin acts by elongation of the cell wall.
(iii) Auxin moves away from light.
(iv) Auxin acts by cell differentiation.
a. (i) & (ii)
b. (ii), (iii) & (iv)
c. (ii) & (iv)
d. (i) & (iii)

10. The sequence of the mRNA transcribed by the given segment of DNA will be:

5' ATGTCCTTGCAACAT 3' - Sense strand
3' TACAGGAACGTTGTA 5'

a. 5' AUGUCCUUGCAACAU 3'
b. 5' UACAACGUUCCUGAU 3'
c. 5' UACAGGAACGUUGTA 3'
d. 5' AUGUUGCAAGGACAU 3'

11. The diagram illustrates stomatal closing. The major mistake in the diagram is:



a. The concentration of the K^+ should be more outside the guard cells.
b. The concentration of the K^+ should be equal on both inside and outside.
c. The peripheral walls of the guard cells should be thicker.
d. The water should move inside the guard cells.

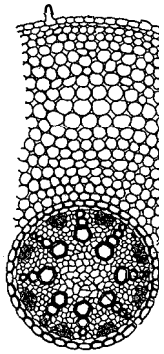
12. A qualitative antibody assay of serum from an infected patient was carried out. It showed the presence of IgG antibodies. What conclusions can you draw from this observation?
a. It is a recent infection.
b. The dose of the pathogen is very high.
c. There has been a time lag between the infection and the assay.
d. Both a & b

13. If 'x' is the amount of DNA present in a cell after mitosis, the amount of DNA per cell in the G_2 phase is:
a. x
b. 2x
c. x/2
d. 4x

14. A test cross to determine the genotype of smooth yellow seed (both dominant characters) has to be performed. The required phenotype of the seed to be used should be:
a. Smooth yellow
b. Wrinkled green
c. Smooth green
d. Wrinkled yellow

15. Which of the following pairs represent identical processes?
a. Conjugation and fragmentation
b. Binary fission and mitosis
c. Transformation and transduction
d. Parthenogenesis and gametogenesis

16. The diagram given below is a transverse section of:

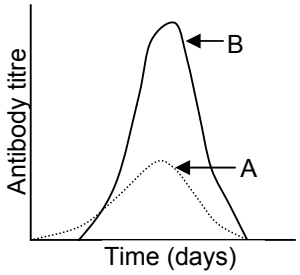


a. Monocot root
b. Monocot stem
c. Dicot root
d. Dicot stem

17. Nucleic acids are **absent** in:
(i) mitochondria (ii) chloroplasts
(iii) Smooth ER (iv) Rough ER
(v) nucleolus
a. only (iii)
b. (ii) and (iii)
c. (i), (ii), (iv) and (v)
d. (iii), (iv) and (v)

18. During protein synthesis, an antibiotic that binds to the smaller sub unit of ribosome will have an inhibitory effect on:
a. Peptide bond formation
b. Translocation
c. Correct reading of mRNA
d. Binding of tRNA to A – site

19. Immune response in terms of antibody levels in blood is depicted below. Mark the correct interpretation:

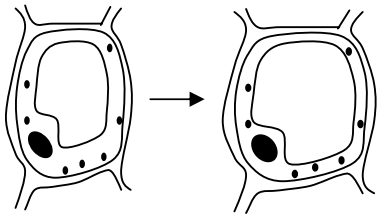


a. 'A' & 'B' indicate response to two different antigens.
b. 'A' & 'B' indicate two different types of antibodies.
c. 'A' & 'B' indicate primary and secondary immunological response.
d. Both a & b

20. Which of the following can divert the photosynthetic reaction to mere fluorescence of light?
a. Changing the wavelength of the incident light.
b. Increasing the leaf temperature.
c. Inactivating the electron acceptors.
d. Increasing the ratio of chlorophyll and accessory pigments.

21. Blood stains were found at the site of crime. If DNA fingerprinting is to be used for conviction, which of the following can be used?
a. Erythrocytes
b. Leucocytes
c. Platelets
d. Serum

22. A plant cell suspended in a test solution shows the following change in morphology. The test solution possibly could be:

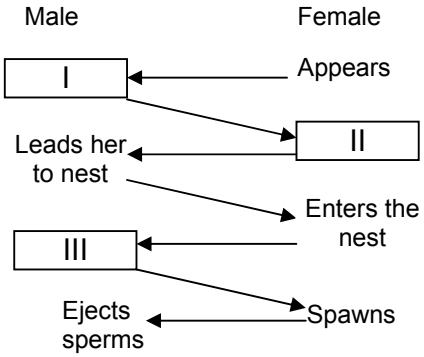


a. Hypertonic containing sodium chloride.
b. Hypotonic containing sucrose.
c. Water containing glycerol.
d. Either b or c

23. Which of the following statements about reproduction in Paramaecium are true?
(i) Conjugation is a process of sexual reproduction.
(ii) Macronuclei always divide mitotically.
(iii) Conjugation is a process of only genetic recombination.
(iv) During the process of conjugation, each paramaecium gives and receives equal amount of DNA.
a. (i), (iii) and (iv)
b. (ii) and (iv)
c. (iii) and (iv)
d. (i), (ii), (iii) and (iv)

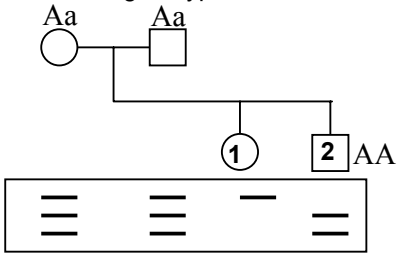
24. Trisomy is a condition wherein three copies of a particular chromosome are present in a cell. This condition occurs due to an error during:
a. Metaphase I
b. Metaphase II
c. Anaphase I
d. Anaphase II

25. Reproductive behaviour of stickleback fish is shown. I, II and III indicate:



a. I: Trembling
   II: Releases pheromones
   III: Displays swollen belly
b. I: Zigzag dance
   II: Displays swollen belly
   III: Trembling
c. I: Trembling
   II: Zigzag dance
   III: Leaves the nest
d. I: Displays aggressive behaviour
   II: Zigzag dance
   III: Displays swollen belly

26. The pedigree and the corresponding autoradiograph of restriction map of a family with two children is shown below. The genotype of child 1 is:



a. Aa
b. aa
c. AA
d. Cannot be determined.

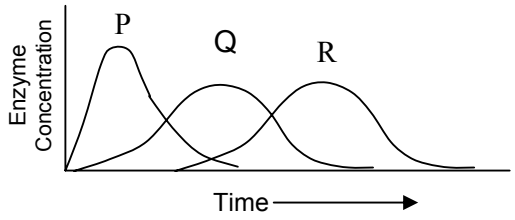
27. A total parasite is nutritionally:
a. A photoautotroph
b. A chemoautotroph
c. A photoheterotroph
d. A chemoheterotroph

28. Plants pure for red and white flowers were allowed to cross. (Red dominant over white). After selfing of F_1 plants, the proportion of white flowered plants in the total progeny would be:
a. One third
b. One fourth
c. Three fourth
d. Half

29. The characteristics of Phylum Rotifera, Nematoda and Platyhelminthes are:
a. Bilateral symmetry, pseudocoelomate, complete or sac like digestive tract.
b. Bilateral symmetry, acoelomate, greatly reduced digestive tract.
c. Bilateral symmetry, coelomate / acoelomate, complete digestive tract.
d. Radial symmetry, pseudocoelomate, no digestive tract.

30. The nitrogen content of cotyledons is likely to reduce during:
a. dormancy
b. flowering
c. germination
d. photosynthesis

31. The concentration of certain enzymes in the cell during recombination is graphically represented. The curves P, Q and R represent:

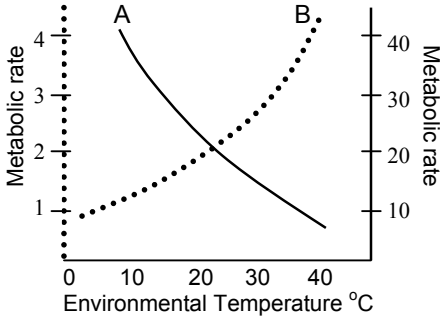


a. P: Polymerases; Q: Ligase;
   R: Restriction enzymes
b. P: Restriction enzymes; Q: Ligase;
   R: Polymerases
c. P:Restriction enzymes;
   Q: Polymerases; R: Ligase
d. P: Restriction enzymes; Q: Ligase;
   R: Endonuclease

32. In a gritty fruit like pear, the fleshy part and the spotted wall of the fruit are respectively made up of:
a. Sclereids and parenchyma
b. Parenchyma and sclereids
c. Collenchyma and parenchyma
d. Sclereids and collenchyma

33. The water runoff from an area under study showed a very high concentration of nitrate ions. This is indicative of:
a. Very heavy rainfall.
b. Drought.
c. Total cut down of trees.
d. Excessive growth of trees.

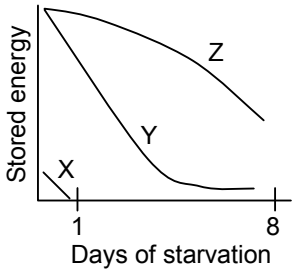
34. Curves A and B in the following graph represent:



a. A: cat B: lizard
b. A: elephant B: mouse
c. A: bird B: mouse
d. A: fish B: frog

35. A plant placed near a burning flame showed untimely fall of leaves. This is probably due to:
a. Increased catabolism compared to anabolism.
b. Decreased photosynthesis compared to respiration.
c. Enzyme inactivation leading to chlorosis.
d. Ethylene production leading to senescence.

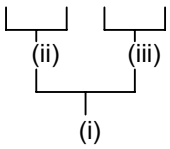
36. During starvation, different types of food reserves will be used up at different rates. They are shown in the graph. Mark the correct option:

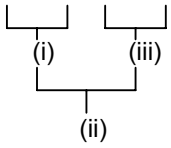


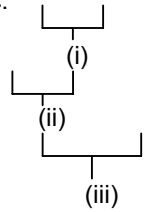
a. X: proteins Y: fat
Z: carbohydrates
b. X: nucleic acids Y: carbohydrates
Z: fats
c. X: carbohydrates Y: fats
Z: proteins
d. X: unsaturated fats Y: carbohydrates
Z: proteins

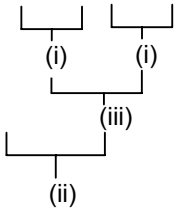
37. Which of the following **will not** result in a blood clot?
a. Breakdown of platelets.
b. Absence of prothrombin in blood.
c. Absence of antithrombin activity in blood.
d. Presence of factor VIII in blood.

38. Some criteria for classifying animals are:
(i) Presence or absence of coelom.
(ii) Presence or absence of true tissue organization.
(iii) Presence of 2 or 3 tissue layers.
The correct way of classification using the above criteria is:

a.


b.


c.


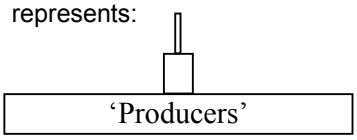
d.


39. Events that occur during regulation of blood glucose are:
    (i) Increase in blood glucose.
    (ii) Increase in circulating glucagon.
    (iii) Release of glucose from glycogen.
    (iv) Decrease in blood glucose level.

The correct order of these events is:

a. (iv), (iii), (ii), (i)
b. (iii), (i), (ii), (iv)
c. (iv), (ii), (iii), (i)
d. (i), (ii), (iv), (iii)

40. The pyramid of biomass given below represents:



a. A forest
b. A grassland
c. An ocean
d. A mammal with parasites

41. Animals of the same phylum are grouped. Mark the **incorrect** group.

a. Spider, insects, shrimp
b. Fish, mammal, reptile
c. Snail, squid, slug
d. Earthworm, millipede, leech

42. Study the two cases carefully.

	Mother	Father	Children
Case 1	With disease	Normal	Sons always with disease
Case 2	With disease	Normal	Sons and daughters could show disease

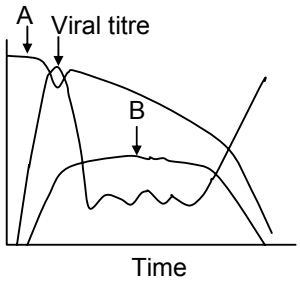
The correct interpretation of the 2 cases is:

a. Case 1: X – linked recessive disease
   Case 2: autosomal recessive disease
b. Case 1: Y – linked recessive disease
   Case 2: X – linked recessive disease
c. Case 1& 2: X – linked recessive disease.
d. Case 1: X – linked dominant disease
   Case 2: autosomal dominant disease

43. Two genetic diseases namely Phenylketonurea and haemophilia are to be tested in two different individuals. Both these techniques will involve the use of:

a. Autosomes
b. Sex chromosomes
c. Restriction enzymes
d. Pedigree analysis

44. The course of infection with HIV is shown in the graph. Lines A and B indicate:



a. A: Antigen concentration
   B: Helper cell concentration
b. A: Antigen concentration
   B: Interferon concentration
c. A: Interferon concentration
   B: Antibody titre
d. A: Helper cell concentration
   B: Antibody titre

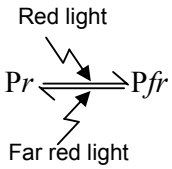
45. Four basic ways of nucleotide synthesis are listed below. Which of them is/are **not observed** *in vivo*?
    (i) Polynucleotide synthesis with proof reading activity.
    (ii) Nonenzymatic polynucleotide synthesis.
    (iii) Polynucleotide synthesis with mismatch repair.
    (iv) Enzymatic synthesis of polynucleotide.

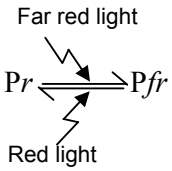
a. Only (ii)
b. (ii) and (iii)
c. (i) and (ii)
d. None of the above.

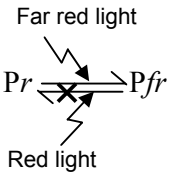
46. Which of the following **cannot** be a strategy to overcome water stress in plants?

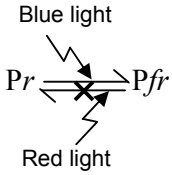
a. Reduction of surface area
b. Closing of stomata
c. Increasing the rate of photosynthesis
d. Inhibition of growth

47. The correct process of phytochrome conversion is:

a. 

b. 

c. 

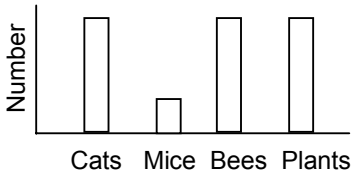
d. 

48. Organisms store carbohydrates for yielding energy and forming structural components in the form of:
a. Starch, glycogen, gelatin
b. Starch, glycogen, cellulose, pectin, keratin
c. Starch, glycogen, cellulose, gum, inulin
d. Starch, glycogen, cellulose, aleurone grains, cystolith.

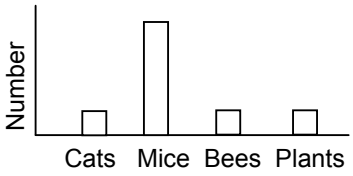
49. In the leaves of C_3 plants, the cells that normally contain chlorophyll are:
a. Palisade mesophyll cells
b. Bundle sheath cells
c. Lower epidermal cells
d. Endodermal cells

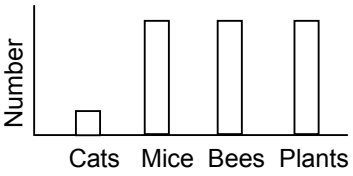
50. In sea urchins, biochemical differences allow sperms to fertilize only with eggs of its own species. This type of isolation is:
a. Behavioral
b. Ecological
c. Physiological
d. Seasonal

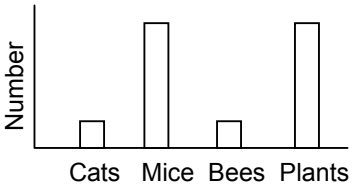
51. In an ecosystem, four major interdependent components were in the given proportions:

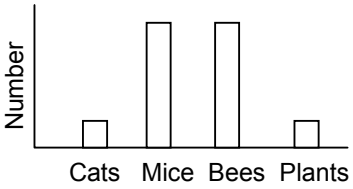


What would be the new composition of the same ecosystem when majority of the cats were killed?

a. 

b. 

c. 

d. 

52. Normal concentration of solutes 'A' & 'B' in blood capillaries is 0.9% each. The data indicates that the solutes 'A' and 'B' pass the membrane by:

Solute 'A'		Solute 'B'	
Amount of solute in food (g/100ml)	Amount absorbed (g)	Amount of solute in food (g/100ml)	Amount absorbed (g)
0.5	0.3	0.8	0
1.0	0.6	1.0	0.05
1.5	1.0	2.0	0.8

a. Simple diffusion
b. Capillary action
c. Active transport & simple diffusion respectively
d. Facilitated diffusion & carrier transport respectively

53. Partial pressure of oxygen will be highest in:
a. Plasma
b. Whole blood
c. Serum
d. Water

54. Water solubility of the DNA molecule is due to:
a. Deoxy- sugars
b. N- containing bases
c. Phosphate groups
d. All the above

55. Imagine an organism, which comprises of proteins made from 10 amino acids each of which exists in 2 different topological forms with a specific functionality. If 3 types of bases are available, the codon should be:
a. At least a duplex
b. At least a triplet
c. Always a triplet
d. Either a duplex or a triplet

56. Which of the following participates in increase as well as decrease in skin temperature?
a. Skin arterioles
b. Skeletal muscles
c. Increased adrenaline production
d. Sweat glands

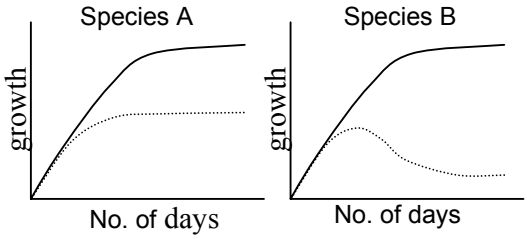
57. Which of the following hormones is **not** a protein/ peptide?
a. Oxytocin
b. Gastrin
c. Estrogen
d. Insulin

58. In an ascus of *Neurospora,* the spores had following genotypes:
(i) ABC (ii) ABC (iii) abC (iv) abC
(v) abc (vi) abc (vii) ABc (viii) ABc
This is suggestive of:
a. Segregation
b. Crossover between A and B sites
c. Crossover between B and C sites
d. Crossover between A and B as well as B and C sites.

59. Following are the types of neuroglial cells. Which of them are most abundant in mammals?
a. Astrocytes
b. Microglial cells
c. Ependymal cells
d. Oligodendrocytes

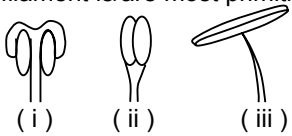
60. Hardy – Weinberg's principle of 'Zero evolution' is based on:
(i) Genetic equilibrium
(ii) Random mating
(iii) No migrations
(iv) High gene frequency
(v) Differential reproduction
a. (i) & (v)
b. (ii), (iii) & (iv)
c. (i), (ii) & (iii)
d. (i), (iv) & (v)

61. The graphs given below show the growth of two species A & B when grown separately (——)and together (·····). The graphs indicate:



a. Competition
b. Synergism
c. Parasitism
d. Commensalism

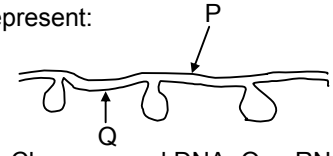
62. Which of the following condition/s of attachment between the antherlobes and filament is/are most primitive?



a. (i)
b. (ii)
c. (iii)
d. Both (i) and (ii)

63. Sympathetic nervous system slows down digestion and increases heart rate in animals. Which of the following effects **is not** consistent with this?
a. Inhibition of flow of saliva.
b. Inhibition of conversion of glycogen to glucose.
c. Bronchi dilation
d. Constriction of vessels supplying blood to stomach.

64. Complementarity of two polynucleotide strands is shown. The strands P and Q represent:



a. P: Chromosomal DNA; Q: mRNA
b. P: cDNA Q: Chromosomal DNA
c. P: cDNA Q: mRNA
d. P: tRNA Q: mRNA

65. Large surface to volume ratio is characteristic of:
a. Villi
b. Axon
c. Mitochondria
d. All the above

66. Which of the following is the most probable course of human evolution?
a. A.afarensis → A.robustus → H.erectus → H. sapiens
b. A.ramidus → A.afarensis → H.erectus → H. sapiens
c. A.africanus → A.robustus → H.habilis → H.sapiens
d. A.ramidus → A.afarensis → H. habilis → H. sapiens

67. The frequency of recessive sex linked gene for colour blindness in a human population is 0.02 whereas the frequency of its normal allele is 0.98. The proportion of colour blind and carrier females in this population would be:
a. 0.004 & 0.0392
b. 0.04 & 3.92
c. 0.004 & 3.92
d. 4 & 39.2

68. Mark the **incorrect** pair:
a. Structural protein : Keratin
b. Transport protein : Myoglobin
c. Storage protein : Ferretin
d. Contractile protein : Myosin

69. Three letter triplet code specifying a particular protein molecule is shown:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
C	G	A	A	A	G	C	T	A	C	G	C	A	T	C

Which of the following mutations will change the primary sequence maximally?
a. Deletion mutation at 4, 5 and 6.
b. Insertion mutation at 10.
c. Base substitution at 3.
d. Insertion mutation at 4.

70. In an evolutionary time scale, the correct order of evolution of various life forms is:
a. Jellyfish & Corals, Lichens, Fern, Insects
b. Lampreys, Mosses, Echinoderms, Birds
c. Fish, Amphibians, Bivalve mollusks, Reptiles
d. Sponges, Univalve mollusks, Insects, Flowering plants.

71. Marrow from which of the following bones is most suitable for transplant?
a. Sternum
b. Femur
c. Humerus
d. Ribs

72. A change in cell size, shape or arrangement due to chronic irritation or inflammation is called:
a. Anaplasia
b. Dysplasia
c. Paraplasia
d. Metaplasia

73. The membrane proteins that confer blood groups are:
a. Glycoproteins
b. Stromatins
c. Spectrins
d. Phoshphoproteins

74. Fragment of DNA contains 31 residues of thymine and 46 residues of guanine. The number of hydrogen bonds between complementary strands and the number of complete twists through 360^{o} will respectively be:
a. 77 and 7
b. 200 and 7
c. 155 and 15
d. 200 and 20

75. Bone cells that disintegrate the bone matrix to release Ca^{++} in blood in response to parathormone are:
a. Osteoblasts
b. Osteoclasts
c. Osteocytes
d. All the above

76. A population contains equal number of individuals with the genotypes AA and Aa. Proportion of alleles A and a in the gametes will be:
a. 3:1
b. 1:1
c. 1:2
d. Cannot be determined

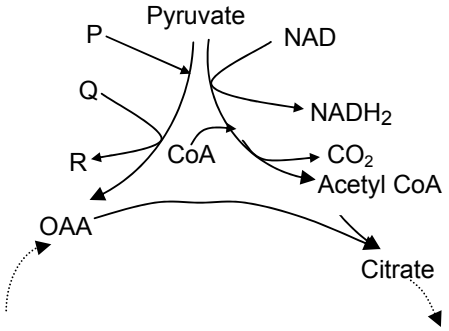
77. The property of water that allows an insect to walk on its surface is:
a. High density
b. Hydrophobic interaction
c. Surface tension
d. Adhesive forces

78. Callus exposed to low auxin & moderate cytokinin concentration will result in:
a. Multiple shoots
b. Roots
c. Plantlets
d. No change

79. Free nuclear divisions are characteristic of:
a. Megaspore
b. Developing endosperm
c. Zygospore
d. Developing mesoderm

80. Which of the following **is not** a 'green house gas'?
a. Carbon dioxide
b. Oxygen
c. Water vapour
d. Sulfur dioxide

81. The diagram shows a part of aerobic pathway. P, Q and R respectively indicate:



a. CoA, $NADH_2$, NAD
b. H_2O, NAD, $NADH_2$
c. H_2O, ADP+ iP, ATP
d. CO_2, ATP, ADP+iP

82. Circular DNA is characteristic of:
(i) Bacteria (ii) Plasmids
(iii) DNA virus (iv) Mitochondria
(v) Round worms
a. (i) and (ii)
b. (i), (ii) and (iv)
c. (ii), (iii) and (v)
d. (i), (ii), (iii) and (iv)

83. ^{3}H- labelled molecules are the best suited for autoradiography because:
a. They are easily assimilated.
b. They have short half-life.
c. They are $\beta-$ emitters.
d. All the above.

84. Of the following biological fluids, the correct order with increasing pH values is:
(i) Stomach (ii) Intestinal fluids
(iii) Blood (iv) Urine
a. (i), (iv), (iii), (ii)
b. (iii), (i), (iv), (ii)
c. (ii), (iii), (iv), (i)
d. (i), (ii), (iii), (iv)

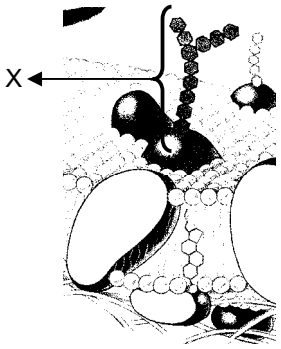
85. Which of the following characters describe a 'mature ecosystem'?
a. Linear and grazing food chains.
b. High species diversity.
c. Broad niche specialization.
d. Small biomass.

86. The most energy intensive activity going on in every cell when the metabolic rate of the body is at its minimum is:
a. DNA replication
b. Na^+/K^+ pump
c. Intercellular communication
d. Protein synthesis

87. Which of the following serve as the anchoring junctions between the cells?
a. Tight junctions
b. Gap junctions
c. Desmosomes
d. Nexuses

88. When exposed to high freezing stress, plant cells die as a result of destabilization of membranes. The enzyme that is predominantly secreted is:
a. Phospholipase
b. Cellulase
c. Protease
d. Glycosidase

89. Structure of plasma membrane is shown. Here 'X' indicates:



a. Glycoprotein
b. Cholesterol tail
c. Peripheral protein
d. Cytoskeleton

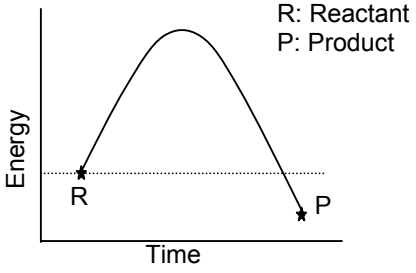
90. The substance that **does not** directly participate in human digestion is:
a. Nucleotidase
b. Enterokinase
c. Bile salts
d. Dipeptidase

91. An ecosystem comprising of producers, herbivores and carnivores is an incomplete ecosystem if it does not include:
a. Top carnivores
b. Decomposers
c. Secondary consumers
d. Secondary & tertiary consumers

92. Of the following structures found in Angiosperms, the one that **does not** have an equivalent structure in Coniferophyta is:
a. embryo sac
b. carpel
c. sepal
d. stamen

93. Which of the following descriptions **does not** apply to Phaeophyta?
a. Dominant photosynthetic pigment is fucoxanthin.
b. Stores cabohydrates as mannitol.
c. Nearly all are freshwater.
d. Body is filamentous or thalloid.

94. The chemical reaction indicated in the graph is:



a. exergonic
b. endergonic
c. isothermal
d. endothermic

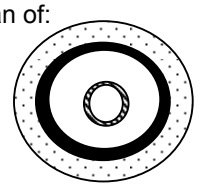
95. Respiratory quotient of carbohydrates with associated organic acid synthesis is:
a. 1
b. >1
c. <1
d. Either a or b

96. Information storage and energy transfer are prime functions of:
a. Carbohydrates
b. Proteins
c. Nucleotides
d. Lipo-polysaccharides

97. Solar energy of incident radiation $1x10^6$ KJ m^{-2} yr^{-1} → Photosynthesis 1000 KJ m^{-2} yr^{-1} ↓ Respiration 2000 KJ m^{-2} yr^{-1}

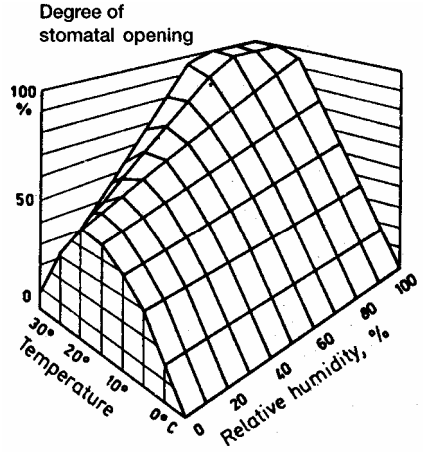
In the above ecosystem, photosynthetic efficiency of autotrophs is:
a. 0.1%
b. 20%
c. 0.8%
d. 80%

98. The figure represents the internal body plan of:



a. Platyhelminthes
b. Nematoda
c. Annelida
d. Echinodermata

99. The graph reveals stomatal opening in relation to environmental factors. It is maximum at:



a. low humidity and high temperature
b. high humidity and low temperature
c. moderate humidity irrespective of temperature
d. high humidity and high temperature

100. Herring gulls spend a lot of energy and time to remove broken egg shells from the nest once the chicks have hatched. The correct explanation is:
a. It provides more space for laying more eggs.
b. It aids in protecting the young ones from the predators.
c. It prevents injuries to the chicks.
d. It is an innate behaviour without any selective advantage.

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