



Previous Year Question Paper  
of

**CSIR – UGC JRF / NET**  
**LIFE SCIENCES**

**Examination**

**DECEMBER 2010 (II)**

*(Original Question Paper with Answer Key)*  
COUNCIL OF SCIENTIFIC & INDUSTRIAL RESEARCH



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## CSIR JRF NET DECEMBER 2010 (II)

### LIFE SCIENCES

Original Solved Question Paper

1. The correct configuration for given structure is:



- a. L configuration
- b. D configuration
- c. R configuration
- d. S configuration

**Ans. c**

2. Pumice is the name of the most common volcanic rock that floats. It has various air bubbles and capillaries which trap air. Which statement is correct for this rock

- a. Air cavities are interconnected
- b. Air cavities are not connected
- c. Density of rock is more than water
- d. Rock is very older

**Ans. b**

3. For a reaction  $A \rightarrow B$ , the rate of reaction can be represented as:

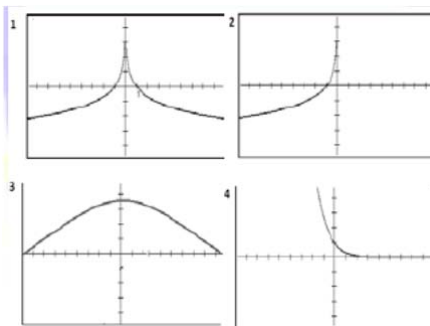
$$\frac{dx}{dt} = K(a - x)$$

Where (a) and (a-x) are concentration of reactants at time 0 and t. Then the unit of K will be:

- a.  $\text{Mol}^{-1}\text{L}^{-1}$
- b.  $\text{Mol}^{-2}\text{L}^{-1}$
- c.  $\text{L}\cdot\text{mol}^{-1}\cdot\text{s}^{-1}$
- d.  $\text{Sec}^{-1}$

**Ans. d**

4. Identify the graph of the logarithmic function  $f(x) = xe^x$



**Ans. a**

5. What amount has to be taken from 11 N HCl to make 50 ml of 2N HCl:

- a. 11.0 ml
- b. 9.09 ml
- c. 6.03 ml
- d. 2.0 ml

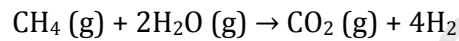
Ans. b

6. High Biological oxygen demand in water body indicates:

- a. Chemical pollution
- b. Organic pollutant
- c. High photoautotroph
- d. Pressure of heterotrophs

Ans. b

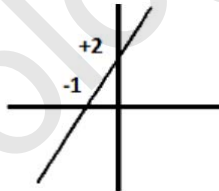
7. If standard enthalpies of formation for  $\text{H}_2\text{O}(\text{g})$  - 242,  $\text{CH}_4(\text{g})$  -75 and  $\text{CO}_2(\text{g})$  is - 11  $\text{KJmol}^{-1}$  respectively. Determine the heat of reaction of the following reaction:



- a. - 206  $\text{KJ mol}^{-1}$
- b. +206  $\text{KJ mol}^{-1}$
- c. - 670  $\text{KJ mol}^{-1}$
- d. - 745  $\text{KJ mol}^{-1}$

Ans. c

8. Slope of line in given plot will be:



- a. -1
- b. -1/2
- c. +1/2
- d. 2

Ans. d

9. If period of  $f(x)=\sin x$  is  $2\pi$ , then the period of  $g(x)=\sin(2x)$  will be:

- a.  $\pi$
- b.  $2\pi$
- c.  $\pi/2$
- d.  $4\pi$

Ans. a

10. It is predicted that due to global warming there would be rise in level of oceans. If radius of earth is R and rise in level of water is 'h', then the volume of water will be:

- a.  $\pi r^2 h$
- b.  $\frac{3}{4} \pi r^2 h$
- c.  $2\pi r^2 h$

d.  $\frac{4}{3} \pi r^2 h$

11. If a rectangle is inscribed in circle of diameter 'D'. Then the area of rectangle will be:

- a. Independent of length and breadth
- b. Will be always smaller than  $D^2/2$
- c. Will be always smaller than  $D^2/4$
- d. Will be always greater than  $\pi D^2/4$

**Ans. b**

12. An aero plane flies with a ground speed of 800 km/h and velocity of wind is constant 50 km/h. If this aero plane flies one hour upstream and one hour downstream of wind. Then total distance covered and average speed will be:

- a. 1600 km and 800 km/h
- b. 1650 km and 825 km/h
- c. 1550 km and 775 km/h
- d. 1700 km and 850 km/h

**Ans. a**

13. Which of the following element is required for production of thyroxin?

- a. NaCl
- b. Iodine
- c. Bromine
- d. Fluorine

**Ans. b**

14. Temperature above which gas cannot be liquefied even by applying pressure is termed as:

- a. Critical temperature
- b. Boyle temperature
- c. Curie temperature
- d. Charles temperature

**Ans. a**

15. If a nail is hammered in the bark of tree at height 4 m, after ten years the height of tree is doubled. Then the height of nail will be:

- a. 4 m
- b. 8 m
- c. 16 m
- d. 10 m

**Ans. a**

16. Let  $f: [0, 1] \rightarrow (0, \infty)$  be a continuous function. Suppose  $f(0) = 1$  and  $f(1) = 7$ . Then

- a.  $f$  is uniformly continuous and is not onto.
- b.  $f$  is increasing and  $f([0, 1]) = [1, 7]$ .
- c.  $f$  is not uniformly continuous.
- d.  $f$  is not bounded

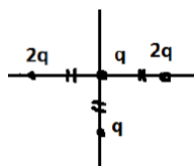
**Ans. c**

17. Lassaigne's test is employed to detect the presence of nitrogen, sulphur, halogens, and phosphorous in an organic compound. These elements are present in the covalent form in an organic compound. On treatment with sodium metal covalent carbon of organic compound are converted into which ionic form:

- a. Cyanide
- b. Suphide
- c. Nitrate
- d. Carbide

**Ans. a**

18. The net direction of force on charge placed at origin as shown in diagram will be in:



- a. +Y
- b. -Y
- c. +X
- d. -X

**Ans. a**

19. Zinc oxide is thermochromic, changing from white to yellow when heated to high temperature. This color change is caused due to:

- a. Stoichiometric property of metal
- b. Non-stoichiometric property of metal
- c. Burning of oxygen
- d. Fluorescence at high temperature

**Ans. b**

20. A wild form animal gives one egg and mutant form gives three egg per year respectively. If all parents and progenies survive, then what would be ratio of number of wild to mutant after four years?

- a. 4
- b. 2 X 4
- c. 2 X 3 X 4
- d. 2<sup>4</sup>

**Ans. d**

21. If a certain place shows stable population distribution. It means maximum number of individual will be

- a. Healthy
- b. Youngest
- c. Oldest
- d. Reproductively more active

**Ans. b**

22. Which of the following is responsible for ozone hole?

- a. CO<sub>2</sub>
- b. CH<sub>4</sub>
- c. Chlorine
- d. NO

**Ans. c**

23. At 35°C ambient room temperature any liquid in two containers are allowed to cool from 100°C to 70°C and 80 to 50°C respectively. If we compare rate cooling in we find that rate of cooling in later will be:

- a. Slow
- b. Fast
- c. Both at same rate
- d. Depends on container size

**Ans. a**

24. Earth is active planet and have phenomenon like volcano, earthquake and continental drift. The major source of energy for continental drift is:

- a. Moon gravity
- b. Earth gravity
- c. Radioactivity in core of earth
- d. Energy from sun

**Ans. c**

25. The mean salinity of sea 35 g per liter. The main cause of this observed salinity is

- a. Evaporation and rainfall
- b. Photosynthesis
- c. Crust erosion and surface run off
- d. Rivers drainage

**Ans. a**

26. If the handle of a door placed at hinges is displaced toward center, more force is required to open it because:

- a. Less moment of force
- b. More moment of force
- c. Force will be zero
- d. Centre of gravity is zero

**Ans. a**

27. If a gas is released from pressurized bottle, then which statement will be true for release gas?

- a. It will gain energy
- b. It will have same temperature as in bottle
- c. It will gain temperature
- d. It will cool as compare to gas in container

**Ans. d**

28. Among the following which cell can divide by binary fission

- a. Muscle cell
- b. Nerve cell

- c. RBC
- d. Bone marrow cell

*Ans. d*

29. Which statement is not correct for all mammals?

- a. Absence of scales
- b. Absence of laying egg
- c. Absence of segmentation
- d. Presence of asexual reproduction

*Ans. d*

30. Smog is due to:

- a. Air pollution derived from smoke and vehicles
- b. More moisture in environment
- c. Increase in CO<sub>2</sub>
- d. Low temperature of earth surface

*Ans. a*

31. Cell with large round size has more chance to survive as compare to thin cell under desiccation because of

- a. Low surface to volume ratio
- b. High surface to volume ratio
- c. Thin membrane
- d. Thick membrane

*Ans. a*

32. Which of the following is not a direct consequence of greenhouse effect?

- a. Increase in sea level
- b. Rainfall
- c. Tsunami
- d. Global warming

*Ans. c*

33. NaCl has ionic bond because

- a. Both Na and Cl has same number of valence electron
- b. Both Na and Cl belongs to same group
- c. Na loses one electron and chlorine receive one electron
- d. Due to difference in their electronegativity

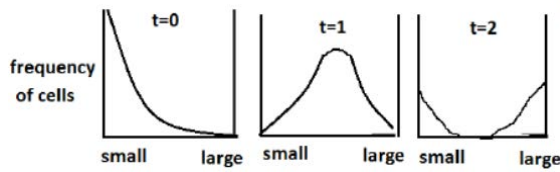
*Ans. c*

34. Brown ring test is confirmatory test for which anionic species

- a. Nitrate
- b. Bromide
- c. Chloride
- d. Fluoride

*Ans. a*

35. The graph below shows frequency distribution of different sizes of cell during different stages of cell culture.



From this pattern of growth we can draw conclusion that

- a. Most of the cell divides at same time
- b. Rate of cell division is constant
- c. Cell does not divide
- d. All the cell divides at same time

Ans. a

36. The computer codes for decimal number 99 will be

- a. 1100011
- b. 1110111
- c. 1000011
- d. 011000111

Ans. d

37. Parts per billion can be represented as:

- a. ng/Kg
- b.  $\mu\text{g/Kg}$
- c.  $\mu\text{l/l}$
- d.  $\mu\text{g/g}$

Ans. a

38. Which of the following is not possible in biological systems?

- a. DNA  $\rightarrow$  RNA  $\rightarrow$  Protein
- b. Protein  $\rightarrow$  RNA  $\rightarrow$  DNA
- c. Glucose  $\rightarrow$  amino acid  $\rightarrow$  Protein
- d. RNA  $\rightarrow$  DNA  $\rightarrow$  Protein

Ans. b

39. The liquid is flowing in tube as shown in diagram:



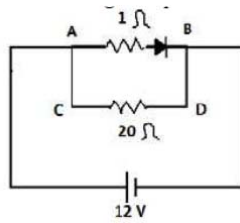
The rate of flow at position A as compare to B will be

- a. four times
- b. Sixteen times
- c. Half
- d. One fourth

Ans. b

40. In given circuit voltage drop at diode is 0.9 V





Then which statement is correct

- a. More current is flowing through path AB
- b. More current is flowing through path CD
- c. Equal current is flowing from both routes
- d. Resistance is not influencing flow of current

**Ans. a**

41. A bottle containing 2 ml of  $^{14}\text{C}$  labeled phenyl alanine shows radioactivity of 1mCi. The specific activity of isotope is 200 Ci/mMol. Then the concentration of phenyl alanine in bottle is:

- a.  $200 \times 10^{-3} \text{ M}$
- b.  $400 \times 10^3 \text{ M}$
- c.  $100 \times 10^{-3} \text{ M}$
- d.  $2.5 \times 10^{-3} \text{ M}$

**Ans. d**

42. The general procedure for estimation of primary production is the "light" and "dark" bottles method. In an experiment two bottles containing 200 mg/l of  $\text{O}_2$  was incubated in light and dark for seven days. The amount of  $\text{O}_2$  estimated after incubation period was found to be 600 mg/l and 100 mg/l in light and dark respectively. The net primary production during incubation period is.

- a. 400 mg/l
- b. 100 ml/l
- c. 500 mg/l
- d. 600 mg/l

**Ans. a**

43. Which is not a structural alignment tool?

- a. SSAP
- b. TM-Align
- c. T-coffee
- d. DALI

**Ans. c**

44. Which of the following is major radioactive indoor air pollutant in home air conditioner?

- a. Cs
- b. U
- c. Sr
- d. Rn

**Ans. d**

45. Variation in two characters in two or more species can be best represented by
- Histogram
  - Scattered diagram
  - Triangular box
  - Linear curve

Ans. a

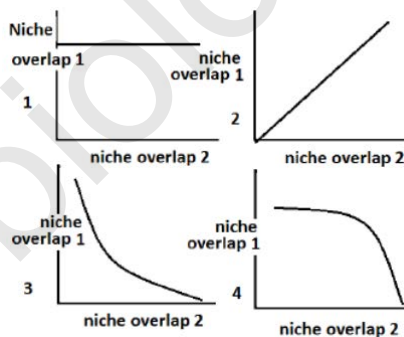
46. Which of the following statement correctly refer statistical parameter mode?
- Most of insects mature on third day of development
  - Major part of population fails to advance their education above 10+2.
  - The average number of seeds by plant is 3.5
  - The height of plant ranges from 5 to 10 m

Ans. a

47. In statistical error Type-I is represented by  $\alpha$  and Type II by  $\beta$ . Then measure of power of error will be:
- $1-\alpha$
  - $1-\beta$
  - $\alpha-\beta$
  - $\beta-\alpha$

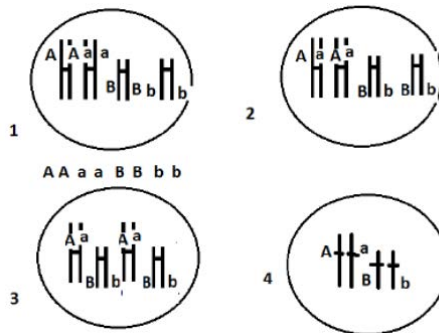
Ans. b

48. Which of the following diagram correctly represents co-existence of two species even during niche overlapping?



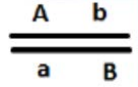
Ans. b

49. If all four gametes AB, aB, Ab and ab are formed in equal probability. Then arrangement of chromosomes at metaphase-I of meiosis will be:



Ans. a

50. The distance between gene A and B is 10 cM. If a genotype is selfed, the percentage of progeny with genotype aabb will be:



- a. 10 %
- b. 25 %
- c. 0.25 %
- d. 0.01 %

**Ans. c**

51. Male parental care is expected to be observed during:

- a. Polygynous species
- b. Small population size
- c. Life long bond pairing
- d. Reverse sexual dimorphism

**Ans. d**

52. Which of the following is the major environmental cue for migration of birds during winter?

- a. Duration of day length
- b. Instinct
- c. Falling temperature
- d. Learning

**Ans. a**

53. Which cyclin is involved in formation of pre-transcriptional enhancer binding protein (PTEB)?

- a. Cyclin D
- b. Cyclin K
- c. Cyclin E
- d. Cyclin T

**Ans. b**

54. Binding of erythropoietin to its EPO receptor leads to activation of signaling pathway termed as:

- a. JAK-STAT pathway
- b. NF- $\kappa$ B pathway
- c. Apaf-smad pathway
- d. Tyrosine kinase pathway

**Ans. a**

55. Receptors for FSH are present on:

- a. Leydig cells
- b. Sertoli cells
- c. Peritubular cells
- d. Spermatogonium germ cells

Ans. b

56. During gametogenesis in male, cell during development are termed as primary spermatocytes when they are:

- a. Before meiosis-I
- b. After meiosis-I
- c. After meiosis-II
- d. Mature sperms

*Ans. a*

57. Which statement is true about progenitor cells?

- a. They are same as stem cells
- b. They are totipotent cells
- c. They can divide but do not remain differentiated as stem cells
- d. They cannot divide

*Ans. c*

58. Neuropeptides and neurotransmitters are molecules secreted by neuron. Which statement is correct statement about neuropeptide as compare to neurotransmitter?

- a. Less potent and short acting
- b. More potent but short acting
- c. Less potent but long acting
- d. More potent and longer acting

*Ans. d*

59. There is small gap between two neurons at synapses. The purpose of gap is

- a. Unidirectional flow of information
- b. Reabsorbtion of neurotransmitter
- c. Coupling of charge over membrane
- d. Slow down speed of propagation

*Ans. a*

60. Most abundant intracellular ion in plants is:

- a. Iron
- b. Calcium
- c. Potassium
- d. Zinc

*Ans. c*

61.  $\text{Na}^+\text{-K}^+$  pump operates under intracellular concentration of

- a. High Na and low K
- b. High Na and High K
- c. Low Na and low K
- d. Low Na and high K

*Ans. d*

62. Precursor for amino acid proline is:

- a. Pyruvate
- b. 3-Phosphoglycerate
- c. Oxalo acetate

d.  $\alpha$ -keto glutarate

**Ans. d**

63. S-adenosyl methionine is a precursor of which plant hormone?

- a. Abscisic acid
- b. Auxin
- c. Ethylene
- d. Cytokinin

**Ans. c**

64. Under certain conditions pyruvate can be allowed to decarboxylate into acetyl CoA and CO<sub>2</sub>. For evolution of <sup>14</sup>C labeled carbon in CO<sub>2</sub>, which carbon atom must be radiolabelled in glucose prior to glycolysis?

- a. C1 or C6
- b. C2 or C3
- c. C3 or C4
- d. C5 or C2

**Ans. c**

65. Which cycle has been used in hetero lactic fermentation?

- a. Entner–Doudoroff pathway
- b. Phosphoketolase Pathway
- c. Pentose Phosphate Pathway
- d. Glycolate pathway

**Ans. b**

66. The characteristic of mitochondrial genome is?

- a. Intron free DNA
- b. Repetitive DNA
- c. Polycistronic RNA
- d. Satellite DNA

**Ans. a**

67. In scanning Simple Sequence Repeats (SSR) primers are used against

- a. Random sequence
- b. Repetitive sequence
- c. Flanking region of repetitive sequence
- d. Conserved region of exon of gene

**Ans. c**

68. Integrity of introduced transgene in mouse can be validated by

- a. Male pronuclei insertion
- b. Fusion of enucleated egg with somatic cells
- c. Transfer into competent embryogenic cell
- d. Southern blot analysis

**Ans. d**

69. Techniques used to assess HIV-I seroconversion are

- a. immunoblot and ELISA
- b. Immuno precipitation and PCR

- c. PCR and Immunofluorescence
- d. PCR and ELISA

**Ans. b**

70. Which of the following cancerous transformation is due to retero virus?

- a. Human T-Cell leukemia
- b. Burkitt Lymphoma
- c. Oral Epithelial Cancer
- d. Colon cancer

**Ans. a**

71. Among the following which is termed as proof reading activity of DNA polymerase?

- a. 5' → 3' polymerase activity
- b. 3' → 5' polymerase activity
- c. 5' → 3' exonuclease activity
- d. 3' → 5' exonuclease activity

**Ans. d**

72. The Carboxy-Terminal domain (CTD) of RNA polymerase II consists of heptapeptide repeats (YSPTSPS). Other proteins often bind the C-terminal domain of RNA polymerase in order to activate polymerase activity. Which of the following is not a function associated with CTD of RNA polymerase?

- a. Promoter recognition
- b. Promoter clearance
- c. 5'-Capping
- d. Splicing

**Ans. a**

73. Which of following is reactive center for splicing of exons during processing of m-RNA?

- a. U1 and U5
- b. Branch point, U2 and U6
- c. Branch point, U4 and U6
- d. U2 and U4

**Ans. b**

74. Which of the following is the first step in translational proof reading?

- a. Aminoacylation of t-RNA by amino acyl t-RNA synthetase
- b. Peptide bond formation
- c. Entry into A site
- d. Formation of amino acyl-t-RNA, 40 S ribosome and m-RNA ternary complex

**Ans. b**

75. Puromycin blocks translation. Mode of action of drug puromycin is:

- a. binds to A site and stop elongation :
- b. Stops peptidyl transferase activity
- c. Binds EF-TU-GTP and prevent initiation

- d. Do not allow termination of translation

**Ans. a**

76. Tetracyclines are a group of broad-spectrum antibiotics against bacterial resistance. Tetracycline antibiotics are protein synthesis inhibitors and exerts its effect by binding to

- a. 30 S subunit of ribosome
- b. 50 S subunit of ribosome
- c. A site of ribosome
- d. Peptidyl transferase

**Ans. a**

77. Ciprofloxacin is a synthetic chemotherapeutic antibiotic of the fluoroquinolone drug class. The target of antibiotic ciprofloxacin is

- a. Replication
- b. Protein synthesis
- c. Cell wall synthesis
- d. Membrane structure

**Ans. a**

78. The one of the most widely used herbicides methyl viologens interfere photosynthesis of higher plants. They are responsible for

- a. Evolution of more oxygen
- b. Dissipation of proton gradient across thylakoid membrane
- c. Inhibition of flow of electron from PS II to PSI
- d. Transfer of electrons from PS I to molecular oxygen

**Ans. b**

79. Which would be the result of mutation in genes responsible for radial patterning in roots of higher plants?

- a. No apical root formation
- b. Root hair will fail to develop
- c. Variation in number and position of cell in vascular system
- d. Roots will be positively geotropic

**Ans. c**

80. In *Arabidopsis* gene responsible for formation shoot meristem is

- a. Leafy
- b. Agamous
- c. Clavata
- d. Wus

**Ans. c**

81. Among the following which gene product migrates from leaves to shoot meristem during transition of shoot meristem into floral meristem?

- a. Flowering locus T
- b. Flowering locus D
- c. Leafy
- d. Apetala 1

*Ans. a*

82. The position of collagen triple helix in Ramachandran plot is at-
- Top Left
  - Top right
  - Bottom right
  - Bottom left

*Ans. a*

83. One of the most important genes, involved in dorsal- ventral axis determination in *Drosophila* is dorsal. It codes Dorsal protein which
- Is taken up into the nuclei of cells and this side will become the ventral side
  - Remains in the cytoplasm of cell and this side will become ventral side.
  - Is taken up into the nuclei of cells and this side will become the dorsal side.
  - Degraded in one side and that will become dorsal side

*Ans. a*

84. Which is true for amount of yolk and cleavage in egg of amphibian?
- Mesolecithal and holoblastic cleavage
  - Isolecithal and holoblastic cleavage
  - Mesolecithal and meroblastic cleavage
  - Microlecithal and meroblastic cleavage

*Ans. a*

85. Among the following which enzyme used NAD as cofactor?
- Histone acetyl transferase
  - Histone methyl transferase
  - Histone deacetylase
  - Histone demethylase

*Ans. c*

86. Which of the following system can be utilized for glycosylation of peptides expressed using recombinant DNA technology?
- Large bacterial fermenters
  - Small bacterial fermenters
  - Normal bacterial bioreactors
  - Mammalian Cell line

*Ans. d*

87. Among the following which is not responsible for producing near UV signal in circular dichroism for secondary structure determination of proteins?
- Tyrosine
  - Tryptophan
  - Disulphide bond
  - Peptide bond

*Ans. d*

88.  $\beta$ - $\alpha$ - $\beta$  structure in protein structure are known for



- a. ligand binding
- b. stereological hindrance in binding of ligand
- c. Catalytic center
- d. Trans-membrane domain

**Ans. a**

89. Which of the following is most unstable condition in protein folding?
- a. Non-polar side chain exposed to outside
  - b. Polar side chain present in core of protein
  - c. Non polar side chains in core of protein
  - d. Polar amino acids exposed to outside

**Ans. a**

90. Most effective protein denaturant form of guanidinium when used in equimolar concentration is
- a. Iodide
  - b. Chloride
  - c. Bromide
  - d. Sulphate

**Ans. b**

91. The melting temperature ( $T_m$ ) is defined as the temperature at which half of the DNA strands are in the double-helical state and half are in the random coil states.  $T_m$  of DNA does not depends on
- a. Length of DNA
  - b. % GC content
  - c. Presence of cations
  - d. Presence of anions

**Ans. d**

92. In a heterozygous two recessive mutation at different site will give mutant phenotype when genes involved are
- a. Allelic and placed in cis
  - b. Allelic and placed in trans
  - c. Non-allelic and placed in cis
  - d. Non-allelic and placed in trans

**Ans. a**

93. Allele frequency of a particular allele was found to be 0.6 in three different populations. It is probably due to is
- a. Neutral allele
  - b. Stable polymorphism
  - c. Heterozygote advantage
  - d. Natural selection

**Ans. a**

94. Molecular evolution do not reflects
- a. Species divergence
  - b. Convergent evolution

- c. Natural selection
- d. Neutral mutation

**Ans. c**

95. Somatic hypermutation in immunoglobulin genes is responsible for

- a. Class switching
- b. Affinity maturation
- c. Clonal selection
- d. VDJ Recombination

**Ans. b**

96. To assess the mutation in bacteria, bacteria were inoculated in various aliquots and later on shifted on screening media for selection of mutants. The most important information for assessing mutation would be

- a. Total number of mutant
- b. Average number of mutant per aliquot
- c. Petri plates with single mutant colony
- d. Petri plates without any mutant colony

**Ans. b**

97. Interaction of antibody with antigen is like lock and key. The major force responsible for antigen antibody interaction is

- a. Hydrogen bond
- b. Vander wall interaction
- c. Disulphide bond
- d. Peptide bond

**Ans. a**

98. Which is common cytokine secreted by both TH1 and TH2 cells

- a. IL-2
- b. IL-4
- c. INF- $\gamma$
- d. IL-5

**Ans. a**

99. Major Histocompatibility complex I (MHC I) is present at

- a. All nucleated cells
- b. Only on antigen presenting cells
- c. Only on B and T lymphocytes
- d. Macrophages and Dendritic cells

**Ans. a**

100. Major reason for evolution for diversity in immune system is

- a. Natural selection
- b. Neutral mutations
- c. Directed evolution
- d. Co-evolution

**Ans. d**

101. At any place if more diversity and variation is observed in any species of domestic animal, then it can be concluded that

- a. Place is natural center of origin of that species
- b. Animal has been introduced once and is invasive
- c. Animal has been introduced more than once
- d. People take more care of animals

Ans. c

102. Among the following which is typical tree of Indian desert ecosystem?

- a. *Prosopis cineraria*
- b. *Avicennia officinalis*
- c. *Mangifera indica*
- d. *Acer negundo*

Ans. a

103. Which of the following is not an invasive plant species in India?

- a. *Parthenium hysterophorus*
- b. *Salvinia molesta*
- c. *Lantana camara*
- d. *Myristica fida*

Ans. d

104. The causal organism for blast of rice is

- a. *Pyricularia grisea*
- b. *Ustilago tritici*
- c. *Erwinia chrysanthemi*
- d. *Cercospora janseana*

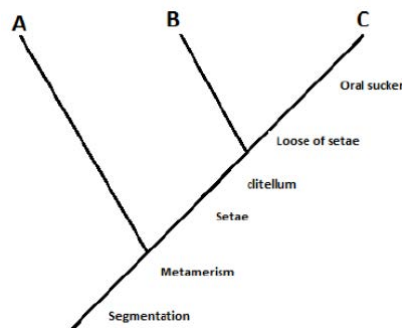
Ans. a

105. Which group of algae is believed to be most closely related to higher plants?

- a. Charophyceae
- b. Chlorophyceae
- c. Rhodophyceae
- d. Pheophyceae

Ans. a

106. Following cladogram represent changes in annelids during evolution.



The group 'C' in cladogram represents:

- a. *Hirudinea*

- b. *Echiura*
- c. *Polychaetes*
- d. *Oligochaeta*

**Ans. a**

107. Characteristic feature of Cnidaria is

- a. No tissue or organ system
- b. Diploblastic or bilayered
- c. Triploblastic or three layered
- d. Segmentation

**Ans. a**

108. Nilgiri Tahr is restricted only to upper heights (1,200 to 2,600 meters) of Western Ghat. The major reason is

- a. Habitat preferences
- b. Habitat shrinkage
- c. Urbanization in other part of habitat
- d. Pressure of tiger predation at lower height

**Ans. a**

109. Which of the following is not a characteristic of climax community?

- a. Wide niche
- b. Complex food web
- c. Low resilience
- d. Inter-biotic nutrients dependence

**Ans. a**

110. In abandoned area first nitrogen fixing communities arrives and carry out nitrogen fixation, later on this community is replaced by non-nitrogen fixing species. In the mechanism of succession this is in general agreement according to

- a. Facilitation
- b. Tolerance
- c. Inhibition
- d. Adaptation

**Ans. a**

111. Under what thermodynamically condition reaction would be spontaneous?

- a.  $\Delta H > 0$  and  $\Delta S > 0$
- b.  $\Delta H < 0$  and  $\Delta S > 0$
- c.  $\Delta H < 0$  and  $\Delta S < 0$
- d.  $\Delta H > T \Delta S$

**Ans. b**

112. Which is most favorable for maximum sustainable harvesting of resources?

- a. Major part of population is near or around the carrying capacity
- b. Population is half of the carrying capacity
- c. Population is one fourth below the carrying capacity
- d. Population has slow doubling time

**Ans. a**

113. Which statement is not correct for blood?
- Mature RBC is of larger size as compare to its precursor cells
  - Platelets play important role in blood clotting
  - Neutrophils are major phagocytotic cells
  - Basophils are present in least amount

**Ans. a**

114. Mammalian jaw has evolved from
- Pharyngeal arches
  - Temporal bone
  - Frontal bone
  - Dentary and squamosal bones

**Ans. d**

115. Which eukaryotic RNA polymerase transcribes t-RNA genes?
- RNA polymerase I
  - RNA polymerase II
  - RNA polymerase III
  - DNA polymerase I

**Ans.c**

116. An insertion of single nucleotide in coding region of gene leads to frame shift mutation and result is formation of nonfunctional protein. Under certain condition second suppressor mutation in another gene may result into formation of functional protein. How suppressor mutation can do this
- There is insertional mutation in gene of t-RNA anticodon such that it is able to interact with four nucleotide codon
  - Mutation in gene of ribosome leading to frame shift over transcript
  - Mutation in gene whose product bulge out extra nucleotide
  - Another mutation reverses the original insertion

**Ans. a**

117. Which statement is correct regarding ABC transporters?
- Consist of the transmembrane domain as well as the nucleotide-binding domain
  - All are P glycoproteins
  - Present in only eukaryotes
  - Makes membrane porous

**Ans. a**

118. The organelle of C3 plants, where glyoxylate is formed is
- Chloroplast
  - Peroxisome
  - Mitochondria
  - Cytosol

**Ans. b**

119. In prokaryotes during replication, the lagging strand is synthesized in a series of short fragments known as Okazaki fragments, consequently requiring many

primers. The RNA primers of Okazaki fragments are subsequently degraded by DNA polymerase I and the gap are filled. How DNA polymerase I fills the gap once the primer have been removed from lagging stand?

- a. DNA polymerase I has its own primer
- b. DNA polymerase I do not require primer
- c. DNA from leading stand serves as primer
- d. Ends of existing Okazaki fragments on lagging stand serves as primer

**Ans. d**

120. Which of the following small G-protein is involved in nuclear transport and targeting?

- a. Ras
- b. Ran
- c. Rab
- d. Rho

**Ans. b**

121. Which of the following is not a characteristic feature of Apoptosis?

- a. Swelling of cell
- b. Nuclear fragmentation
- c. Change in cell wall porosity
- d. Permeability of mitochondrial inner membrane

**Ans. a**

122. Which statement is correct in relation of activity of telomerase?

- a. Increase with age
- b. Observed in all cancers and responsible for immortality
- c. Responsible for apoptosis but not for ageing
- d. Re-synthesize telomeres

**Ans. b**

123. In an organism if number of linkage group is 12 then, number of haploid set of chromosome is

- a. 12
- b. 6
- c. 24
- d. 4

**Ans. a**

124. Chromophore associated with phytochrome of plants is

- a. Phycobillin
- b.  $\beta$ -carotene
- c. Pterin
- d. Flavin adenine dinucleotide

**Ans. a**

125. During the early origin of earth oxygen was absent in environment. Later on the oxygen increased and reached to present level. The main source of oxygen was

- a. Photosynthesis
- b. Released from  $\text{CaCO}_3$
- c. Escape of  $\text{CO}_2$  to environment
- d. Escape of oxygen from internal sources

**Ans. a**

126. Which of the following is produced in phenyl propanoid pathway?
- a. Phenolics
  - b. Carotenes
  - c. Alkaloids
  - d. Terpenes

**Ans. a**

127. Which of the following helps in osmoprotection in plants?
- a. Proline
  - b. Tryptophan
  - c. Glycine
  - d. Levulinic acid

**Ans. a**

128. Frog A has length "l" and weight "w". Another frog "B" has double length and four times weight. It means
- a. Frog A is more cylindrical
  - b. Frog B is more cylindrical
  - c. Frog A has low surface to volume ratio
  - d. Frog B is overweight

**Ans. a**

129. In a certain genetic cross, 1/16 proportion of progeny shows mutant phenotype. It means
- a. Two independent assorting genes are involved for trait
  - b. Two independently assorting duplicate genes are involved
  - c. Two linked genes are involved for trait
  - d. Two independent segregating alleles are responsible for trait

**Ans. b**

130. Which statement is correct for membrane receptors for signal transduction?
- a. Contain single or multiple membranes spanning domain
  - b. Always coupled with trimeric G protein
  - c. Always results in production of secondary messenger
  - d. Recognized non-polar signaling molecules

**Ans. a**

131. Spontaneity of mutation means
- a. Mutation in absence of exogenous mutagen
  - b. Mutation directly proportion to presence of mutagen
  - c. Mutation inversely proportion to presence of mutagen
  - d. Mutation at in appropriate time

**Ans. a**

132. Plasmid copy number achieved by plasmid encoded control elements that regulate the initiation of the replication step. For example in stringent plasmid protein Rep A dimerize and binds to origin of replication and do not allow replication more than once. What mutation may convert this stringent mode of replication in plasmid into relaxed one?

- a. Over expression in repA protein
- b. Mutation in repA gene in dimerization domain
- c. Mutation in repA other than dimerization domain
- d. Gain of function in recognition domain of repA

**Ans. b**

133. Ants and bees social structure include queen, sterile female workers and soldier drones. This is best example of

- a. Eusociality
- b. Sub-social
- c. Group selection
- d. Altruism

**Ans. a**

134. Among the following which is insulin dependent glucose transporter?

- a. GLUT1
- b. GLUT2
- c. GLUT4
- d. GLUT 5

**Ans. c**

135. What would be effect on serum concentration of TSH if a bolus of thyroxine is injected to a person?

- a. Remain unchanged
- b. First increase and then come to normal
- c. Initially decrease but after short time will be normal
- d. Remain high for prolonged period of time

**Ans. c**

136. Substrate for DNA synthesis is?

- a. Nucleotide tri phosphate
- b. Nucleoside tri phosphate
- c. Nucleoside pyrophosphate
- d. Ribonucleotide tri phosphate

**Ans. b**

137. Optimum temperature for growth of extemo thermophiles is

- a. 0° C
- b. 20° C
- c. 50° C
- d. Over 80° C

**Ans. d**



138. Treatment of acetosyringone is given during transfer of transgene using *Agrobacterium* as vector. The rationale behind this is that acetosyringone

- a. Helps in anchorage of bacteria to plant cell wall
- b. Activates vir operon of bacteria
- c. Helps in integration of T-DNA in plant genome
- d. Promotes bacterial growth by activating genes in plant

**Ans. b**

139. When a person enters a dark room from bright sunlight he cannot see anything for a few seconds because

- a. Rhodopsin pigment of rod cells is inactivated in bright light which takes time and is activated in dark and associate with opsin protein
- b. Scotopsin proteins of rods are denatured
- c. All Scotopsin are bound with retinal in rod cells
- d. All Sctoposin becomes non-functional in bright light

**Ans. a**

140. Largest reservoir of carbon is

- a. Atmosphere
- b. Ocean sediments
- c. Carbonate and Silicate Rocks
- d. Inorganic carbon in earth mantle

**Ans. b**

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