

PAPER – II
LIFE SCIENCES

Note : Attempt all the questions. Each question carries *two* (2) marks.

1. Ionophores are
 - 1) the gating mechanisms associated with the transport of ions
 - 2) intrinsic proteins that actively transport ions
 - 3) chemicals that form pores in the plasma membrane and allow ions to pass through
 - 4) intrinsic proteins that passively transport ions

2. The two 80S ribosomal subunits remain united with each other due to high concentration of which of the following ions?
 - 1) K^+
 - 2) Ca^{2+}
 - 3) Mg^{2+}
 - 4) Cl^-

3. Which of the following occurs in meiosis but not in mitosis?
 - 1) Attachment of spindle fibres to the kinetochore
 - 2) Pairing of homologous chromosomes at the metaphase plate
 - 3) Replication of DNA prior to the start of cell division
 - 4) Separation of sister chromatids at anaphase

4. The amount of microbial mass produced from a nutrient can be expressed quantitatively as
 - 1) Cell count
 - 2) Growth yield
 - 3) Balanced growth
 - 4) Dilution rate

5. Stem cell factor is produced mainly by
- 1) stem cells
 - 2) thymic Epithelium
 - 3) bone marrow stromal cells
 - 4) megakaryocytes
6. The direction of flagellar rotation is modulated by the signaling molecule
- 1) Che A
 - 2) Che B
 - 3) Che Y
 - 4) Che A-P
7. Familial cancer is caused by
- 1) a mutation in somatic cell only
 - 2) a mutation in germline cells only
 - 3) a germline mutation and a somatic mutation in affected tissue
 - 4) two germline mutations
8. HIV attacks
- 1) Tc cells
 - 2) Macrophages
 - 3) T_H cells
 - 4) Ts cells
9. Phytochrome action influenced by long day can be substituted by
- 1) Auxin
 - 2) Anti auxin
 - 3) Cytokinin
 - 4) Gibberllin

10. Which one of the following is an anti-auxin?
- 1) 2,4-Dichlorophenoxyacetic acid
 - 2) 2,4,5-Trichlorophenoxyacetic acid
 - 3) 2,3,5-Triiodobenzoic acid
 - 4) 2-Methoxy-3, 6-dichlorobenzoic acid
11. Classical experiments in understanding the nature of circadian rhythms in plants were carried out first by
- 1) Charles Darwin
 - 2) Wilhem Pfeffer
 - 3) De Mairan
 - 4) Francis Darwin
12. Blood flow that is directed through the lungs and back to the heart is called
- 1) unidirectional circulation
 - 2) gill circulation
 - 3) pulmonary circulation
 - 4) pulmocutaneous circulation
13. Which of the following is an INCORRECT association?
- 1) Anoxia – Deficiency of O₂
 - 2) Dyspnea – Labored breathing
 - 3) Apnea – Excessively high breathing rate
 - 4) Pleurisy – Inflammation of the pleura
14. Which of the following statement is correct with respect to kidney function regulation?
- 1) During summer when body loses lot of water by evaporation, the release of ADH is suppressed
 - 2) When someone drinks lot of water, ADH release is suppressed
 - 3) Exposure to cold temperature stimulates ADH release
 - 4) An increase in glomerular blood flow stimulates formation of Angiotensin II

15. Mutations which occur in body cells which do not go on to form gametes
- 1) auxotrophic mutations
 - 2) somatic mutations
 - 3) morphological mutations
 - 4) temperature sensitive mutations
16. In Whittaker's five kingdom classification all primitive eukaryotes were bunched into the group
- 1) Monera
 - 2) Protista
 - 3) Fungi
 - 4) Animalia
17. A microscopic unicellular organisms characterized with a food gullet, flagellum, chloroplasts, mitochondria and a nucleus can qualify itself to be member of
- 1) Protista
 - 2) Plantae
 - 3) Fungi
 - 4) Monera
18. Examine the species listed and recognize that which belongs to Indian centre among the 8 centres of origin recognized by Vavilov in his attempts to study the domestication of crops
- 1) Millets, sorghum, Soy Bean, Cannabis and Tea
 - 2) Cluster Bean, Pigeon Pea, orange, Lemon and Sugarcane
 - 3) Ginger, Banana, Coconut, Pepper and Turmeric
 - 4) Coriander, Coffee, Bhendi, Sesame and Fenugreek

19. With reference to 'Eco-Sensitive Zones', which of the following statements is/are correct?

- A. Eco-Sensitive Zones are the areas that are declared under the Wildlife (Protection) Act, 1972
- B. The purpose of the declaration of Eco-Sensitive Zones is to prohibit all kinds of human activities, in those zones except agriculture

Select the correct answer

- 1) A only
- 2) B only
- 3) A and B
- 4) Neither A nor B

20. Choose the correct set of eras during Precambrian eon

- 1) Archean – Proterozoic – Paleozoic
- 2) Hadean – Archean – Proterozoic
- 3) Archean – Hadean – Paleozoic
- 4) Proterozoic – Phanerozoic – Paleozoic

21. The presence of two families of monotremes and 13 families of marsupials and no wild placental mammals of Australian fauna is the evidence for

- A. Mammalian radiation is the consequence of continental drift
- B. Origin of mammals occurred in Australian and South American continents
- C. Migration of early mammals - prototherians and metatherians after Laurasia and Gondwana formation
- D. Early mammalian evolution of prototherians and metatherians occurred in Pangeae

- 1) A and B only
- 2) B and C only
- 3) A and D only
- 4) B and D only

22. Humans differ from one another by how much?

- 1) An average of 1 nucleotide in 100
- 2) An average of 1 nucleotide in 1000
- 3) An average of 1 nucleotide in 10,000
- 4) An average of 1 nucleotide in 1,000,000

23. In affinity chromatography the required ligand is often released by

- 1) Changing the pH
- 2) Vigorous shaking
- 3) Changing the temperature from 37° to 4°
- 4) Boiling

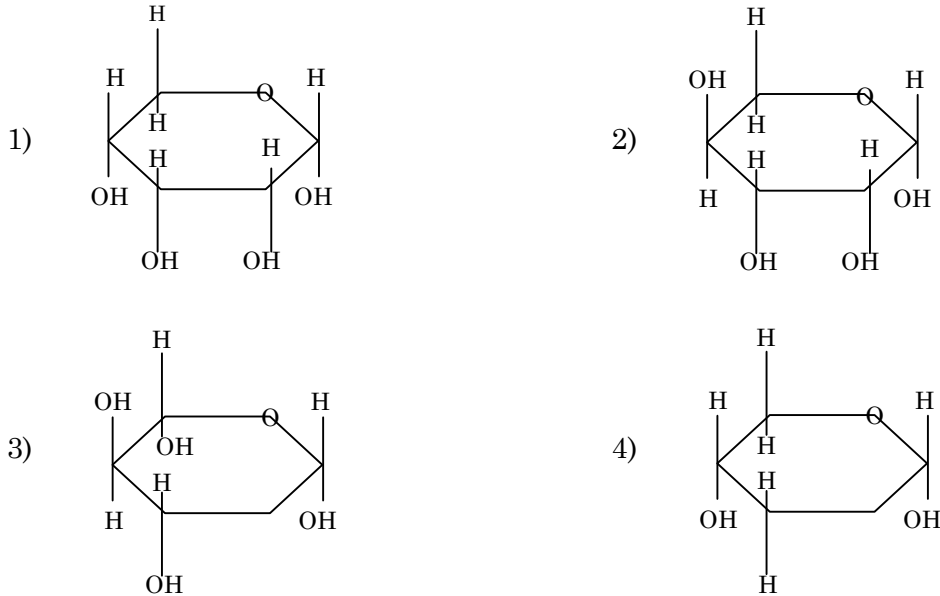
24. Protein A, which has strong affinity to Fc region of immunoglobulin, is extracted from

- 1) *Saccharomyces cerevisiae*
- 2) *Staphylococcus aureus*
- 3) *Streptococcus pyogenes*
- 4) *Streptococcus sanguis*

25. Which of the following microscopy techniques relies on the specimen interfering with the wavelength of light to produce a high contrast image without the need for dyes or any damage to the sample?

- 1) Conventional bright field light microscopy
- 2) Phase contrast microscopy
- 3) Electron microscopy
- 4) Fluorescence microscopy

26. Which is the furanose form of D-ribose?



27. Indicate the ionic species that predominates at pH 4, 8 and 11 for ammonia.

- 1) pH 4, NH_4^+ ; pH 8, NH_4^+ ; pH 11, NH_3
- 2) pH 4, NH_4^+ ; pH 8, NH_3^+ ; pH 11, NH_2
- 3) pH 4, NH_4^+ ; pH 8, NH_3^+ ; pH 11, NH_3
- 4) pH 4, NH_3^+ ; pH 8, NH_3^+ ; pH 11, NH_2

28. All of the following can be chemically isolated except

- 1) Enzyme – substrate complexes
- 2) Enzyme – Inhibitor complexes
- 3) Enzyme – Substrate covalent intermediates
- 4) Transition states

29. The severe form of galactosemia is

- 1) a genetic deficiency of a uridyl transferase that exchanges Galactose-1-phosphate for glucose on UDP glucose
- 2) results from a deficiency of an epimerase
- 3) insignificant in infants but a major problem in later life
- 4) an inability to form galactose-1-phosphate

- 30.** What is the RNA primers used for Bacteriophage T7 replicating DNA
- 1) PPP ACCA, PPP ACCC
 - 2) PPP AACC, PPP ACCC
 - 3) PPP ACCA, PPP CCCA
 - 4) PPP ACAC, PPP CCAC
- 31.** The following features of the genetic codes should be observed
- I. most amino acids have more than one codon
 - II. three codons signal termination of polypeptides synthesis the stop codons UAA, UAG and UGA
 - III. one codon signals initiation of polypeptide synthesis the start codon AUG
- Which of the following is true?
- 1) I is correct II, III are incorrect
 - 2) II is correct I, III are incorrect
 - 3) III is correct II, III are incorrect
 - 4) I, II, III is correct
- 32.** The gal operon has three cistrons,
- 1) *gal E, gal T and gal K*
 - 2) *gal A, gal B and gal C*
 - 3) *gal A, gal T and gal K*
 - 4) *gal E, gal B and gal K*
- 33.** Name the RNA polymerase I and type of gene it transcribes
- 1) 18S, 5.8S and 28S RNA
 - 2) 16S, 3.8S and 18S RNA
 - 3) 5S, 18S and 28S RNA
 - 4) 16S, 5S and 3.8S RNA

- 34.** Animals that exhibit discoidal cleavage pattern in their meroblastic eggs
- 1) Sea Urchin and Amphioxus
 - 2) Annelids and Mollusks
 - 3) Mammals and Nematodes
 - 4) Birds and Reptiles
- 35.** Plastochron is a term that speaks about
- 1) Shoot development
 - 2) Root development
 - 3) Leaf arrangement
 - 4) Leaf development
- 36.** The pattern leaf arrangement where a leaf from a node departs in pairs at right angles in successive nodes is called
- 1) Alternate phyllotaxy
 - 2) Opposite superposed phyllotaxy
 - 3) Whorled phyllotaxy
 - 4) Opposite descussate phyllotaxy
- 37.** During non-cyclic electron transport, photophosphorylation occurs at
- 1) two places
 - 2) one place
 - 3) three places
 - 4) none of the above
- 38.** Glycolytic reactions of respiration occurs in
- 1) mitochondria
 - 2) cytosol
 - 3) peroxisome
 - 4) glyoxysome

39. A hormone involved in regulating basal metabolism is:
- 1) Insulin
 - 2) Gastrin
 - 3) Thyroid hormone
 - 4) Glucagon
40. The number of type of gametes produced by a heterozygous individual is
- 1) 2
 - 2) 3
 - 3) 1
 - 4) many
41. The gene formed by the joining DNA segments from different sources are called as
- 1) chimeric gene
 - 2) recombinant gene
 - 3) joint gene
 - 4) both (2) and (3)
42. Which of the following statement(s) is/are true in regards to $F^+ \times F^-$ mating events?
- 1) DNA is transferred from F^- to F^+ cells
 - 2) DNA is transferred from F^+ to F^- cells
 - 3) No DNA is transferred because F^- cells are unable to perform conjugation
 - 4) No DNA is transferred because F^+ cells are unable to perform conjugation

43. Two of the Indian hot spots out of 25 identified and declared world over
- 1) Eastern Himalayas and Western Himalayas
 - 2) Eastern Himalayas and Western Ghats
 - 3) Western Himalayas and Eastern Ghats
 - 4) Andaman and Nicobar Islands
44. Two sympatric species growing in the same area must have different character where as two allopatric species growing in different geographical area may have similar morphological characters, which is known as
- 1) Spatial variation
 - 2) Adaptations
 - 3) Character displacement
 - 4) Speciation
45. The discontinuous variation in morphological features and cryptic differences such as allozymes, chromosomes of allozymes, chromosomes of a local population of a species adapted to particular ecological condition is called
- 1) Coenospecies
 - 2) Ecospeices
 - 3) Ecotype
 - 4) Ecoline
46. Which one of the following is the best description of the term 'ecosystem'?
- 1) A community of organisms interacting with one another
 - 2) That part of the earth which is inhabited by living organisms
 - 3) A community of organisms together with the environment in which they live
 - 4) The flora and fauna of a geographical area

47. All of the following are parts of the allopatric speciation by natural selection model, except;
- 1) Geographically isolated populations evolve or change in response to novel environments
 - 2) Reproductive isolation evolves as a by-product of changes in other traits associated with adapting to new resources or environments
 - 3) Selection against hybridization leads to exaggeration of signals to facilitate recognizing conspecifics (individuals of the same species)
 - 4) Changes among or between populations occur while populations are geographically separated
48. Find the wrong cause for sympatric speciation.
- 1) Adaptations and differentiation within a population can lead to speciation.
 - 2) The evolution of distinct population or varieties via mimicry
 - 3) Speciation among insects can be initiated by adaptation to different host plants as source of food
 - 4) Populations divided by the budding off a small, completely isolated founder colony form a larger population
49. Enzymes are required for making plant protoplasts
- 1) Cellulase and proteinase
 - 2) Cellulase and pectinase
 - 3) Cellulase and amylase
 - 4) Amylase and pectinase
50. Hybridoma is formed by the fusion of
- 1) Plasma cell with a plasma cell of another species
 - 2) T cell and Plasma cell
 - 3) Plasma cell and myeloma cell
 - 4) macrophage and myeloma cell

ROUGH WORK

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