SET 2013

PAPER – III

LIFE SCIENCES

Signature of the Invigilator | Question Booklet No. .....

1. | OMR Sheet No.. .....

Subject Code 03 | **ROLL No.**

Time Allowed : 150 Minutes | **Max. Marks : 150**

No. of pages in this Booklet : **11** | No. of Questions : **75**

INSTRUCTIONS FOR CANDIDATES

1. Write your Roll No and the OMR Sheet No in the spaces provided on top of this page.
2. Fill in the necessary information in the spaces provided on the OMR response sheet.
3. This booklet consists of seventy five (75) compulsory questions each carrying 2 marks.
4. Examine the question booklet carefully and tally the number of pages/questions in the booklet with the information printed above. **Do not accept a damaged or open booklet**. Damaged or faulty booklet may be got replaced within the first **5** minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time given.
5. Each Question has four alternative responses marked (A), (B), (C) and (D) in the OMR sheet. You have to completely darken the circle indicating the most appropriate response against each item as in the illustration.

6. All entries in the OMR response sheet are to be recorded in the original copy only.
7. Use only Blue/Black Ball point pen.
8. Rough Work is to be done on the blank pages provided at the end of this booklet.
9. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Sheet, except in the spaces allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, you will render yourself liable to disqualification.
10. You have to return the Original OMR Sheet to the invigilators at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. **You are, however, allowed to carry the test booklet and the duplicate copy of OMR Sheet** on conclusion of examination.
11. Use of any calculator, mobile phone or log table etc. is strictly prohibited.
12. **There is no negative marking.** **03-13**

LIFE SCIENCES
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Note : This paper contains **seventy five (75)** objective type questions of **two (2)** marks each. **All** questions are compulsory.

1. An ecosystem must have continuous external source of :
   (A) Minerals
   (B) Energy
   (C) Food
   (D) All of the above

2. The source of energy in an ecosystem is :
   (A) ATP
   (B) Sunlight
   (C) DNA
   (D) RNA

3. In a food chain of grassland ecosystem the top consumers are :
   (A) Herbivores
   (B) Carnivores
   (C) Bacteria
   (D) Either carnivores or herbivores

4. A means of trans-membrane transport in which a molecule moves from an area of low concentration to high concentration utilizing membrane carriers is called :
   (A) Active transport
   (B) Facilitated diffusion
   (C) Passive diffusion
   (D) Endocytosis

5. During the carbon cycle, which of the following carbon compounds would be utilized as an energy source by heterotrophs ?
   (A) Calcium carbonate
   (B) Carbonic acid
   (C) Organic molecules
   (D) Carbon dioxide

6. Energy flow in ecosystem is :
   (A) Unidirectional
   (B) Bidirectional
   (C) Multidirectional
   (D) None of the above

7. An ecosystem may be defined as :
   (A) The community of organisms together with the environment in which they live
   (B) The abiotic component of a habitat
   (C) The part of the earth and its atmosphere which inhibits living organisms
   (D) A community of organisms interacting with one another

8. Bioremediation means :
   (A) Degradation of molecules to an atom
   (B) Use of biota to degrade toxic compound to non-toxic compound
   (C) Use of biodegradation as a technique to remove the toxic compounds from environment
   (D) Use of chemicals for clean up of the environment

9. Hexokinase has minimum K_m value for :
   (A) Glucose
   (B) Mannose
   (C) Galactose
   (D) Fructose

10. Nonsense codon :
    (A) Terminates transcription
    (B) Converts sense DNA into nonsense DNA
    (C) Releases polypeptide chain from tRNA
    (D) Attaches specific amino acid to tRNA

11. During development, lens of the vertebrate eye is derived from :
    (A) Mesoderm and endoderm
    (B) Ectoderm and mesoderm
    (C) Ectoderm
    (D) Mesoderm

12. Concentration of urine in mammals depends on :
    (A) Size of Glomerulus
    (B) Length of Henle's loop
    (C) Osmotic pressure of blood
    (D) Length of proximal tubule

13. Torpor is characterized by :
    (A) High body temperature and high physiological activity
    (B) Low body temperature and low metabolic rate
    (C) Ability of the animal to tolerate wide variation of temperature
    (D) Ability of the animal to tolerate wide range of salinity

14. ADH is synthesized in the :
    (A) Anterior pituitary
    (B) Posterior pituitary
    (C) Hypothalamus
    (D) Thalamus

15. Excretion of uric acid is useful in :
    (A) Thermoregulation
    (B) Removal of water
    (C) Retention of water
    (D) Regulation of blood volume

16. After a high protein meal, most of the nitrogen in amino acids that is targeted for urea biosynthesis is transferred via transamination to :
    (A) Ornithine
    (B) Acetoacetate
    (C) Citrulline
    (D) Alpha-ketoglutarate

17. Somatostatin :
    (A) Stimulates glucagon release and inhibits insulin release
    (B) Stimulates release of insulin and glucagon
    (C) Inhibits release of insulin and glucagon
    (D) Inhibits glucagon release but stimulates insulin release

18. In *Paramecium :*
    (A) Macronucleus and micronucleus are diploid
    (B) Macronucleus and micronucleus are polyploid
    (C) Macronucleus is polyploid and micronucleus is diploid
    (D) Macronucleus is diploid and micronucleus is polyploid

19. In the life history of *Plasmodium falciparum*, Maurer's dots are present on the surface of :
    (A) Sporozoite
    (B) Ookinete
    (C) Infected erythrocyte
    (D) Infected hepatocyte

20. An increase in the length of hind limb of frog is due to :
    (A) Long femur
    (B) Long femur and tibiofibula
    (C) Long set of astragalus and calcaneum
    (D) Long carpels

21. Down's syndrome is :
    (A) Monosomy
    (B) Trisomy 21
    (C) Trisomy 16
    (D) Trisomy involving sex chromosomes

22. The equilibrium model of island biogeography suggests all of the following except :
    (A) Larger islands have more species than small islands
    (B) The species richness of an island is determined by colonization and extinction
    (C) Small islands have lower rates of extinction
    (D) Islands closer to the mainland will have higher colonization rates

23. The emerging field which deals with the systematic search for genes, natural compounds, designs, and whole organisms in wild life with a potential for product development by biological observation and biophysical, biochemical, and genetic methods is known as :
    (A) Bioprospecting
    (B) Bioengineering
    (C) Biomining
    (D) Biosystematics

24. Region that is distinguished by particular environmental conditions (climate, soil, altitude, etc.) and therefore a characteristic assemblage of organisms :
    (A) Critical habitat
    (B) National park
    (C) Biotope
    (D) Wild life sanctuary

25. Ecological arrangement in which two or more species use different, non-overlapping resources in a given habitat is called :
    (A) Mutualism
    (B) Resource partitioning
    (C) Association
    (D) Exclusion

26. Which one of the following is true for 'translational frame shifting' ?
    (A) It is random and may start at any codon in the mRNA
    (B) It has been commonly identified in all groups of organisms including plants, animals, bacteria, fungi, etc
    (C) It allows more than one protein to be synthesized from a single mRNA
    (D) It allows one protein to be synthesized from a single mRNA

27. RNA editing primarily :
    (A) Causes degradation of excessively transcribe RNA
    (B) Increases rate of transcript of rRNA gene
    (C) Can change meaning of the RNA message
    (D) Increases stability of RNA

28. Diphtheria toxin acts on human by :
    (A) Inhibiting protein synthesis
    (B) Inhibiting DNA replication
    (C) Disintegration of cell membrane
    (D) Inhibiting TCA cycle

29. Which of the following statements is NOT correct ?
    (A) ABA represses α-amylase gene expression in the aleurome tissue of barley seeds
    (B) Auxin and GA stimulate plant growth by increasing the extensibility of cell walls
    (C) ABA and ethylene inhibit plant growth by causing a decrease in extensibility
    (D) During cell expansion, loosening of cell wall occurs through the breakage and reformation of non-cellulosic polysaccharides called as expansins, which cross link the cellulose microfibrils

30. When a mixture of green alga and motile aerobic bacteria is illuminated by red or blue light, bacteria accumulate near the algal filaments but not when it is illuminated with green light. It shows that :
(A) Chlorophyll is involved in photosynthesis
(B) Chlorophyll absorbs green light
(C) Red and blue lights are most effective in photosynthesis
(D) Oxygen is released from water in the light reaction

31. Which of the following acts as a catalytic unit for ATP synthase in oxidative phosphorylation ?
(A) Cytochrome C
(B) Cytochrome a/a3
(C) F1
(D) Iron-sulphur proteins

32. Nastic movements differ from tropisms in that :
(A) Tropisms involve growth toward or away from a stimulus, while nastic movements involve growth away from a stimulus only
(B) Nastic movements usually take longer than tropisms
(C) Tropisms do not involve any chemical or hormonal changes in the plant
(D) Nastic movements are independent of the direction of the stimulus

33. The lowest water potential in xylem vessels is observed in :
(A) Root hairs
(B) Vascular cylinder of roots
(C) Trachieds of stem
(D) Leaves

34. In which of the following forms is iron absorbed by plants ?
(A) Ferrous form only
(B) Ferric form only
(C) Both ferrous and ferric forms
(D) Elemental form

35. Which of the following elements acts as an activator of the enzyme cytochrome oxidase involved in respiration ?
(A) Copper
(B) Manganese
(C) Iron
(D) Magnesium

36. Which one of the following is an antigibberellin ?
(A) Ubiquinone
(B) Plastoquinone
(C) AMO-1618 and phosphon
(D) Silver nitrate

37. Older, dying leaves export much of their mineral content to younger leaves. Element most readily mobilized is :
(A) Sulphur
(B) Calcium
(C) Sodium
(D) Magnesium

38. Which of following elements are abundant in meristematic tissues in plants ?
(A) Phosphorus and potassium
(B) Potassium and calcium
(C) Calcium and magnesium
(D) Calcium and phosphorus

39. According to chemiosmotic hypothesis, facilitated diffusion of proton across the thylakoidal membrane into the stroma, is brought about by :
(A) Cytochrome b
(B) Cytochrome f
(C) F_0 component of ATPase
(D) F_1 component of ATPase

40. Internode/petiole elongation in deep water rice plants is promoted by :
(A) IAA
(B) GA_3
(C) Ethylene
(D) ABA

41. In the recent past, maize hybrids have been developed with improved nutritional quality. They are particularly rich in :
(A) Vitamins A and K
(B) Potassium and iron content
(C) Lysine and tryptophan
(D) Amylopectin

42. Fruit juices bought from market are clearer than those made at home. These juices are clarified by the use of :
(A) Amylase and lipase
(B) Lipase and cellulase
(C) Cellulase and pectinase
(D) Pectinase and protease

43. Up to what percentage of photosynthetically active radiation available from solar radiation is captured by plants ?
(A) Up to 10%
(B) Up to 20%
(C) Up to 39%
(D) Up to 50%

44. Single membrane bound organelle crucial for compartmentalizing the toxic substances is
(A) Lysosome
(B) Endoplasmic reticulum
(C) Oleosome
(D) Vacuole

45. Which one of the following part of eukaryotic chromosome is not primarily composed of DNA ?
(A) Telomere
(B) Centromere
(C) Kinetochore
(D) Origin of replication

46. The mobile peptide that gets translocated from the leaf to SAM to induce flowering is :
(A) Gibberellic acid
(B) Flowering locus T
(C) Zeatin
(D) Actin

47. The most common pattern of leaf arrangement (phyllotaxy) is :
(A) 2/5
(B) 1/3
(C) 3/8
(D) 5/13

48. Evolution of a variety of species from a recent ancestor to adapt to diverse habitats is termed :
(A) Convergent evolution
(B) Convergent radiation
(C) Adaptive evolution
(D) Adaptive radiation

49. Shift in the flowering phenology of certain angiosperms is largely a consequence of :
(A) Deforestation
(B) Global warming
(C) Increasing urbanization
(D) Inadequate resource accumulation

50. When compatible pollination occurs in an unopened flower, it is termed as :
(A) Cleistogamy
(B) Herkogamy
(C) Dichogamy
(D) Xenogamy

51. Hotspots refer to :
(A) Thermolabile areas in seismic zones
(B) Species rich areas with high rates of extinction
(C) Volcanic areas of earth
(D) Volcanoes inside the oceans

52. Fluorescence *in situ* hybridization may be used to find out :
(A) The frequency of recombination between two loci in an organism
(B) Gene deletion
(C) To decide the size of DNA fragment for cloning
(D) All of the above

53. The excitation and emission wavelengths for a particular fluorochrome in fluorescence microscope is resolved by :
(A) Diaphragm
(B) Objective
(C) Dichroic assembly
(D) Photomultiplier tube

54. R^2 is the mathematical notation for :
(A) The Co-efficient of Variation
(B) Pearson's Co-efficient of Correlation
(C) Spearman's Co-efficient of Rank Correlation
(D) The Co-efficient of Determination

55. Hormone pair required for a callus differentiation is :
(A) Auxin and cytokinin
(B) Auxin and ethylene
(C) Auxin and absiccic acid
(D) Cytokinins and gibberellins

56. Classification of organisms based on evolutionary as well as genetic relationships is called :
(A) Numerical taxonomy
(B) Phonetics
(C) Biosystematics
(D) Cladistics

57. An enzyme used in both glycolysis and gluconeogenesis is :
(A) 3-phosphoglycerate kinase
(B) Glucose 6-phosphate
(C) Hexokinase
(D) Phosphofructokinase

58. The key regulatory enzyme of fatty acid synthesis is :
(A) Acetyl coA synthetase
(B) Acetyl coA carboxylase
(C) Keto acyl synthase
(D) Thioesterase

59. Which of the following is NOT a part of human chromosome in any phase ?
(A) Centriole
(B) Histone
(C) Nucleosome
(D) Centromere

60. The major event that occurs during the anaphase of mitosis, which brings about equal distribution of chromosomes is :
(A) Splitting of centromeres
(B) Splitting of chromatids
(C) Condensation of chromatids
(D) Replication of genetic material

61. Why is it more difficult to create transgenic animals than transgenic plants ?
(A) Introduction of foreign DNA into animal cells is difficult
(B) Animal cells cannot transcribe and translate foreign DNA
(C) Plants and animals use different genetic codes
(D) Animal cells cannot replicate foreign DNA

62. Which tropical fruit has been successfully engineered for protection against a lethal virus ?
(A) Passion fruit
(B) Papaya
(C) Mango
(D) Lychee

63. The delayed ripening of tomato was achieved by ———a gene.
(A) Altering
(B) Silencing
(C) Replacing
(D) Relocating

64. The epimerization of galactose to glucose and vice-versa takes place by :
(A) UTP
(B) GTP
(C) CTP
(D) ATP

65. Co-enzyme Q is involved in electron transport as :
(A) A water soluble electron donor
(B) Covalently attached cytochrome co-factor
(C) Lipid soluble electron carrier
(D) Oxygen carrier

66. What happens after glycolysis when oxygen is available as an electron acceptor ?
(A) Pyruvate is formed
(B) NADH is produced
(C) Oxidative phosphorylation occur
(D) Fermentation initiates

67. Which of the following is a sulfur containing amino acid ?
(A) Glycine
(B) Lysine
(C) Tyrosine
(D) Cysteine

68. In polysaccharides, monosaccharides are linked together by :
(A) Peptide bonds
(B) Hydrogen bonds
(C) Glycosidic linkages
(D) Phosphodiester linkages

69. Which one of the following is true about sex linked recessive disease causing genetic disorder ?
(A) All the daughters but none of the sons of the affected fathers are affected
(B) Most affected individuals have unaffected parents
(C) Approximately half of the children of the carrier female should be affected
(D) Most affected individuals are males

70. The phenomenon where a character is not rigidly influenced by the defined genotype but a range of phenotypic possibilities influenced by the environment are exhibited is referred to as :
(A) Incomplete dominance
(B) Norm of reaction
(C) Codominance
(D) Inheritance of acquired characters

71. A species inhabiting different geographic areas is called :
(A) Allopatric
(B) Sympatric
(C) Biospecies
(D) Congeneric

72. For specific sites, ratio of more than one between nonsynonymous and synonymous mutation implies that it is under :
(A) Negative selection
(B) Positive selection
(C) Purifying selection
(D) Neutral selection

73. Molecular clocks are based on the principle :
(A) All genes do not evolve at constant rate
(B) Some genes evolve at constant rate
(C) Evolutionary changes in the genes affect fitness
(D) Genetic changes can not estimate the past evolutionary events

74. Which of the following is a dominant marker ?
(A) RFLP
(B) SSR
(C) RAPD
(D) Allozyme

75. In which of the following techniques, restriction endonuclease digested DNA fragments are ligated to adapters ?
(A) RFLP
(B) AFLP
(C) SSR
(D) RAPD

ROUGH WORK

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