LIFE SCIENCES

PAPER-III
AUG-17/04

Name & Signature of the Invigilator

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OMR Answer Sheet No. : | | | | | | |

Roll No. : | | | | | | |

(in figures as in Hall Ticket)

Roll Number in words : .....

.....

Time : 2½ Hours] **No. of Printed Pages : 24** **[Maximum Marks : 150**

Instructions for the Candidates

1. Write your Roll Number in the space provided on the top of this page.
2. This paper consists of **Seventy Fifty (75)** multiple choice type of questions. **All** questions are compulsory.
3. At the commencement of examination, the question booklet will be given to you. In the first 5 minutes, you are requested to open the booklet and compulsorily examine it as below :
   (*i*) To have access to the Question Booklet, tear off the paper seal on the edge of this cover page. Do not accept a booklet without sticker seal and do not accept an open booklet.
   (*ii*) Tally the number of pages and number of questions in the booklet with the information printed on the cover page. Faulty booklets due to pages/questions missing or duplicate or not in serial order or any other discrepancy should be got replaced immediately by a correct booklet from the invigilator within the period of 5 minutes. Afterwards, neither the Question Booklet will be replaced nor any extra time will be given.
   (*iii*) After this verification is over, the Test Booklet Number should be entered on the OMR Answer Sheet and the OMR Answer Sheet Number should be entered on this Test Booklet.
4. Each item has four alternative responses marked (A), (B), (C) and (D). You have to darken the oval as indicated below on the correct response against each item.

   Example : (A) ● (C) (D) where (B) is the correct response.
5. Your responses to the items are to be indicated on the OMR Answer Sheet under **Paper – III only**. If you mark your response at any place other than in the oval in the OMR Answer Sheet, it will not be evaluated.
6. Read instructions given inside carefully.
7. Rough Work is to be done in the end of this booklet.
8. If you write your Name, Roll Number, Phone Number or put any mark on any part of the OMR Answer Sheet, except for the space allotted for the relevant entries, which may disclose your identity, or use abusive language or employ any other unfair means, such as change of response by scratching or using white fluid, you will render yourself liable to disqualification.
9. You have to return the original OMR Answer Sheet to the invigilator at the end of the examination compulsorily and must not carry it with you outside the Examination Hall. You are however, allowed to carry original question booklet and duplicate copy of OMR Answer Sheet on conclusion of examination.
10. Use only Blue/Black Ball point pen.
11. Use of any calculator or log table etc., is prohibited.
12. There shall be no negative marking.
13. In case of any discrepancy in the English and Gujarati versions of questions, English version will be taken as final.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

1. આ પાનાની ટોચ પર દર્શાવેલી જગ્યામાં તમારો રોલ નંબર લખો.
2. આ પ્રશ્નપત્રમાં બહુવૈકલ્પિક ઉત્તરો ધરાવતા **પંચોતેર (૭૫)** પ્રશ્નો આપેલા છે. **બધાજ** પ્રશ્નો ફરજિયાત છે.
3. પરીક્ષાની શરૂઆતમાં આપને પ્રશ્નપુસ્તિકા આપવામાં આવશે. પ્રથમ પાંચ (૫) મિનિટ દરમ્યાન તમારે પ્રશ્નપુસ્તિકા ખોલી અને ફરજિયાતપણે નીચે મુજબ પરીક્ષણ કરવું :
   (*i*) પ્રશ્નપુસ્તિકાનો વપરાશ કરવા માટે આ કવર પૃષ્ઠની ધાર પર આપેલ સીલ સ્ટીકર ફાડી નાખો. કોઈપણ સંજોગોમાં સીલ સ્ટીકર વગરની કે ખુલ્લી પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં.
   (*ii*) કવર પૃષ્ઠ પર છપાયેલ નિર્દેશાનુસાર પ્રશ્નપુસ્તિકાના પ્રશ્નો, પૃષ્ઠો અને સંખ્યાને ભરાભર ચકાસી લો. ખામીયુક્ત પ્રશ્નપુસ્તિકા કે જેમાં પ્રશ્નો/પૃષ્ઠો ઓછા હોય, બે વાર છપાયા હોય, અનુક્રમમાં અથવા અન્ય કોઈ ફરક હોય અર્થાત કોઈપણ સંજોગોમાં ખામીયુક્ત પ્રશ્નપુસ્તિકા સ્વીકારશો નહીં. અને જો ખામીયુક્ત પ્રશ્નપુસ્તિકા મળી હોય તો નિરીક્ષક પાસેથી તુરંત જ બીજી સારી પ્રશ્નપુસ્તિકા મેળવી લેવી. આ માટે ઉમેદવારને પાંચ (૫) મિનિટનો સમયગાળો આપવામાં આવશે. પછી થી, પ્રશ્નપુસ્તિકા બદલવામાં આવશે નહીં કે કોઈ વધારાનો સમયગાળો આપવામાં આવશે નહીં.
   (*iii*) આ ચકાસણી સમાપ્ત થાય પછી, પ્રશ્નપુસ્તિકાનો નંબર OMR જવાબ પત્રક પર લખવો અને OMR જવાબ પત્રકનો નંબર પ્રશ્નપુસ્તિકા પર લખવો.
4. પ્રત્યેક પ્રશ્ન માટે ચાર જવાબ વિકલ્પ (A), (B), (C) અને (D) આપવામાં આવેલ છે. તમારે સાચા જવાબના ઓવલ (oval) ને નીચે આપેલ ઉદાહરણ મુજબ પેનથી ભરીને સંપૂર્ણ કાળું કરવાનું રહેશે.

   ઉદાહરણ : (A) ● (C) (D) કે જ્યાં (B) સાચો જવાબ છે.
5. આ પ્રશ્નપુસ્તિકાના પ્રશ્નો ના જવાબ અલગથી આપવામાં આવેલ OMR જવાબ પત્રકમાં પેપર–III લખેલ વિભાગમાં જ અંકિત કરવા. જો આપ OMR જવાબ પત્રકમાં આપેલ ઓવલ (oval) સિવાય અન્ય સ્થાને જવાબ અંકિત કરશો તો તે જવાબનું મૂલ્યાંકન કરવામાં આવશે નહીં
6. અંદર આપેલ સૂચનાઓ ધ્યાનપૂર્વક વાંચો.
7. કાચું કામ (Rough Work) પ્રશ્નપુસ્તિકાના અન્તિમ પૃષ્ઠ પર કરવું.
8. જો આપ OMR જવાબ પત્રક નિયત જગ્યા સિવાય અન્ય કોઈપણ સ્થાને, આપનું નામ, રોલ નંબર, ફોન નંબર અથવા એવું કોઈ ચિન્હ કે જેનાથી તમારી ઓળખ થઈ શકે, અંકિત કરશો અથવા અભદ્ર ભાષાનો પ્રયોગ કરો, અથવા અન્ય કોઈ અનુચિત સાધનોનો ઉપયોગ કરો, જેમ કે અંકિત કરી દીધેલ જવાબ ભૂંસી નાખવાં કે સફેદ શાહીનો ઉપયોગ કરી બદલશો તો આપને પરીક્ષા માટે અયોગ્ય જાહેર થઈ શકો છો.
9. પરીક્ષા સમય પૂરો થઈ ગયા બાદ ઓરીજીનલ OMR જવાબ પત્રક જે તે નિરીક્ષકને ફરજીયાત સોંપી દેવું અને કોઈ પણ સંજોગોમાં તે પરીક્ષાખંડની બહાર લઈ જવું નહીં. પરીક્ષા પૂર્ણ થયા બાદ ઉમેદવાર ઓરીજીનલ પ્રશ્નપુસ્તિકા અને OMR જવાબ પત્રકની ડુપ્લિકેટ કોપી પોતાની સાથે લઈ જઈ શકે છે.
10. માત્ર કાળી/ભૂરી બોલ પોઈન્ટ પેન વાપરવી.
11. કેલ્કયુલેટર અને અન્ય ઈલેક્ટ્રોનિક યંત્રોનો ઉપયોગ કરવાની મનાઈ છે.
12. ખોટા જવાબ માટે નકારાત્મક ગુણાંકન પ્રથા નથી.
13. પ્રશ્નપુસ્તિકાના કોઈ પ્રશ્નમાં અનુવાદ અંગે કોઈ વિવાદ/મતભેદ જણાય તો અંગ્રેજી વર્ઝન યોગ્ય ગણાશે.

SEAL

LIFE SCIENCE

PAPER - III

Note : This paper contains **Seventy five (75)** multiple-choice, assertion/reasoning/ matching questions. Each question carrying **TWO (2)** marks. Attempt **All** the questions.

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1. Which amino acid is *not* commonly found in an alpha helix ?

   (A) Glutanine (B) Arginine

   (C) Proline (D) Tryptophan

2. Enzyme *not* involved in DNA replication :

   (A) Helicase (B) Topoisomerase

   (C) Reverse transcriptase (D) Primase

3. DNA strands are anti-parallel because of :

   (A) hydrogen bonds (B) phosphodiester bonds

   (C) disulphide bonds (D) Glycosidic bonds

4. Okazaki fragments are formed in :

   (A) Synthesis of the lagging strand of DNA

   (B) The splicing of *m*-RNA

   (C) The neurons of vertebrates

   (D) The oocytes of amphibians

5. Exon part of *m*-RNA have codes for :

(A) Protein (B) Lipid

(C) Carbohydrate (D) Phospholipids

6. Polysaccharide found in the exoskeleton of insects in :

(A) Chitin (B) Chondrosamine

(C) Insalin (D) Hyaluronic acid

7. The 50,s ribosomal subunit is present in :

(A) Eukaryotic cell (B) Prokaryotic cell

(C) Viruses (D) Green algae

8. Balbiani rings are found in :

(A) Polysomes

(B) Autosomes

(C) Polytenic chromosomes

(D) Sex chromosomes

9. Golgi complex is involved the secretion of :

(A) non-cellulosic cell wall polysaccharides

(B) Proteins

(C) Nucleic acids

(D) Amino acids

10. Non-genetic RNA is of :

(A) one type (B) two type

(C) three type (D) non-functional type

11. A contractile vacuole is a sub-cellular organelle involved in osmoregulation in :

(A) Monera (B) Animalia

(C) Protista (D) Fungi

12. When change in the phenotype or gene expression occur without changes in the underlying DNA sequence, the phenomenon is called :

(A) Mutation

(B) Epigenetics

(C) Epistasis

(D) Nucleosome sliding

13. Photolysis of water is done by :

(A) Photosystem I

(B) Photosystem II

(C) Both photosystems I & II

(D) Plastocyanin

14. Bacteriophage with radioactive DNA and protein when injects a bacterium the radioactivity inside the bacterium will be located :

(A) In DNA

(B) In protein

(C) Both in DNA and protein

(D) In all parts of bacterial cell

15. In G_1 phase of interphase :

(A) RNA and proteins are synthesized

(B) DNA is replicated

(C) Chromosome number becomes $4n$

(D) Cell prepares for M phase

16. Recombinant DNA technology is used for :

(A) To create novel genotypes

(B) To create new genes

(C) To create new species

(D) None of the above

17. Liposome encapsulated drugs are good candidates for during targeting against :

(A) Intracellular parasites

(B) Extracellular parasites

(C) Free living parasites

(D) Gut dwelling parasites

18. In single stranded RNA viruses replication occurs by which of the following enzymes :

(A) RNA replicase

(B) Reverse transcriptase

(C) RNA polymerase

(D) Telomerase

19. Immediate hypersensitivity reactions (Type I reactions) involves :

(A) IgA

(B) IgE

(C) IgG

(D) IgM

20. Skin cancer is induced by which type of DNA damage caused by exposure to harmful UV rays in sunlight :

(A) Alkylation

(B) Depurination

(C) Deamination

(D) Pyrimidine dimer formation

21. Calcium regulation in the body is carried out by the secretion of .....

(A) Thyriod gland

(B) Parathyriod gland

(C) Adrenal gland

(D) Islets of Langerhans

22. Apomixis is a mode of reproduction in plants in which :

(A) One of the male nuclei take part in fertilization

(B) More than two male nuclei take part in fertilization to form many embryoes

(C) Two male nuclei take part in fertilization but seed does not develop

(D) Fertilization does not take place

23. In sporophytic self incompatibility, rejection of male gametophyte occurs at the level of :

(A) Stigma surface (B) Ovary

(C) Stylar canal (D) Micropyle

24. Homoxylous condition is seen in the family :

(A) Magnoliaceae (B) Annonaceae

(C) Hamamelidaceae (D) Winteraceae

25. One of the following is a bilaterally symmetrical larvae of starfish :

(A) Bipinnaria (B) Echinopleutea

(C) Ophiopleutea (D) Tornaria

26. Major advantage of sexual reproduction is that it :

(A) Allows rapid transmission of hereditary traits compared to asexual reproduction

(B) Prevent transmission of defective traits

(C) Allows rapid generation of new genotype due to recombination

(D) Prevent loss of homozygosity

27. Shoot apex of a plant bends towards a light source as a result of :

(A) its requirement of light for photosynthesis

(B) an unequal distribution of auxin in the shoot apex

(C) an increased amount of food synthesized in the cells facing the light

(D) Weakening of the cells facing the light

28. Which of the following hormones will increase if communications from hypothalamus is severed ?

(A) GH

(B) TSH

(C) Prolactin

(D) Vasopressin

29. Insulin stimulates glucose transport in muscle cells by activating :

(A) Phosphorylation/Dephosphorylation cascade

(B) GPCR signalling cascade

(C) Apoptotic pathway

(D) TLR signalling pathway

30. Free-martin is an example of :

(A) sex reversal

(B) hormonal control of sex

(C) transformer gene

(D) none of the above

31. CAM plants are characterized by :

(A) Presence of acedic cell sap

(B) Kranz anatomy

(C) Adaptation to grow and flower in shade

(D) Opening of stomata at night

32. Translocation of organic material in plants is best explained by :

(A) Active transport

(B) Transpiration pull

(C) Imbibition theory

(D) Mass flow hypothesis

33. The poison of the nematocysts of cnidarians contains :

(A) Haemotoxin (B) Hypnotoxin

(C) Hirudin (D) Metalotoxin

34. In ruminants, which of the following part is true stomach ?

(A) Abomasum (B) Omasum

(C) Reticulum (D) Rumen

35. In most of the representatives of fishes and amphibians one of the following types of kidney is common :

(A) Pronephros (B) Mesonephros

(C) Opisthonephros (D) Metanephros

36. Which one of the following joints is highly flexible for articulation and movements ?

(A) Sutures (B) Gomphoses

(C) Synovial joint (D) Symphyses

37. The cyclic changes in the reproductive system of primate female is known as :

(A) Gestation (B) Menopause

(C) Oestrus cycle (D) Menstrual cycle

38. Calcium regulation in the human body is carried out by the secretion of :

(A) Adrenal gland (B) Thyroid gland

(C) Parathyroid gland (D) Islets of Langerhans

39. Which one of the following pairs is *not* correctly matched :

(A) Plasmid — small piece of extra-chromosomal DNA in Bacteria

(B) Cosmid — a vector for carrying large DNA fragments into host cells

(C) Interferon — an enzyme the interfere with DNA replication

(D) Anticodon — site of *t*-RNA molecule hydrogen bond that binds to m-RNA molecule

40. Restriction endonuclease is :

(A) any fragment of DNA

(B) double helical DNA

(C) (+) fragment of DNA

(D) (–) fragment of DNA

41. Albinism and phenylketonuria are caused due to :

(A) recessive autosomal genes

(B) dominant autosomal genes

(C) recessive sex genes

(D) dominant sex genes

42. Turner's syndrome is depicted by :

(A) XY (B) XO

(C) XXY (D) XYY

43. Longitudinal fission as asexual mode of reproduction is observed in :

(A) Amoeba (B) Paramoecium

(C) Planaria (D) Obelia

44. Genes which confer antibiotic resistance on bacteria are located on :

(A) Chromosomal DNA (B) Plasmid

(C) RNA (D) Polysome

45. Mycorrhizae :

(A) form nitrogen fixing nodules on roots of higher plants

(B) increase the absorptive surface of plants

(C) help in the sperm dispersal in lower plants

(D) transfer the nutrients from one plant to another

46. Which one of the following groups of microorganisms, is responsible for nitrification ?

(A) *Rhizobium* and *Azotobacter*

(B) *Nitrosomonas* and *Nitrobacter*

(C) *Nostoc* and *Anabaena*

(D) *Clostridium* and *Pseudomonas*

47. Among fishes myogenic electric organs are found in :

(A) Sharks (B) Rays

(C) Chimaeras (D) Lung fishes

48. Animals like Vampire bats, pit viper snake etc. through specialized surface receptors can detect :

(A) Ultraviolet radiation (B) Cosmic rays

(C) Infrared radiation (D) Microwaves

49. Plant group which shows mutualism in underground as well as aerial parts :

(A) Grasses (B) Orchids

(C) Pines (D) Ferns

50. In Tapworms the mature proglottids get separated from the body by :

(A) Hydrolysis (B) Haemolysis

(C) Geolysis (D) Apolysis

51. Life-history characteristics with K-selected organisms include :

(A) Inhabiting early successional state communities, rapid maturation rates and numerous large offsprings

(B) Inhabiting climax communities, short life span and many small offsprigns

(C) repeated reproduction, few progeny and large body size

(D) Rapid reproductive rates, short generation times and large body size

52. Members of which trophic level would suffer the most from biological magnification of harmful substances :

(A) First trophic level

(B) Second trophic level

(C) Third trophic level

(D) Fourth trophic level

53. Ecological succession refers to :

(A) erosion of nutrients by rains

(B) tendency of some species to become dominant

(C) changes in the community composition

(D) decomposition of biomass and its incorporation into the plants

54. Cartagaena protocal is related to :

(A) Sea weeds

(B) Urban pollution

(C) Agricultural pesticides

(D) Transgenic organisms

55. Complete picture of ecological importance of species with respect to the community structure can be obtained by studying its :

(A) Fidelity (B) Abundance

(C) Relative dominance (D) IVI

56. A biogeochemical cycle without an atmospheric component is :

(A) Carbon (B) Nitrogen

(C) Phasphorus (D) Sulphure

57. Animals have acquired a variety of endogenous rhythms, when such rhythm matches with 24 hour cycle it is termed as :

(A) Circa tidal (B) Circa annular

(C) Circadian (D) Circa syzygic

58. In orientation of animals, when it moves in response to gravity the term applied is :

(A) Hydrotaxis (B) Thigmotaxis

(C) Rheotaxis (D) Geotaxis

59. The cleaning of body surface by licking, nibbling and such other kinds of manipulation is known as :

(A) Habituation (B) Grooming

(C) Imprinting (D) Altruism

60. The visceral arches IV to VII of basic vertebrate plan gave rise to one of the following system during evolution and growth of organism :

(A) Digestive system (B) Respiratory system

(C) Nervous system (D) Excretory system

61. One of the following animals is considered to be 'living fossil' :

(A) Dodo (B) Latimeria

(C) Protopterus (D) Amphioxus

62. An increase in the inbreeding coefficient, F_1 is likely to result in :

(A) Higher proportion of genes that show linkage

(B) Higher proportion of genes with introns

(C) Lower level of difference between proteins in two daughter cells

(D) Reduced likelihood of heterozygotes being present in populations

63. Which one of the following is *not* correctly matched ?

(A) Golden rice — Carotenoids

(B) Insect resistant cotton — Bt

(C) Herbicide tolerant soyabean — 2, 4–D

(D) 'Flavr–Savr' tomato — Ferritin

64. *Arabidopsis* is advantageous for plant genetic research because :

(A) It is an important food crop

(B) Its genome shows close similarity to that of human

(C) It is a small plant with small genome size, which can be raised easily

(D) It is a living fossil species

65. Anti-viral drugs are used to :

(A) Inhibit the replication of viruses within cells

(B) Prevent the formation of enzymes within the viral genome

(C) Stimulate the production of antibodies in the body

(D) Inhibit the formation of viral envolop

66. In *E.coli* presence of tryptophan amino acid causes :

(A) Activation of operon

(B) Closure of operon

(C) Both of the above

(D) None of the above

67. Bioinformatics is an interdisciplinary branch which is concerned with the application of :

(A) Engineering techniques in biological studies

(B) Chemistry in understanding biological phenomenon

(C) Information science in analysing the biological data

(D) Physics in understanding various life processes

68. The process of improving human race genetically is called :

(A) Enthenics (B) Engenics

(C) Euphenics (D) All of these

69. Results of peptide MALDI-TOF cannot distinguish between these two amino acid residues :

(A) Isoleucine and valine

(B) Leucine and Isoleucine

(C) Glutamic acid and aspartic acid

(D) Glutamine and aspargine

70. To get the image of the specimen in the scanning electron microscope :

(A) Light should pass through the specimen

(B) Electrones are scattered from the surface of specimen

(C) Water vapours are reflected back to form the image

(D) Murcury is converted into liquid on the surface of specimen

71. RFLP analysis is a technique that :

(A) is used to detect genetic variation at the protein level

(B) uses hybridization to detect specific DNA restriction fragment in genomic DNA

(C) is used to determine whether a gene is transcribed in specific cells

(D) measure the transfer frequency of genes during conjugation

72. The best method to protect genetic resources is :

(A) Cloning

(B) Multiplication

(C) Cryopreservation

(D) Making gene library

73. DNA fingerprinting method is very useful for :

(A) DNA tests for identification and relationship

(B) Forensic studies

(C) Polymorphism

(D) All of the above

74. Affinity chromatography is used to isolate proteins based on their :

(A) Molecular weight

(B) Structure

(C) Binding specificity

(D) Polarity

75. Which one of the following is a structural homopolysaccharide ?

(A) Hyaluronic acid

(B) Inlin

(C) Chitin

(D) Starch

ROUGH WORK

SEAL