Signature of Invigilators

1. .....

2. .....

Roll No. | | | | | |

(In figures as in Admit Card)

LIFE SCIENCES

Paper III

Roll No. .....

.....

(In words)

D/03/4

Name of Areas/Section (if any) .....

Time Allowed : $2\frac{1}{2}$ Hours] [Maximum Marks : 200

Instructions for the Candidates

1. Write your Roll number in the space provided on the top of this page.
2. Write name of your Elective/Section if any.
3. Answer to short answer/essay type questions are to be written in the space provided below each question or after the questions in test booklet itself. No additional sheets are to be used.
4. Read instructions given inside carefully.
5. Last page is attached at the end of the test booklet for rough work.
6. If you write your name or put any special mark on any part of the test booklet which may disclose in any way your identity, you will render yourself liable to disqualification.
7. Use of calculator or any other Electronics Devices are prohibited.
8. There is no negative marking.
9. You should return the test booklet to the invigilator at the end of the examination and should not carry any paper outside the examination hall.

પરીક્ષાર્થીઓ માટે સૂચનાઓ :

૧. આ પૃષ્ઠના ઉપલા ભાગે આપેલી જગ્યામાં તમારી ક્રમાંક સંખ્યા (રોલ નંબર) લખો.

૨. તમે જે વિકલ્પનો ઉત્તર આપો તેનો સ્પષ્ટ નિર્દેશ કરો.

૩. ટૂંક નોંધ કે નિબંધ પ્રકારના પ્રશ્નોના ઉત્તર દરેક પ્રશ્નની નીચે આપેલી જગ્યામાં જ લખો. વધારાના કોઈ કાગળનો ઉપયોગ કરશો નહીં.

૪. અંદર આપેલી સૂચનાઓ ધ્યાનથી વાંચો.

૫. આ ઉત્તરપોથીને અંતે આપેલું પૃષ્ઠ કાચા કામ માટે છે.

૬. આ ઉત્તરપોથીમાં કયાંય પણ તમારી ઓળખ કરાવી દે એવી રીતે તમારું નામ કે કોઈ ચોકકસ નિશાની કરી હશે તો તમે આ પરીક્ષા માટે ગેરલાયક સાબીત થશો.

૭. કેલકયુલેટર અથવા ઈલેકટ્રોનિકસ સાધનો જેવા ઉપયોગ કરવો નહીં.

૮. નકારાત્મક ગુણાંક પદ્ધતિ નથી.

૯. પ્રશ્નપત્ર લખાઈ રહે એટલે આ ઉત્તરપોથી તમારા નિરીક્ષકને આપી દેવી. પરીક્ષાખંડની બહાર કોઈપણ પ્રશ્નપત્ર લઈ જવું નહીં.

FOR OFFICE USE ONLY
Marks Obtained

Question Number	Marks Obtained	Question Number	Marks Obtained	Question Number	Marks Obtained
1		26		51	
2		27		52	
3		28		53	
4		29		54	
5		30		55	
6		31		56	
7		32		57	
8		33		58	
9		34		59	
10		35		60	
11		36			
12		37			
13		38			
14		39			
15		40			
16		41			
17		42			
18		43			
19		44			
20		45			
21		46			
22		47			
23		48			
24		49			
25		50			

Total Marks Obtained.....
Signature of the co-ordinator.....
(Evaluation)

SEAL

LIFE SCIENCES
PAPER-III

Note :— (*a*) Answer any **20** questions out of the given **60** questions.

(*b*) *All* questions carry equal marks.

(*c*) Answer each question in about **200** words (2 pages).

1. Describe Bentham and Hooker System of plant classification. Explain briefly its demerits.

2. Explain evolutionary trend in algae with reference to thallus organization.

3. Discuss the roles of fungi and lichens in the present scenario.

4. Compare the elements and development of xylem in gymnosperms and angiosperms.

5. Differentiate the structure of shoot and root apical meristem.

6. Describe a typical embryo type in dicotyledon. How does it differ from the one in monocotyledons.

7. Give an account of drug plants of Gujarat. Discuss recent issues on availability of medicinal plants from wild.

8. What is ethnobotany ? Discuss unexploited plants of potential economic value in Gujarat.

9. Discuss the frequency and distribution of stomata in plants. Explain the role of potassium in stomatal movement.

10. Explain the role of water potential in water movement across the plant body. Add a note on the components of water potential.

11. Explain :

    (*a*) Leaf senescence

    (*b*) Synthesis of abscisic acid

    (*c*) Seed dormancy.

12. Discuss the distribution of the reactions of photosynthesis in time in CAM plants.

13. Write the phylum to which the following animals belong ?

(*a*) Herdmonia

(*b*) Amphioxus

(*c*) Salpa

(*d*) Obelia

(*e*) Sea urchin

(*f*) Hippocampus

(*g*) Hedge Hog

(*h*) Whale

(*i*) Jelly fish

(*j*) Liver fluke.

14. With the help of suitable diagram discuss excretory system in nematohelminths.

15. Discuss the origin and evolution of vertebrate heart.

16. Discuss briefly adaptive radiations in reptiles.

17. Discuss the impulse transmission in myelinated and non-myelinated nerve.

18. With the help of suitable diagrams discuss various events during penetration of an ovum by a sperm.

19. Discuss the role of maternal contributions in early embryonic development.

20. Discuss the advantage of sociality for animals. How do many animals successfully live alone ?

21. Discuss the importance of mimicry in animal survival.

22. Taking an example of Trypanosoma, discuss the host-parasite interactions leading to physiological changes in the host.

23. Discuss the asexual life-cycle of plasmodium in man.

24. How do plants protect themselves from insect pests ?

25. What is polyploidy ? Differentiate between (*a*) autopolyploids and heteropolyploids; (*b*) euploidy and aneuploidy.

26. Discuss the structure and functions of lysosomes.

27. Explain :

    (*a*) Ecological pyramids;

    (*b*) Ecological niche.

28. Describe in brief the endangered and endemic biodiversity of Gujarat.

29. Discuss productivity of any man-made reservoir.

30. Give an account of flora and fauna of a freshwater lake.

31. What are the structural differences between cellwall of gram positive and gram negative bacteria ?

32. Which culture would you select to produce citric acid ? Explain how the citric acid accumulation is regulated. Discuss methods of recovery and industrial applications of citric acid.

33. Describe the structure and types of immunoglobulins.

34. Giving appropriate examples explain the mechanism of enzyme action involving the following coenzymes :

    (*a*) TPP;

    (*b*) Biotin;

    (*c*) Pyridoxal phosphate.

35. Explain :

(*a*) Ramchandran's plot and its uses;

(*b*) How do the following amino acids in the proteins influence protein structure ?

(*i*) Cysteine;

(*ii*) Proline;

(*iii*) Glycine.

36. What do you understand by regulatory steps in the glycolysis ? Name the reactions and explain their regulation (using liver as a tissue).

37. What do you understand by thermodynamically unfavourable reactions ? Giving appropriate examples explain how these reactions are brought about in biological systems.

38. Discuss the technological applications of microsatellites. Describe the differences and similarities between restriction fragment length polymorphism and DNA fingerprinting.

39. What is origin of replication ? Discuss the enzymatic activities required to initiate DNA application.

40. Discuss the post-transcriptional modifications of the primary transcript in eukaryotes.

41. Describe the changes in chromatin organization underlying regulation of gene expression in eukaryotes.

42. What are cancer suppressor genes ? Give at least *two* examples and briefly describe their role in normal cell.

43. How do plasmids maintain certain copy number per cell ? What is meant by incompatibility groups of plasmids ?

44. Discuss the applications of PCR in genotyping cells and diagnosis of diseases.

45. Discuss the various methods used for introducing foreign genes into plant cells ? Comment on merits and limitations of these methods.

46. Discuss the methods employed to visualize DNA-protein interaction.

47. Explain :

(*a*) Cybrids;

(*b*) Synthetic seeds;

(*c*) Androgenesis.

48. Explain with appropriate examples the role of Ca^{++}, IP_3 and c-AMP as second messengers.

49. Discuss the basic principle of cytophotometry and flow cytometry.

50. Compare the light and electron microscope.

51. Discuss different methods used in determination of molecular weight of a purified protein.

52. Discuss the principles involved in native, SDS-PAGE, two-dimensional gel electrophoresis and isoelectric focussing.

53. Differentiate principles involved in high speed centrifugation and ultra-centrifugation. Which one can be used for separation of microsomes from mitochondria ? Give reasons.

54. What is meant by Southern, Northern and Western blotting ?

55. Discuss the principles and applications of X-ray diffraction in biological system.

56. Discuss the principle involved in the NMR. Enumerate the use of NMR spectroscopy in the cell biology.

57. Explain what you understand by pulse chase technique. What is the application of the same ?

58. What is the principle involved in liquid scintillation chromatography ? What is quenching ? Write down the differences between c.p.m. and d.p.m.

59. What do you understand by measures of central tendency ? Explain its applications.

60. How is standard deviation different from standard error ? What information one derives from each of these ?