

Instructions:

- 1. The question paper consists of four parts A, B, C and O.**
- 2. Part-A consists of I & II and Part-D consists of V & VI.**
- 3. All the parts are compulsory.**
- 4. Draw diagrams wherever necessary, unlabelled diagrams or illustrations do not attract any marks.**

PART-A

I. Select the correct alternative from the choices given below:

15×1= 15

- Triple fusion occurs between
 - a) Egg and male gamete
 - b) Male gamete and secondary nucleus
 - c) Antipodal cell and male gamete
 - d) Egg and antipodal cell
- Which one is unpaired gland in male reproductive gland?
 - a) Seminal vesicle
 - b) Cowper's gland
 - c) Prostate gland
 - d) Lacrimal gland
- Emergency contraceptives are effective if used within:
 - a) 72hrs of coitus
 - b) 72hrs of ovulation
 - c) 72hrs of menstruation
 - d) 72hrs of implantation
- Strength of linkage is inversely proportional to distance between the
 - a) chromosomes
 - b) genes
 - c) Telomeres
 - d) chromatids
- RNA polymerase I of an eukaryotic cell catalyses
 - a) Elongation in transcription
 - b) rRNA synthesis
 - c) mRNA synthesis
 - d) tRNA synthesis
- Antigen binding site in an antibody is found between
 - a) Two light chains
 - b) one heavy and one light chain
 - c) Two heavy chains
 - d) Either (A) or (B) depending upon nature of antigen
- Aspergillus niger is used for commercial and industrial production of
 - a) acetic acid
 - b) butyric acid
 - c) citric acid
 - d) lactic acid
- One of the most frequently used techniques in DNA finger printing is
 - a) VNTR
 - b) SSCP
 - c) SCAR
 - d) AFLP
- SCID is caused by defective gene coding for enzyme
 - a) Adenosine deaminase
 - b) Adenosine transaminase
 - c) Adenosine transferase
 - d) Guanosine transaminase
- Silencing of mRNA has been used in producing transgenic plants resistant to
 - a) Bollworms
 - b) white rusts
 - c) Nematodes
 - d) Bacterial blights

11. According to the competitive exclusion principle, developed in 1934 by the Russian Biologist GF Gause, two species can't remain in the same community if they have the same
 - a) Taxonomy
 - b) Niche
 - c) Habitat
 - d) Food requirements
12. Red list contains data or information on
 - a) threatened species
 - b) marine vertebrates only
 - c) all economically important plants
 - d) plants whose products are in traditional trade
13. An inverted pyramid of biomass can be found in which ecosystem
 - a) Forest
 - b) Marine
 - c) Grassland
 - d) Tundra
14. In 'lac operon' repressor protein attaches to
 - a) operator
 - b) promoter
 - c) regulator
 - d) beta-galactosidase
15. De Vries gave his mutation theory on organic evolution while working on
 - a) *Althea rosea*
 - b) *Drosophila melanogaster*
 - c) *Pisum sativum*
 - d) *Oenothera lamarckiana*

II. Fill in the blanks by choosing the appropriate word/ words from those given below: 5×1=5

(GEAC, adaptive radiations, 5th month, oxygen, splicing)

16. Darwin's finches are a good example of
17. Removal of introns and joining of exons during transcription is
18. In India, research in genetic modification of organisms and safety issues are controlled by.....
19. The first movement of the human foetus in the womb is noticed during.....
20. Methanogens do not produce.....

PART-B

III. Answer any five of the following questions in 3-5 sentences each, wherever applicable: 5×2=10

21. What is emasculation? When and why does a plant breeder employ this technique?
22. What are fimbriae? Mention their function.
23. "Pollen grains has some harmful effects". Discuss.
24. Mention the phenomenon of sex determination in the following cases.
 - a) Male *Drosophila*.
 - b) Female fowl.
25. What would happen if histones were to be mutated and made rich in amino-acids aspartic acid and glutamic acid in place of basic amino-acids such as lysine and arginine?
26. Distinguish between Exponential and Logistic growth.
27. While doing a PCR, 'denaturation' step is missed. What will be its effect on the process?
28. How can you say the lobefin fish were the ancestors of amphibian?

PART-C

IV. Answer any five of the following questions in about 40-80 words each, wherever applicable: 5×3=15

29. a) "Predator in nature are prudent". Justify
b) Give an example for Brood Parasitism.
30. Explain the process of parturition.
31. Draw a neat labelled diagram of nucleosome model of eukaryotes.
32. Draw a neat labelled diagram of an agarose gel electrophoresis unit.
33. What is pleiotropy? Explain with suitable example.

34. Mention the insect vectors which transmit malaria, filariasis and Dengue.
35. Define infertility. Give reasons for this among young couple.
36. Draw a neat labelled diagram of Miller's experiment.

PART-D

V. Answer any three of the following questions in about 200-250 words each, wherever applicable:

3×5=15

37. Draw a neat labelled diagram of female reproductive system.
38. Describe the structure of an anatropous ovule or megasporangium with a neat labelled diagram.
39. Explain the benefits of creating transgenic animals.
40. Explain the dihybrid cross with an example.
41. Explain the process of semi-conservative DNA replication.
42. Name the following and their microbial source
 - a) Clot buster enzyme
 - b) Immunosuppressive agent
 - c) Blood cholesterol lowering agent.
 - d) Write any two significance of anaerobic sludge digesters.

VI. Answer any two of the following questions in about 200-250 words each, wherever applicable:

2×5=10

43. Draw a neat labelled diagram of T.S. of young dithecous anther.
44. a) Why is tobacco smoking is associated with rise in blood pressure and emphysema in the body. Explain(2)
- b) why an immunosuppressive agent is taken after an organ transplant? (2)
- c) Which organ can trap the microbes in the body fluid? (1)
45. a)What is a mutagen? Name one physical and chemical mutagen. (2)
- b) Name two factors responsible for genetic variation in an organism. (2)
- c) Name an inborn genetic disorder. (1)
46. a) What type of transcription is found in retrovirus? Name the enzyme. (2)
- b) Who proposed the central dogma? Write the central dogma of molecular biology. (2)
- c) Who developed the technique for DNA finger printing? (1)
47. Draw a neat labelled diagram of a t-RNA.
