SUBJECT - BIOLOGY

Time: 3 Hours **M.M: 70**

General Instructions:

(i) All questions are compulsory.

(ii) The question paper consists of five sections A,B, C, D and E. Section A contains 5 questions of one mark each, Section B contains 5 questions of two marks each, Section C has 12 questions of three marks each, Section D contains 1 question of four marks and Section E contains 3 questions of five marks each.

(iii) There is no overall choice. However an internal choice has been provided in one question of 2 marks, one question of 3 marks and all three questions of five marks weightage. A student has to attempt only one of the alternatives in such questions.

(iv) Section D has a 4 mark question which is value based. It is a compulsory question.

(v) Wherever necessary, the diagrams drawn should be neat and properly labeled.

SECTION-A

Q 1. How is the presence of cyanobacteria in the paddy fields beneficial to rice crops? (1)

Q2. Which of the following represents female heterogamety?
XO, XY, XX, ZW (1)

Q3. Name the source organism from which T_i plasmid is isolated. (1)

Q4. Name the Indian variety of rice patented by an American company. (1)

Q5. What is meant by stratification in an ecosystem? (1)

SECTION-B

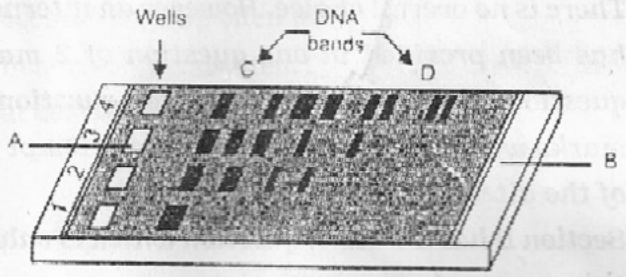
Q6. (i) What forms the male gametes in angiospermic plants?

(ii) Why should the bisexual flowers be emasculated and then bagged prior to artificial pollination in hybridisation programmes? (2)

Q7. Describe the responsibility of GEAC setup by the Indian Government.

OR

Study the diagram given below and answer the questions that follow:



A typical agarose gel electrophoresis showing migration of DNA fragments.

(a) Why have DNA fragments in band 'D' moved further away in comparison to those in band 'C'?

(b) Identify the anode end in the diagram.

(c) How are these DNA fragments visualized? (2)

Q8. Give one example each where

(a) population estimation of a species is done indirectly without actually counting the organisms.

(b) percentage cover is more meaningful. (2)

Q9. (a) How does saliva act in body defense?

(b) What prevents a child to suffer from a disease he/she is vaccinated against? (2)

Q10. State the dual role of deoxyribonucleotide triphosphosphates during DNA replication. (2)

SECTION-C

Q11. Define apomixis. Mention two ways in which apomictic seeds develop. (3)

Q12. (a) Mention two uses of cloned genes in molecular diagnostics.

(b) 5' - GAATTC - 3'

3' - CTTAAG - 5'

It is the palindromic sequence on a DNA segment, where a restriction enzyme cuts the strands. Name the enzyme that cuts this DNA segment and indicate the site where it cuts. (3)

Q13. Name the category and the principle involved in the use of each of the following contraceptive methods:

(a) Vasectomy (b) LNG - 20 (c) Saheli (3)

Q14. Explain how gene therapy is used to treat ADA deficiency in humans. (3)

Q15. (a) How does the theory of panspermia explain origin of life?

(b) Mention the brain capacities of :

(i) Homo habilis (ii) Neanderthal man (3)

Q16. What are the target cells of Luteinising hormone in human males and females. Explain the effect induced by the hormone in each case. (3)

Q17. Draw a diagram of a mature embryo of grass and label six parts.

OR

Describe the structure of a microsporangium of an angiosperm along with its diagram. (3)

Q18. Bring out the differences between λ - thalassemia and β - thalassemia.

Q19. (a) Define biopiracy.

(b) Name two Bt toxin genes and the pest controlled by each of them.

(c) What is the significance of RNAi in eukaryotic organisms? (3)

Q20. Why should biological control of pests and pathogens be preferred to the conventional use of chemical pesticides? Explain how the following microbes act as biocontrol agents:

(a) Bacillus thuringiensis

(b) Nucleopolyhedrovirus. (3)

Q21. (a) There are sixty four codons in the genetic code dictionary.

(i) How many of them code for amino acids?

(ii) How many amino acids are coded?

(b) Describe transcription in eukaryotes. (3)

Q22. (a) Give the steps of DNA fingerprinting.

(b) Name the source organism that possesses Taq polymerase. What is so special about the function of this enzyme? (3)

SECTION-D

Q23. A person in your group housing society has recently been diagnosed with AIDS. Many members of the society want him to leave the society as they are scared of the spread of the disease.

(a) Name the causative agent and write the symptoms of the disease.

(b) Mention the routes of transmission of the disease.

(c) Write your view on the situation. (4)

SECTION-E

Q24. (a) Identify the animal to which each of the following skulls belong. Which of these two resemble more closely?

(b) Name the genetic disorder caused by trisomy of 21 st chromosome in human beings. Write the characteristic/diagnostic features of this disorder.

OR

(a) A snapdragon plant homozygous for red flower, when crossed with a white flowered plant of the same species produced plants with pink flowers in F_1 generation.

(i) What is this phenotypic expression called?

(ii) Work out a cross to show the F_2 generation produced by self- pollinating the F_1 plants. Give the phenotypic and genotypic ratios of the F_2 generation.

(b) How many pairs of chromosomes does a male Drosophila fly have? Which one of these bears the gene for eye colour? (5)

Q25. Describe the different methods of treatment of cancer.

OR

(a) Give the scientific name of the most common species of honey bee reared in India.

(b) Why is it advantageous to keep beehives in crop - fields during flowering periods?

(5)

(c) Enlist the points important for successful bee keeping. (5)

Q26. (a) Differentiate between climax community and seral communities.

(b) Mention any four adaptations that parasites have evolved for their successful survival.

(c) Name the two intermediate hosts of liver fluke.

OR

(a) How are secondary carnivores different from secondary consumers?

(b) Why is the pyramid of biomass of an aquatic ecosystem more often inverted?

(c) In terrestrial ecosystem DFC and GFC are interlinked at certain levels. Justify the statement. (5)