

Question Paper II
XII- Biology

Time : 3 Hours Max. Marks : 70

GENERAL INSTRUCTIONS :

1. All questions are compulsory.
2. The question paper consists of four sections A, B, C and D. Section-A contains 8 questions of 1 mark each, Section B is of 10 questions of 2 marks each, Section C has 9 questions of 3 marks each whereas Section D is of 3 questions of 5 marks each.
3. 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 the three questions of 5 marks weightage. A student has to attempt only one of the alternatives in such questions.
4. Wherever necessary, the diagrams drawn should be neat and properly labelled.

SECTION – A

- (1) In the whiptail lizards only females are born generation after generation. There are no males How is this possible? 1
- (2) In the following figure of a fruit, label the part which is protective in function and that which is responsible for producing new plants. 1
- (3) Which Mendel's law of inheritance is universally acceptable and without any exception? State the law. 1
- (4) In the following pedigree chart, state if the trait is autosomal dominant, autosomal recessive or sex linked. Give a reason for your answer. 1
- (5) Given below are pairs of disease and causative organism. Which out of these is not a matching pair and why? 2

Filariasis : Wuchereria
Ringworm : Ascaris
AIDS : Human immuno virus
Malaria : Plasmodium

- (6) In the picture provided, what is the relationship between (1) and (2) with respect to population interaction and between (3) and (4) with respect to trophic levels.

- (7) Provide one word or one sentence information about 'plasmid' with respect to its (i) chemical nature and (ii) its duplication.

- (8) Expand the following

- (i) PCR
- (ii) Bt

SECTION –B

- (9) In the adjacent population growth curve,

- (i) What is the status of food and space in the curves (a) and (b)?
- (ii) In the absence of the predators, which curve (a) or (b) would appropriately depict the prey population?

- (10) Given below is a sequence of steps of transcription in a eukaryotic cell. Fill up the blanks (1, 2, 3, 4) left in the sequence.

s

OR

(10) Name the type of inheritance in which the genotypic ratio is the same as the phenotypic ratio. Also give the ratio. 2

(11) In the following table the ecological units are mentioned in the first column vertically and their attributes are mentioned horizontally. Match the ecological units and its attribute and put a tick in the blanks within the table: 2

(12) Certain molecular processes are given in column (A). Provide the terms given to these processes in column (B), after selecting them from the terms: Recombination, gene regulation, prokaryotic, transcription, eukaryotic transcription, translation, replication, gene transfer, DNA fingerprinting

(13) In the table given below, select and enter one correct device out of the following :

(14) If the chromosome number of a plant species is 16, what would be the chromosome number and the ploidy level of the (i) microspore mother cell and (ii) the endosperm cells? 2

(15) In the pie charts (A) and (B) drawn below to show the global animal diversity, which groups of animals would you name and write on the areas shaded black in (A) and (B). In which kind of habitat would you find these groups of animals? 2

(16) In the pyramid of biomass drawn below, name the two crops : (i) one which is supported and (ii) the one which supports. In which ecosystem is such a pyramid found? ($\frac{1}{2} + \frac{1}{2} + 1$) =2

(17) The steps in a programme are: 2

- Collection of germplasm
- Crossbreeding the selected parents
- Selecting superior recombinant progeny
- Testing, releasing and marketing new cultivars.

(I) What is this programme related to?

(ii) Name two special qualities as basis of selection of the progeny.

(iii) What was the outcome of the programme?

(iv) What is the popular term given to this outcome? Also name the Indian scientist who is credited with chalking out of this programme.

(18) A multinational company (XYZ) marked a medicine extracted from medicinal herbs grown in the sprawling fields in a foreign country. This herb is found only in our country and no compensation was paid or permission taken from relevant authority.

(i) What is the term used to refer to such an act committed by the multinational company?

(ii) Justify the meaning of the term.

(iii) What has our government done to prevent such deeds?

SECTION – C

(19) How are biofertilisers different from fertilisers such as NPK that we buy in the market? Justify the role of Rhizobium as a biofertiliser. 3

(20) In the adjacent figure of a typical dicot embryo, label the parts (1), (2) and (3). State the function of each of the labelled part. 3

(21) The events of the menstrual cycle are represented below. Answer the questions following the diagram.

- (i) State the levels of FSH, LH and Progesterone simply by mentioning high or low, around 13th and 14th day and 21st to 23rd day
- (ii) In which of the above mentioned phases does the egg travel to the fallopian tube?
- (iii) Why is there no menstruation upon fertilisation? 3

(22) Few gaps have been left in the following table showing certain terms and their meanings. Fill up the gaps. 3

Terms Meanings

- (i) - Non coding sequence in eukaryotic DNA
- (ii) - Technique used in solving paternity disputes
- (iii) Restriction endonuclease _____
- (iv) Plasmid _____
- (v) Transgenics _____
- (vi) - Nucleotide sequences with single base differences

(23)

AB and CD represent two strands of a DNA molecule.

When this molecule undergoes replication, forming a replication fork between A and C in the above.

- (i) name the template strands for replication.
- (ii) using which strand as the template, will there be continuous synthesis of a complementary DNA strand?
- (iii) complementary to which strand will okazaki segments get synthesised discontinuous synthesis will occur.
- (iv) What are template strands and Okazaki pieces?
- (v) In which direction is a new strand synthesised?

(24) "A population has been exhibiting genetic equilibrium". 3

Answer the following with regard to the above statement.

- (i) Explain the above statement.
 - (ii) Name the underlying principle.
 - (iii) List any two factors which would upset the genetic equilibrium of the population.
 - (iv) Take up any one such factor and explain how the gene pool will change due to that factor
- OR

In the 1950s, there were hardly any mosquitoes in Delhi. The use of the pesticide DDT on standing water killed their larvae. It is believed that now there are mosquitoes because they evolved DDT resistance through the interaction of mutation and Natural Selection. Point wise, state in a sequence how that could have happened. 3

(25) A thalassemic child needed repeated blood transfusions got infected by HIV. 3

- (i) Use a rough diagrammatic sketch and arrows to show how the virus increased in number.
- (ii) Why did the increased number of the HIV virus deteriorate the child's immunity?
- (iii) Which diagnostic test showed that the infective virus was HIV?

(26) Microbes play a dual role when used for sewage treatment as they not only help to retrieve usable water but also generate fuel. Write in points how this happens? 3

(27) Name the particular technique in Biotechnology whose steps are shown in the figure, Use the figure to summarise the technique in three steps. 3

SECTION – D

(28) With an example, explain how biotechnology has been applied in each of the following:

- (i) In curing Diabetes mellitus
- (ii) In raising pest resistant plants
- (iii) In producing more nutritionally balanced milk.

Do you think it is ethical to manipulate organisms for human benefits? Justify your answer. 5

OR

Name any two cloning vectors. Describe the features required to facilitate cloning into a vector. (29)

The above diagram shows a simplified biogeochemical cycle

- (i) Name the compound whose cycle is depicted.
- (ii) In what way do vehicles add this compound to the atmosphere?
- (iii) What adverse effect does its excess have on the environment?
- (iv) Cite an event which depicts this effect in the modern times.
- (v) Suggest two ways of reducing this effect. 5

OR

Create an aquatic food chain in a water body into which effluents flow from a pesticide factory. Diagrammatically represent biomagnification in this food chain. Explain why a decline in the predator-bird population is expected, when it feeds on the tertiary consumers of this food chain. 5

(30) Study the following carefully and explain why mutation (A) did not cause any sickle cell anemia inspite of change in the molecular structure of the gene which codes for Haemoglobin, when as a similar mutation (B) did. 5

(The question is based on properties of the genetic code. c = codon, a = amino acid, Hb = Hoemoglobin)

OR

One chromosome contains one molecule of DNA. In eukaryotes the length of the DNA molecule is enormously large. Explain how such a long molecule fits into the tiny chromosomes seen at Metaphase. 5