Sample Question Paper-5

BIOLOGY

Class- XII

SOLVED

Time Allowed : 3 hours **Maximum Marks : 70**

General Instructions :

(i) *All questions are compulsory.*

(ii) *The question paper has five sections and 33 questions. All questions are compulsory.*

(iii) *Section–A has 16 questions of 1 mark each; Section–B has 5 questions of 2 marks each; Section– C has 7 questions of 3 marks each; Section– D has 2 case-based questions of 4 marks each; and Section–E has 3 questions of 5 marks each.*

(iv) *There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*

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

Section – A

1. In a typical complete, bisexual and hypogynous flower the arrangement of floral whorls on the thalamus from the outermost to the innermost is:

(A) calyx, corolla, androecium and gynoecium.
(B) calyx, corolla, gynoecium and androecium.
(C) gynoecium, androecium, corolla and calyx.
(D) androecium, gynoecium, corolla and calyx. [1]

2. Match the following representing parts of the sperm and their functions and choose the correct option.

	Column A		Column B
(a)	Head	i.	Enzymes
(b)	Middle piece	ii	Sperm motility
(c)	Acrosome	iii.	Energy
(d)	Tail	iv.	Genetic material

Options :

(A) (a)-ii, (b)-iv, (c)-i, (d)-iii
(B) (a)-iv, (b)-iii, (c)-i, (d)-ii
(C) (a)-iv, (b)-i, (c)-ii, (d)-iii
(D) (a)-ii, (b)-i, (c)-iii, (d)-iv [1]

3. If the sequence of nitrogen bases of the coding strand of DNA in a transcription unit is : 5'-ATGAATG-3', the sequence of bases in its RNA transcript would be:

(A) 5'-AUGAAUG-3'.
(B) 5'-UACUUAC-3'.
(C) 5'-CAUUCAU-3'.
(D) 5'-GUAAGUA-3'. [1]

4. In a DNA strand, the nucleotides are linked together by

(A) glycosidic bonds.
(B) phosphodiester bonds.
(C) peptide bonds.
(D) hydrogen bonds. [1]

5. Many diseases can be diagnosed by observing the symptoms in the patient. Which group of symptoms are indicative of pneumonia?

(A) Difficulty in respiration, fever, chills, cough, headache.
(B) Constipation, abdominal pain, cramps, blood clots.
(C) Nasal congestion and discharge, cough, sore throat, headache.
(D) High fever, weakness, stomach pain, loss of appetite and constipation. [1]

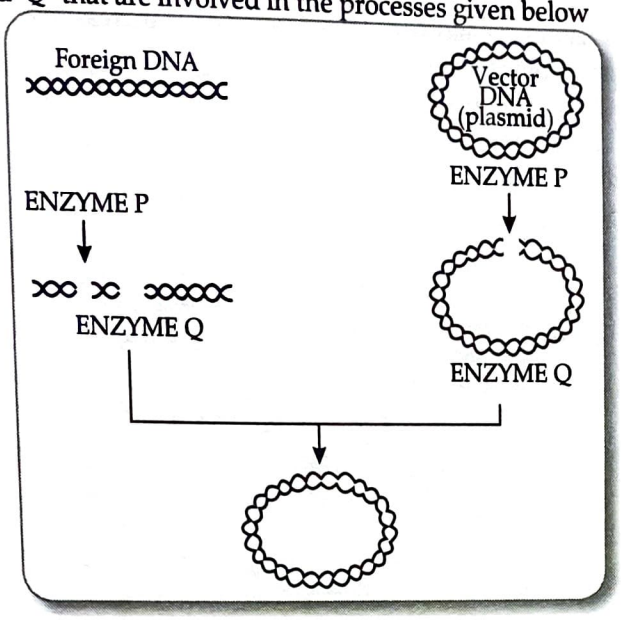
6. Which of the following are the reason(s) for Rheumatoid arthritis? Choose the correct option.

(i) Lymphocytes become more active.
(ii) Body attacks self-cells.
(iii) More antibodies are produced in the body.
(iv) The ability to differentiate pathogens or foreign molecules from self-cells is lost.

(A) (i) and (ii)
(B) (ii) and (iv)
(C) (iii) and (iv)
(D) (i) and (iii) [1]

7. In malignant tumours, the cells proliferate, grow rapidly and move to other parts of the body to form new tumours. This stage of disease is called
   (A) metagenesis.
   (B) metastasis.
   (C) teratogenesis.
   (D) mitosis. [1]

8. Name the enzymes 'P' and 'Q' that are involved in the processes given below



   (A) Enzyme P-Exonuclease and Enzyme Q- Permease
   (B) Enzyme P- Exonuclease and Enzyme Q- Ligase
   (C) Enzyme P-Endonuclease and Enzyme Q- Permease
   (D) Enzyme P-Restriction endonuclease and Enzyme Q- Ligase [1]

9. A population has more young individuals compared to the older individuals. What would be the status of the population after some years?
   (A) It will decline.
   (B) It will stabilise.
   (C) It will increase.
   (D) It will first decline and then stabilise. [1]

10. Among the following, where do you think the process of decomposition would be the fastest?
   (A) Tropical rain forest
   (B) Antarctic
   (C) Dry arid region
   (D) Alpine region [1]

11. Match the animals given in column A with their location in column B.

	Column A		Column B
(a)	Food Chain	(i)	The pyramid of energy is always upright
(b)	Litter	(ii)	It is a single linear sequence of organism dependent on each other.
(c)	Inverted Pyramid	(iii)	It contains all kinds of wastes generated on the surface of earth
(d)	Upright pyramid	(iv)	The pyramid of biomass and the pyramid of number can be inverted.

Choose the correct match from the following :
   (A) (a) – (iii), (b) – (ii), (c)– (i), (d) – (iv)
   (B) (a) – (ii), (b) – (i), (c) – (iv), (d) – (iii)
   (C) (a) – (ii), (b) – (iii), (c) – (iv), (d) – (i)
   (D) (a) – (iv), (b) – (ii), (c) – (iii), (d) – (i) [1]

12. Lichens are the associations of
   (A) bacteria and fungus.
   (B) algae and bacterium.
   (C) fungus and algae.
   (D) fungus and virus. [1]

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

   (A) Both A and R are true and R is the correct explanation of A.
   (B) Both A and R are true and R is not the correct explanation of A.
   (C) A is true but R is false.
   (D) A is False but R is true.

13. **Assertion (A):** Pollen grains are best preserved as fossils.
Reason (R): The sporopollenin of exine is highly resistant to the action of strong acids and alkali and can withstand a high temperature. [1]

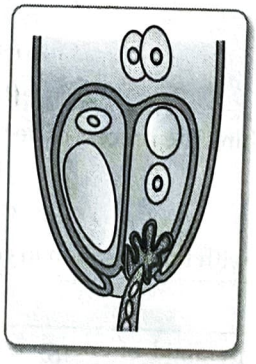
14. **Assertion (A):** The chances of having a child with Down's syndrome increases if the age of the mother is between 20 to 25.
Reason (R): The chances of having a child with Downs syndrome increases with the age of the mother because age adversely affects meiotic chromosome behaviour. [1]

15. **Assertion (A):** Chargaff's rule is applicable to RNA.
Reason (R): RNA contains ribose sugar in them. [1]

16. **Assertion (A):** Sacred groves are highly protected.
Reason (R): They are of religious importance to the communities. [1]

Section – B

17. **(a)** In the figure given below label the following parts : male gametes, egg cell, polar nuclei, synergids and pollen tube.



(b) Name the part of gynoecium that determines the compatible nature of pollen grain. [2]

18. Name the type of cross that would help to find the genotype of a pea plant bearing violet flowers. [2]

19. A person shows strong unusual hypersensitive reactions when exposed to certain substances present in the air. Identify the condition. Name the cells responsible for such reactions. What precaution should be taken to avoid such reactions. [2]

20. **(a)** Why must a cell be made 'competent' in biotechnology experiments? How does calcium ion help in doing so? [2]

(b) State the role of 'biolistic gun' in biotechnology experiments. [1]

21. Observe the set of Figures A, B and answer the following questions. [2]

(a) Which one of the figures shows mutualism?

(b) What kind of association is shown in B? [2]

Fig. A

Fig. B

OR

(a) A parasite has to adapt to be able to live in the host. Write the various parasitic adaptations.

(b) Mention an adaptive feature exhibited in brood parasitism in Koel and Crow. [2]

Section – C

22. (a) What are the benefits of choosing a dioecious plant species for plant breeding experiments?

(b) How would you proceed to cross-pollinate a monoecious flower?

(c) Draw a labelled schematic diagram of T.S. of an anther of an angiosperm. [3]

23. (a) Name the types of flowers produced by *Viola* (Pansy). How do they differ from each other?

(b) Describe the kind of pollination in one of the types of flowers that ensures seed-set production.

(c) Describe the process of pollination in *Vallisnaria*. [3]

24. (a) On which strain of bacteria did Griffith worked.

(b) State the contribution of Macleod, McCarty and Avery.

(c) Define transformation in Griffith's experiment. [3]

25. (a) Explain any two defence mechanisms plants have evolved against their predators.

(b) How does predation differ from parasitism? [3]

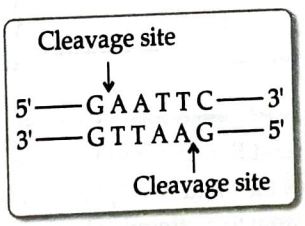
26. "Maintenance of personal and public hygiene is necessary for prevention and control of many infectious diseases". Justify the statement giving suitable examples. [3]

OR

(a) Name two diseases whose spread can be controlled by the eradication of *Aedes* mosquitoes.

(b) Certain pathogens are tissue/organ specific. Justify the statement with suitable examples. [3]

27. (a) Restriction enzymes that are used in the construction of recombinant DNA are endonucleases which cut the DNA at 'specific-recognition sequence'. What would be the disadvantage if they do not cut the DNA at specific-recognition sequence? AI



(b) A plasmid DNA and a linear DNA (both are of the same size) have one site for a restriction endonuclease. When cut and separated on agarose gel electrophoresis, plasmid shows one DNA band while linear DNA shows two fragments. Explain. [3]

28. (a) Name the association in which one species produces poisonous substance or a change in environmental conditions that is harmful to another species.

(b) How do mycorrhizae help the plants to grow better?

Section – D

Q. no 29 and 30 are case based questions. Each question has sub-parts with internal choice in one subpart.

29. **Read the following passage and answer the questions given below:** [4]

Sex determination process is a biological process that determines the development of sexual characteristics of an organism. Different species use different strategies for this purpose. Some organisms rely on environmental factors for sex determination. In some, it is determined genetically. Sex determination results in the development of individuals with characteristics that allow them to be identified as male, female or in some cases, hermaphrodites in many species, sex determination have different alleles or different genes that specify their sexual morphology. Sex determination was discovered in the mealworm by the American geneticist Nettie Stevens in 1903. The sex-determination in honey bee is based on the number of sets of chromosomes an individual receives.

(a) In which sex determination type, both male and female have same number of chromosomes?

(b) Female heterogamety is seen in _____.

(c) Name the two organisms which rely completely on environmental factors for sex determination? What will be the sex of the fertilised egg if the incubation temperature is more than critical temperature?

OR

What is sex determination?

30. **Read the following text and answer the following questions on the basis of the same:**
Health is defined as a state of complete physical, mental and social well being. Balanced diet, personal hygiene and regular exercise are very important to maintain good health. Any disturbance of structure or function of the body may be regarded as disease. Diseases can broadly be categorised into infectious (communicable) and non-infectious (non-communicable). A wide range of organisms belonging to bacteria, viruses, fungi, protozoans etc., could cause diseases in man.

(a) What are communicable diseases? [4]

(b) DPT is used as vaccine for the immunisation against which disease?

(c) Give some examples of bacterial diseases?

OR

Name two diseases whose spread can be controlled by the eradication of *Aedes* mosquitoes

Section – E

31. Starting with the zygote, draw the diagrams of the different stages of embryo development in a dicot. AI [5]

OR

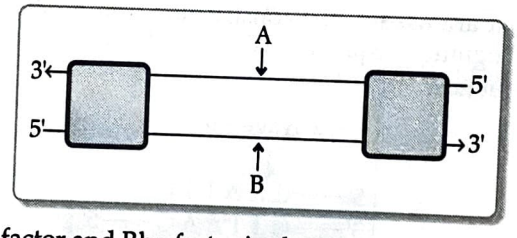
Embryo sacs of some apomictic species appear normal but contain diploid cells. Suggest a suitable explanation for the condition. [5]

32. **(a)** What is polygenic inheritance? Explain with the help of a suitable example. AI

(b) How are pleiotropy and Mendelian pattern of inheritance different from polygenic pattern of inheritance? [5]

OR

(a) Identify strands 'A' and 'B' in the diagram of transcription unit given below and write the basis on which you identified them.



(b) State the functions of Sigma factor and Rho factor in the transcription process in a bacterium.

(c) Write the functions of RNA polymerase-I and RNA polymerase-III in eukaryotes.

33. Discuss with your teacher and find out how to distinguish between: [5] AI

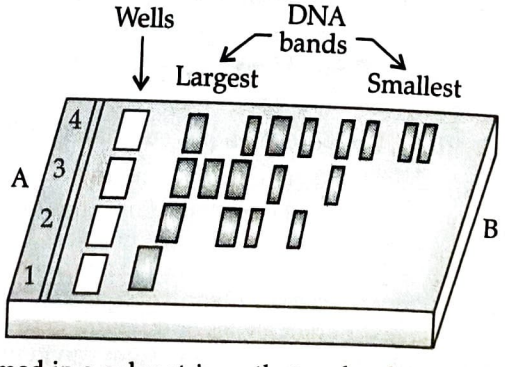
(a) Plasmid DNA and Chromosomal DNA

(b) RNA and DNA

(c) Exonuclease and Endonuclease

OR [5]

Given diagram shows the process of gel electrophoresis.



Gel electrophoresis is performed in a gel matrix so that molecules of similar electric charges can be separated on the basis of their size. Most commonly used matrix in gel electrophoresis is agarose. The fragments are separated under the influence of an electric field. The separated DNA fragments can be seen only after staining the DNA with compound known as ethidium bromide (EtBr) followed by exposure to UV radiation as bright orange band.

(a) What is the principle of gel electrophoresis? [3]

(b) Why EtBr is used in gel electrophoresis inspite of it being highly carcinogenic? [2]