



BIOLOGY

Class 12 - Biology

Time Allowed: 3 hours

Maximum Marks: 70

General Instructions:

1. All questions are compulsory.
2. The question paper has five sections and 33 questions. All questions are compulsory.
3. 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.
4. 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.
5. Wherever necessary, neat and properly labeled diagrams should be drawn.

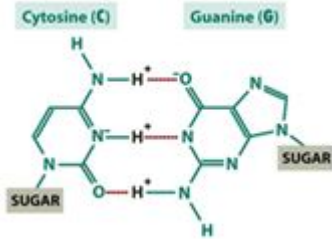
Section A

1. In some plants, diploid embryo sac develops directly from the diploid megaspore mother cell. This condition is called as: [1]
 - a) Microspory
 - b) Diplospory
 - c) Monosporry
 - d) Megaspory
2. Which one of the following helps in absorption of phosphorus from soil by plants ? [1]
 - a) Rhizobium
 - b) Glomus
 - c) Frankia
 - d) Anabaena
3. Out of the following which is not an example of parasitism? [1]
 - a) Plasmodium and humans
 - b) Tapeworm and humans
 - c) Head louse and humans
 - d) E.coli and humans
4. Which of the following are used in gene cloning? [1]
 - a) Mesosomes
 - b) Plasmids
 - c) Lomasomes
 - d) Nucleoids
5. The IUCN Red Data List (2004) in the last 500 years documents the extinction of nearly 784 species including: [1]
 - a) 359 invertebrates
 - b) 330 invertebrates
 - c) 338 invertebrates
 - d) 362 invertebrates
6. A sperm cell moving from the lumen of the seminiferous tubule to the exterior of the body passes through all of the following structures except the: [1]

- a) Vas deferens
- b) Epididymis
- c) Seminal vesicle
- d) Urethra

7. The cutting out of separated bands of DNA from the agars gel is called: [1]
- a) Elution
 - b) Polymerisation
 - c) Electrophoresis
 - d) Annealing

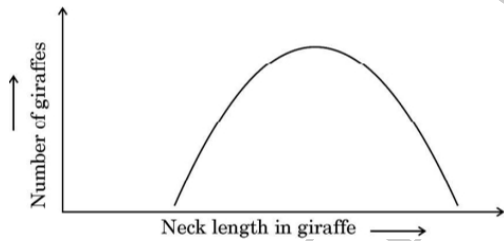
8. H-bonds between Cytosine and Guanine are [1]



- a) 1
- b) 2
- c) 3
- d) 4

9. Filiform apparatus present at micropylar part of the Synergids help in: [1]
- a) Providing nutrition to the embryo
 - b) Help in germination of seed
 - c) Help in absorption of water
 - d) Guiding the entry of pollen tube

10. Select the option that gives the correct description of the process of Natural Selection with respect to the length of the neck of giraffe. [1]



- a) Stabilising selection as giraffes with medium neck lengths are selected.
- b) Directional selection as giraffes with longer neck lengths are selected.
- c) Stabilising selection as giraffes with longer neck lengths are selected further.
- d) Disruptive selection as giraffes with smaller and longer neck lengths are selected.

11. DNA probes used in fingerprinting are: [1]
- a) Highly sensitive electron microscope
 - b) UV beams
 - c) X-ray scanners
 - d) DNA segments having radioactive isotopes

12. Gel electrophoresis is a technique to separate fragments of DNA from a mixture. Some of the events of electrophoresis are given below. Arrange the events in order. [1]



1. Cut out DNA bands

2. Expose to UV
3. Force DNA to move through gel
4. Stain DNA with ethidium bromide

- | | |
|------------------|------------------|
| a) 4 - 3 - 1 - 2 | b) 4 - 3 - 2 - 1 |
| c) 1 - 2 - 3 - 4 | d) 1 - 3 - 4 - 2 |

13. **Assertion (A):** Karyotypes study is used to detect of chromosomal aberrations. [1]
Reason (R): Karyotypes can be used to know the sex of an unborn child.

- | | |
|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
| c) A is true but R is false. | d) A is false but R is true. |

14. **Assertion (A):** Coccyx, vermiform appendix and muscles of the external ears are vestigial organs of man. [1]
Reason (R): They are functional in childhood only.

- | | |
|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
| c) A is true but R is false. | d) A is false but R is true. |

15. **Assertion (A):** Benign tumor produces cellular lump. [1]
Reason (R): Benign tumor infect adjacent tissues.

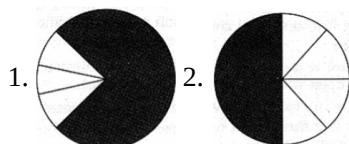
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|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
| c) A is true but R is false. | d) A is false but R is true. |

16. **Assertion (A):** Dendritic cells originate in the bone marrow. [1]
Reason (R): Dendritic cells are found in neuron.

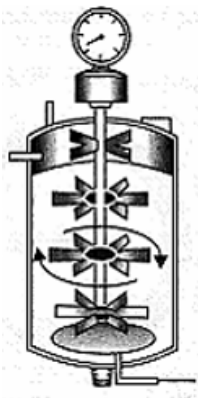
- | | |
|---|---|
| a) Both A and R are true and R is the correct explanation of A. | b) Both A and R are true but R is not the correct explanation of A. |
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Section B

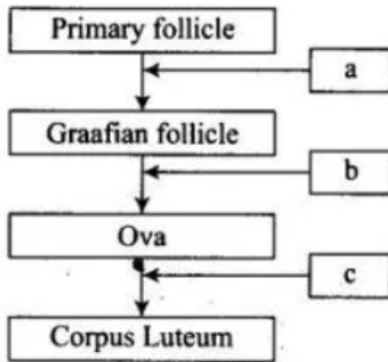
17. Microbes can be used to decrease the use of chemical fertilisers and pesticides. Explain how this can be accomplished. [2]
18. In the pie chart (a) and (b) drawn below to show the global animal diversity, which group of animals would you name and write on the areas shaded back in (a) and (b). In which kind of habitat would you find these groups of animals? [2]



19. Name the type of bioreactor shown. Write the purpose for which it is used. [2]



20. Given below is a flow chart showing ovarian changes during the menstrual cycle. Fill in the spaces giving the name of the hormones responsible for the events shown. [2]



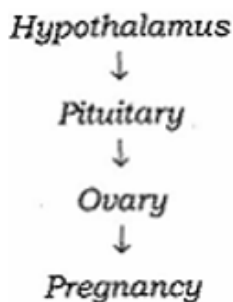
21. Define population and community. [2]

OR

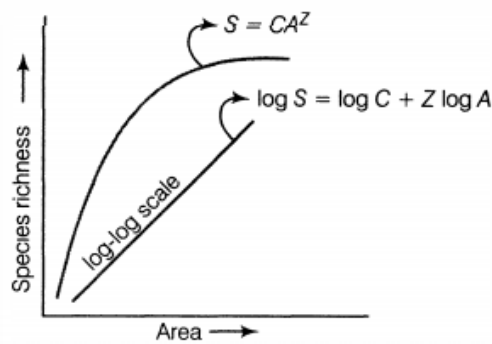
Describe the mutualistic relationship that exists between the Mediterranean orchid *Ophrys* and a bee species.

Section C

22. Why is anaerobic degradation is more important than aerobic degradation for the treatment of large volumes of wastewaters rich in organic matter? Discuss. [3]
23. Study the following flow chart and answer the following question: [3]



- Name the hormones involved in each state.
 - Explain the functions of hormones involved in each state.
 - Write the name of the placental hormone.
24. Explain the following terms with examples: [3]
- Co-dominance
 - Incomplete dominance
25. i. Explain the species-area relationship using the graphical representation given below. [3]



ii. Explain giving reasons why there is greater biodiversity in tropical regions of the earth.

26. What is endosperm and how is it formed? Describe the various types of endosperm found in angiosperms. [3]

OR

Draw a schematic transverse section of a mature anther of an angiosperm. Label its epidermis, middle layers, tapetum, endothecium, sporogenous tissue and the connective.

27. Poaching of a tiger is a burning issue in today's world. What implication would this activity have on the functioning of the ecosystem of which the tigers are an integral part? [3]

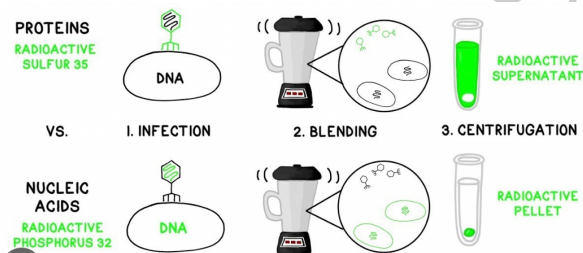
28. i. List any four characteristics of an ideal contraceptive. [3]

ii. Name two intrauterine contraceptive devices that affect the motility of sperms.

Section D

29. Read the following text carefully and answer the questions that follow: [4]

In 1952, Alfred Hershey and Martha Chase took an effort to find the genetic material in organisms. Their experiments led to an unequivocal proof to DNA as genetic material.



Hershey and Chases's experiments:

i. Name the kind of virus they worked with and why? (1)

ii. Why did they use two types of culture media to grow viruses in? Explain. (1)

iii. What was the need for using a blender and later a centrifuge during their experiments? (2)

OR

State the conclusion drawn by them after the experiments. (2)

30. Read the following text carefully and answer the questions that follow: [4]

Ryan is suffered from Adenosine Deaminase deficiency is a hereditary disease. His parents consulted a doctor. The doctor prescribed treatment through gene therapy?

i. What is gene therapy? (1)

ii. What is the function of adenosine Deaminase enzyme? (1)

iii. In which year the first clinical gene therapy was given? (2)

OR

Which tissue is obtained from the ADA patient for gene therapy? (2)

Section E

31. You have studied the story of Pepper moths in England. Had the industries been removed, what impact could it [5]

have on the moth population? Discuss.

OR

In the 1950s, there were hardly any mosquitoes in Delhi. The use of 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.

32. Pesticidal crystal proteins (Cry) are endotoxins produced by *Bacillus thuringiensis*, and form crystal structures (thus the name "cry" proteins, short for crystal). Cry toxins have specific activities against insect species of the orders Lepidoptera (moths and butterflies), Diptera (flies and mosquitoes), Coleoptera (beetles), Hymenoptera (wasps, bees, ants and sawflies) and nematodes. When insects ingest toxin crystals, the alkaline pH of their digestive tract denatures the insoluble crystals, making them soluble and thus amenable to being cut with proteases found in the insect gut, which liberate the cry toxin from the crystal. The Cry toxin is then inserted into the insect gut cell membrane, paralyzing the digestive tract and forming a pore. The insect stops eating and starves to death; live Bt bacteria may also colonize the insect which can contribute to death. A bacterium *Bacillus thuringiensis* produces a toxic protein named 'Cry protein' that is lethal to certain insects but not to bacterium.
- Why this toxin does not kill the bacteria?
 - What type of changes occurs in the gut of insects on consuming this protein?
 - How man has exploited this protein for his benefit?

OR

Tobacco is the common name of several plants in the genus *Nicotiana* of the family Solanaceae, and the general term for any product prepared from the cured leaves of these plants. More than 70 species of tobacco are known, but the chief commercial crop is *N. tabacum*. The more potent variant *N. rustica* is also used in some countries. *Meloidogyne incognita*, also known as the "southern root-nematode" or "cotton root-knot nematode" is a plant-parasitic roundworm in the family Heteroderidae. This nematode is one of the four most common species worldwide and has numerous hosts.

- Tobacco plants are damaged severely when infested with *Meloidogyne incognita*. Name and explain the strategy that is adapted to stop this infestation.
 - Name the vector used for introducing the nematode-specific gene in the tobacco plant.
33. Explain the following with reference to **Cancer**: [5]
- Contact Inhibition
 - All normal cells have proto-oncogenes
 - Name of carcinogens and their role
 - Difference between benign and malignant tumours

OR

Write the events that take place when a vaccine for any disease is introduced into the human body.