CBSE-2015-Biology-Solutions

General Instructions:

1. There are total **26** questions and five sections in the question paper. All questions are compulsory.
2. Section A contains questions number **1 to 5**; very short answer type questions of **1** mark each.
3. Section B contains questions number **6 to 10**, short-answer type **I** questions of **2** marks each.
4. Section C contains questions number **11 to 22**, short answer type **II** questions of **3** marks each.
5. Section D contains question number **23**, value based question of **4** marks.
6. Section E contains questions number **24 to 26**, long-answer type questions of **5** marks each.
7. There is no overall choice in the question paper; however, an internal choice is provided in one question of **2** marks, one question of **3** marks and all the three questions of **5** marks. In these questions, an examinee is to attempt any of the two given alternatives.

SECTION A

1. How many chromosomes do drones of honey bees possess? Name the type of cell division involved in the production of sperms by them. [1]

2. What is a cistron? [1]

3. Retroviruses have no DNA. However, the DNA of the infected host cell does possess viral DNA. How is it possible? [1]

4. Why do children cured by enzyme-replacement therapy adenosine deaminase deficiency need periodic treatment? [1]

5. List two advantages of the use of unleaded petrol in automobiles as fuel. [1]

SECTION B

6. Why do moss plants produce very large number of male gametes? Provide one reason. What are these gametes called? [2]

7. [2]

(a) Select the homologous structures from the combinations given below:

(i) Forelimbs of whales and bats

(ii) Tuber of potato and sweet potato

(iii) Eyes of octopus and mammals

(iv) Thorns of Bougainvillea and tendrils of Cucurbita

(b) State the kind of evolution they represent.

8. [2]

(a) Why are the plants raised through micropropagation are termed as somaclones?

(b) Mention two advantages of this technique.

9. Explain the different steps involved during primary treatment phase of sewage. [2]

10. What is mutualism? Mention any two examples where the organisms involved are commercially exploited in agriculture. [2]

OR

List any four techniques where the principle of ex-situ conservation of biodiversity has been employed. [2]

SECTION C

11. State what is apomixis. Comment on its significance. How can it be commercially used? [3]

12. During a monohybrid cross involving a tall pea plant with a dwarf pea plant, the offspring populations were tall and dwarf in equal ratio. Work out a cross to show how it is possible. [3]

13. Explain the significance of satellite DNA in DNA fingerprinting technique. [3]

14. What does the following equation represent? Explain. [3]
$P^2 + 2pq + q^2 = 1$

15. A heavily bleeding and bruised road accident victim was brought to a nursing home. The doctor immediately gave him an injection to protect him against a deadly disease. [3]
    (a) Write what did the doctor inject into the patient's body.
    (b) How do you think this injection would protect the patient against the disease?
    (c) Name the disease against which this injection was given and the kind of immunity it provides.

16. Enumerate any six essentials of good, effective Dairy Farm Management Practices. [3]

17. State the medicinal value and the bioactive molecules produced by Streptococcus, Monascus and Trichoderma. [3]

    OR

    What are methanogens? How do they help to generate biogas? [3]

18. Rearrange the following in the correct sequence to accomplish an important biological reaction: [3]
    (a) In vitro synthesis of copies of DNA of interest
    (b) Chemically synthesized oligonucleotides
    (c) Enzyme DNA-polymerase
    (d) Complementary region of DNA
    (e) Genomic DNA template
    (f) Nucleotides provided
    (g) Primers
    (h) Thermostable DNA-polymerase (from Thermus aquaticus)
    (i) Denaturation of ds-DNA

19. Describe any three potential applications of genetically modified plants. [3]

20. How did an American Company, Eli Lilly use the knowledge of r-DNA technology to produce human insulin? [3]

21. How do snails, seeds, bears, zooplanktons, fungi and bacteria adapt to conditions unfavourable for their survival? [3]

22. With the help of a flow hart, show the phenomenon of biomagnifications of DDT in an aquatic food chain. [3]

SECTION D

23. Your school has been selected by the Department of Education to organize and host an interschool seminar on "Reproductive Health – Problems and Practices". However, many parents are reluctant to permit their wards to attend it. Their argument is that the topic is "too embarrassing."
Put forth four arguments with appropriate reasons and explanation to justify the topic to be very essential and timely. [4]

SECTION E

24. [5]

(a) Plan an experiment and prepare a flow chart of the steps that you would follow to ensure that the seeds are formed only from the desired sets of pollen grains. Name the type of experiment that you carried out.

(b) Write the importance of such experiments.

OR

Describe the role of pituitary and ovarian hormones during the menstrual cycle in a human female. [5]

25. [5]

(a) Why are thalassemia and haemophilia categorized as Mendelian disorders? Write the symptoms of these diseases. Explain their pattern of inheritance in humans.

(b) Write the genotypes of the normal parents producing a haemophilic son.

OR

How do m-RNA, t-RNA and ribosomes help in the process of translation? [5]

26. [5]

(a) List the different attributes that a population has and not an individual organism.

(b) What is population density? Explain any three different ways the population density can be measured, with the help of an example each.

OR

"It is often said that the pyramid of energy is always upright. On the other hand, the pyramid of biomass can be both upright and inverted."
Explain with the help if examples and sketches. [5]