Roll Number		

SET A

INDIAN SCHOOL MUSCAT
SECOND PRE-BOARD EXAMINATION
BIOLOGY

CLASS: XII Subject Code: 044 Time Allotted: 3 Hrs.

14.04.2021 Max. Marks: 70

General Instructions:

(i) All questions are compulsory.

(ii) The question paper has four sections: Section A, Section B, Section C and Section D. There are 33 questions in the question paper.

(iii) Section–A has 14 questions of 1 mark each and 02 case-based questions. Section–B has 9 questions of 2 marks each. Section–C has 5 questions of 3 marks each and Section–D 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. Name the Geneticist who had worked on verification of chromosome theory of inheritance. 1

2. What is the polarity of the Template strand supporting discontinuous synthesis of DNA? 1

3. Name the parasite which causes amoebiasis. 1

4. Given below are a few impurities in urban wastewater. Select two colloidal impurities: ammonia, faecal matter, silt, bacteria, and calcium. 1

5. Can exonuclease be used while producing a recombinant DNA molecule? 1

6. For which Indian rice variety was patent filed by a USA company? 1

7. Why do plants in arid regions have sunken stomata? 1

8. Name the interaction between a whale and the barnacles growing on its back. 1

9. Find out the odd one with respect to 'biodiversity hot spots'- 1

(a) Western Ghats and Sri Lanka (b) Indo-Burma (c) Himalaya (d) Gangatic plains

10. Assertion: Newer antibiotics are required to be produced regularly. 1

Reason: Pathogens often develop resistance to existing antibiotics.

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

11. Assertion: Recombinant DNA technology has become successful because of the presence of restriction endonucleases in eukaryotic cell. 1

Reason: Restriction endonucleases cut the DNA molecules to form blunt ends.

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

12. Assertion: Plant-animal interactions do not generally involve co-evolution of the mutualistic organisms. 1

Reason: Evolution of plant and animal go side by side.

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Assertion is wrong statement but reason is correct statement.

13. Assertion: Species diversity decreases as we ascend towards high mountains 1

Reason: Due to drop in temperature, no seasonal variability occurs in high mountains.

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

14. Assertion: tRNA acts as a adapter molecule. 1

Reason: tRNA recognizes codon sequence of mRNA during translation.

a. Both assertion and reason are true, and reason is the correct explanation of assertion.

b. Both assertion and reason are true, but reason is not the correct explanation of assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

OR

Assertion : UAA, UAG and UGA terminate protein synthesis.

Reason : They are not recognized by tRNA.

15. Read the following and answer any four questions from15 (i) to 15 (v) given below: 4

Pollinating agents

The pollen-pistil interaction begins with pollination, followed by pollen adhesion to the stigma. After it adheres, it imbibes water and gets hydrated which initiates pollen tube germination. There are different agents of pollination like wind, insects, birds and water.

Anemophilous flowers are pollinated by the agency of wind. These flowers are small and inconspicuous. The pollen grains are very light, non-sticky and sometimes winged.

Entomophilic flowers are pollinated by insects. These flowers are often attractive to look at with bright petals and are fragrant to attract the insect visitors to them. They often have broad stigmas or anthers to allow the insect to perch on it. Many of the insect-pollinated flowers also secrete nectar which attracts bees, butterflies or other similar insects to the flowers. The pollen grain surface of such flowers produces mucilaginous secretion.

Hydrophilic flowers are pollinated by water. It is commonly found in algae, bryophytes, pteridophytes and some angiosperms. The pollen grains may have a mucilaginous covering to protect it from getting wet.

(i) The pollinating agent of an inflorescence of small dull coloured flowers with well exposed stamens and large feathery stigma is

a. Water

b. Wind

c. Insects

d. Birds.

(ii) An example of biotic agent for pollination is

a. Air

b. Water

c. Honey bee

d. All of the above.

(iii) The pollen grains in the flowers are generally sticky that help them to

a. stick on to the body of the insects

b. float on water

c. float in the air

d. fall on the ground safely.

(iv) Which of the following statements seem to describe the water-pollinated submerged plants?

a. The flowers do not produce nectar.

b. The flower petals are not brightly coloured.

c. The pollen grains have mucilaginous covering.

d. The female flowers have long stalk to reach the surface.

(v) Assertion: The pollen grains are easily carried by the wind.

Reason: They are very light and sometimes winged.

a. Both assertion and reason are true, and the reason is the correct explanation of the assertion.

b. Both assertion and reason are true, but the reason is not the correct explanation of the assertion.

c. Assertion is true but reason is false.

d. Both assertion and reason are false.

16. Enzymes are best known for their ability to catalyze biochemical reactions without undergoing any change. A large number of enzymes are being used in biotechnological industry. Most of them are obtained from microbes. Proteases degrade proteins and polypeptides. Most of the commercially applicable proteases are alkaline and are biosynthesized mainly by bacteria such us *Pseudomonas, Bacillus* and some fungi like, *Aspergillus.* These enzymes are used in clearing beer, softening of bread and meat, degumming of silk, etc. Alkaline serine proteases have the largest applications in bio-industry. Alkaline proteases have shown their capability to work under high pH, temperature and in presence of inhibitory compounds. Another important group of enzymes is amylases. Amylolytic enzymes act on starch. These are obtained from *Aspergillus*, *Rhizopus* and *Bacillus sp*. These are used in softening and sweetening of bread, production of alcoholic beverages from starchy materials, clearing of turbidity in juices caused by starch etc. 4

(i) Polypeptides are degraded by

a) Amylases b) Proteases c) Lipases d) Pectinases

(ii) Amylolytic enzymes are not obtained from

a) *Aspergillus* b) *Mucor* c) *Bacillus* d) *Rhizopus*

(iii) Clearing of turbidity in juices caused by starch is achieved by

a) Amylases b) Proteases c) Rennet d) both (a) and (b)

(iv) Select the incorrect option from the following

a) Enzymes of proteinaceous substances

b) Enzymes are substrate specific

c) Enzymes are large sized molecules

d) Microbial enzymes can work only in normal temperature and pH.

(v) A farmer harvests corns and prepares corn starch. He wants to prepare some corn syrup from this. For the conversion he needs to use the enzyme ……..

a) Amylases b) glucoamylases c) glucoismerases d) all said enzymes

SECTION B

17. What is the end product of 2

    a) Triple fusion

    b) Division of megaspore in a flowering plant.

18. Structural genes in a transcription unit may be moncocistronic or polycistronic. What do you mean by the terms underlined? 2

OR

Complete the blanks a, b, c and d on the basis of Frederick Griffith Experiment.

S Strain →inject into mice →(a)

R strain →inject into mice → (b)

S strain (heat killed) →inject into mice → (c)

S strain (heat killed) + R strain (live) →inject into mice → (d)

19. Identify the sex of organism as male or female in which the sex chromosome are found as 2

(i) ZW in bird (ii) XY in Drosophila (iii) ZZ in birds. (iv) XO in grasshopper.

20. Why is an antibody represented H_2L_2? 2

21. Name an allergen and write the response of human body when exposed to it. 2

22. What is the host called that produce a foreign gene product? What is this product called? 2

OR

What are sticky ends? State their significance in recombination DNA technology.

23. Which is the first transgenic cow? Which gene was inserted into it? 2

24. How do seals adapt to their natural habitat? Explain. 2

25. Mention the kind of biodiversity of more than a 1000 varieties of mangoes in India represent. How is it possible? 2

SECTION C

26. Enlist the types of IUDs with one example each. 3

OR

Sexually Transmitted Diseases will lead to other body complications if not attended at early stage. Explain those complications in detail. Which age group is more vulnerable to STDs?

27. A red eyed male fruit fly is crossed with white eyed female fruit fly. Work out the possible genotype & phenotype of F1 & F2 generation. Comment on the pattern of inheritance in this cross? 3

28. How many types of RNA polymerases are found in eukaryotes? Mention function of each RNA polymerase. 3

29. (i) Expand BOD. (ii) At a particular segment of a river near a sugar factory, the BOD is much higher than the normal level. What is it indicative of? What will happen to the living organism in this part of the river? (iii) Under what conditions will the BOD be lowered in the river? How will it affect the aquatic life? 3

30. Why should biodiversity be conserved? Explain giving three reasons. 3

SECTION D

31. How are spermatogenesis different from Oogenesis? Describe the role of hormones in regulating the function of male reproductive system. 5

OR

Name the functions of the following:

(a) Corpus Luteum (b) Endometrium (c) Acrosome (d) Sperm tail (e) Fimbriae

32. Explain Hershey and Chase experiment to proof that DNA is the genetic material. 5

OR

Explain the process of packaging DNA in Eukaryotes with a diagram.

33. One of the main objectives of biotechnology is to minimize the use of insecticides on cultivated crops. Explain with the help of a suitable example how insect resistant crops have been developed using techniques of biotechnology. 5

OR

(a) How is mature insulin different from proinsulin secreted by pancreas in humans?

(b) Explain how human functional insulin was produced using rDNA technology.

(c) Why is the functional insulin thus produced considered better than the ones used earlier by diabetic patients?

End of the Question Paper