SATISH SCIENCE ACADEMY

DHANORI PUNE-411015

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. The process of embryo formation without fertilisation is known as: **[1]**

   a) Polyembryony b) Apogamy

   c) Parthenocarpy d) Apospory

2. Lactic acid bacteria (LAB) grow in milk and convert it to curd and improve its nutritional quality by increasing: **[1]**

   a) Vitamin-A b) Vitamin-C and A

   c) Vitamin-B_1 d) Vitamin- B_{12}

3. A common means of sympatric speciation is: **[1]**

   a) Temporal segregation of breeding season. b) Spatial segregation of mating sites.

   c) Polyploidy d) Imposition of geographical barrier.

4. A ladder is used in Gel electrophoresis as it helps in: **[1]**

   a) it prevents the movement of DNA out of the gel. b) comparing the size of the DNA fragment.

   c) it helps in denaturation of DNA. d) it helps in EtBr binding.

5. How many spots of biodiversity in world have been identified till date by Normal Myers? **[1]**

   a) 34 b) 17

   c) 25 d) 43

6. Urethral meatus refers to the: **[1]**

   a) Muscles surrounding the urinogenial duct b) Opening of vas deferens into urethra

c) Urinogenital duct

d) External opening of the urinogenital duct

7. An MNC exploiting biological resources (turmeric) of other nation without proper authorization will be called as: **[1]**

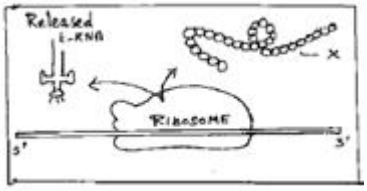
a) Eugenics

b) Bioethics

c) Biopiracy

d) Biopatent

8. What does X represent in the following diagram: **[1]**



a) Released tertiary protein

b) Released polypeptide chain

c) Released secondary protein

d) Released 3D protein molecule

9. The flower which does not open for pollination are called as: **[1]**

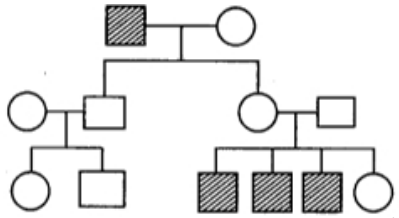
a) Chasmogomous

b) Autogamous

c) Cleistogamous

d) Geitogamous

10. Inthe given pedigree the shaded figures denote individuals expressing a specific trait: **[1]**



Which of the following is the most probable mode of inheritance of this trait?

a) X-linked recessive transmission

b) Simple Mendelian Recessive

c) Codominant relationship of a single pair of alleles

d) X-linked dominant transmission

11. Which of the following is correct pair of pyrimidine bases? **[1]**

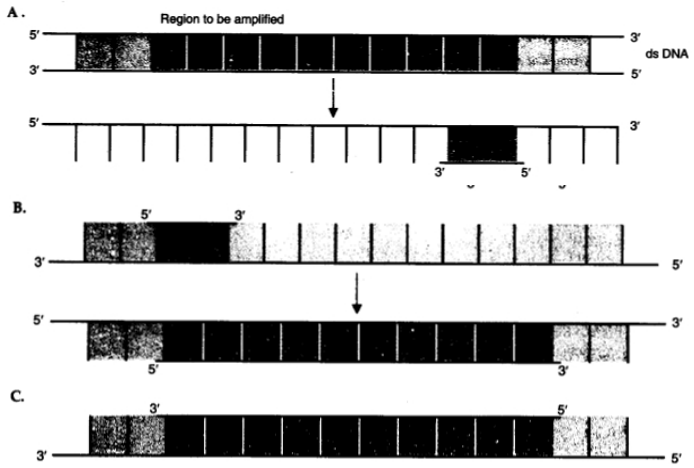
a) Guanine and Cytosine

b) Adenine and guanine

c) Thymine and Cytosine

d) Adenine and thymine

12. The figure below shows three steps (A, B, C) of Polymerase Chain Reaction (PCR). Select the option giving correct identification together with what it represents? **[1]**



a) C - extension in the presence of heat stable DNA polymerase.

b) A - denaturation at a temperature of about $50^{o}C$.

c) B - denaturation at a temperature of about $98^{o}C$ separating the two DNA strands.

d) A - annealing with two sets of primers.

13. **Assertion (A):** Chromosomes and genes both occur in pairs. **[1]**

Reason (R): The two alleles of the gene pair are located on homologous sites on homologous chromosomes.

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:** Evolution is not a direct process in the sense of determinism. **[1]**

Reason: It is a stochastic process based on chance events in nature and chance mutation in the organisms.

a) Assertion and reason both are correct statements and reason is correct explanation for assertion.

b) Assertion and reason both are correct statements but reason is not correct explanation for assertion.

c) Assertion is correct statement but reason is wrong statement.

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

15. **Assertion (A):** All RNA viruses cannot directly multiply in host cells. **[1]**

Reason (R): RNA viruses need reverse transcriptase to synthesize DNA.

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):** Histamine is related with allergic an inflammatory reactions. **[1]**

Reason (R): Histamine is a vasodilator.

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.

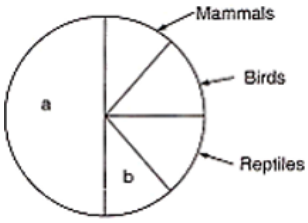
c) A is true but R is false.

d) A is false but R is true.

Section B

17. What is the use of lipase and streptokinase enzymes? **[2]**

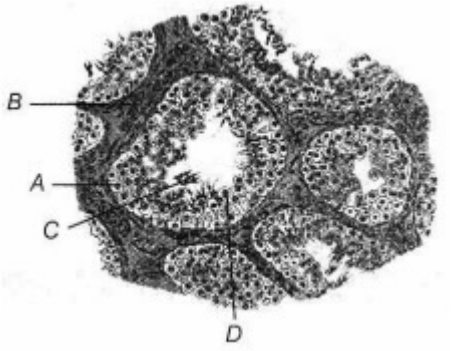
18. **[2]**



Name the unlabelled areas 'a' and 'b' of the pie chart representing biodiversity of vertebrates showing the proportionate number of species of major taxa.

19. (A) bacterial cell is shown in the figure given below. Label the part (A) and (B). Also mention the use of part 'A' in rDNA technology. **[2]**

20. Study the sectional view of human testis showing seminiferous tubules given below. **[2]**



i. Identify A, B and C.

ii. Write the function of A and D.

21. How does a population become 'founders' of a new species? **[2]**

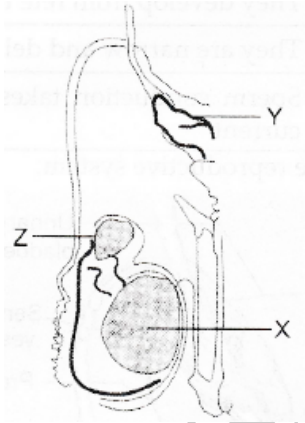
OR

Explain commensalism with the help of an example from the animal world.

Section C

22. What are the processes through which soil nutrients are lost and what process restores them? What is the justification of using artificial methods of maintaining soil fertility? **[3]**

23. The below diagram shows human male reproductive system (one side only). **[3]**



i. Identify *X* and write its location in the body.

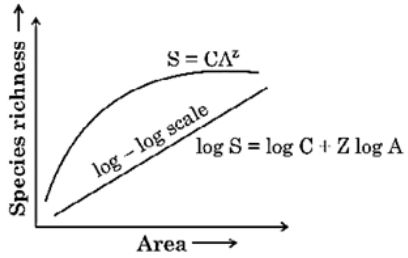
ii. Name the accessory gland 'Y'and its secretion.

iii. Name and state the function of 'Z'.

24. It is said, that the harmful alleles get eliminated from population over a period of time, yet sickle cell anaemia is persisting in human population. Why? **[3]**

25. a. Write the inference drawn by Alexander von Humboldt after his extensive explorations of South Americal jungle. **[3]**

b. Study the graph given below:



As per Alexander von Humboldt, what do the symbols S, A, Z and C in the graph stand for, in respect of a species and area relationship?

26. Draw a longitudinal section of the pistil from a flowering plant, where pollination has occurred. Label the following: **[3]**

i. Stigma showing germinating pollen grains
ii. Style
iii. Pollen tube reaching the micropyle of the ovule
iv. Embryo sac
v. Components of the egg apparatus

OR

i. With the help of a labelled diagram depict the organization of a typical embryo sac just after double fertilization.
ii. How are seeds advantages to angiosperms?

27. Snake charmer came to the house and smelled the presence of a cobra which the residents had never seen in the last 10 years. The landlord agreed to allow the man to search, catch and take away with him the snake. Little Jazman disagreed and drove the man away. **[3]**

i. Did Jazman do the right thing? What values did he show?
ii. What importance do snakes have in nature?
iii. Draw a food web showing the place of snakes.

28. What are test tube babies? **[3]**

Section D

29. **Read the following passage:** **[4]**

Generally, in eukaryotic cells the average length of a transcription unit along a DNA molecule is about 8,000 nucleotides, so the RNA product of the transcription is also that long. But it only takes about 1200 nucleotides from the above RNA product to translate average sized polypeptide of 400 Amino acids.

a. Name this RNA product transcribed from the DNA that subsequently translates into a polypeptide of 400 amino acids. Mention the enzyme responsible for transcribing this type of RNA from the DNA. **(1)**
b. Name and explain the process the RNA molecule transcribed from 8000 nucleotide long DNA undergoes to be able to translate a polypeptide of 400 amino acids. **(2)**
c. Write the number of RNA polymerases involved in the transcription of DNA in a prokaryote and eukaryotes. **(1)**

OR

Mention the difference in the site of transcription in a prokaryote and eukaryote cell. **(1)**

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

Transgenic animals can serve as factories that in some cases, may produce large amounts of proteins more efficiently. Transgenic mice have been engineered to express human antibodies by introducing a large segment of human DNA encoding human immunoglobulin genes. In transgenic large animals such as cows or sheep proteins of pharmaceutical value can be produced in large quantities in milk which is later purified. Transgenes can be used to alter many phenotypic properties including growth rate, fat composition, milk production, hair texture, etc.

i. In transgenic animals, i.e. cow and sheep proteins of pharmaceutical value are produced in large quantities in which gland. (1)

ii. Why is mouse the most preferred animal for studies on gene transfer? (1)

iii. Why does the production of transgenic animals take place? (2)

OR

Assertion (A): Transgenic mice have been engineered to express human antibodies. (2)

Reason (R): Large segments of human DNA encoding human immunoglobulin have been transferred to mice.

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.

Section E

31. Describe S.L. Miller's experiment. Comment on the observations he made and his contribution towards the origin of life on Earth. **[5]**

OR

Explain evolution by natural selection with an example.

32. What are Cry proteins? Name an organism that produce it. How has man exploited this protein to his benefit? **[5]**

OR

a. Name the insect that attacks cotton crops and causes lot of damage to the crop. How has Bt cotton plants overcome this problem and saved the crop? Explain.

b. Write the role of gene Cry IAb.

33. Diseases like dysentery, cholera, typhoid, etc., are more common in overcrowded human settlements. Why? **[5]**

OR

i. What is the chemical name of **smack**? Why is the consumption of smack considered as an abuse?

ii. Name the source plant and one effect of the following drugs on the human body:

1. Marijuana
2. Cocaine
3. Morphine