PRINCE ACADEMY
OF HIGHER EDUCATION
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BOARD SAMPLE PAPER- III (2025-26)

Time : 03 : 00 Hours | **CLASS :– XII-BIOLOGY (044)** | **M.M. : 70**

General Instructions:

(1) All questions are compulsory.

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

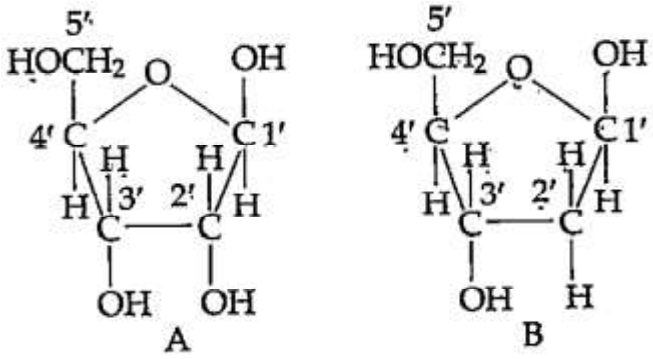
(3) Section-A has 16 questions of 1 mark each; Section-B has 5 questions of 2 marks each; Section-C has 7 questions of 3 marks each; Section-D has 2 case-based questions of 4 marks each; and Section-E has 3 questions of 5 marks each.

(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. Observe structures A and B given below. Which of the following statements are correct ?



(a) A is having 2'-OH group which makes it less reactive and structurally stable, whereas B is having 2'-H group which makes it more reactive and unstable.

(b) A is having 2'-OH group which makes it more reactive and structurally unstable, whereas B is having 2'-H group which makes it less reactive and structurally stable.

(c) A and B both have -OH groups which make it more reactive and structurally stable.

(d) A and B both are having -OH groups which make them less reactive and structurally stable.

2. The population of an insect species shows an explosive increase in number during rainy season, followed by its disappearance at the end of the season. Which of the following is the correct inference of this observation ?

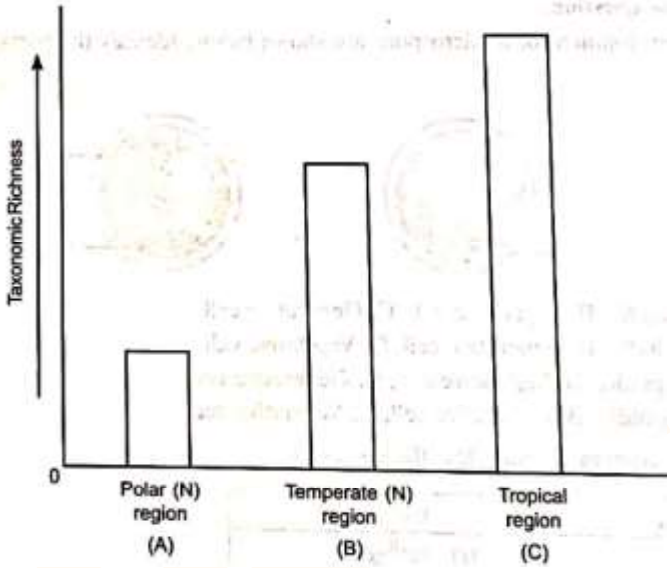
(a) The good plants flourish during rainy season and die at the end of season.

(b) The population growth curve of the insect is J shaped

(c) The population growth curve of the insect is sigmoid.

(d) The population of predators must have increased.

3. The data collected based on the survey conducted for species richness of a group of mammals in three different climatic regions of the world is shown in the bar graph given below :



Panama has nearly 560 species of mammals, Canada has about 301 species of mammals and Denmark has 67 species of mammals.

Based on the species richness of mammals, select the correct matching of the countries and the respective climate region.

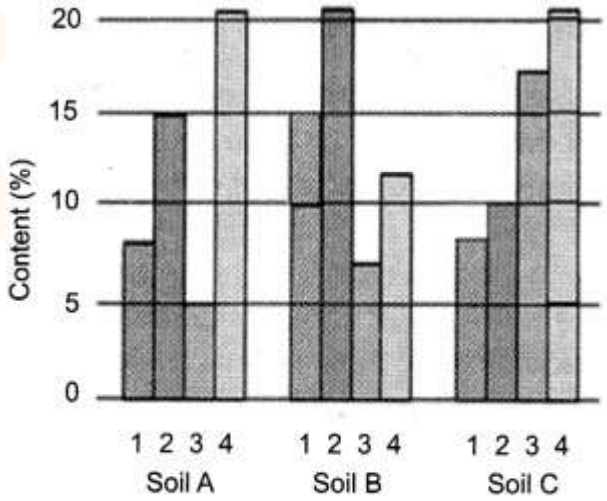
(a) Canada - A, Panama - B, Denmark - C

(b) Denmark - A, Canada - B, Panama - C

(c) Panama - A, Denmark - B, Canada - C

(d) Canada - A, Denmark - B, Panama - C

4. Observe the contents 1, 2, 3 and 4 of soil samples A, B and C shown in the graph. If the temperature and soil moisture of all soil samples are identical, which soil sample(s) will show faster decomposition?



1 Indicates lignin content, 2 Indicates chitin, 3 Indicates Nitrogen content and 4 Indicates sugar content

(a) Soil Sample A

(b) Soil Sample B

(c) Soil Sample A and B both

(d) Soil Sample C

5. Which of the following statements about sigmoid growth curve is incorrect ?

(a) It occurs when the resources are limited in the habitat.

(b) It has four phases- lag phase followed by acceleration, deceleration and asymptote phases.

(c) Population often grows beyond carrying capacity.

(d) It is more realistic than exponential growth curve.

6. Match List-I with List-II.

List-I Drug		List-II Effect	
A	Heroin	1	Affects cardiovascular system
B	Cocaine	2	Sedative and pain killer
C	Marijuana	3	Stimulant that produces a sense of euphoria
D	Morphine	4	Depressant that slows down body function

Choose the correct answer from the options given below :

(a) A-2, B-3, C-4, D-1 (b) A-2, B-4, C-1, D-3 (c) A-4, B-3, C-1, D-2 (d) A-4, B-1, C-2, D-3

7. Antibiotics produced by microbes are regarded as one of the most significant discoveries of the twentieth century and have greatly contributed towards the welfare of the human society. Which one of the following is not true about antibiotics?

(a) They are the chemicals produced by microbes that kill or retard the growth of other microbes.

(b) First antibiotic was discovered by Alexander Fleming.

(c) They are produced by prokaryotes only.

(d) Penicillin, the first antibiotic was used to treat the soldiers wounded in World War II.

8. Match List-I with List-II.

List-I Name of Scientist		List-II Contribution	
A	Alexander von Humboldt	1	Species diversity at about 7 million
B	Paul Ehrlich	2	Term 'Biodiversity'
C	Edward Wilson	3	Species-Area relationship
D	Robert May	4	Rivet-popper hypothesis

Choose the correct answer from the options given below:

(a) A-3, B-4, C-1, D-2 (b) A-3, B-4, C-2, D-1 (c) A-4, B-3, C-2, D-1 (d) A-4, B-3, C-1, D-2

9. During the menstrual phase of the menstrual cycle, the endometrial lining and its blood vessels disintegrate causing menstruation to occur; it is casused by

(a) Lack of progesterone

(b) Excess secretion of luteinising hormone (LH)

(c) Lack of estrogens

(d) Excess secretion of follicle stimulating hormone (FSH)

10. Given below are two statements:

Statement I: Restriction endonucleases recognise a specific sequence, called palindromic nucleotide sequence, to cut the DNA strands.

Statement II: Restriction endonucleases which cut the DNA strands a little away from the centre of palindrome are useful in rDNA technology.

In the light of the above statements, choose the correct answer from the options given below:

(a) Both Statement I and Statement II are true

(b) Both Statement I and Statement II are false

(c) Statement I is true, but Statement II is false

(d) Statement I is false, but Statement II is true

11. Select the option with the incorrect statements regarding Darwinian theory of Natural selection.

A. Any population has built-in variation in characteristics.

B. Fitness of an individual or population according to Darwin, refers ultimately and only to reproductive fitness.

C. Those who are better fit in a natural environment would produce less number of offspring to make them fit.

D. All different life forms have appeared simultaneously through adaptive radiaton.

(a) A and B (b) B and C (c) B and D (d) C and D

12. Identify the incorrect statement from the following:

(a) In domesticated fowls, the sex of the offspring is dependent on the type of sperm fertilising the ovum.

(b) 50% of the sperms produced by a male grasshopper, have no sex chromosome.

(c) Female Drossophila is homogametic.

(d) Female birds produce two types of gametes.

For Questions number (13-16) , two statements are given - one labelled as Assertion (A) and the other labelled as Reason (R) . Select the correct answer to these questions from the codes (a), (b), (c) , and (d) as given below.

(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).

(b) Both Assertion (A) and Reason (R) are true, but Reason(R) is not the correct explanation of the Assertion(A).

(c) Assertion (A) is true, but Reason (R) is false.

(d) Assertion (A) is false, but Reason (R) is true.

13. Assertion (A) : During gel electrophoresis, DNA moves towards the anode.

Reason (R) : DNA is positively charged.

14. Assertion (A) : Genetic drift is the change in allelic frequencies in a population due to some chance events and forms an important factor for evolution.

Reason (R) : Smaller populations have greater chances for genetic drift.

15. Assertion (A) : Primary endosperm nucleus is diploid.

Reason (R) : It is the product of double fertilisation.

16. Assertion (A) : A primary spermatocyte produces four functional spermatozoa and a primary oocyte produces only one functional ovum.

Reason (R) : Both primary spermatocyte and primary oocyte undergo meiosis.

SECTION - B

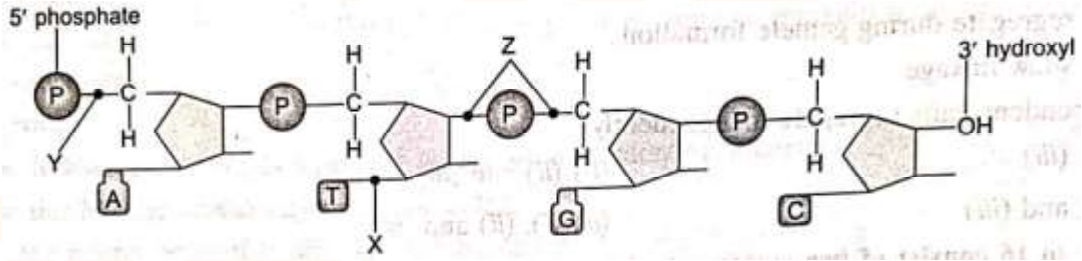
17. A corn farmer has perennial problem of corn borer infestation in his crop. Being environment conscious, he does not want to spray insecticides. Suggest a solution based on your knowledge of biotechnology. Write the steps to be carried out to achieve this.
18. Give reason for each of the following :
    (A) HIV is a retrovirus and has no DNA; but, the infected host cells show viral DNA.
    (B) Indiscriminate use of X-rays in the diagnostic practices should be avoided.
19. (A) Name any two vertebrate body parts that are homologous to human forelimbs/hands.
    (B) 'Sweet potato tubers and potato tubers are the result of convergent evolution'. Justify the statement.
20. Why are sacred groves highly protected ? Give two examples of it.

    OR

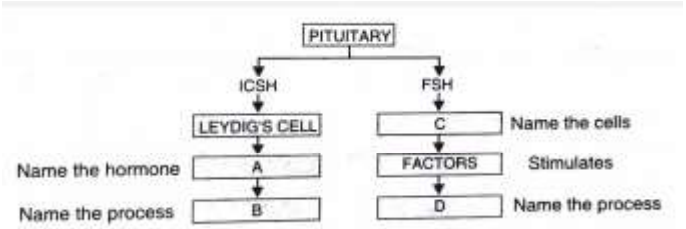
    (A) What is meant by threatened species ?
    (B) What is common about Eichhornia, Lantana and Parthenium with reference to the threat to our biodiversity ?
21. What is Ramsar convention ? How was it called Previously ?

SECTION - C

22. (A) Name the fungal genus that forms mycorrhizal assosciation with higher plants.
    (B) How do plants benefit from having mycorrhizal assosciation ? List any 4.
23. Study the diagram given below :



    Name the linkages X, Y, Z and the respective molecules formed by them.
24. Given below is an incomplete flow chart showing influence of hormones on gametogenesis in males. Observe the flow chart carefully and fill in the blanks A, B, C and D.



25. Give 3 reasons as to why the prokaryotes are not given any figures for their diversity by the ecologists.

26. (A) How is a continuous culture system maintained in bioreactors and why ?

(B) Why is the enzyme cellulase needed for isolating genetic material from plant cells and not from animal cells ?

27. (A) Write any four ways used to introduce a desired DNA segment into a bacterial cell in recombinant DNA technology experiments.

(B) Why is it essential to have a 'selectable marker' in a cloning vector ?

OR

Explain the three basic steps to be followed during genetic modification of an organism.

28. (A) Explain linkage and recombination as put forth by T.H Morgan, based on his observations with Drosophilla melanogaster crossing experiment.

(B) Write the basis on which Alfred Sturtevant carried out gene mapping.

SECTION - D

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

29. Some helminths are known to be pathogenic to humans. A healthy person acquires this helminth infection through contaminated water, vegetables, fruits, etc. The common roundworm, filarial worms live as parasites in humans. Besides helminths some fungi also cause common infectious diseases in humans. Maintenance of personal and public hygiene is very important for prevention and control of many such infectious diseases. Public hygiene includes proper disposal of waste and excreta, periodic cleaning and disinfection of water reservoirs.

(i) Name the causal organisms for filariasis and ringworm.

(ii) Mention two symptoms each of filariasis and ringworm.

(iii) (a) How do these diseases spread?

OR

(iii) (b) Write two preventive measures each for filariasis and ringworm.

30. The unequivocal proof that DNA is a genetic material came from the experiments of Alfred Hershey and Martha Chase in - 1952. They worked with viruses that infect bacteria and are called bacteriophages.

The experiments were designed to ascertain whether it was protein or DNA from the viruses that entered the bacteria.

Radioactive elements were used to label DNA and proteins in the bacteriophages. Recall the experiment and answer the questions that follow:

(i) (a) Why were viruses grown in medium containing radioactive phosphorus?

(b) What happened when viruses were grown in medium containing radioactive sulfur?

(ii) Why were bacteriophage and E. coli used in the experiment?

(iii) (a) Write the conclusion that Hershey and Chase arrived at, at the end of this experiment.

OR

(iii) (b) Why was a blender used during this experiment?

SECTION - E

31. (A) Construct a complete transcription unit with promoter and terminator on the basis of the hypothetical template strand given below.

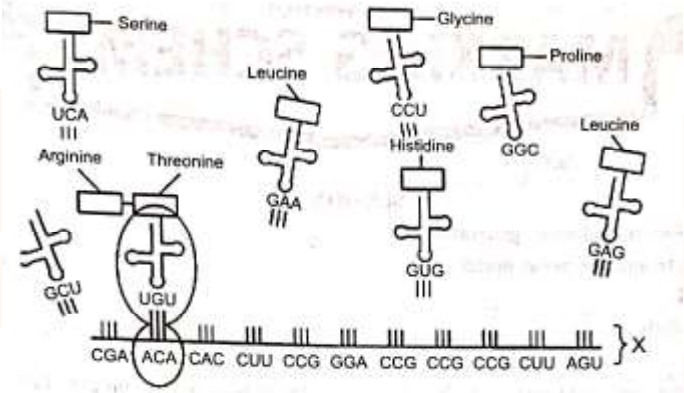
(B) How is transcription a more complex process in eukaryotic cell ? Explain the additional processes that a precursor mRNA has to undergo in these organisms.

OR

(A) Explain the process of aminoacylation of tRNA. Mention its role in translation.

(B) How do ribosomes in the cells act as factories of protein synthesis ?

(C) Given below is a strand of mRNA undergoing the process of translation, what will be the sequence of Amin acids that will be translated ? Name the triplet codons that should be added to bring the translation at end at X.

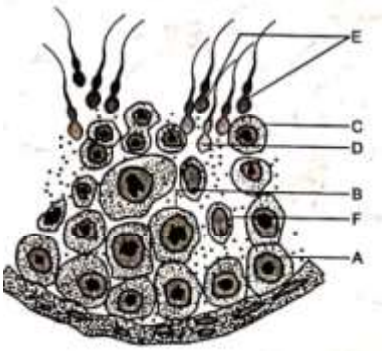


32. (A) Draw a labelled schematic diagram of the transverse section of a mature anther of an angiospermic plant.

(B) Describe the characteristic features of insect-pollinated flowers.

OR

The diagram given below shows an enlarged view of a section of a human seminiferous tubule, showing the various stages of spermatogenesis.



(A) Identify and name the cell which undergoes spermatogenesis.

(B) Name the cell F and mention its function.

(C) Identify and name the cells which have 92 chromatids in them.

(D) Identify and name the cell which undergo

(i) Meiosis I (ii) Meiosis II, respectively

(E) Name and define the process, which the cell D undergoes.

33. (A) (i) Explain how human pro insulin is processed in the cell to become a fully mature functional insulin.

(ii) Describe how human insulin is produced using the techniques of genetic engineering.

OR

(B) (i) Explain the working of simple stirred tank bioreactor.

(ii) Describe what is meant by DSP ?

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