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Q.P.3 Subject Code-044

Please check that this question paper contains 33 questions and has 2 printed pages

**D.A.V. INSTITUTIONS CHHATTISGARH
EXAMINATION-2023-24
CLASS-XII
SUBJECT-BIOLOGY (044)**

Time: 3 Hrs

Maximum Mark-70

General Instructions:-

- (i). All questions are compulsory.
- (ii) The question paper has five sections and 33 questions. All questions are compulsory.
- (iii) 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.
- (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. Penetration of the sperm in the ovum is followed by

- (a) Formation of first polar body
- (b) Completion of meiosis II
- (c) First meiosis
- (d) Dissolution of zona pellucida

2. Match the columns and select the correct option.

Column-I	Column-II
A. Baculoviruses	1.Nitrogen fixing cyanobacteria
B. Methanogens	2.Mycorrhiza
C. Glomus	3.Blood clot removal
D. Anabaena	4.Biogas plants
	5.IPМ programme

- (a) A-5, B-4, C-1, D-2
- (b) A-5, B-4, C-2, D-1
- (c) A-4, B-5, C-2, D-1
- (d) A-3, B-4, C-2, D-1

3. Broadly utilitarian argument for the conservation of biodiversity does not include.

- (a) Pollination of plants
- (b) Oxygen release by photosynthesis
- (c) Regulation of climate and water
- (d) Bioprospecting

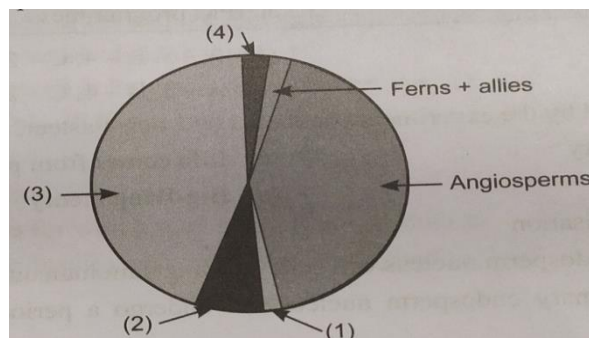
4. Which of the following is not the product of transgenic experiments?

- (a) Pest resistance crop variety
- (b) High nutritional value in grains
- (c) Production of Insulin by rDNA technology
- (d) Drought resistance crops

5. Which of the following pyramid is always upright?

- (a) Energy
- (b) Biomass
- (c) Number
- (d) All of these

6. Identify the area labeled 1,2,3 and 4 in the pie chart given below representing the biodiversity of plants showing their proportionate number of species of major taxa.



- (a) 1-Lichens, 2-Algae, 3-Fungi, 4- -Mosses
- (b) 1-Liverworts, 2-Algae, 3-mosses, 4-Fungi
- (c) 1-Pteridophytes, 2-Mosses, 3.-Algae, 4-Liverworts
- (d) 1-Pteridophytes, 2-Algae, 3-Liverworts, 4-Mosses

7. Which of the following statement is incorrect?

- (a) Patients who have undergone surgery are given morphine as pain killer.
- (b) Malignant tumors exhibit the property of metastasis
- (c) Heroin accelerates the brain functions
- (d) The plant *Erythroxylum coca* that yields cocaine is a native of south America.

8. Following is the sequence of nucleotides of a fragment of DNA molecule.

5'GCCATTG...ACTAAGCATA3'
3, CGGTAAC...TGATTCGTAT5'

The most appropriate primer for replication of the above fragment shall be:-

- (a) 5'UAUG3; and 5'GCCA3'
- (b) 5'TATG3' and 5'ACCG3'
- (c) 5'GCCU3' and 5'TATG3'
- (d) 5'UGGA3' and 5'GTAT3'

9. Match the enzymes in column I with their functions in column II and select the correct option.

Column-I	Column-II
A. Tag polymerase	1.Digestion of bacterial cell wall
B. Cellulase	2.Formation of DNA from RNA
C. Chitinase	3.Amplification of DNA
D. Lysosomes	4.Digestion of plant cell wall
	5.Digestion of fungal cell wall

- (a) A-2, B-4, C-5, D-1
- (b) A-2, B-1, C-5, D-4
- (c) A-2, B-1, C-5, D-4
- (d) A-3, B-4, C-5, D-1

10. Evolutionary convergence is development of a—

- (a) Common set of functions in group of different ancestry
- (b) Dissimilar set of functions in closely related groups
- (c) Common set of structures in closely related groups
- (d) Dissimilar set of functions in unrelated groups.

11. From the statements given below, choose the options that are true for a typical female gametophyte of a flowering plant?

- (i). It is 8-nucleate and 7-celled at maturity
- (ii) It is free-nuclear during the development
- (iii) It is situated inside the integument but outside the nucellus
- (iv) It has an egg apparatus situated at the chalazal end.

Choose the correct answer from the options given below:-

- (a) i and v
- (b) ii and iii
- (c) i and ii
- (d) ii and iv

12. Net primary productivity (NPP) refers to-

- (a) The rate of organic matter produced by primary consumers.
- (b) The rate of organic matter produced by plants through photosynthesis minus the respiratory losses.
- (c) The rate of organic matter stored by any consumer for consumption by organism of the next trophic level
- (d) The rate of organic matter produced by primary carnivores.

QuestionNo. 13 to 16 consist of two statements- Assertion (A) and Reason (R).

Answer these questions selecting the appropriate option given below.

- A. Both Assertion and Reason are true and the Reason is a correct explanation of the Assertion.
- B. Both Assertion and Reason are true but the Reason is not a correct explanation of the Assertion.
- C. Assertion is true but Reason is false.
- D. Assertion is False but Reason is true.

13. Assertion:-Turner's syndrome is generally not found in male.

Reason:- The disorder occurs due to monosomy.

14. Assertion:-parturition is induced by a complex-endocrine system mechanism.

Reason:- At the end of the gestation period, the maternal pituitary releases prolactin which causes uterine contraction.

15. Assertion:-Retroviruses are used efficiently as vectors in rDNA technology experiments

Reason:-Agrobacterium tumefaciens is the most commonly used vector for transformation of plant cells.

16. Assertion:-Vertical distribution of different species, which occupies different level, is called stratification.

Reason:-In forest ecosystem, trees occupy top strata followed by shrubs, herbs and grasses.

SECTION-B

17. (a) Explain the cause responsible in a human to have sex chromosomes as 'XXY' instead of 'XX' or 'XY'?

(b) List any two ways such individuals are different from normal being.

18. Name the type of immunity a baby is born with, How is it different from the one he gets from the Mothers milk after birth?

19. State two advantages of an apomictic seed to a farmer?

20. If a population growing exponentially double in size in three years, what is the intrinsic rate of increase (r) of the population?

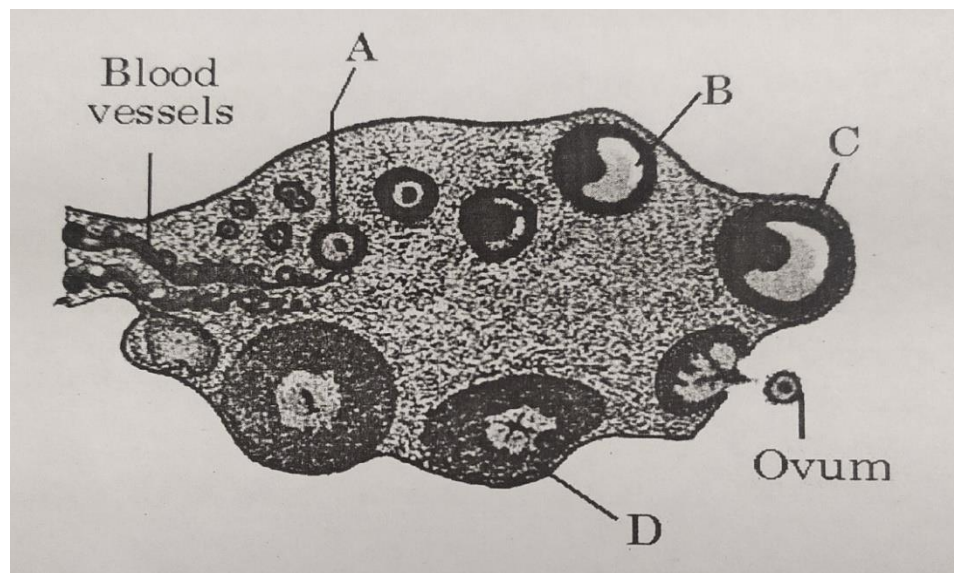
OR

- a) Name the oldest viable seed excavated from Arctic Tundra as per the records?
- b) Name two parasite species of plants that produce many minutes' seeds in a fruit?

21. Why does the son of a carrier mother and a normal father suffer from haemophilia, whereas the son of a hemophilic father and a normal mother would not? Explain?

SECTION-C

22. Study the transverse section of human ovary given below and answer the questions that follow:

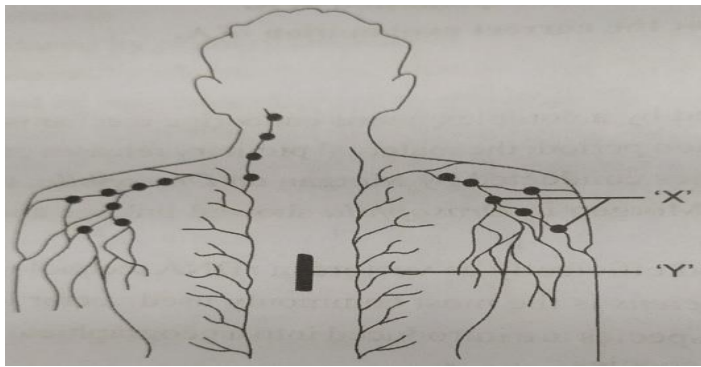


- (a) Name the hormone that helps in the growth of A-B-C.
- (b) Name the hormone secreted by A and B
- (c) State the role of the hormone produced by D.

23. What does an interaction between pollen grain and its compatible stigma result in. after pollination? List two steps in sequence that follows after the process?

24. Explain the three different ways in which natural selection operates?

25. Given below is a diagrammatic representation of immune system of the human body.



(a) Identify 'X' and 'Y' in the given diagram.

(b) Explain two functions of the organs that you have identified.

26. "Microbes are used for production of enzymes and they play an importance role in many processes" Justify the statement by giving example of three enzymes with their functions?

27. What is Ramsar convention? What was it called previously?

OR

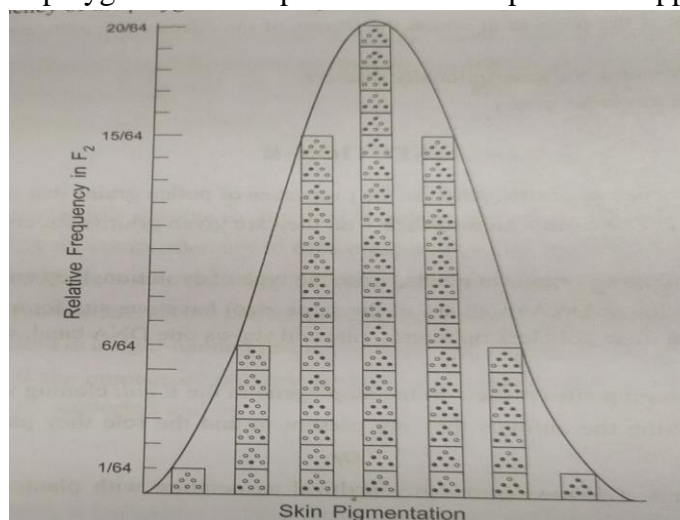
Name the different types of polymerases in a eukaryotic cell. Write their roles in transcription?

28. " Cotton bollworms enjoy feeding on cotton plants, but get killed when feed on Bt cotton plant" Justify the statement?

SECTION-D

Question No. 29 and 30 are case-based questions .Each question has 3 subparts with internal Choice in one subpart.

29. The traits studies by Mendel showed two distinct alternate forms, called contrasting traits but there are many heritable traits which are not so distinct in their occurrence, but are spread across a gradient such traits are controlled by more than one gene and their inheritance is described as polygenic inheritance. When the relative frequency of the polygenic cross is plotted. a bell-shaped curve appears as given below;-



Answer the following questions

(a) Give two examples of human traits that show polygenic inheritance. (1)

(b) How many genes are involved in the traits shown the graph and how many phenotypes have appears? (1)

(c) How does polygenic inheritance differ from multiple allelism?

OR

(d) How does polygenic inheritance differ from pleiotropy? (2)

30. There is growing public awareness and anger that certain companies are being granted patent for products and technologies that make use of the genetic materials, plants and other resources that have long been identified, developed and used by the farmers. An American company got patent rights on Basmati Rice through the US patent and trademark office: this allowed the company to sell a new variety of Basmati in the US and abroad.

(a) What term is given to such an act by the countries? (1)

(b) What is the 'new' variety of Basmati developed by the US Company? (1)

(c) Mention the efforts of the Indian Government to prevent such deeds?

OR

(d) Indian Government has set up organization like GEAC. Mention two objectives of setting up GEAC by our Government? (2)

SECTION-E

31. i) List any four goals of Human Genom Projects?

ii) Write any four ways, the knowledge from HGP is of Significance for human?

iii) Expand BAC and mention its importance?

OR

(a) Name the type of DNA that forms the basis of DNA fingerprinting and Mention two features of this DNA?

(b) Write the steps carried out in the process of DNA fingerprinting technique and Mention its applications?

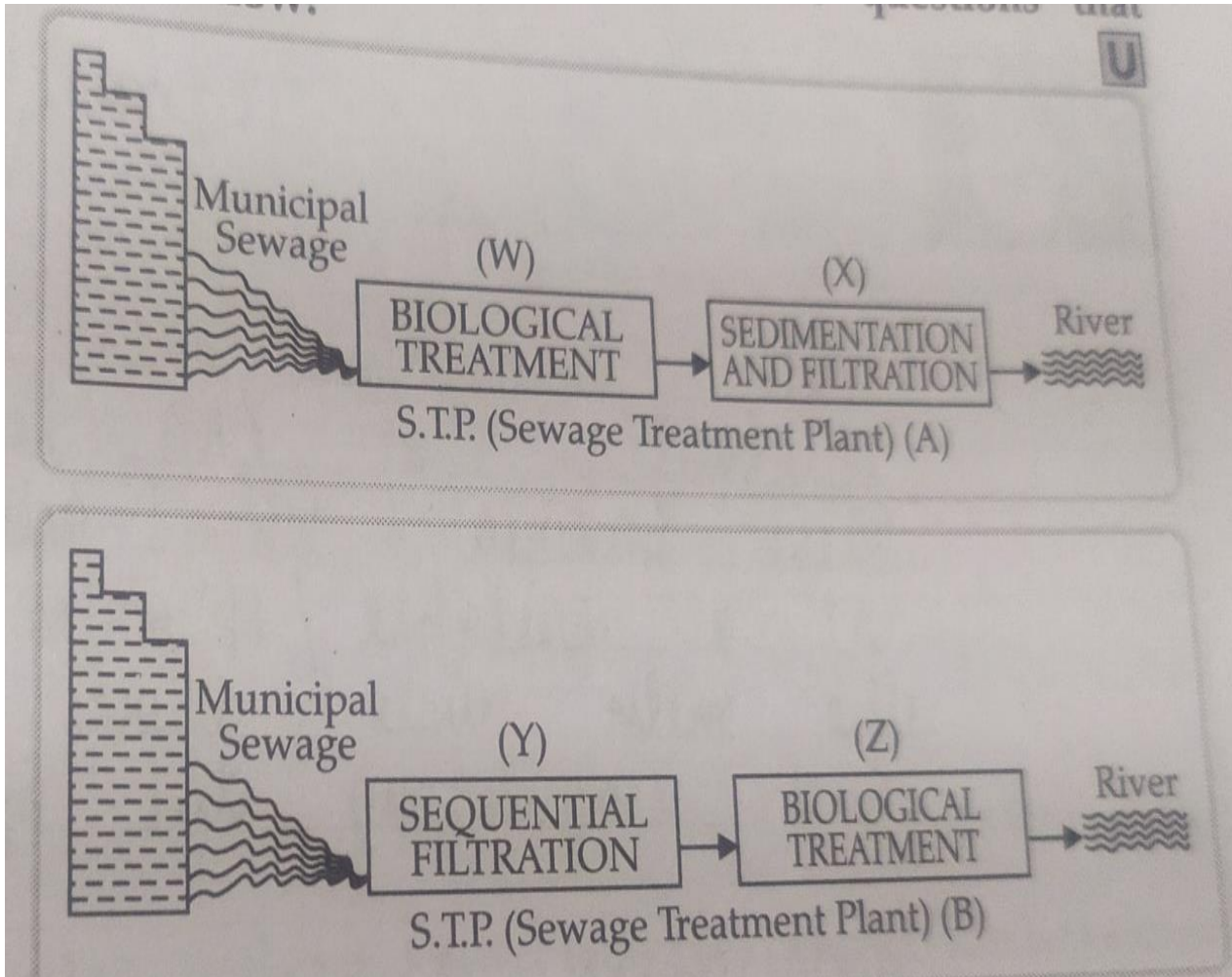
32. (a) When does the process of spermatogenesis begin in human males? Describe the process of spermatogenesis?

(b) Explain the role of gonadotropin in this process.

OR

- (a) How does microspore mother cell develop into mature pollen grain in angiosperms ?
- (b) Describe the structure of a mature pollen grain and draw a labelled diagram of its two celled stage.

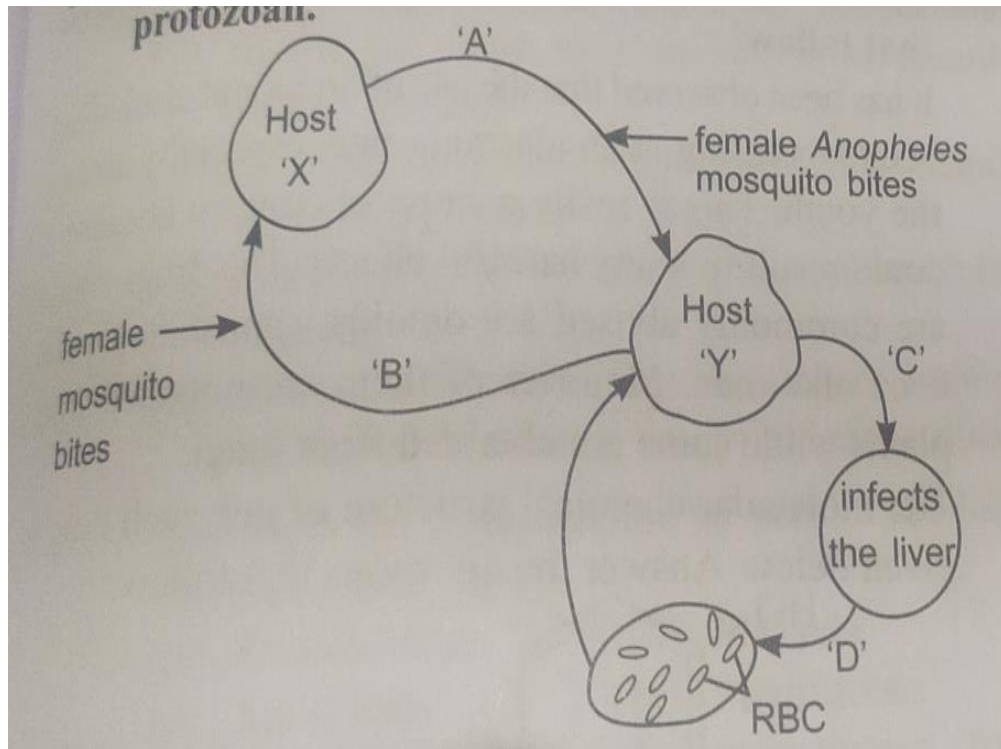
33. Study the given diagram of sewage treatment plant (STP) and answer the questions that follow:-



- (a) Which one of two STP, A or B will be more effective in treating the human excreta in the Municipal wastages?
- (b) Write the steps followed in carrying the treatment of the sewage in step (Z), once the BOD of sewage is reduced significantly till it is passed on the “anaerobic sludge digesters”?
- (c) List the event reduce the biological oxygen demand of a primary effluent during sewage treatment?

OR

Observe the diagram shows the life cycle of a pathogenic protozoan.



- (a) Name the parasitic stage that is being transferred from 'X' to Host 'Y'.
- (b) Write the changes the parasite undergoes in the liver?
- (c) Write the changes the parasite undergoes when it enters the RBC.
- (d) Trace the changes the parasite undergoes when the host 'X' takes its blood meal from infected host 'Y'.
- (e) At which stage during the life cycle of the pathogen does the host 'Y' experience the symptoms Of the Disease? Name the disease and toxic substance responsible for these symptoms?
