

Roll No. -----

Q.P.2 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. Select incorrect statement.

- (1) Tropical latitudes have remained relatively undisturbed for millions of years and thus had a long evolutionary time for species diversification.
- (2) Tropical environments are more seasonal and less predictable than temperate.
- (3) There is more solar energy available which contributes to higher productivity.

- (a) 1 and 2
- (b) only 2
- (c) 2 and 3
- (d) only 1

2. Match the columns and select the correct option.

Column-I	Column-II
A. Methonogen	1.Immunosuppressant
B. Fermenter	2.Biological oxygen demand
C. Organic matter in sewage	3.Large vessels for culturing microbes for bioconversion
D. Cyclosporin A	4.clot buster
	5.Rumen of cattle

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

3. Phosphodiester bond links two nucleotides together and maintains polarity which refers to:

- (a) The 5' hydroxyl group of pentose of one nucleotide to 3' hydroxyl group of adjacent nucleotide through a phosphate group.
- (b) 5' end with a phosphate group and 3' end with hydroxyl are free.
- (c) Addition of new nucleotide occurs via attachment of 5' phosphate group of new nucleotide to 3' phosphate group of an existing chain.
- (d) All of the above

4. $\log S = \log C + Z \log A$

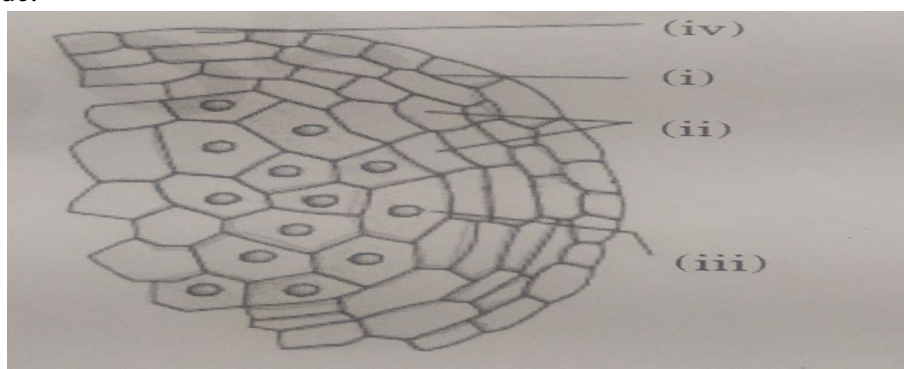
In the given equation of species area relationship, the value of regression coefficient for a whole continent, would be :-

- (a) 0.1-0.2
- (b) 0.5-0.7
- (c) 0.6-1.2
- (d) 0.3-0.5

5. The rate of formation of new organic matter by rabbit in grassland is called?

- (a) Secondary productivity
- (b) Net primary productivity
- (c) Gross primary productivity
- (d) Net productivity

6. In the transverse section of a young anther shown below, Identify the correct sequence of wall layers from outside to inside.



	i	ii	iii	iv
a.	Middle layers	Endothecium	Epidermis	Tapetum
b.	Tapetum	Middle layers	Endothecium	Epidermis
c.	Epidermis	Endothecium	Middle layers	Tapetum
d.	Endothecium	Middle layers	Tapetum	Epidermis

7. The organ transplant is often rejected, if not taken from a compatible person. It is?

- (a) Due to CMI
- (b) Mediated by T-lymphocytes
- (c) Body distinguishes self and non-self cells
- (d) All of these

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. Which of the following is NOT a property of cancerous cells?

- (a) They divide in uncontrolled manner
- (b) They do not remain confined to the site of origin.
- (c) They exhibit contact inhibition
- (d) They compete with the normal cells for vital nutrients

10. Brewer's yeast is used for **A** of malted cereals and fruit juices to produce **B**_.

- (a) A-Distillation; B- CO₂
- (b) A-Distillation; B- organic acid
- (c) A-Fermentation; B- CO₂
- (d) A-Fermentation; B-Alcohol

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. Identify the correct path of milk secreted by the mammary glands.

- (a) Alveoli-Mammary ducts-Ampulla-Mammary tubules-Lactiferous ducts
- (b) Alveoli- Ampulla –Mammary ducts- -Mammary tubules-Lactiferous ducts
- (c)Alveoli- Mammary tubules- Mammary ducts-Ampulla- -Lactiferous ducts
- (d) Lactiferous ducts - Alveoli-- Mammary tubules -Ampulla---Mammary ducts

Question No. 13 to 16 consists 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:-Many species like stellar sea cow, passenger pigeon etc became extinct due to Habitats loss and fragmentation.

Reason: - over exploitation is one of the causes of biodiversity loss.

14. Assertion:-Hugo de-Vries defined the mechanism of evolution as saltation.

Reason:- Saltation is a single step large mutation which brings major change as speciation.

15. Assertion:-When an alien or recombinant DNA is ligated at the Pvu I site of the E.coli cloning Vector, pBR322, the recombinant loses resistance to ampicilin.

Reason:-The Pvu I site lies within the coding sequence of ampicillin-resistance gene.

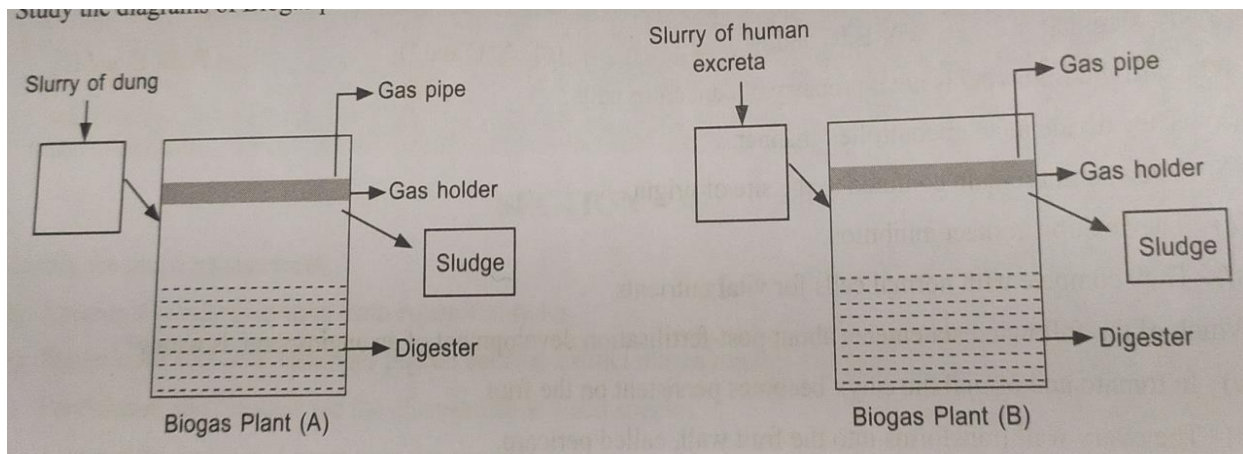
16. Assertion:-A secondary oocytes , at the time of ovulation has 46 chromatids.

Reason:-A secondary oocyte and the first polar body are formed when the primary oocyte completes meiosis I

SECTION-B

17. How does EcoRI specifically act on DNA molecule? Explain.

18. Study the diagram of Biogas plants 'A' and 'B', which of the two biogas plants can be used for generating gas fuel and electricity and why? Give suitable reasons in support to your answer.



19. Explain Hardy-Weinberg principle?

OR

(a) Where was the first man like animal found?

(b) When did modern Homo sapiens appear on this planet?

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

21. Write the location and function of:-

(a) Sertoli cells

(b) Leydig cells

SECTION-C

22. How has RNAi technique helped to prevent the infestation of roots in tobacco plants by a nematode, *Meloidegryne incognitia*?

23. (a) List the two methodologies which were involved in human genome project?

Mention how they were used?

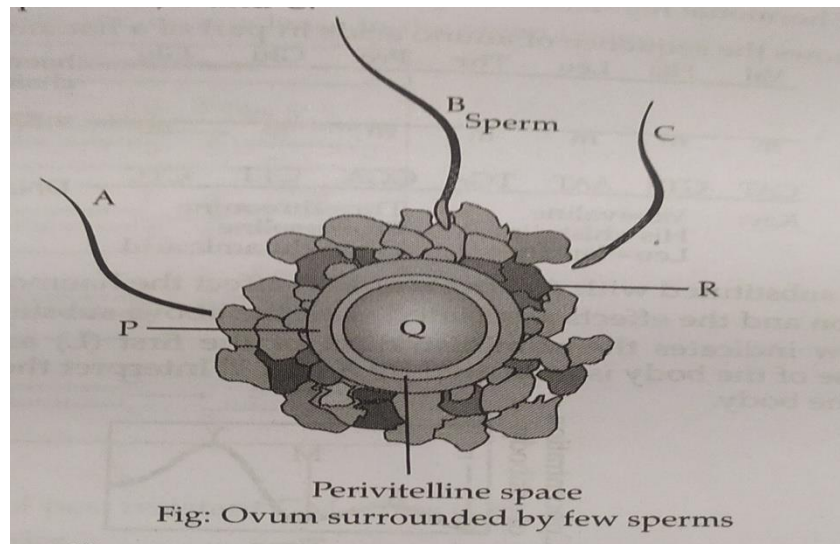
(b) Expand 'YAC', and mention what was it used for?

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

OR

Explain the three different ways in which natural selection operates?

25. The figure given below show 3 sperms A, B, C



(a) Which one of the three sperms will gain entry into the ovum?

(b) Describe the association changes induced by it on P and Q.

26. Mention the effects of the following drugs on humans?

(i)LSD

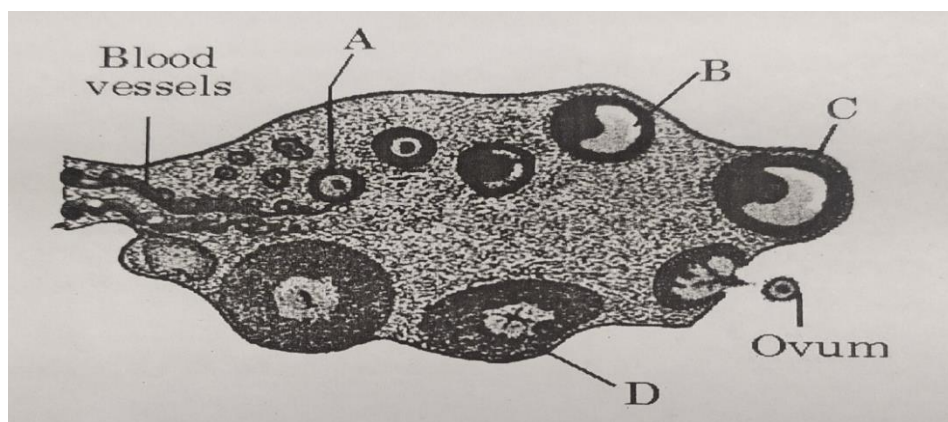
(ii)Morphine

(iii)Charas and ganja

27. (a) Differentiate between primary response and secondary response.

(b)Draw structure of an antibody molecule and label it?

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

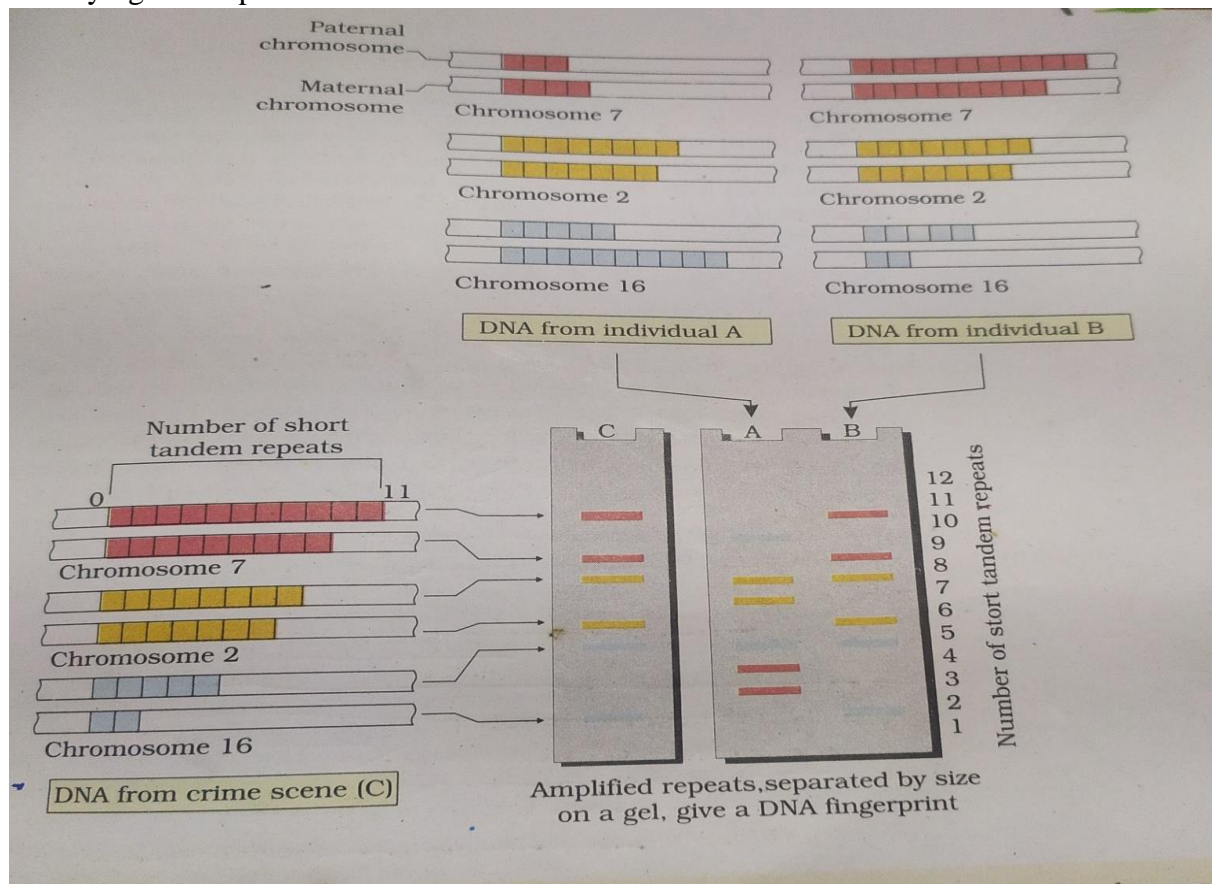


- (a) Name the hormone that helps in the growth of A-B-C.
- (b) Name the hormone secreted by A and B
- (c) State the role of the hormone produced by D.

SECTION-D

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

29. Two blood samples of suspects 'A' and 'B' were sent to the Forensic Department along with sample 'C' from the crime scene. The Forensic Department was assigned the responsibility of running the samples and matching the samples of the suspects with that of the sample from the scene of the crime and thereby identifying the culprit.



- (a) what does "Probe" refers in DNA fingerprinting? (1)
- (b) How does polymorphism arise in a population? (1)
- (c) State the steps involved in DNA Fingerprinting in a sequential manner?

OR

- (d)Mention two applications of DNA fingerprinting other than forensic science? (2)

30. The growth of a population with time shows specific and predictable patterns. Two types of growth patterns of the population are exponential and logistic growth. When resources in the habitat are unlimited each species has the ability to realize fully its innate potential to grow in number. Then the population grows in an exponential fashion. When the resources are limited growth curve shows an initial slow rate and then it accelerates and finally slows giving the growth curve which is sigmoid.

a) Write an equation for logistic growth model? (1)

b) What is carrying capacity? (1)

c) State the basis for the difference in the shape of the curve in both growth models?

OR

Explain Gause's competitive Exclusion principle? (2)

SECTION-E

31 (i) Name the source from which Insulin was extracted earlier ? Why is this Insulin no more in use by diabetic people?

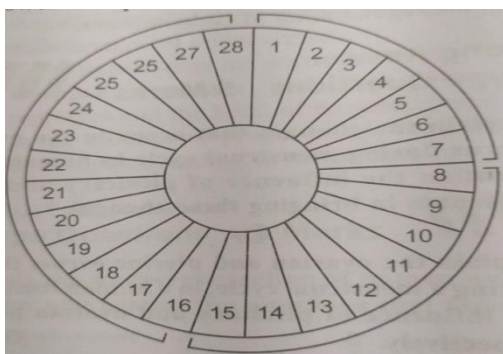
(ii) Explain the process of synthesis of Insulin by Eli Lilly company? Name the technique used by the company.

(iii) How is the Insulin produced by human body different from the Insulin produced by the Eli Lilly Company?

OR

(iv) Draw a labeled diagram of a simple stirred-tank bioreactor and describe its functioning?

32. Observe the diagram given below showing the menstrual cycle of a normal human female.



(a) What are the suitable technical terms used for the following?

i) Days 1-7

ii) Days 8-12

iii) Days 16-28

iv) Days -13-15

(b) Explain the role of ovarian and pituitary hormones during the following time periods

- (i) Days 8-12
- (ii) Days 13-15
- (iii) Days 16-28

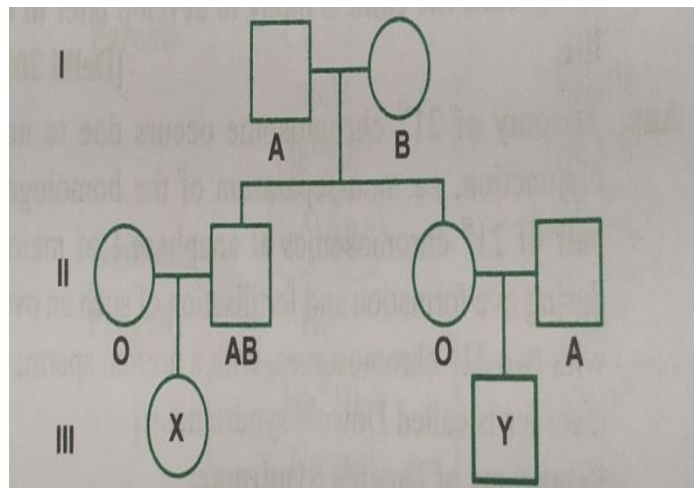
OR

- (i) Where does microsporogenesis occurs in an angiosperm? Describe the process of microsporogenesis?
- (ii) Draw a labeled diagram of the two-celled male gametophyte of an angiosperm. How is the three-celled male gametophyte different from it?

33. Explain the role of different genes in a lac operon, when in a 'Switched On' state?

OR

(a) Study the given pedigree charts the pattern of inheritance of blood group character in a family and answers the questions that follow:-



- (i) Give genotype of parents in generation-I
 - (ii) Write the possible genotypes and phenotypes of the individuals X and Y in generation-III. Justify your answer.
- (b) Write the types and location of the genes causing thalassemia in humans?
State the cause and symptoms of the disease?
