



**CLASS XII: BIOLOGY (044)**  
**PRE BOARD EXAMINATION**  
**SESSION: 2023-24**

*gauri*  
29

**NAME:**

**ROLL NO.:**

**Weightage:**

70 marks.

**Time Duration:**

3 hr

**General Instructions:**

- (i) The question paper has five sections and 33 questions. All questions are compulsory.
- (ii) 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.
- (iii) 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.
- (iv) Wherever necessary, neat and properly labeled diagrams should be drawn.

**SECTION-A (1x16=16)**

**1. In eukaryotes, RNA polymerase do not have this additional function-**

- a) RNA polymerase I transcribes rRNAs
- b) RNA polymerase III is responsible for transcription of tRNA
- c) RNA polymerase II transcribes precursor of mRNA
- d) RNA polymerase II is responsible for transcription of 5srRNA and snRNAs

1

**2. The largely tropical Amazonian rain forest in South America has the greatest biodiversity on earth- it is home to -**

- a) 40,000 species of plants, 3000 of fishes & 378 of reptiles
- b) 1,300 species of birds, 427 of mammals, 427 of amphibians & 378 of reptiles
- c) 1000 species of birds, 427 of mammals, 427 of reptiles & 378 of amphibians
- d) 50,000 species of plants, 13,00 of fishes & 1,300 of birds

1

**3. Specific Bt toxin genes were isolated from *Bacillus thuringiensis* and incorporated into the several crop plants such as-**

- a) cryIAC and cryIIAb control the cotton bollworms
- b) cryIAb and cryIIAC control the cotton bollworms
- c) cryIIAb controls corn borer.
- d) cryIAC controls corn borer

1

**4. In a certain species of insects, some have 13 chromosomes, and the others have 14 chromosomes. The 13 and 14 chromosome bearing organisms are**

- a) males and females, respectively
- b) females and males, respectively
- c) all males
- d) all females

1

**5. In a large randomly mating population, only one person in 10,000 is an albino. What will be the frequency of a carrier person of albinism?**

- a) 1 in 100
- b) 99 in 10,000
- c) 2 in 10,000
- d) 1 in 50

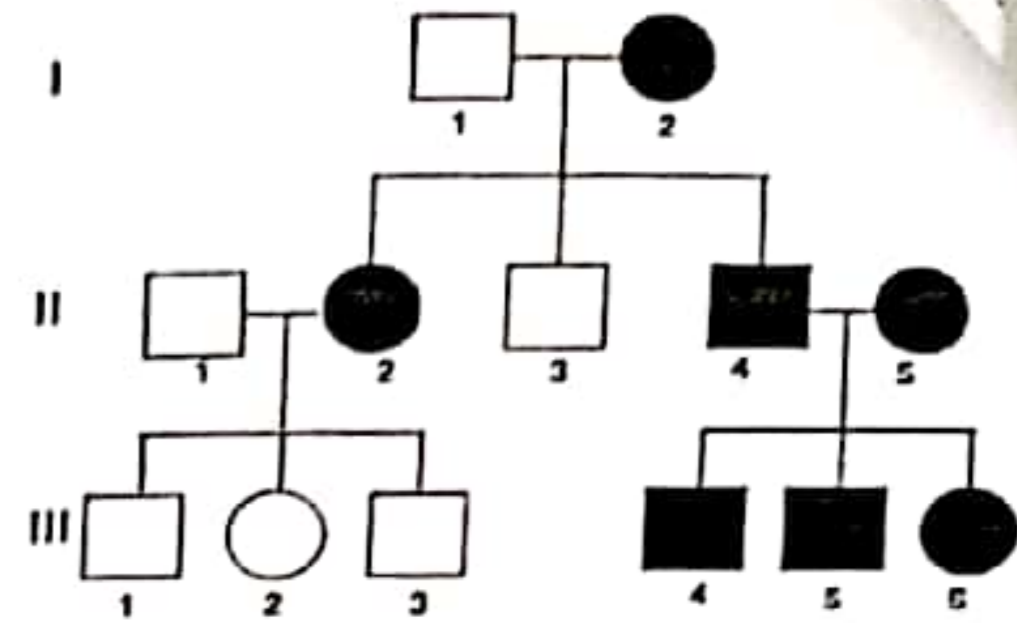
1

6. *E. coli* has only  $4.6 \times 10^6$  base pairs and completes the process of replication within 18 min then the average rate of polymerization is approximately?

- a) 1000 base pairs/second
- b) 2000 base pairs/second
- c) 3000 base pairs/second
- d) 4000 base pairs/second

7. The pedigree given alongside tracks Duchenne Muscular Dystrophy (DMD) through several generations. If individuals I-I and I-II had another son, what is the chance he would have DMD.

- a) 0% b) 25% c) 50% d) 100%



1

8. Which of the following theories is true on Competition among organism in a habitat-

- i) Gause's 'Competitive Exclusion Principle' states competing for the same resources cannot coexist indefinitely
- ii) Competitive Exclusion Principle' states that species facing competition might evolve mechanisms that promote coexistence rather than exclusion
- iii) MacArthur showed that species of warblers living on the same tree were able to avoid competition and co-exist.
- iv) MacArthur showed that co-exist is not possible due to behavioral differences in the Warbler's foraging activities

- a) ii & iv                      b) i & iv                      c) ii & iii                      d) i & iii

1

9. The promoter site and the terminator site for transcription are located at:

- a. 3' (downstream) end and 5' (upstream) end, respectively of the transcription unit
- b. 5' (upstream) end and 3' (downstream) end, respectively of the transcription unit
- c. the 5' (upstream) end
- d. the 3' (downstream) end

1

10. Which of the following microorganism and the product obtained from it is wrongly matched

- i) *Streptococcus*- Penicillin - Alexander Fleming
- ii) *Aspergillus niger* -bacterium- Citric acid
- iii) *Streptococcus* - Clot Buster - Streptokinase
- iv) Fungus- *Trichoderma polysporum* - Statins

- a) i & iv                      b) ii & iv                      c) iii & iv                      d) i & ii

1

11. Information about the endosperm tissue is correct in all but -

- a) Endosperm may be completely consumed by the developing embryo as in pea and groundnut
- b) Endosperm is totally consumed in the mature seed as in castor and coconut
- c) Endosperm is persistent in cereals like wheat, rice and maize.
- d) Non Albuminous seeds have no residual endosperm as it is completely consumed during embryo development

1

12. Identify the a incorrect statement regarding outbreeding devices in plants:

- a) Continued self-pollination result in Inbreeding depression
- b) To encourage Xenogamy pollen release and stigma receptivity are synchronised.
- c) Self-incompatibility is a mechanism that prevents self-pollen from fertilising the ovules
- d) Dioecy as in papaya - male and female flowers are present on different plants

1

Question No. 13 to 16 consist of two statements – Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option given below:

- a) Both A and R are true and R is the correct explanation of A.
- b) Both A and R are true and R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

13. Assertion (A): Method of embryo sac formation from a single megaspore is termed monosporic development.

Reason(R): Only the functional megaspore develops into the embryo sac.

1

14. Assertion (A): A nitrogenous base is linked to the -H of 3' C pentose sugar through a N-glycosidic linkage to form a nucleoside.

Reason(R): Nucleosides are adenosine or deoxyadenosine, guanosine or deoxyguanosine, cytidine or deoxycytidine and uridine or deoxythymidine.

1

15. Assertion (A): Cannabinoids are a group of chemicals which interact with cannabinoid receptors present principally in the brain.

Reason(R): Some forms generally taken by inhalation and oral ingestion are known for their effects on the cardiovascular system of the body.

1

16. Assertion (A): Transfer of pollen grains from the anther to the stigma of another flower of the same plant therefore there has to be pollinating agent

Reason(R): Geitonogamy is functionally cross-pollination

1

### SECTION-B (2M x 5=10)

17. Draw the structure of the ovum just before it undergoes ovulation-what is this stage known as? 2

18. Mendelian disorders can show a dominant or recessive inheritance pattern. Describe a blood related disorder and its inheritance pattern which shows -

i) sex-linked inheritance pattern

ii) autosomal linked recessive trait.

2

19. On what principle of immunisation or vaccination is based? What type of immunity is provided by vaccines?

2

20. Restriction enzymes belong to which type of enzymes? Give the kinds of Restriction enzymes? How do they work?

2

21. a) A constant input of solar energy is the basic requirement for any ecosystem to function and sustain- therefore what is meant by primary productivity? What are its units?

b) What is net primary productivity? How is this quantity measured?

2

OR

a) There are certain limitations of ecological pyramids- mention two such limitations?

b) Draw the pyramid of biomass of the sea. What is the nature of this pyramid drawn by you?

2

### SECTION-C (3M x 7=21)

22. a) Trace the path taken by the sperm till it leaves the urogenital canal.

b) Make a flowchart to explain the hormonal regulation of the male reproductive system. 1.5 x 2

23. Explain the phases in embryonic development from the morula stage till the establishment of pregnancy in a human female. 3

24. What is point mutation? Explain your answer with the aid of an example.

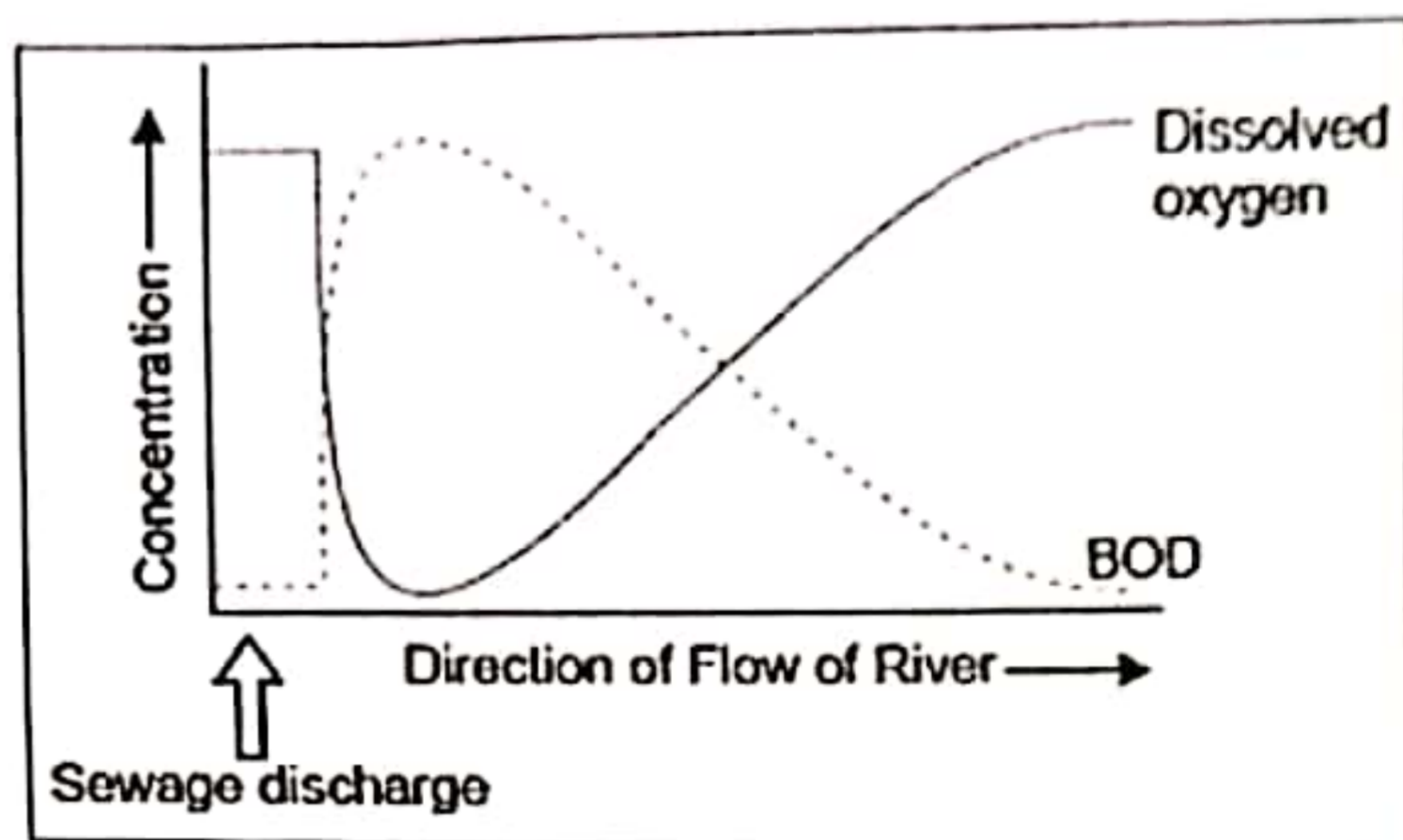
b) Which type of mutations are referred to as frameshift mutations? Briefly explain. 1+2

25. a) Which contemporary of Darwin influenced his studies on natural selection? What are the postulates of the theory of Natural selection?

b) What is Saltation? Who proposed this theory and how is it different from the theory of natural selection? 2+1

26.a) What is the relationship between dissolved oxygen and biochemical oxygen demand (BOD)? Explain your answer in brief

b) Define BOD. 2+1



OR

26. Why is it necessary for farmers to shift to Organic Farming? Biofertilizers are used in Organic farming techniques- what are these so called biofertilizers, explain with examples. 3

27 a) State how *Agrobacterium* has been made a useful cloning vector to transfer DNA to plant cells.

b) What is RNA i - explain what happens during this biotechnological process? 3

28. The accelerated rates of species extinctions that the world is facing now are largely due to human activities. There are four major causes of biodiversity loss, explain, giving examples in each case. 3

### SECTION-D (4M x 2=08)

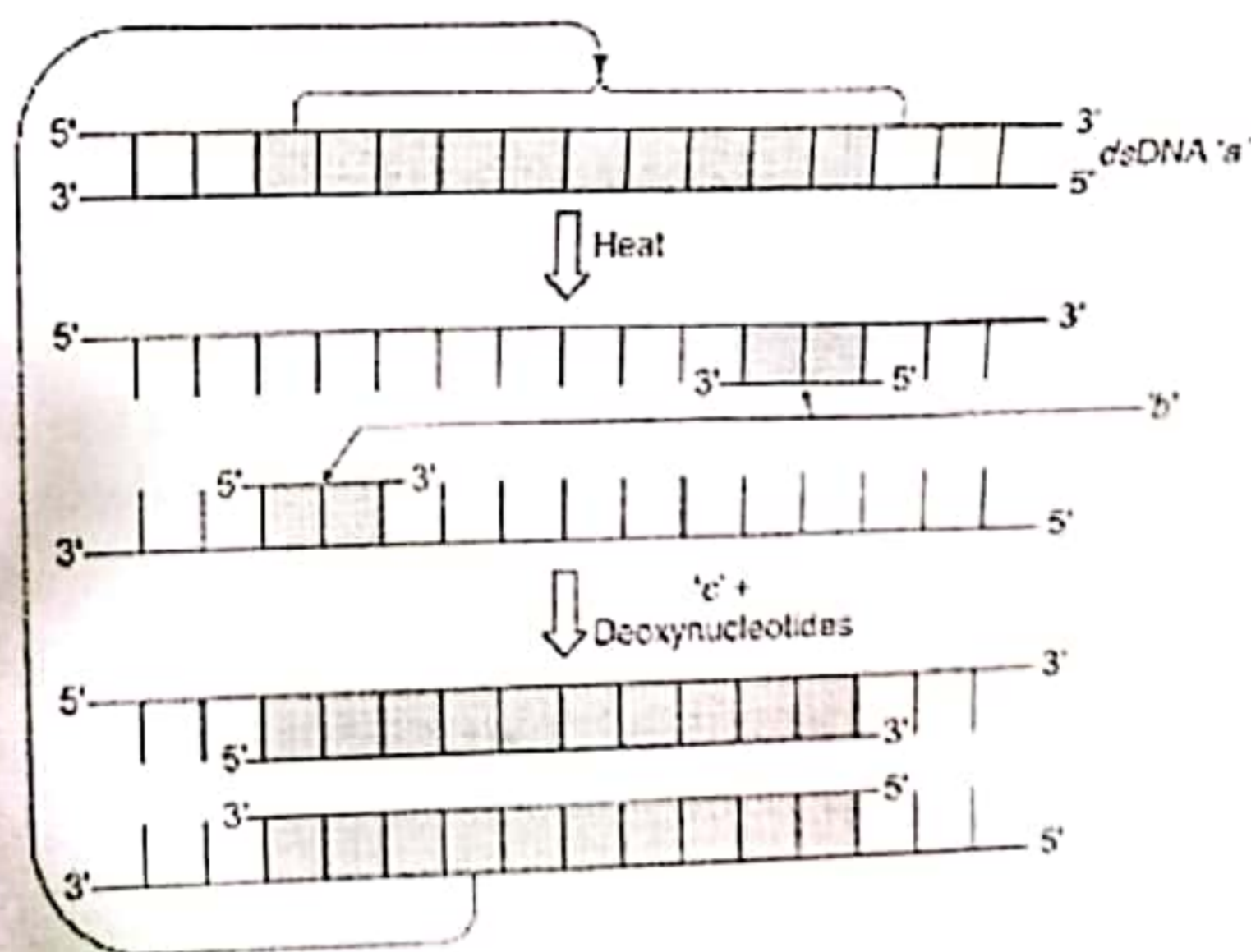
29. A schematic diagram of PCR is given - Study the diagram and answer the questions that follow: 1 x 4

i) Name the process a. Identify the b.

ii) What is the importance of substance 'c'? From where is it obtained?

iii) What is the process that is conducted with substance 'b'.

iv) Give the functions of Deoxynucleotides in the above reaction.



30. Does the growth of a population with time show any specific and predictable pattern? We have been concerned about unbridled human population growth and problems created by it in our country and it is therefore natural for us to be curious if different animal populations in nature behave the same way or show some restraints on growth. Perhaps we can learn a lesson or two from nature on how to control population growth.

- a) When the population grows in an exponential or geometric fashion, what is this type of population growth known as?
- b) What is 'r' in the above growth model? Give the value of r for Norway rat and human population.
- c) Which type of growth model is seen in normal healthy populations? What type of graphical curve does it form?
- d) Describe this curve with the aid of an equation. What is 'K' mentioned in this equation? 1 x 4

### SECTION-E (5M x 3=15)

- 31.a) What happens to cells when they lose the capacity of contact inhibition?
- b) What are the various ways in which the above patient can be diagnosed? 1+2+2
- c) What are the various methods to treat the patient who has this above condition?
- 32.a) What are the salient features of the human genome project? Why was it referred to as a mega project?
- b) Explain the terms : ESTs , BAC, Sequence Annotation and SNPs 3+2

OR

- a) What is meant by trisomy and monosomy of a chromosome? Explain with examples.
- b) Explain the difference between aneuploidy and polyploidy.
- c) Explain one disease that shows an autosomal recessive inheritance pattern. 2+2+1

33. a) Given are a few of the ARTs suggested to parents unable to conceive children. Give the full form of these procedure and prescribed the right type of technique for couples with problems they face- i) IVF    ii) ET    iii) GIFT    iv) ICSI    v) AI    vi) IUI

- b) What is amniocentesis? Describe the procedure? 3+2
-