

# Sample Paper 1

## Biology (044)

### Class XII Session 2022-23

Time: 3 Hours

Max. Marks: 70

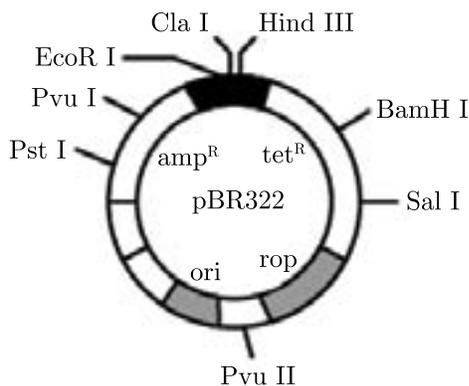
**General Instructions:**

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.
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## SECTION-A

1. C-peptide of human insulin is
  - (a) removed during maturation of pro-insulin to insulin
  - (b) responsible for the formation of disulphide bridge
  - (c) a part of mature insulin molecule
  - (d) responsible for its biological activity
  
2. Atmosphere of earth just before the origin of life consisted of:
  - (a)  $\text{CH}_4$ ,  $\text{NH}_3$ ,  $\text{H}_2$  and water vapours.
  - (b)  $\text{CO}_2$ ,  $\text{NH}_3$ , and  $\text{CH}_2$
  - (c) water vapours,  $\text{CH}_4$ ,  $\text{NH}_3$  and oxygen.
  - (d)  $\text{CH}_4$ ,  $\text{O}_3$ ,  $\text{O}_2$  and water vapours.
  
3. The term 'precipitation' includes
  - (a) rain
  - (b) snow
  - (c) Both (a) and (b)
  - (d) None of them
  
4. Methanogenic bacteria are present in
  - (a) anaerobic sludge
  - (b) rumen (a part of stomach) of cattle
  - (c) Both (a) and (b)
  - (d) None of these

5. Who proposed that the first form of life come from pre-existing non- living molecules?
- (a) Darwin and Lamarck (b) de Vries and Sturtevant  
(c) Oparin and Haldane (d) Louis Pasteur and Miller
6. Asexual reproduction is common among
- (a) single celled organisms only.  
(b) single celled animals, plants and animals with simple organizations.  
(c) animals with simple organization.  
(d) plants only.
7. Which one of the following pair is a purine pair?
- (a) Adenine, Guanine (b) Cytosine, Thymine  
(c) Uracil, Guanine (d) Adenine, Thymine
8. The trigger for activation of toxin of *Bacillus thuringiensis* is
- (a) alkaline pH of gut  
(b) high temperature  
(c) acidic pH of stomach  
(d) mechanical action in the insect gut
9. The law of segregation of characters postulated by Mendel can be related to
- (a) the presence of two genes for each character in a somatic cell.  
(b) presence of both genes on the same chromosome.  
(c) a gamete receiving only one of the two homologous chromosomes during gamete formation.  
(d) None of the above
10. The figure below is the diagrammatic representation of the E.Coli vector pBR 322. Which one of the given options correctly identifies its certain component (s)?



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- (a) ori - original restriction enzyme  
(b) ampR, tetR - antibiotic resistance genes  
(c) Hind III, EcoRI - selectable markers  
(d) rop-reduced osmotic pressure
11. The polymerase enzyme used in PCR is  
(a) DNA polymerase I (b) restriction endonuclease  
(c) reverse transcriptase (d) Taq polymerase
12. Which of the following statement confirm the law of dominance  
(a) Alleles do not show any blending and both characters recovered as such in  $F_2$  generation  
(b) It is the conclusion of a dihybrid cross  
(c) 3:1 ratio in  $F_2$  generation  
(d) Alleles of a pair segregate from each other such that gamete receives only one of the two factors

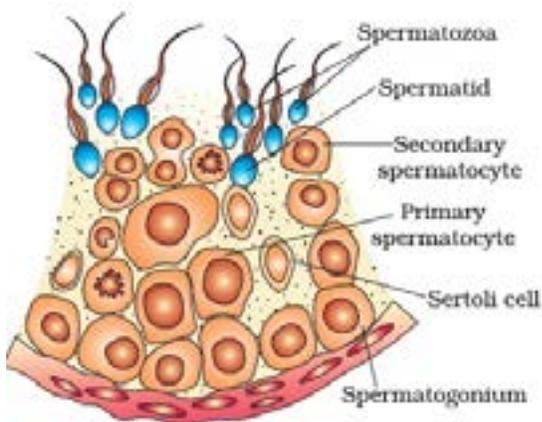
**DIRECTION : Q. No. 13-16: Consist of two statements—Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:**

13. **Assertion:** Phagocyte cells digest microbes and debris  
**Reason:** Natural killer cells destroy virus-infected cells and tumor cells.  
(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.
14. **Assertion:** Hybrid is formed by cross between two organisms that are different in one or more traits.  
**Reason:** Mendel crossed two plants differing in one trait to obtain F1 plants in monohybrid cross.  
(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.
15. **Assertion:** An antibody is a protein molecule made by the lymphocytes.  
**Reason:** An antibody binds to a specific antigen and neutralizes its odd effects.  
(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.

16. **Assertion:** Replication and transcription occur in the nucleus but translation takes place in the cytoplasm.  
**Reason:** mRNA is transferred from the nucleus into cytoplasm where ribosomes and amino acids are available for protein synthesis.
- (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.

## SECTION-B

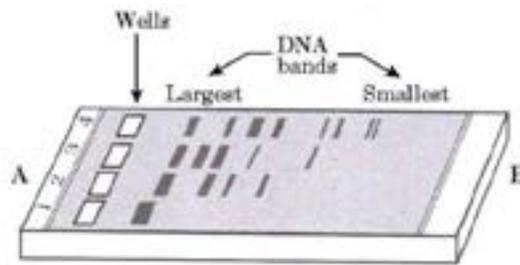
17. State the role of 'biolistic gun' in biotechnology experiments. Microparticles of which elements are used in this technique?
18. A region of a coding DNA strand has the following nucleotide sequence: -ATGC-  
 What shall be the nucleotide sequence in the following?  
 (i) Sister DNA segment it replicates.  
 (ii) m-RNA polynucleotide it transcribes.
19. Refer the figure of a part of seminiferous tubule showing different stages of sperm formation and answer the questions.



- (a) Describe the process of spermatogenesis up to the formation of spermatozoa.  
 (b) Trace the path of spermatozoa from the testes up to the ejaculatory duct only.
20. Define the term 'health'. Mention any two ways of maintaining it.  
**or**  
 Microbes play a dual role when used for sewage treatment as they not only help to retrieve usable water but also generate fuel. Write in points how this happens?
21. Cucurbits and papaya plants bear staminate and pistillate flowers. Mention the categories they are put under separately on the basis of the type of flowers they bear.

## SECTION-C

22. A large number of married couples in the world are childless. It is shocking to know that in India the female partner is often blamed for the couple being childless.
- State any two reasons responsible for the cause of infertility in case of male and female.
  - Suggest a technique that can help the couple to have a child where the problem is with male.
23. Name the organic materials exine and intine of an angiosperm pollen grains are made up of. Explain the role of exine.
24. Explain stirring type bioreactors.
25. Study the diagram given below and answer the following questions.



- Why have DNA fragments in band D moved far away in comparison to those in band C?
  - Identify the anode end in the diagram.
  - How are these DNA fragments visualised.
26. Scientists have succeeded in recovering healthy sugarcane plants from a diseased one.
- Name the part of the plant used as explant by scientists.
  - Describe the procedure the scientists followed by recover the healthy parts.
  - Name the technology used for crop improvement.
27. (a) State the cause and symptoms of Down's syndrome. Name and explain the event responsible for causing this syndrome.
- (b) Haemophilia and Thalassemia are both examples of Mendelian disorder, but show difference in their inheritance pattern. Explain how.
28. Name the ancestors of man based on the features given below:
- Human like, meat-eater with 900 cc brain, lived in Java.
  - More human with brain size 1400 cc, lived in central Asia, used hides and buried their dead.
  - Human like, vegetarian, with brain capacity between 650 cc and 800 cc.

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## SECTION-D

29. Read the following and answer any four questions from 29(i) to 29(iv) given below:

**Ex-Situ Conservation:**

In this approach, threatened animals and plants are taken out from their natural habitat and placed in special setting where they can be protected and given special care. Zoological parks, botanical gardens and wildlife safari parks serve this purpose. There are many animals that have become extinct in the wild but continue to be maintained in zoological parks. In recent years ex situ conservation has advanced beyond keeping threatened species in enclosures.

Now gametes of threatened species can be preserved in viable and fertile condition for long periods using cryopreservation techniques, eggs can be fertilised in vitro, and plants can be propagated using tissue culture methods. Seeds of different genetic strains of commercially important plants can be kept for long periods in seed banks.

Biodiversity knows no political boundaries and its conservation is therefore a collective responsibility of all nations. The historic Convention on Biological Diversity ('The Earth Summit') held in Rio de Janeiro in 1992, called upon all nations to take appropriate measures for conservation of biodiversity and sustainable utilisation of its benefits. In a follow-up, the World Summit on Sustainable Development held in 2002 in Johannesburg, South Africa, 190 countries pledged their commitment to achieve by 2010, a significant reduction in the current rate of biodiversity loss at global, regional and local levels.

- (i) What was the outcome of the 1992 Earth Summit in Rio de Janeiro?
- (ii) For endangered species, Ex-situ conservation is a method that is?
- (iii) Which one of the following is related to ex-situ conservation of threatened animals and plants?
- (iv) World summit on sustainable development of 2002 was held in?

30. Read the following and answer any four questions from 30(i) to 30(iv) given below:

**Microbes in commercial production of Chemicals, enzymes and Bioactive molecule:**

Microbes are also used for commercial and industrial production of certain chemicals like organic acids, alcohols and enzymes. Examples of acid producers are *Aspergillus niger* (a fungus) of citric acid, *Acetobacter aceti* (a bacterium) of acetic acid; *Clostridium butylicum* (a bacterium) of butyric acid and *Lactobacillus* (a bacterium) of lactic acid. Yeast (*Saccharomyces cerevisiae*) is used for commercial production of ethanol. Microbes are also used for production of enzymes.

Lipases are used in detergent formulations and are helpful in removing oily stains from the laundry. You must have noticed that bottled fruit juices bought from the market are clearer as compared to those made at home. This is because the bottled juices are clarified by the use of pectinases and proteases.

Streptokinase produced by the bacterium *Streptococcus* and modified by genetic engineering is used as a 'clot buster' for removing clots from the blood vessels of patients who have undergone myocardial infraction leading to heart attack. Another bioactive molecule, cyclosporin A, that is used as an immunosuppressive agent in organ-transplant patients, is produced by the fungus *Trichoderma polysporum*. Statins produced by the yeast *Monascus purpureus* have been commercialised as blood-cholesterol lowering agents. It acts by competitively inhibiting the enzyme responsible for synthesis of cholesterol.

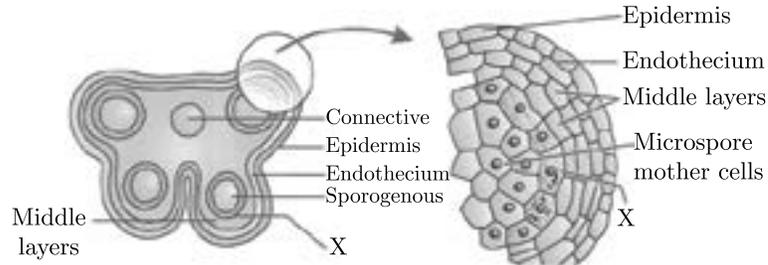
- (i) Which organisms has been Commercialised as blood cholesterol lowering agent?
- (ii) Why bottled fruit juices bought from the market are clearer as compared to those made at home?
- (iii) Identify a, b, c, d, e and fin the given table below

	Organism	Bioactive Molecule	Use
1.	<i>Monascus purpureus</i>	a	b
2.	c	d	Antibiotic
3.	e	Cyclosporin A	f

- (iv) Name the enzyme produced by the bacterium *Streptococcus*?

## SECTION-E

31. (a) "X" part in the given diagram plays an important role in the formation of pollen grain wall. Identify "X" and explain its role in the formation of pollen grain wall.



- (b) Describe the characteristics of flowers that are pollinated by wind.  
 (c) Identify and explain the stage (given below) involved in post-fertilisation event of flowering plants.  
 (i) Transfer of pollen grains  
 (ii) Embryo development  
 (iii) Formation of flower  
 (iv) Formation of pollen grains

or

- (a) Explain the menstrual phase in a human female. State the levels of ovarian and pituitary hormones during this phase.  
 (b) Why is follicular phase in the menstrual cycle also referred as proliferative phase? Explain.  
 (c) Explain the events that occur in a graafian follicle at the time of ovulation and thereafter.

32. (a) Why are thalassemia and haemophilia categorized as Mendelian disorders? Write the symptoms of these diseases. Explain their pattern of inheritance in humans.  
 (b) Write the genotypes of the normal parents producing a haemophilic son.

or

Describe the experiment that helped demonstrate the semi-conservative mode of DNA replication.

33. How is biodiversity at all levels generally conserved?

or

What kind of threat to biodiversity may lead to its loss?

□□□□□□

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