



विद्या सर्वार्थ साधिका

ANANDALAYA  
PERIODIC TEST - 2  
Class: XII

Subject: Biology  
Date : 26-09-2022

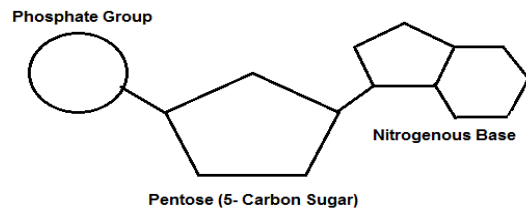
MM :70  
Time: 3 hours

General Instructions:

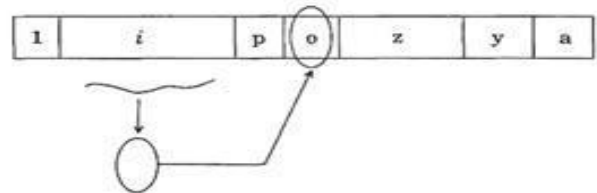
1. There are 32 questions in this question paper. All questions are compulsory.
2. Section A has 5 Very short questions, 5 Multiple Choice Questions and 4 Assertion & Reason questions carrying one mark each. Section B has 2 Case based questions carrying 5 marks each, Section C has 8 questions each of 2 marks, Section D has 5 questions each of 3 marks and Section E has 3 questions each of 5 marks.
3. There is no overall choice. However, an internal choice has been provided in two questions of five marks. You have to attempt only one of the choices in such questions.
4. Wherever necessary neat and labelled diagrams should be drawn.

SECTION A

1. Mention the carbon positions in which nitrogenous base and phosphate molecule are respectively linked in the nucleotide given: (1)



2. What is the difference between a primary oocyte and secondary oocyte? (1)
3. Name the scientists who rediscovered Mendel's results and mention the year of rediscovery. (1)
4. Given below is a schematic representation of a lac operon in the absence of an inducer. Identify 'i' and inducer in this operon. (1)



5. Write a situation where amniocentesis and MTP is recommended by gynaecologist. (1)
6. In a breeding experiment, the selected male parent is diploid and the female parent is tetraploid. What will be the ploidy of the endosperm after double fertilisation? (1)  
(A) Diploid (B) Tetraploid (C) Triploid (D) Pentaploid
7. A DNA molecule is 160 base pairs long. It has 30% Guanine. How many Adenine bases are present in this DNA molecule? (1)  
(A) 48 (B) 64 (C) 96 (D) 192
8. The best description of natural selection is \_\_\_\_\_. (1)  
(A) the survival of the fittest  
(B) the struggle for existence  
(C) the reproductive success of the members of a population  
(D) a change in the proportion of variation within a population
9. What would be the RNA sequence transcribed from the given DNA template strand base sequence 5'-GGTTTAACGA-3'? (1)  
(A) 5'-CCAAATTGCT-3' (C) 5'-UCGUUAAACC-3'  
(B) 3'-GGTTTAACGA-5' (D) 3'-CCAAATTGCT-5'

10. Which one of the following is not a plasmid? (1)  
(A) Sal I (B) YAC (C) Pbr 322 (D) BAC

For question numbers 11, 12, 13 and 14, two statements are given-one labelled Assertion and the other labelled Reason. Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.

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

(B) Both Assertion and Reason are true but Reason is NOT the correct explanation of Assertion

(C) Assertion is true but Reason is false.

(D) Both Assertion and Reason are false.

11. Assertion: Family planning is an action plan to attain reproductive health among people. (1)  
Reason: Improved programmes covering reproduction related areas were propagated by RCH to create awareness.
12. Assertion: Substitution of Glutamine by Valine at the sixth position of the beta globin chain of haemoglobin leads to sickle cell anaemia in humans. (1)  
Reason: Deletions and insertions of base pairs in DNA cause frame shift mutations.
13. Assertion: In certain birds, the females are heterogametic and males are homogametic. (1)  
Reason: A gamete contains a single allele for a trait and is pure for the trait.
14. Assertion: During gel electrophoresis, the DNA fragments move towards the anode. (1)  
Reason: DNA is a negatively charged macromolecule.

### SECTION B

15. Read the following passage and answer the questions: (5)  
Experiments involving cloning genes and expressing proteins require the use of host cells to receive the foreign cloned gene. In some experiments, prokaryotes such as *E.coli*, *Bacillus subtilis* and eukaryotic *Saccharomyces cerevisiae* are used as host cells in DNA cloning. Many cells can be converted into biochemical factories using rDNA technology to produce various kinds of biomolecules. Fortunately, humans have become very experienced at cultivating microbes cheaply and efficiently on large and small production scales.
- (i) The most commonly used microbe in biotechnology is \_\_\_\_\_.  
(A) *E.coli* (B) *Bacillus subtilis* (C) *Lactobacillus* (D) *Saccharomyces cerevisiae*
- (ii) Over the centuries, brewers and bakers have learned to employ yeast cells to manufacture house hold products such as \_\_\_\_\_.  
(A) Wheat Bread, Idli, Roquefort cheese  
(B) Bread, Swiss cheese, Toddy  
(C) Dosa, Idli, Multi-grained Bread  
(D) Insulin, Wheat Bread, Antibiotics
- (iii) Ti plasmid that is used as a plant vector is obtained from \_\_\_\_\_.  
(A) *Agrobacterium tumefaciens* (B) *Agrobacterium rhizogenes* (C) *Agrobacterium radiobactor* (D) *Agrobacterium tumebacter*
- (iv) The preferred and widely used host cells for DNA cloning and producing various biomolecules is \_\_\_\_\_.  
(A) T4 Bacteriophage (B) *Escherichia coli* (C) *Agrobacterium tumefaciens* (D) Bacteriophage lambda

- (v) The most common product made by certain bacteria having a great impact on human health is \_\_\_\_.
- (A) Antibiotics (C) Enzymes  
(B) Bioactive molecules (D) Fermented drinks

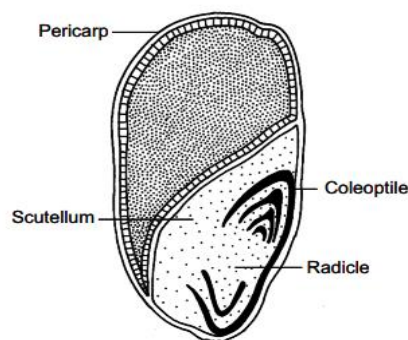
16. Read the passage and answer the questions: (5)

In Angiosperms, the ovary may have one ovule or many. After fertilisation the ovules transform into seeds and the ovary develops into a fruit. It is observed that these two processes occur simultaneously. The fruits may be fleshy or dry fruits. The fruits may be true fruits or false fruits while some others may be parthenocarpy. Plants produce growth regulators as well inhibitors to promote growth and development throughout their life as and when required. Seedless fruits can be induced to develop by the application of auxins and gibberellins. At times the raw fruits are exposed to plant regulators for ripening process.

- (i) The development of fruits without fertilisation of the ovary is called \_\_\_\_.
- (A) parthenogenesis (C) parthenocarpy  
(B) agamospermy (D) apomixis
- (ii) Strawberry and Guava are referred as false fruit as the fruit develops from \_\_\_\_.
- (A) Ovary wall (C) Pedicle  
(B) Thalamus (D) Calyx
- (iii) An example of naturally occurring parthenocarpic fruit is \_\_\_\_.
- (A) Guava (C) Banana  
(B) Apple (D) Mango
- (iv) The reason why fruits do not ripen after harvesting is \_\_\_\_.
- (A) Less production of gaseous ethylene hormone  
(B) Harvested too early due to harsh climatic conditions  
(C) Excess production of auxin hormone  
(D) The plant is diseased and has stunted growth

(v) Look at the diagram given below and select the incorrect option about the pericarp of it:

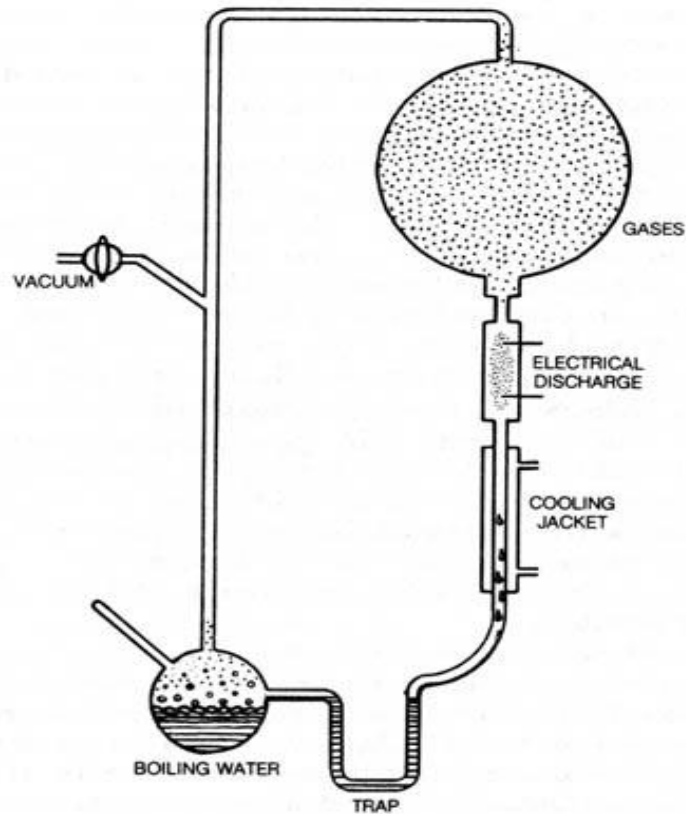
- (A) Pericarp represent the fruit wall  
(B) Seed coat is fused with pericarp  
(C) Pericarp located inside the grain  
(D) Pericarp is incomplete due to single cotyledon in the grain



### SECTION C

17. In a mango seed has one embryo whereas when an orange seed is squeezed many embryos of different sizes and shapes are seen. Which phenomenon led to such condition and explain how it has happened? (2)
18. Draw and label the parts of the head region only of a human sperm. (2)
19. Work out a cross up to F<sub>2</sub> generation between two pure-bred pea plants, one bearing violet flowers and the other white flowers. Name the Mendelian law that can be derived from such a cross. (2)

20. The figure given below represents Miller's apparatus used for his experiment. His apparatus represented the primitive conditions of the earth before the origin of life on it. (2)

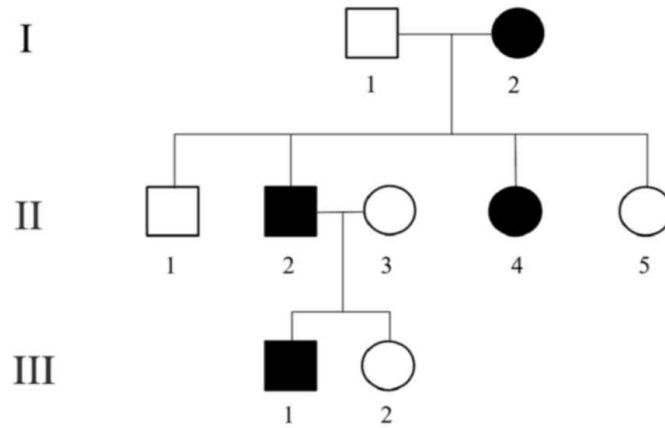


- (a) Identify the primitive conditions represented by parts labelled as 'Boiling water' and 'Gases'.
- (b) Name the molecules that were formed during this experiment. What did Miller prove from this experiment?
21. Write the type of sex determination mechanism, the following crosses show. Give an example of each type. (2)
- (a) Female XX and male XO
- (b) Female ZW and male ZZ
22. A red eyed heterozygous female fruit-fly, *Drosophila melanogaster* is crossed with a white-eyed male. Work out the possible genotypes and phenotypes of the progeny. (2)
23. DNA being hydrophilic, cannot pass through the cell membrane of a host cell. Explain any two methods that are used to introduce the recombinant DNA into the host cell. (2)
24. A and B are the two different cloning vectors in two different bacterial colonies cultured in chromogenic substrate. Bacterial colonies with cloning vector A were colourless, whereas those with B were blue-coloured. Write the scientific reason for the cause of the difference in colour that appeared in bacterial colonies. (2)

#### SECTION D

25. (a) Which two types of flowers produced by *Viola*. How do they differ from each other? (3)
- (b) Name and describe the type of pollination that occurs in *Vallisneria*.

26. Study the pedigree chart and answer the questions given below: (3)



- (a) Is the trait recessive or dominant?  
 (b) Is the trait sex-linked or autosomal?  
 (c) Give the genotypes of the parents shown in generation I and of their second child in generation II and III
27. Explain the phenomena of co-dominance and multiple allelism, taking human ABO blood group as an example. (3)
28. (a) Differentiate between analogous and homologous structures. (3)  
 (b) Identify the analogous structures from given below:  
 (i) Wings of butterfly and birds  
 (ii) Vertebrate hearts  
 (iii) Tendrils of *Bougainvillea* and Cucurbita  
 (iv) Tubers of sweet potato and potato
29. (a) Write the palindromic nucleotide sequence for the following DNA segment: (3)  
 $5' - GAATTC - 3'$   
 (b) Name the molecular scissors that recognises this sequence.  
 (c) How are sticky ends produced? Mention their role.

### SECTION E

30. (a) Explain the process of microsporogenesis in angiosperms. (5)  
 (b) Draw a labelled diagram of a mature pollen grain.
- OR**
- (a) Give a schematic representation of oogenesis in humans. Mention the number of chromosomes at each stage.  
 (b) Explain the role of pituitary and ovarian hormones during oogenesis.
31. (a) Describe Meselson and Stahl's experiment that was carried out in 1958 on *E.coli*. (5)  
 (b) Write the conclusion they arrived at, after the experiment.
32. (a) Explain Darwinian theory of evolution with the help of an example (5)  
 (b) State the two key concepts of the theory.

### OR

Transcription in eukaryotes is more complex process than in prokaryotes. Explain the process of transcription that occurs in bacteria.