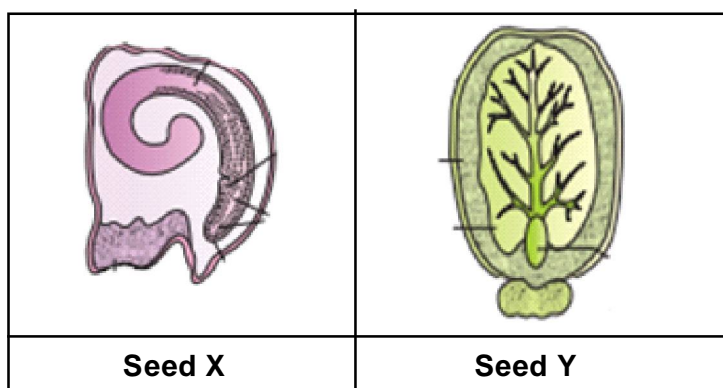


**General instructions :**

- (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****12 × 1 = 12**

1. Which of the following statements are true related to Seed X and Y.



- i) Seed X is monocot and endospermic or albuminous.
- ii) Seed X is dicot and non-endospermic or non-albuminous.
- iii) Seed Y is monocot and endospermic or albuminous.
- iv) Seed Y is dicot and endospermic or albuminous.

Choose the correct option with the respect to the nature of the seed

- a) (i), (iii)                      b) (ii), (iii)                      c) (i), (iv)                      d) (ii), (iv)
2. A molecule that can act as genetic material must fulfill the traits given below, except
    - a) It should be unstable structurally and chemically
    - b) It should provide the scope for slow changes that are required for evolution
    - c) It should be able to express itself in the form of 'Mendelian characters'.
    - d) It should be able to generate its replica
  3. The common cold is caused by
 

a) Rhino viruses	b) <i>Streptococcus pneumoniae</i>
c) <i>Wuchereria</i>	d) <i>Plasmodium vivax</i> .

4. During sewage treatment, 'flocs' formed are allowed to settling tanks. This sediment is called
- a) Primary sludge   b) Activated sludge   c) Anaerobic sludge   d) Inactive sludge
5. In E.coli, the lac operon gets switched off when
- a) Repressor binds to operator                      b) Lactose binds to the repressor
- c) RNA polymerase binds to the promoter        d) Lactose binds to the operator gene
6. Match the following column of bioactive substances and their roles.

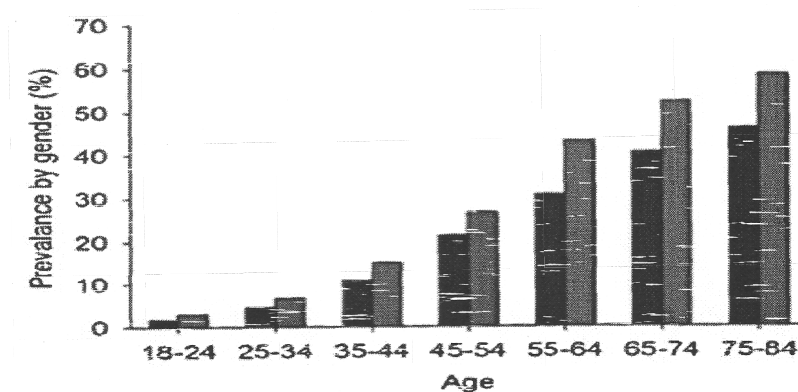
Column I (Bioactive Substance)	Column II (Role)
A. Statin	1. Removal of oil stains
B. Cyclosporin A	2. Removal of clots from blood vessels
C. Streptokinase	3. Lowering of blood cholesterol
D. Lipase	4. Immuno-suppressive agent

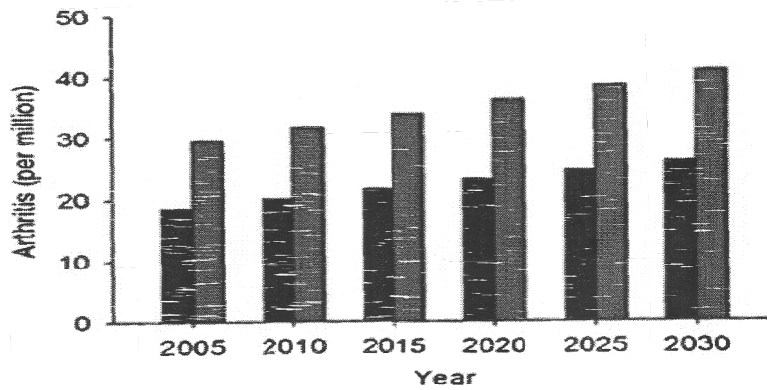
Choose the correct match

Codes

- |    |   |   |   |   |    |   |   |   |   |
|----|---|---|---|---|----|---|---|---|---|
| A  | B | C | D | A | B  | C | D |   |   |
| a) | 2 | 3 | 1 | 4 | b) | 4 | 2 | 1 | 3 |
| c) | 4 | 1 | 3 | 2 | d) | 1 | 2 | 3 | 4 |

7. The most accepted line of descent in human evolution is
- a) Australopithecus → Ramapithecus → Homo sapiens → Homo habilis
- b) Homo erectus → Homo habilis → Homo sapiens
- c) Ramapithecus → Homo habilis → Homo sapiens
- d) Australopithecus → Ramapithecus → Homo erectus → Homo habilis → Homo sapiens
8. Which of the following statements indicates the Parallelism in Genes and Chromosomes?
- I) They occurs in pairs                      II) They segregate during the gamete formation
- III) They shows linkage                      IV) The independent pairs segregate independently
- a) I and III                      b) II and III                      c) I, III and III                      d) I, II and IV
9. Prevalence of arthritis by age group for US men (blue) and women (pink) in 2003-2005 (top panel) and current and projected prevalence of arthritis for US men and women (bottom panel). The graphs are based on data from the Centres for Disease Control website.





From the above diagram, what exactly we get inference?

- Arthritis increases as the age increases
- Arthritis decreases as the age increases
- Arthritis increases as the age increases in men and women
- Arthritis decreases as the age increases in men and women

10. Match the items in column I with the items in column II.

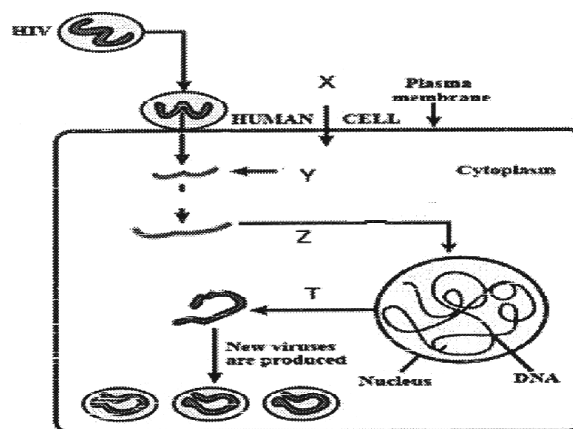
Column I	Column II
A. Remains of nucellus in a seed	1) scutellum
B. Formation of seed without fertilisation	2) Perisperm
C. Cotyledon in the seeds of grasses	3) Polyembryony
D. Occurrence of more than one embryo in a seed	4) Apomixis

- A-1, B-2, C-3, D-4
- A-2, B-1, C-4, D-3
- A-2, B-4, C-1, D-3
- A-4, B-3, C-1, D-2

11. The study of family history about the inheritance of a particular trait in several generations of a family.

- Hybridization
- Mutations
- Aberrations
- Pedigree analysis

12. Identify the correct sequence of HIV life cycle from the Depicted diagram.



- New viral RNA is produced by the infected cell, Viral DNA incorporates into host cell, Viral RNA is introduced into cell, Virus infects normal cell.

- b) Virus infects normal cell, Viral RNA is introduced into cell, Viral DNA incorporates into host cell, New viral RNA is produced by the infected cell.
- c) Virus infects normal cell, Viral DNA incorporates into host cell, Viral RNA is introduced into cell, New viral RNA is produced by the infected cell.
- d) New viral RNA is produced by the infected cell, Virus infects normal cell, Viral RNA is introduced into cell, Viral DNA incorporates into host cell.

**For question numbers 13, 14, 15 and 16, two statements are given-one labelled Assertion(A) and the other labelled Reason(R). Select the correct answer to these questions from the options given below. 4**

- 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.
13. **Assertion** : Replication and transcription occur in the nucleus but translation occur in the cytoplasm.  
**Reason** : mRNA is transferred from the nucleus in to the cytoplasm where ribosomes and amino acids are available for protein synthesis.
14. **Assertion** : In a monohybrid cross, only dominant characters exhibit themselves in the F<sub>1</sub> generation.  
**Reason** : Dominant trait is expressed only in the heterozygous condition.
15. **Assertion** : Primary transcripts in eukaryotes are nonfunctional.  
**Reason** : Methyl guanosine triphosphate is attached to 5' – end of hnRNA.
16. **Assertion** : Wine and beer are formed without distillation.  
**Reason** : Distillation decreases the alcohol content.

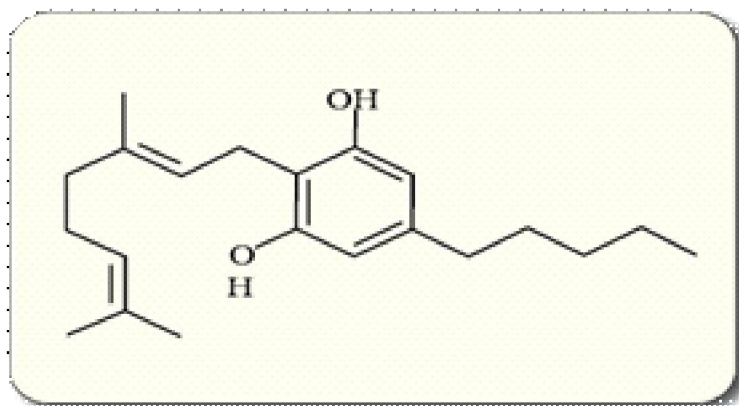
### SECTION - B

17. A cross was carried out between between two plants showing the contrasting traits of height of the plant. The result of the cross showed 1:1 ratio of parental traits. **2**
- a) Work out the cross with the help of Punnet square.
  - b) Name the type of cross carried out.
18. Who proposed the 'chromosomal theory of inheritance'. List the conclusions they brought forth after observing chromosomal movement. **2**

**OR**

- With the help of an example explain the situation where the F<sub>1</sub> generation does not resemble either of the parents. What is this phenomenon known as? Why is it not known as blending?
19. Explain the dual function of AUG. Give the sequence of bases it is transcribed from and its anticodon. **2**
20. How do homologous organs represent divergent evolution? Explain with help of a suitable example. **2**

21. The chemical structure of a widely used drug by human being is given. Answer the following related questions. 2



- a) Mention the accurate name of the chemical structure of the given drug.  
b) What is the source of this drug?

### SECTION - C

22. a) Name the causative agents of pneumonia and common cold.  
b) How do they differ in their symptoms?  
c) Mention two symptoms common to both. 3
23. a) Why is human ABO blood group gene considered a good example of multiple alleles?  
b) Work out a cross up to  $F_1$  generation only, between a mother with blood group A (Homozygous) and the father with blood group B (Homozygous). Explain the pattern of inheritance exhibited. 3
24. Mention the product produced and its use by each of the microbes listed below.  
i. *Penicillium notatum*      ii. *Lactobacillus*      iii. *Trichoderma polysporum* 3
25. A boy when brought a pet dog home, started to complain of watery eyes and running nose. The symptoms disappeared when the boy was kept away from the pet.  
a) Mention the reason for appearance of such symptoms. 3  
b) Name the type of antibody and the chemicals responsible for such a response in the boy.  
c) Name a drug that could be given to the boy for immediate relief from such a response.
26. Describe the experiment with *Streptococcus pneumoniae* that demonstrated the existence of some 'transforming principle'. 3

### OR

Answer the following questions based on Meselson and Stahl's experiment.

- a) Write the name of the chemical substance used as a source of nitrogen in the experiment by them.  
b) Why did the scientists synthesise the light and heavy DNA molecules in the organism used in the experiment ?

- c) How did the scientists make it possible to distinguish the heavy DNA molecule from the light DNA molecule? Explain.
- d) Write the conclusion the scientists arrived at after completing the experiment.
27. Enumerate three most characteristic criteria for designating a Mendelian population. **3**
28. a) A patient suffering from Coronary artery disease (CAD) was advised to take bioactive agents to improve his health. Name two such bioactive agents beneficial for CAD and their mode of action. **3**
- b) Mention the contributions of S.L Miller's experiments on Origin of Life.

#### SECTION - D

29. The picture given below shows a *Commelina* plant, bearing two types of bisexual flowers, an adaptation for assured seed set as well as genetic variation in the progeny. **4**



- a) Name the type of flowers 'A' and 'B', respectively.
- b) Name two other plants which also bear these two types of flowers on the same plant.
- c) Mention the type(s) of pollination that can occur in flower type 'B'. List one advantage and disadvantage.

**OR**

- d) Mention the type(s) of pollination that can occur in flower type 'A'.
30. **Read the following and answer any four questions from (i) to (iv) given below. 4**

Microbes or microorganisms form a big part of the biological systems of the world. They are present everywhere-within the soil, around us, in water, both in and around our body. They are microscopic in nature and have variable shapes and sizes. People are of the belief that all microorganisms are harmful for us. However, it is to be made sure that not all microbes are harmful, some useful microbes benefit humans in a variety of ways.

Microbes and their products are used in everyday life in different fields of work. Surprisingly, microbes like fungi and bacteria can be cultured in laboratory on nutritive media to form colonies.

- i) Microorganisms are termed as 'ubiquitous'. Explain.
- ii) Name the different types of microorganisms.
- iii) There is no life without microorganisms? Discuss.

**OR**

- iv) Explain the role of microorganisms in various fields. (Any two)

**SECTION - E**

31. a) Work out a dihybrid cross up to  $F_2$  generation between pea plants bearing violet coloured axial flowers and white coloured terminal flowers. Give their phenotypic ratio.
- b) State the law of inheritance that was derived from such a cross. **5**

**OR**

What is the inheritance pattern observed in the size of starch grains and seed shape of *Pisum sativum*? Work out the monohybrid cross showing the above traits. How does this pattern of inheritance deviate from that of Mendelian pattern of inheritance?

32. a) Trace the life cycle of a malarial parasite.
- b) Name the infectious stage of the malarial parasite. **5**

**OR**

A person in your colony has recently been diagnosed with AIDS. People/ residents in the colony want him to leave the colony for the fear of spread of AIDS.

- a) Write your view on the situation, giving reasons.
  - b) List the possible preventive measures that you would suggest to the residents of your locality in a meeting organised by you so that they understand the situation.
  - c) Write the symptoms and causative agents of AIDS.
33. a) When and where are primary oocytes formed in a human female? **5**
  - b) Describe the process of oogenesis in human females.

**OR**

- a) When and how does placenta develop in human females?
- b) How is placenta connected to the embryo ?
- c) Placenta acts as an endocrine gland. Explain.