विद्या सर्वार्थि साधिका

ANANDALAYA

PERIODIC TEST -1

Class : XII

Subject: Biology (044) MM : 40

Date : 18-07-2025 Time: 1 Hr. 30 min.

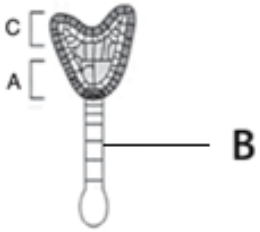
General Instructions:

1. There are 20 questions in all. All questions are compulsory.
2. This question paper has five sections: Section A, Section B, Section C, Section D and Section E. All the sections are compulsory.
3. Section A consists of twelve MCQs of 1 mark each, Section B consists of two questions of 2 marks each, Section C consists of two questions of 3 marks each, Section D consists of two long questions of 5 marks each and Section E consists of two case-based questions of 4 marks each.
4. There is no overall choice. However, an internal choice has been provided in section D and E. You must attempt only one of the choices in such questions.

SECTION A

1. Which of the following hormonal pair is not secreted by the human placenta? (1)
   (A) hCG and progesterone (B) hPL and PGH
   (C) GH and LH (D) oestrogen and progesterone

2. The picture represents one of the embryonic development stages in a dicot plant. Identify the part labelled as B. (1)
   (A) Radicle
   (B) Cotyledons
   (C) Plumule
   (D) Suspensor



3. Match Column I with Column II and select the correct option: (1)

Column I	Column II
(i) Syncarpous ovary	(P) Occurrence of more embryos in a seed
(ii) Polyembryony	(Q) Carpels in a flower are fused together
(iii) Apomixis	(R) Removal of stamens from the bisexual flower bud
(iv) Emasculation	(S) Formation of seeds without fertilisation

   (A) (i) – (P); (ii) – (Q); (iii) – (R); (iv) – (S) (B) (i) – (Q); (ii) – (P); (iii) – (S); (iv) – (R)
   (C) (i) – (P); (ii) – (Q); (iii) – (S); (iv) – (R) (D) (i) – (Q); (ii) – (P); (iii) – (R); (iv) – (S)

4. At what point does the secondary oocyte complete meiosis? (1)
   (A) when acrosomal enzymes begin to break down the egg's jelly coat
   (B) when the luteinizing hormone triggers ovulation
   (C) after it is penetrated by a sperm cell
   (D) when the secondary oocyte implants in the endometrium of the uterus

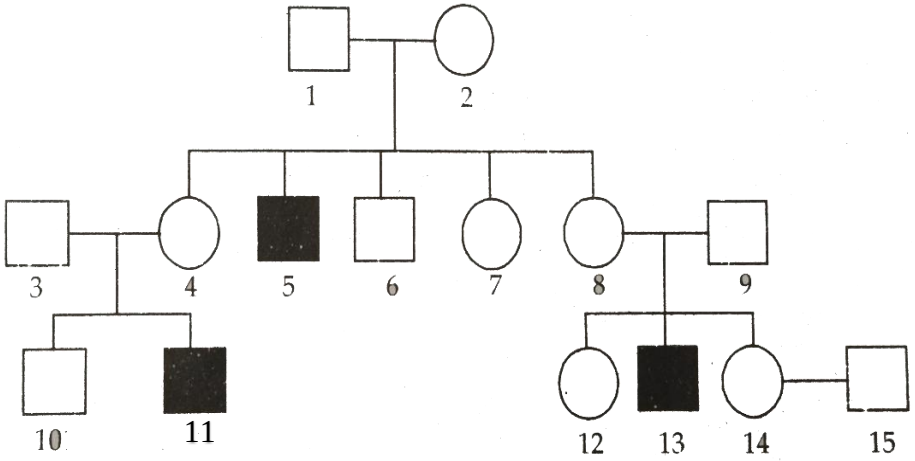
5. Which of these Assisted Reproductive Technology (ART) is less effective, where male partner is infertile due to a very low sperm count? (1)
   (A) ICSI (B) IUI (C) GIFT (D) IVF

6. Down's Syndrome is due to _____. (1)
   (A) crossing over and recombination (B) linkage and no recombination
   (C) non-disjunction of chromosome (D) Sex-linked inheritance

7. The correct sequence of the various phases of a typical menstrual cycle is: (1)
(A) Menstrual ⟶ Follicular ⟶ Secretory ⟶ Ovulatory
(B) Menstrual ⟶ Follicular ⟶ Ovulatory ⟶ Secretory
(C) Ovulatory ⟶ Follicular ⟶ Secretory ⟶ Menstrual
(D) Menstrual ⟶ Secretory ⟶ Follicular ⟶ Ovulatory

8. If you were to sample garden pea plants in Mendel's monastery garden, which of the following statements would be the correct data? (1)
(A) Violet flowers were more abundant than white flowers
(B) White flowers were more abundant than violet flowers
(C) Both white and violet were equal in number
(D) White, violet and pink flowers were equal in number

9. The pedigree chart given below shows the inheritance pattern of haemophilia in a family. What would be the possible genotype combination of symbols marked as 1 and 2. (1)



(A) X Y – X X (B) X Y- X^h X (C) X Y- X^h X^h (D) X^h Y- X^h X

10. If a colourblind woman marries a normal man, their children will be _____. (1)
(A) Normal daughters and sons (B) Normal sons and carrier daughters
(C) Colourblind sons and carrier daughters (D) Colour blind sons and daughters

For question numbers 11 and 12, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (A), (B), (C) and (D) as given below.
(A) Both A and R are true and R is the correct explanation of A.
(B) Both A and R are true but R is not the correct explanation of A.
(C) A is true but R is false
(D) A is false and R is true.

11. (A): Anemophily is directional because wind disperses pollen grains. (1)
(R): Entomophily is highly specific and directional unlike anemophily.

12. (A): Zygote is the only cell that gives a vital link between two generations of an organism. (1)
(R): The two gametes fuse to form a single zygote.

SECTION B

13. Explain any two methods of Assisted Reproductive Technology (ART) that has helped childless couples to bear children. (2)

14. How is the entry of only one sperm and not many ensured into an ovum during fertilization in humans? (2)

SECTION C

15. Women are often blamed for producing female children. Consequently, they are ill-treated and ostracized. How would you address the issue scientifically if you were to conduct an awareness programme to highlight the science involved? (3)

16. Write the scientific reason for the following statements: (3)
(a) The flower of Brinjal is referred to as chasmogamous, while that of Bean is cleistogamous.
(b) Coconut Palm is monoecious while Date Palm is dioecious.
(c) The structure of a typical embryo sac found in flowering plants is said to be monosporic.

SECTION D

17. (a) When and where does spermatogenesis occur in a human male? (5)
(b) Draw a diagram of a mature human male gamete and label the following parts:
(i) Acrosome (ii) Nucleus (iii) Middle piece (iv) Tail.
(c) Mention the function of the acrosome and the middle piece in fertilisation process.

OR

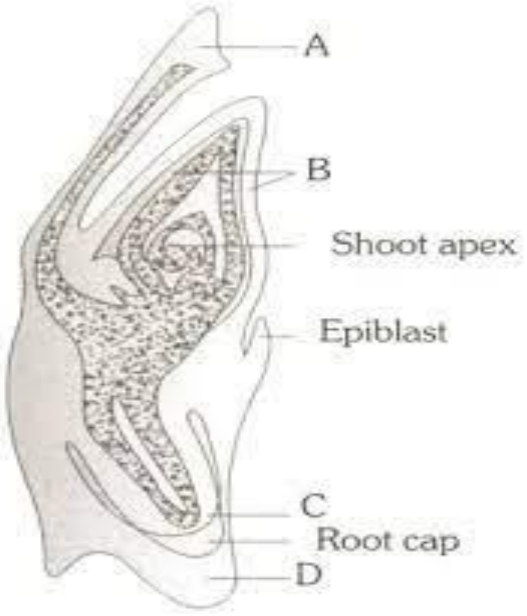
Explain ovarian and uterine events during the menstrual cycle under the influence of pituitary and ovarian hormones.

18. (a) Why is the process of fertilization in angiosperms termed as double fertilization? Explain it with the help of a schematic diagram. (5)
(b) Draw a diagram of an angiosperm embryo sac where fertilization is just completed and label the following parts:
(i) Micropylar end of the embryo sac (ii) Part that develops into an embryo
(iii) Part that develops into an endosperm (iv) The degenerating cells at the chalazal end

SECTION E

Questions 19 and 20 are case based questions and are compulsory. Each question carries 4 marks.

19. An Embryo develops at the micropylar end of the embryo sac, where the zygote is situated. Most zygotes are divided only after a certain amount of endosperm is formed. The early stages of embryo development are similar in both monocotyledons and dicotyledons. The zygote gives rise to the proembryo and subsequently to the globular heart-shaped and mature embryo. A typical dicotyledonous embryo consists of an embryonal axis and two cotyledons. Embryos of monocotyledons possess only one cotyledon.
(i) Name the parts labelled as A and B in the given diagram of the embryo of an angiosperm. (1)



(i) Arrange the following parts of an embryonal axis of a dicot seed from top to base. (1)

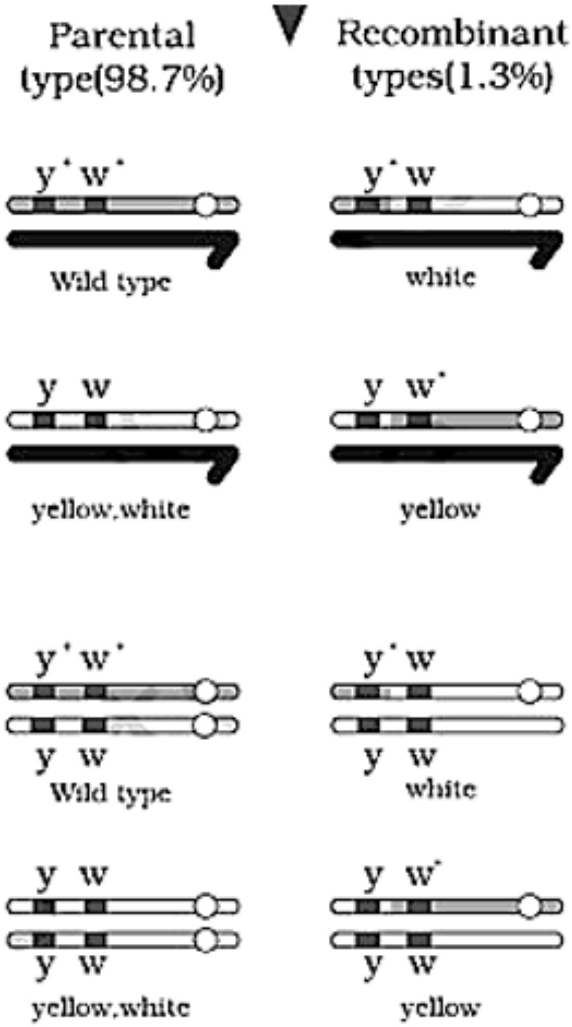
Hypocotyl	Epicotyl	Radicle	Plumule

(iii) What is the role of the endosperm in embryonic development in dicots? (2)

OR

(iv) If you squeeze an orange seed, you might observe many embryos of different sizes. How is it possible? Explain.

20. During a study of the inheritance of two genes, Thomas Morgan crossed the white-eyed, yellow-bodied female Drosophila with a red-eyed, brown-bodied male Drosophila (i.e., wild). He observed that progenies in F_2 generation had 1.3 percent recombinants and 98.7 percent parental type combinations. The experimental cross with results is shown in the given figure. [Note: Dominant wild-type alleles are represented with a (+) sign in superscript.]



(i) What is the relationship between linkage and recombination frequency? (1)

(ii) Name two factors that affect linkage. (1)

(iii) What are the conclusions drawn by T.H. Morgan from this experiment in Drosophila about linkage? (2)

OR

(iv) Define linked genes and explain its significance in inheritance.