BUDHA DAL PUBLIC SCHOOL, PATIALA
First Term Examination (21 September 2023)
Class XII (Science)
Subject - Biology
(Set - B)

Time: 3hrs. M.M. 70

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.**

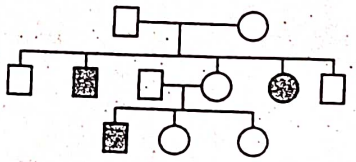
Section - A

Q1. In a fertilized ovule, n, 2n and 3n conditions occur respectively in :
a) Antipodal, zygote and endosperm
b) Zygote, nucellus and endosperm
c) Endosperm, nucellus and zygote
d) Antipodals, synergids and integuments

Q2. During parturition, a pregnant woman is having prolonged labour pains and child birth has to be fastened. It is advisable to administer a hormone that can
a) Increase the metablotic rate
b) Release glucose in blood
c) Stimulate the ovary
d) Activate smooth muscles

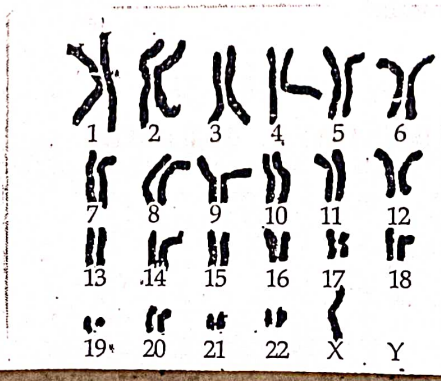
Q3. Listed below are all reproductive tract infections except :
a) Genital herpes b) Filariasis c) Trichomoniasis d) Syphilis

Q4. Study the pedigree chart given below :



What does it show
a) Inheritance of sex-linked in born error of metabolism like phenylketonuria
b) Inheritance of a condition like phenylketonuria as an autosomal recessive trait
c) The pedigree chart is wrong as it is not possible
d) Inheritance of a recessive sex-linked disease like haemophilia

Q5. Given below is a karyotype of a human foetus obtained for screening to find any probable genetic disorder.



B-1

Based on the Karyotype, the chromosomal disorder detected in unborn foetus and the consequent symptoms the child may suffer from are :

a) Turner's syndrome' sterile ovaries, short stature
b) Down's syndrome; Gynecomastia, overall masculine stature
c) Turner's syndrome; small round head, flat back of head
d) Down's syndrome; Furrowed tongue, short stature

Q6. A DNA molecule is 160 base pairs long, if it has 30% cytosine, how many adenine bases are present in this DNA molecule?

a) 48 b) 64 c) 96 d) 192

Q7. Match the following :

A) β-galactosidase	1. Joining DNA fragments
B) Permease	2. Peptide bond formation
C) Ligase	3. Hydrolysis of lactose
D) Ribozyme	4. Increase permeability to β- galactosidase

a) A = 2, B = 1, C = 4, D = 3 b) A = 3, B = 4, C = 1, D = 2
c) A = 2, B = 4, C = 1, D = 3 d) A = 1, B = 2, C = 4, D = 3

Q8. Choose the correct series of human evolution :

a) Dryopithecus → Homo erectus → Australopithecus → Cromagnonman
b) Australopithecus → Homo erectus → Neanderthal → Homo sapiens
c) Australopithecus → Ramapithecus → Dryopithecus → Homo sapiens
d) Homo erectus → Australopithecus → Cromagnon → Neanderthal

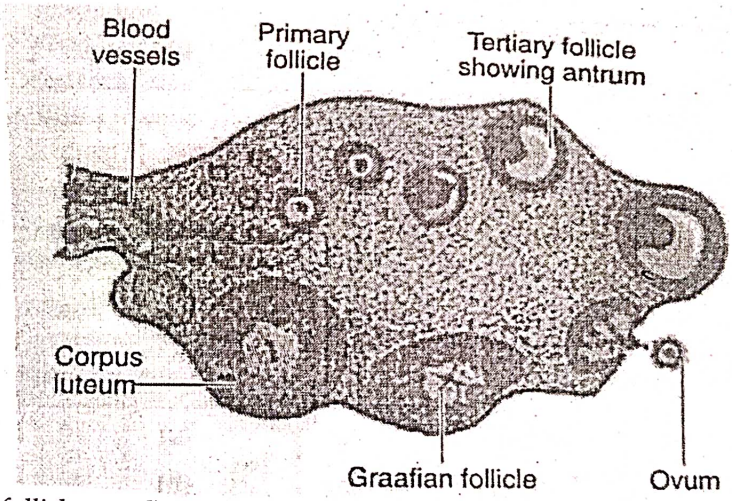
Q9. Variations during mutations of meiotic recombinations are

a) Random and directionless b) random and directional
c) random and small d) random, small and directional

Q10. Choose the option that gives the correct number of pollen grains that will be formed after 225 microspore mother cells undergo microsporogenesis.

a) 900 b) 950 c) 975 d) 225

Q11. Identify the wrongly labelled part



a) Primary follicle b) ovum c) graafian follicle d) corpus luteum

Q12. Following statements are given regarding MTP.
Choose the correct options given below -

i) MTPs are generally advised during first trimester.
ii) MTPs are used as contraceptive method
iii) MTPs are always surgical
iv) MTPs require the assistance of qualified medical personnel

a) (ii) and (i) b) (ii) and (iv) c) (i) and (iv) d) (i) and (ii)

Each of the following questions (Q.No. 13 to Q.No 16) consists of two statements, one is Assertion (A) and the other is Reason (R). Give answer:

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

Q13. Assertion : Perisperm is a haploid tissue.
Reason : Perisperm is the remains of nucellus which surround the embryo in certain seeds.

Q14. Assertion : The morning after pill has been called the miracle pill.
Reason : It is taken by a woman in early morning to prevent pregnancy.

Q15. Assertion : 80% of base sequences among humans are same.
Reason : Humans have 0.1% of genome or 3×10^6 differences in the base sequence.

Q16. Assertion : In birds, females are heterogametic and males are homogametic.
Reason : In birds, females hae ZW sex chromosomes and males have ZZ sex chromosome.

Section - B

Q17. A pollen grain in angiosperm at the time of dehiscence from an anther could be 2 - celled or 3 - celled. Explain. How are cells placed within the pollen grain when shed at a 2 - celled stage?

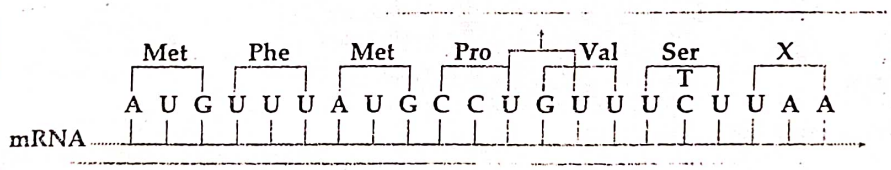
Q18. Give reason -

a) Role of oxytocin during expulsion of the baby out of uterus.
b) What is the function of zona pellucida layer?

Q19. Copper ions - releasing IUDs are more efficient than non - medicated methods. Why?

Q20. A normal man marries a woman who is carrier of haemophilia. What will be the phenotypes of the children born to them? Depict the phenotype through a cross.

Q21. Read the sequence of the nucleotides in the given segment of mRNA and the respective amino acid sequence in the poly peptide chain.



Polypepide : methionine → phenylalanine → methionine → proline → valine → serine

a) Write the nucleotide sequence of the DNA strand from which this mRNA was transcribed.
b) What does the last codon (X) for this RNA stand for?

Section - C

Q22. a) Differentiate between analogous and homologous structures.

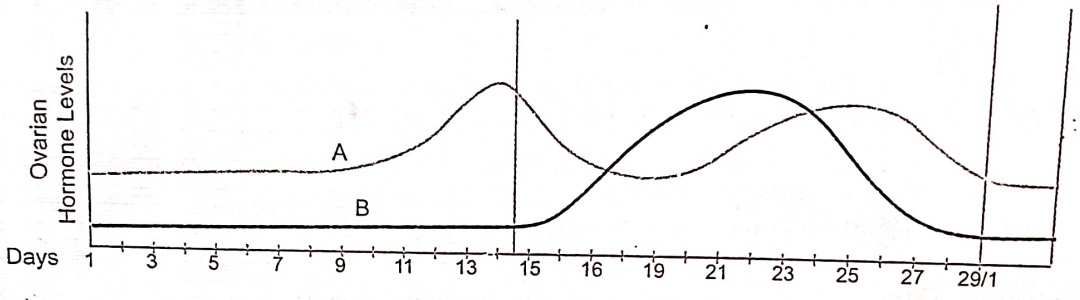
b) Select and write homologous structures from the list given below:

i) wings of butterfly and birds
ii) vertebrate hearts
iii) thorns in bouganvillea and tendrils in cucurbita
iv) Tuber of sweet potato and potato

3. A criminal blew himself up in a local market when he was chased by cops. His face was beyond recognition. Suggest and describe a modern technique that can help establish his identity.

24. A normal visioned woman, whose father is colour blind, marries a normal visioned man. What would be the probability of her (a) sons (b) daughters to be colour blind? Explain with the help of pedigree chart.

25. The graph given below shows the variation in the levels of ovarian hormones during various phases of menstrual cycle.



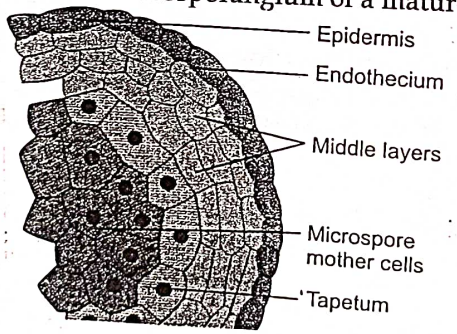
a) Identify A and B.

b) Specify the source of the hormone marked in the diagram.

c) Compare the role of A and B.

Q26. a) Expand and explain the term ZIFT. How is intrauterine transfer technique (IUT) different from it?
b) Name a commonly prescribed non-steroidal oral pill.

Q27. Given below is an enlarged view of one microsporangium of a mature anther



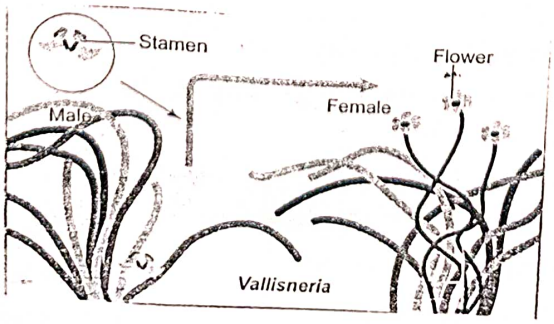
a) An anther with malfunctioning tapetum often fails to produce viable male gametophytes. Give one reason.

b) The meiocyte of rice has 24 chromosomes. How many chromosomes are present in its endosperm and egg cell. Why?

c) What is the role of endothecium present in it?

OR

Observe the diagram of pollination by water in Vallisneria.



Answer the following questions based on diagram.

a) The following statements (i), (ii) and (iii) seem to describe the water- pollinated submerged plants. Which one of these statements is incorrect?

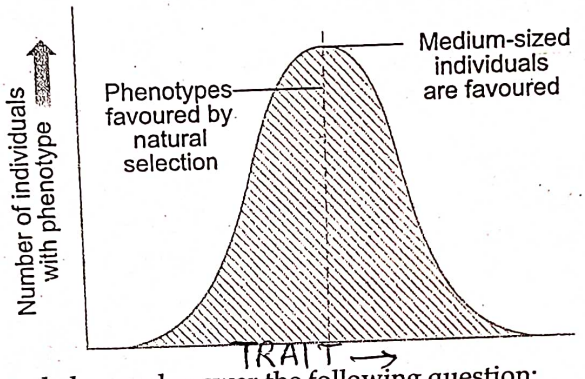
i) The flowers do not produce nectar
ii) The pollen grains have mucilaginous covering
iii) The brightly coloured female flowers have long stalk to reach the surface

b) Mention the pollinating agent of an inflorescence of small dull coloured flowers with well exposed stamens and large feathery stigma. Give any one characteristic of pollen grains produced by such flowers.

c) Name the type of pollination as a result of which genetically different types of pollen grains of the same species land on the stigma.

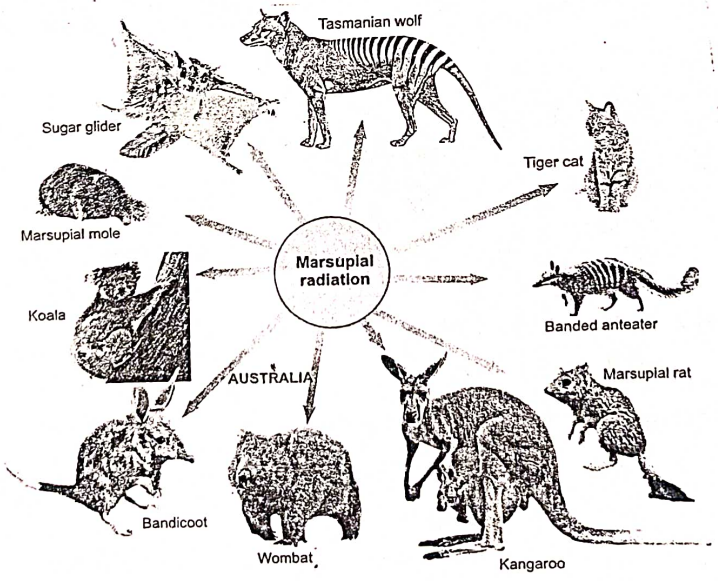
Q28. (*a*) Write the Hardy–Weinberg principle.

(*b*) Explain the three different ways in which natural selection can affect the frequency of a heritable trait in a population shown in the graph given below.



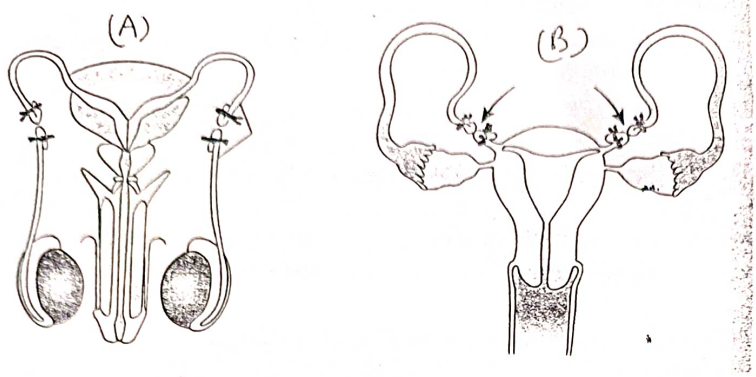
Section-D

Q29. Study the diagram given below and answer the following question:



a) Mention the specific geographical region where these organisms are found?
b) Name and explain the phenomenon that has resulted in the evolution of such diverse species in the region.
c) Explain giving reasons the existence of placental wolf and Tasmanian wolf sharing the same habitat.

Q30. Study the diagram given below and answer the following question:



a) What does the diagrams A and B depicts?
b) What is the difference between both?
c) What are the advantages of both?

OR

What are the disadvantages of both?

Section - E

Q31. a) Where does spermatogenesis occur in human testes? Describe the process of spermat ogenesis upto the formation of spermatozoa.

b) Trace the path of spermatozoa from the testes upt othe ejactilatory duct only.

OR

a) Describe the endosperm development in coconut

b) How are pea seeds different from castor seed with respect to endosperm?

c) Make a list of any three out breeding devices that flowering plants have developed and explain how they help to encourage cross-pollination.

Q32. a) Name the stage in the cell cycle where DNA replication occurs.

b) Explain the mechanism of DNA replication. Highlight the role of enzymes in the process.

c) Why is DNA replication said to be semi – conservative?

OR

i) Describe the structure and function of a tRNA molecule. Why it is referred to as an adaptor molecule.

ii) Explain the process of splicing of hn – RNA in a enkaryotic cell.

iii) What is aminoacylation? State its significance.

Q33. When a garden pea plant with violet flowers was crossed with another plant with white flowers, 50% of the progeny bear violet flowers.

a) Work out the cross.

b) Name the type of cross and mention it's significance.

c) How does the inheritance pattern of flower colour in snapdragon differ from the above?

OR

a) Which organism exhibits haplo – diploidy sex determination system? Explain.

b) Why do normal red blood cells become elongated sickle – shaped in structure in a person suffering from sickle cell anaemia?

c) How does chromosomal disorder differ from Mendelian disorder?