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

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

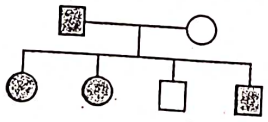
Q1. In a fertilized embryo sac, the haploid, diploid and triploid structures are :
a) synergid, zygote and primary endosperm nucleus
b) synergid, antipodal and polar nuclei
c) antipodal, synergid and primary endosperm nucleus
d) synergid, polar nuclei and zygote

Q2. Which of the following are true in respect of chorionic villi in human?
i) It appears after implantation of human embryo in the uterus.
ii) It becomes interdigitated with cervical tissue of the female reproductive tract
iii) It increases the surface area for exchange of gases
iv) It develops from the inner cell mass of the blastocyst.

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

Q3. Listed below are all venereal diseases except :
a) Genital waits b) ascariasis c) trichomoniasis d) Hepatitis B

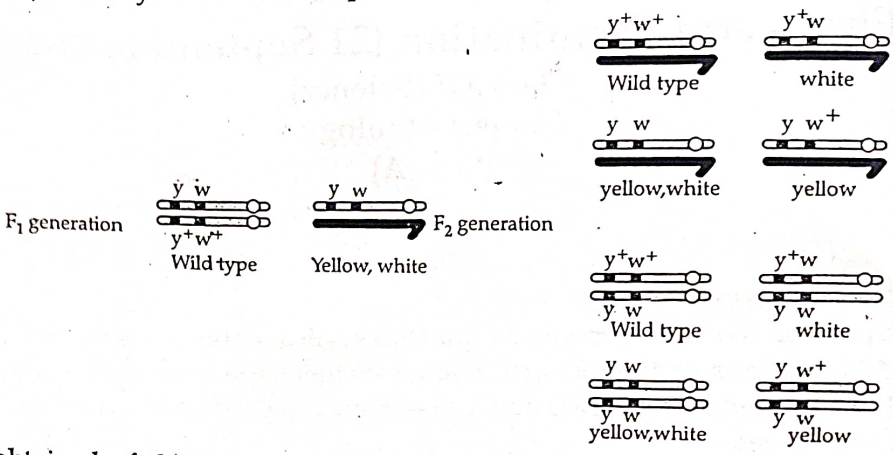
Q4. Study the pedigree chart of a certain family given below and select the correct conclusion which can be drawn for the character ;



a) The female parent is heterozygous
b) The parents could not have had a normal daughter for this character
c) The trait under study could not be colour blindness
d) The male parent in homozygous dominant

Q5. A DNA molecule is 160 base pairs long, if it has 20% adenine, how many cytosine bases are present in this DNA molecule?
a) 48 b) 64 c) 96 d) 192

Q6. In the dihybrid cross that was conducted by Morgan involving mating between parental generation for genes yellow bilobed, white eyed female drosophila and wild type male drosophila , upto F_2 generation is given below:



Study the result obtained of the F_2 progeny. Select the correct option from the given choice for F_2 of progeny:

a) Parental type 1.3%, strength of linkage high.
b) Recombination types, 1.3% ; strength of linkage low.
c) Parental type 98.7% strength of linkage high.
d) Recombination type 98.7% strength of linkage low

Q7. Match the following :

A) tRNA	1. Linking of amino acids
B) mRNA	2. Transfer of genetic information
C) rRNA	3. Nucleolar organising in region
D) Peptidyl transferase	4. Transfer of amino acid from cytoplasm to ribosome

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

Q8. The chronological order of human evolution from early to recent is :

a) Ramapithecus → Australopithecus → Homohabilis → Homo erectus
b) Australopithecus → Ramapithecus → Homo habilis → Homo erectus
c) Pithecanthropus → Pekineses → Homo habilis → Homo erectus
d) Australopithecus → Ramapithecus → Pithecenthropus → Homo erectus

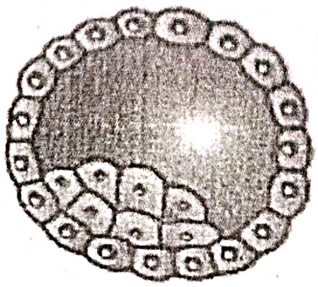
Q9. Appearance of antibiotic – resistant bacteria is an example of

a) Adaptive radiation
b) transduction
c) pre-existing variations in the population
d) divergent evolution

Q10. How many microspore mother cells would be required to produce one hundred pollen grains in a pollen sac?

a) 50 b) 100 c) 20 d) 25

Q11. Identify the human development stage shown below as well as the related right place of its occurrence in a normal pregnant woman & select right option for the two together



A-2

Development Stage	Site of Occurence
a) Blastoyst	uterine wall
b) 6 – celled morula	starting point of fallopian tube
c) Late morula	Middle part of fallopian tube
d) Blastula	End part of fallopian tube

Q12. Diaphragms are contraceptive devices used by the females. Choose the correct option from the following statements below -

i) They are introduced into the uterus
ii) They are placed to cover the cervical region
iii) They are physical barriers for sperm entry
iv) They act as spermicidal agents

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

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 :** Cleistogamous flower can produce seeds without pollination.
Reason : Cleistogamous flowers have no chance of cross pollination and they are invariably autogamous.

Q14. **Assertion :** Saheli is considered as an improved form of contraceptive for human females.
Reason : It is a non steroidal preparation and is once a week pill.

Q15. **Assertion :** Snips are common in human genome.
Reason : They are small variations that occurs at the frequency of one in every 30 bases.

Q16. **Assertion :** Birds like pigeon have homogametic females where as males are heterogametic.
Reason : In pigeons, females have Z and W sex chronosomes where as Males have ZZ sex chromosomes.

Section - B

Q17. "Pollen grains in wheat are shed at the 3 – celled stage while in peas they are shed at the 2 – celled stage. Explain. Where are germ pores present in pollen grain?

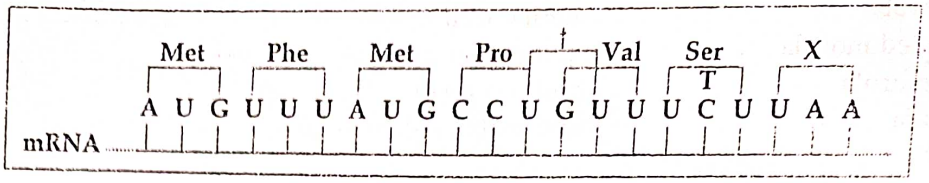
Q18. Give reason –

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

Q19. Explain the mode of action of Cu^{++} releasing IUDs as a good contraceptive. How is hormone releasing IUD different from it?

Q20. A normal man marries a woman who is carrie. 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.



Polypeptide : met-phe-met-proline-valine-serine

a) What does the first and last codon stand for?

b) How many amino acids are present in this polypeptide & provide the codon for valine.

Section - C

Q22. a) Differentiate between analogous and homologous structures.

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

i) wings of butterfly and birds

ii) vertebrate hearts

iii) thrones in bouganvillea and tendrils in cucubita

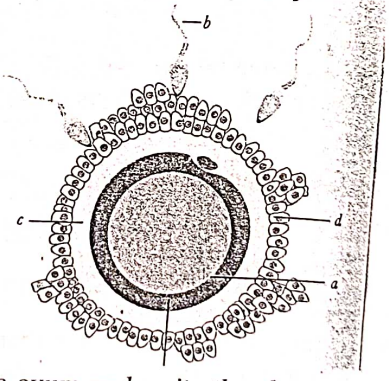
iv) Tuber of sweet potato and potato

Q23. A number of passengers were severely burnt beyond recognition during a train accident. Name and describe a modern technique that can help establish their identity.

Q24. a) State the cause and symptoms of colourblindness in humans.

b) Statistical data has shown that 8% of the human males are colourblind where as only 0.4% of females are colour-blind. Explain reasons with the help of cross. How is it so?

Q25. Given below is the diagram of human ovum surrounded by a few sperms. Study the diagram & answer the following questions:



a) Name and state the function of C.

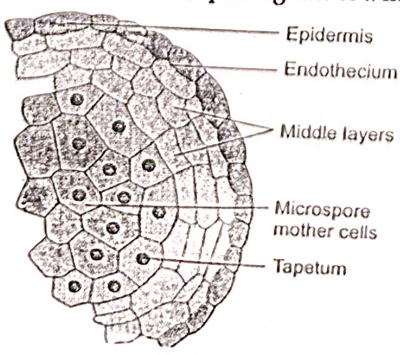
b) Mention what helps the entry of sperm into the ovum and write the changes occurring in the ovum during the process.

c) Name the specific region in the female reproductive system where the event represented in the diagram takes place.

Q26. a) Name and explain the mode of action of any two types of IUDs.

b) List any two advantages of using 'Saheli' as a contraceptive.

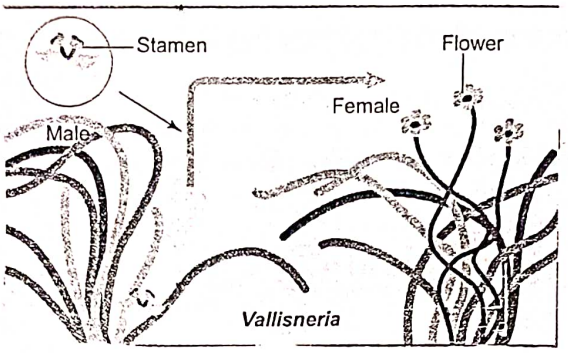
Q27. Given below is an enlarged view of one microsporangium of a mature anther



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.

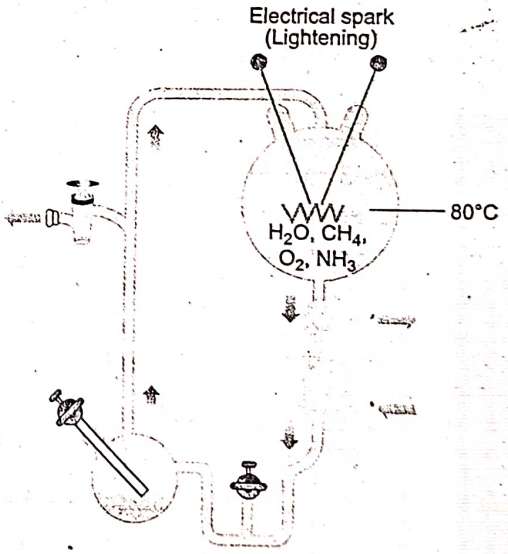


Answer the following questions based on diagram.
a) The following statements (i), (ii) and (iii) seem to describe the water- pollinated submerged plants. Which one of these statements is incorrect?
   i) The flowers do not produce nectar
   ii) The pollen grains have mucilaginous covering
   iii) The 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. What id disturbance in Hardy – Weinberg genetic equilibrium indicative of? Explain how it is caused?

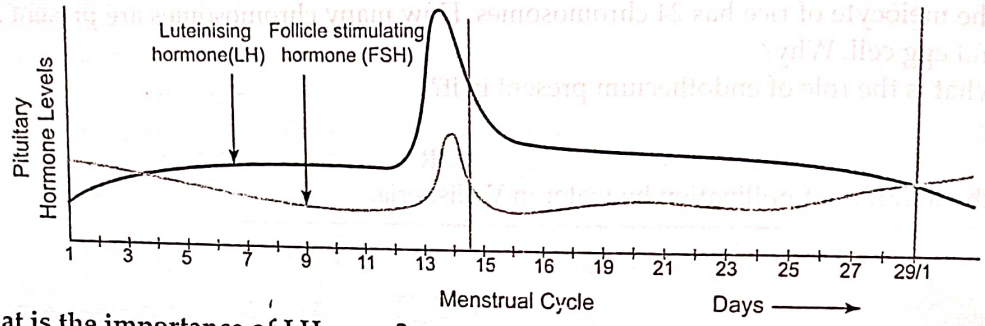
Section-D

Q29. A student was simulating Urey and Miller's experiment to prove the origin of life. The set-up used by the student is given.



Answer the following questions:
a) Find out the reasons why he could not get desired results?
b) What are the correct requirements of this experiment?
c) How many amino acids were synthesized by Urey and Miller during this experiment? Name any two.
d) What was the purpose of this experiment?

Q30:



(*i*) What is the importance of LH surge?

(*ii*) Identify the ovarian phases during the menstrual cycle.

(*a*) 5th day to 12th day of the cycle.

(*b*) 14th day of the cycle.

(*iii*) Menstrual cycles are absent during pregnancy. Why?

OR

Write the name of phases of Menstrual cycle?

Section - E

Q31. a) Draw a diagrammatic sectional view of a mature anatropous ovule and label the following parts in it.

i) That develops into an endosperm in an albuminous seed

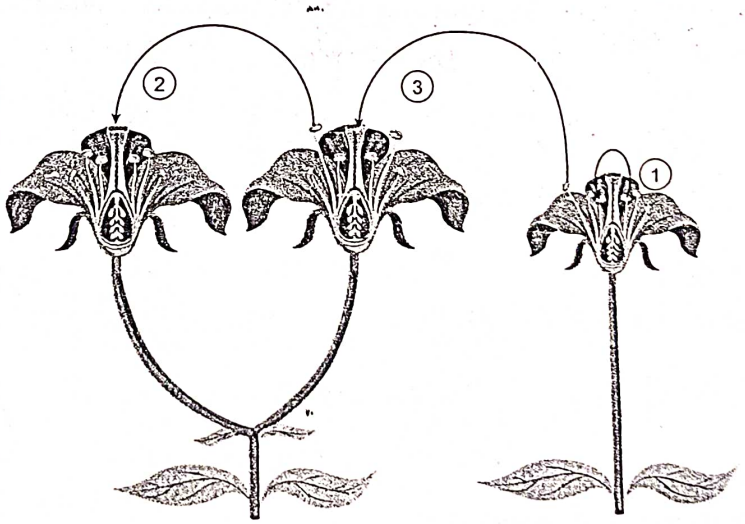
ii) Through which the pollen tube gains entry into the embryo sac

iii) That attaches the ovule to the placenta

b) Name the gonadotropins and explain their role in oogenesis and release of ova.

OR

Study the diagram given below showing the mode of pollination.



Answer the following questions:

i) The given diagram shows three methods of pollen transfer in plants. What are the technical term used for pollen transfer methods '1', '2' and '3' ?

ii) How do the following plants achieve pollination successfully?

a) water lily b) hydrilla

iii) Flowering plants have developed many devices to avoid inbreeding depressions. Explain one hereditary and one physiological device which helps plants to achieve this target.

Q32: a) Draw a schematic diagram of lac operon in the absence of inducer in the culture medium of the bacteria.

b) Why is the lac operon said to be a transcriptionally regulated system?

c) Why is the regulator gene in lac operon marked as i gene?

d) Retro viruses do not follow Central Dogma. Comment.

OR

i) Describe the Hershey – Chase experiment. Write the conclusion they arrived at after the experiment.

ii) You are repeating this experiment and are provided with two isotopes ^{32}P and ^{15}N (in place of ^{35}S in the original experiment). How do you expect your results to be different?

Q33. A cross was carried between a pea plant homozygous for round and yellow seeds with pea plant homozygous for wrinkled and green seeds.

a) Show the cross in a punnet square.

b) Write the phenotype of the progeny of this cross.

c) What is this cross known as? State the purpose of conducting such a cross.

OR

Define aneuploidy. How is it different from polyploidy? Describe individuals having following chromosomal abnormalities.

a) Trisomy of 21st chromosome b) XXY c) X0