BUDHA DAL PUBLIC SCHOOL, PATIALA
First Term Examination (12 September 2024)
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 labelled diagrams should be drawn.

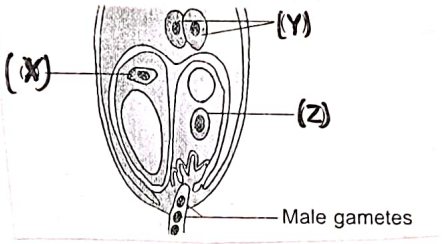
Section - A

Q1. In a breeding experiment, the selected male parent is diploid and the female parent is tetraploid. What will be the ploidy level of the endosperm that will develop after double fertilization?

a) Diploid (2n) b) Triploid (3n) c) Tetraploid d) Pentaploid (5n)

Q2. The given figure of an egg apparatus of an angiosperm shows the entry of pollen tube for releasing the two male gametes. Which of the two from 'X', 'Y' and 'Z', the two male gametes fuse with :

a) X and Z
b) X and Y
c) Y and Z
d) Z and Z



Q3. Given below are the observations drawn in HGP. Select the option that shows the correct observations:

i) The human genome contains 3164.7 billion base pairs.
ii) The average gene consists of 3000 bases.
iii) Less than 2% of the genome codes for proteins
iv) Chromosome 1 has the most genes (2698)

Options:

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

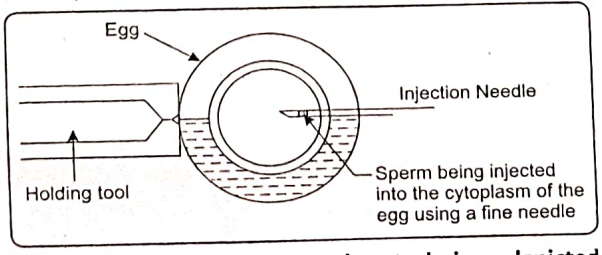
Q4. Among the human ancestors, the brain size was more than 1000 cc in

a) Homo habilis b) Ramapithecus c) Homo erectus d) Neanderthal man

Q5. Select the pathogen mismatched with the symptoms of the disease caused by it, from the list given below:

a) Entamoeba histolytica : Constipation, abdominal pain
b) Epidermophyton : Dry, scaly lesions on nail
c) Wuchereria bancrofti : Chronic inflammation of lymphatic vessels or lower limbs
d) Haemophilus influenza : Blockage of the intestinal passage

Q6. **Observe the schematic representation of assisted reproductive technology given below:**



Identify the most appropriate technique depicted in the above diagram. *(CBSE 2024)*

a. IUT
b. IUI
c. ICSI
d. ZIFT

A-1

Q7. Penetration of the sperm in the ovum is followed by :
a) formation of first polar body
b) completion of meiosis - II
c) first meiosis
d) dissolution of zona pellucida

Q8. A couple has two daughters. What is the probability that the third child will also be a female?
a) 25% b) 50% c) 75% d) 100%

Q9. If the sequence of nitrogen bases of the coding strand in a transcription unit is 5′ - ATGAATG - 3′, the sequence of bases in its RNA transcript would be :
a) 5′-AUGAAUG -3′ b) 5′- UACUUAC- 3′ c) 5′- CAUUCAU- 3′ d) 5′- GUAAGUA - 3′

Q10. Which of the following is an example for link species?
a) Lobe fish b) Dodo bird c) Seaweed d) Chimpanzee

Q11. A toxic substance, responsible for the chills and high fever recurring every three to four days in malarial fever, is :
a) Interferon b) baemozion c) hirudin d) colostrum

Q12. Charging of tRNA during translation is necessary for:
a) Binding of anticodons of tRNA to the respective codons of mRNA.
b) Peptide bond formation between two amino acids.
c) Movement of ribosomes from codon to codon.
d) Binding of ribosomes to the mRNA.

Two statements are given - one labelled Assertion (A) and the other labeleld Reason (R).
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 the reason is correct explanation of the assertion.
b) Both assertion and reason are true, and the reason is not the correct explanation of the assertion.
c) Assertion is true but reason is false.
d) Assertion is false but Reason is true.

Q13. **Assertion :** Primary endosperm nucleus is diploid.
Reason : it is the product of double fertilisation.

Q14. **Assertion :** Interstitial spaces outside the seminiferous tubule have blood vessels and Sertoli cells.
Reason : Sertoli cells provide nutrition to the germ cells.

Q15. **Assertion :** Black coloured Biston betularia are abundant due to industrial pollution.
Reason : Natural selection of darker forms occur in response to industrial pollution

Q16. **Assertion :** In birds the sex of the offspring is determined by males.
Reason : Males are homogametic while females are heterogametic.

Section - B

Q17. Double fertilization is reported in plants of both Castor and Groundnut. However, the mature seeds of Groundnut are nonalbuminous and the mature seeds of Castor are albuminous. Explain the post-fertilization events that are responsible for it.

Q18. State the role of oxytocin in parturition. What triggers its release from the pituitary?

Q19. a) Name any two copper releasing IUDs.
b) Explain how do they act as effective contraceptives in human females.

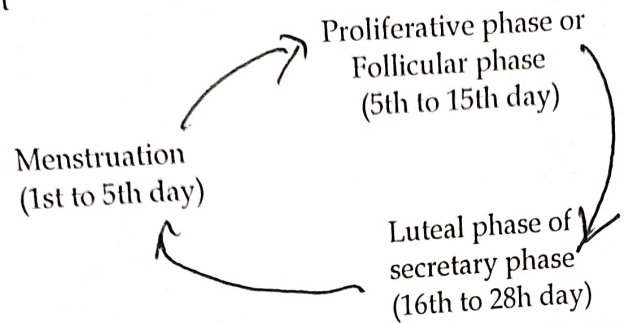
Q20. a) Name the protozoan parasite that causes amoebic dysentery in humans.
b) Mention two diagnostic symptoms of the disease.

Q21. If the base adenine constitutes 31% of an isolated DNA fragment, then write what will be the expected percentage of the base cytosine in it. Explain how did you arrive at the answer given.

Section - C

Q22. a) How are parthenocarpic fruits produced by some plants and apomictic seeds by some others? Explain.
b) How do farmers prefer using apomictic seeds?

Q23. The events of the menstrual cycle are represented below. Answer the question following the diagram



i) State the levels of FSH, LH and progesterone simply by mentioning high or low around 13th and 14th day and 21st to 23rd day.

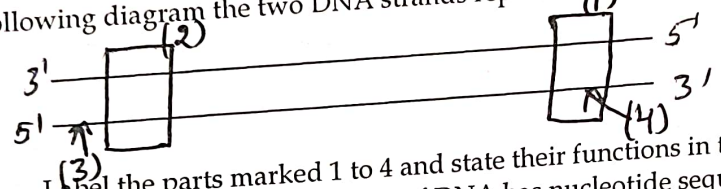
ii) In which of the above mentioned phases does the egg travel to the fallopian tube?

iii) Why is there no menstruation upon fertilization?

Q24. a) Give an example of a chromosomal disorder caused due to non-disjuction of autosomes.

b) Both Down's syndrome and Turner's syndrome are examples of chromosomal disorders. write the differences between the two.

Q25. In the following diagram the two DNA strands represented are ready for transcription.



i) Label the parts marked 1 to 4 and state their functions in transcription

ii) Which one of the two strands of DNA has nucleotide sequence similar to mRNA that will be transcribed and why?

Q26. Identify the following parts as homologous and analogous organs and justify.

a) Sweet Potato and Potato

b) Thorns of Bougainvillea and tendrils of Cucurbita

c) Forelimbs of Bat and Whale

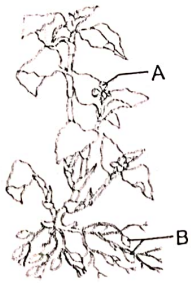
Q27. a) Why does DNA replication occur within a replication fork and not in its entire length simultaneously?

b) "DNA replication is continuous and discontinuous on the two strands within the replication fork". Explain with the help of a schematic representation.

Q28. Recently a baby girl has been reported to suffer from haemophilia. How is it possible? Explain with the help of a cross.

Section – D

Q29. The figure given below shows a Commelina plant, bearing two types of bisexual flowers, an adaptation for assured seed set and genetic variation in the progeny.



a) Name two other plant species, which also produce these two types of flowers on the same plant.

OR

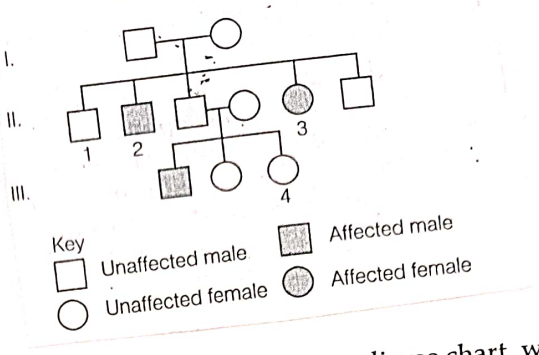
Name the type of flower B and the type(s) of pollination that can occur in it.

b) Which of the two types of flowers A or B, will show (i) assured seed set and (ii) genetic variation in the progeny, respectively.

c) Name the type of flower A and the type(s) of pollination that can occur in it.

A-3

Q30. Study the pedigree chart given below :



Answer the following questions:

a) On the basis of the inheritance pattern represented by this pedigree chart, what is your conclusion with respect to the given disease/ trait?

OR

a) What will happen to the female who is homozygous for this trait?
b) i) To a couple where the female is unaffected and the male is affected, what will be the genotype of the offspring they have? Show the same by using a genetic cross.
ii) If a carrier female marry an affected male then what would be the genotype of the offspring?
c) What would happen to the male children of the couple where woman is a carrier for this trait and man is normal? Explain with the help of a cross.

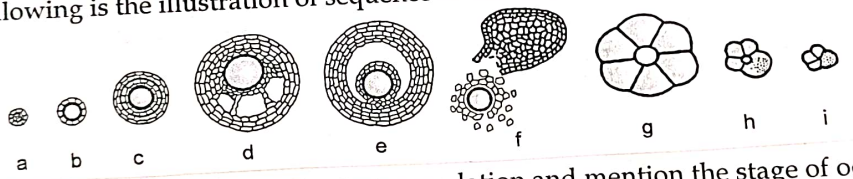
Section - E

Q31. Explain the salient features of Hugo de Vries theory of mutation. How is Darwin's theory of natural selection different from it? Explain.

OR

a) Why did Hershey and Chase use '35S' and '32P' in their experiment? Explain.
b) State the importance of (1) blending and (2) centrifugation in their experiment.
c) Write the conclusion they arrived at the end of their experiment.

Q32. The following is the illustration of sequence of ovarian events (a-i) in human female?



a) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.
b) Name the ovarian hormone and pituitary hormone that has caused the above mentioned event.
c) Explain the changes that occur in the uterus simultaneously in anticipation.
d) Write the difference between 'c' and 'h'.
e) Draw a labelled sketch of human ovum prior to fertilization.

OR

a) Identify the figure that illustrates corpus luteum and name the pituitary hormone that influences its formation.
b) Specify the endocrine function of corpus luteum. How does it influence uterus?
c) What is difference between 'b' and 'e'?
d) Draw a labelled sketch of Graafian follicle.

Q33. A flower of tomato/brinjal plant following the process of sexual reproduction produces 240/360 viable seeds. Answer the following giving reasons:

a) What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?
b) What would be the minimum number of ovules present in the ovary?
c) How many megaspore mother cells were involved?
d) What is the minimum number of microspore mother cells involved in the above case?
e) How many male gametes were involved in this case?

OR

How does the process of natural selection affect Hardy-Weinberg equilibrium? Explain. List the other four factors that disturb the equilibrium.

A-4