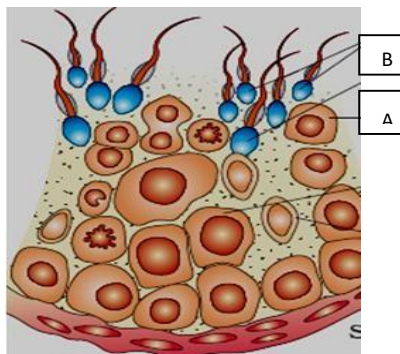


BCM SCHOOL BASANT AVENUE, DUGRI LUDHIANA
XII BIOLOGY
HOLIDAYS HOMEWORK (2024-25)

***ART INTEGRATED PROJECT-** Infographics on role of transgenic animals in biotechnological products .
***ASSIGNMENT –** Solve the given below assignment in notebook .

1 Study the diagram and answer the following question:



- a. Identify 'A' and 'B'.
- b. Which cell division takes place to form a primary spermatocyte from spermatogonia?
- c. State the function of interstitial cells

2 a. What are the four levels at which gene expression is regulated in eukaryotic cell ?
b. Name the regulatory gene of Lac –operon .

3 Explain with the help of a suitable example, the inheritance of a trait where two different dominant alleles of a trait express themselves simultaneously in the progeny. Name this kind of inheritance pattern.

4 In shorthorn cattle, coat colour may be red, white or roan. Roan is an intermediate phenotype expressed as a mixture of red and white hair. The following data were obtained from various crosses:

red X red → all red
white X white → all white
red X white → all roan
roan X roan → 1/4 red: 1/2 roan: 1/4 white

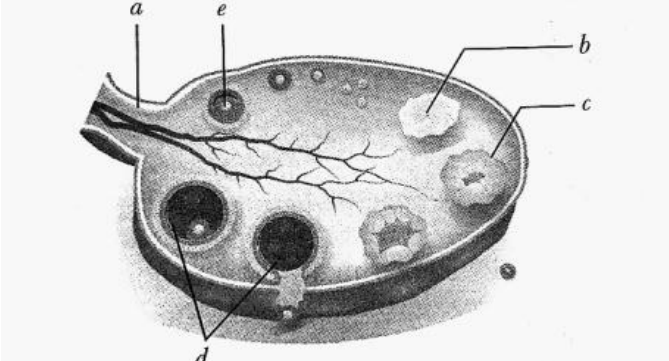
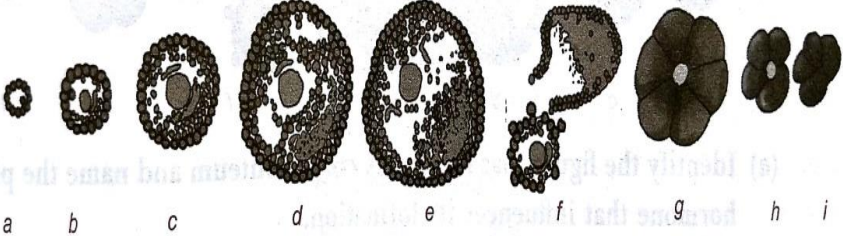
- a. What is the inheritance pattern for coat colour is shown in shorthorn cattle?
- b. What are the genotypes of parents and offspring of each cross?

5 a. Define polygenic inheritance? Explain the concept with the help of an example.
b. What do you understand by the concept of pleiotropy? Explain the concept with the help of one condition observed in plants and humans?

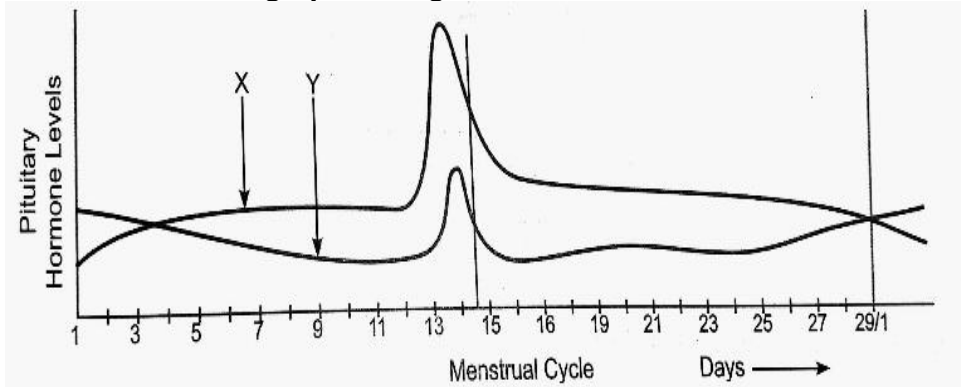
6 Growth hormone injection treatment is prescribed for children who have been diagnosed with growth hormone (GH) deficiency and other conditions causing short stature and insufficient growth. This hormone is produced by the pituitary gland in humans so the gene for this hormone was isolated from the pituitary gland and introduced into pHG407 vectors for production. However, a problem with this was that the protein so produced was 26 amino acids longer than the active growth hormone (24 amino acids long) and so this method could not be used.
(a) Given that the amino acid sequence of the active growth hormone was known, use a diagram to explain how human growth hormone could be produced outside the body.
(b) The vector consists of a lac gene which codes for the enzyme β - galactosidase. Describe how this gene can help with the selection of colonies containing the transgene.

7 Flower of tomato plant following the process of sexual reproduction produces 240 viable seeds. Answer the following questions giving reason.

- a. What is the minimum number of pollen grains that must have been involved in the pollination of its pistil?

	<p>b. What would have been the minimum number of ovules present in the ovary? c. How many megaspore mother cells are 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?</p>
8	<p>Give reasons why? a. Most zygotes in angiosperms divide only after a certain amount of endosperm is formed. b. Micropyle remains as a small pore in the seed coat of a seed. c. Integuments of an ovule harden and water content is highly reduced as the seed matures. d. Apple and cashew are not called the fruit. e. The probability of fruit set in a self-pollinated bi-sexual flower of a plant is far greater than a dioecious plant.</p>
9	<p>Answer the following: Plan an experiment and prepare a flow chart of the steps that you would follow to ensure that the seeds are formed only from the desired sets of pollen grains. a. Name the type of experiment that you carried out. b. What is triple fusion and double fertilization?</p>
10	<p>Identify 'a' to 'e' for the following diagram showing the T.S. of the ovary of a human female.</p> 
11	<p>Based on the diagram given below answer the questions :</p>  <p>a. Identify the figure that illustrates corpus luteum and name the pituitary hormones that influence its formation. b. Specify the endocrine function of corpus luteum. How does it influence the uterus? Why is it essential? c. What is the difference between D and E? d. Draw a neatly labelled sketch of graffian follicle.</p>

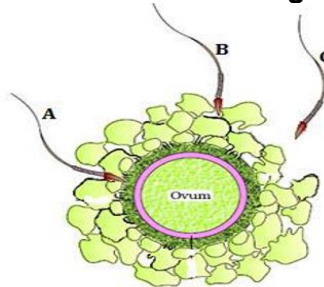
12 Based on the graph given below answer the following



questions.

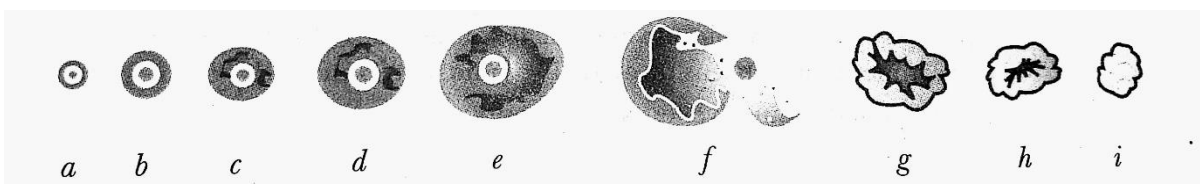
- Identify hormone X and Y.
- Name the ovarian phases during a menstrual cycle:
 - 5th day to 12th day of the cycle-
 - 14th day of the cycle-
 - 16th to 25th day of the cycle.-

13 Given below is the diagram of a human ovum surrounded by a few sperms. Observe the diagram and answer the following questions:



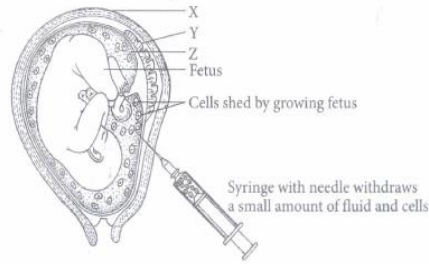
- Compare the fate of sperms shown in the diagram.
- What is the role of zona pellucida in this process?
- Analyze the changes occurring in the ovum during the process.
- How is the entry of sperm into the ovum facilitated?
- Specify the region of the female reproductive system where the event represented in the diagram takes place.

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



- Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.
- name the ovarian hormone and the pituitary hormone that have caused the above-mentioned event.
- Explain the changes that occur in the uterus simultaneously in anticipation.
- Write the difference between C and H.
- Draw a labelled sketch of the structure of a human ovum prior to fertilization.

15 A technique known as amniocentesis is used to determine foetal abnormalities. This test is based on the chromosomal pattern in amniotic fluid. However, this technique is legally banned now.



- Identify X and Y in the above given figure.
- What is the function of Z?
- Which of the diseases can not be diagnosed by amniocentesis?