

NEW STANDARD ACADEMY

Date : 24-11-25

CLASS : 12TH BIOLOGY

Marks: 70
Time: 3 hours

SECTION-A

- Choose the correct option for the features of functional mammary gland of all female mammals from the statements below:
 - Glandular tissue with variable amount of fat.
 - Mammary lobes, 30-40 in number called alveoli.
 - Mammary ducts joins to form mammary tubules.
 - Mammary ampulla connected to lactiferous duct.

(a) (i) and (iii) (b) (ii) and (iii)
(c) (i) and (iv) (d) (ii) and (iv)
- Seminal plasma, the fluid part of semen, is contributed by.
 - Seminal vesicle
 - Prostate gland
 - Urethra
 - Bulbourethral gland

(a) i and ii (b) i, ii and iv
(c) ii, iii and iv (d) i and iv
- The immature male germ cell undergoes division to produce sperms by the process of spermatogenesis. Choose the correct one with reference to above.
 - Spermatogonia have 46 chromosomes and always undergo meiotic cell division.
 - Primary spermatocytes divide by mitotic cell division
 - Secondary spermatocytes have 23 chromosomes and undergo second meiotic division.
 - Spermatozoa are transformed into spermatids.
- During the time of ovulation in a female, which combination of hormones is observed at their maximum plasma concentrations?
 - Highest concentrations of estrogen and progesterone
 - Highest concentrations of LH and progesterone
 - Highest concentrations of LH and FSH
 - Highest concentrations of FSH and progesterone
- Which of these cells of the human male reproductive system is haploid?
 - Spermatid
 - Sertoli cells
 - Leydig cells
 - Spermatogonium
- Spot the odd one out from the following structures with reference to the male reproductive system:
 - Rete testis
 - Epididymis
 - Vasa efferentia
 - Isthmus
- If fertilisation takes place, the secondary oocyte undergoes Meiosis II to produce:
 - Two haploid, equal cells-Second polar body and ovum
 - Two haploid, unequal cells Second polar body and ovum
 - Two haploid, unequal cells - First polar body and second polar body
 - Two diploid, unequal cells - Second polar body and ovum
- The concentration of estrogens and progesterone a pregnant woman's blood is found to be several fo higher than non-pregnant woman. What is the most appropriate reason for this?
 - Increased physical activity during pregnancy
 - Dietary changes during pregnancy
 - The endocrine function of the placenta
 - The malfunction of the woman's pancreas
- Which of the following hormones is not secreted by
 - Hcg
 - Estrogens
 - Progesterone
 - LH

10. Which of the following statements describes the difference between placenta and umbilical cord?

- (a) The placenta secretes hormones whereas the umbilical cord does not.
- (b) The placenta persists after pregnancy while the umbilical cord is expelled.
- (c) The placenta is lined with veins and arteries while the umbilical cord is not.
- (d) The placenta interlocks with foetal tissues whereas the umbilical cord interlocks with the uterine tissue.

11. If a zygote has XY chromosomes, what can be inferred about the fertilisation process?

- (a) The ovum had an abnormal number of chromosomes
- (b) Y chromosome-bearing sperm fertilized the ovum.
- (c) Two sperms, one carrying X and another carrying Y, fertilized the ovum.
- (d) The mitotic division has altered the chromosome pattern

12. Morula is a developmental stage:

- (a) Between the zygote and blastocyst
- (b) Between the blastocyst and gastrula
- (c) After the implantation
- (d) Between implantation and parturition

Assertion and Reason

Direction: The following questions consist of two statements

Assertion (A) and Reason (R). Answer these questions by selecting the appropriate option 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, but R is true.

13. Assertion (A): Only one sperm can fertilise an ovum

Reason (R): During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum

14. Assertion (A): Penetration of a sperm into an ovum is a chemical process.

Reason (R): Acrosome of a sperm secretes a lytic enzyme which dissolves the zona pellucida of ovum.

15. Assertion (A): Seminiferous tubules of the testis open into the rete testis through vasa efferentia.

Reason (R): Vasa efferentia open into epididymis located along the posterior surface of each testis.

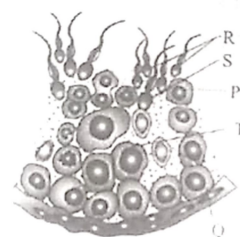
16. Assertion (A): The testis has about 250 testicular lobules

Reason (R): Each lobule contains five to ten highly coiled seminiferous tubules in which sperms are produced.

SECTION-B

17. Explain the process of hormonal regulation of spermatogenesis

18. The given diagram depicts microscopic anatomy of the seminiferous tubules showing spermatogenesis. Answer the following with reference to it,



(a) Identify the stages of spermatogenesis in a sequence.

(b) Based on your understanding of cell division calculate the number of chromosomes in a P.

19. What would be the complication if the testis fails to descend after birth? Briefly comment.

20. List the three hormones produced in women only during pregnancy. What happens to the levels of estrogen and progesterone during pregnancy?

21. Kavya says that the placenta produces relaxin which plays a crucial role during pregnancy.

(a) Is she correct? Justify.

(b) Name TWO other hormones secreted by the placenta during pregnancy.

SECTION-C

22. Draw a labelled diagram to show interrelationship of four accessory ducts in a human male reproductive system.

23. A couple is trying to conceive and start a family.
- (a) If the women's period, which is regular, is scheduled to start on July 19, what was the estimated date of ovulation for the previous cycle?
- (b) Name the four important reproductive hormones and state whether their levels will be high or low on the date identified in (a).
24. Meiotic arrest is a phenomenon noticed during oogenesis in human females where oocytes are arrested in the primary oocyte stage.
- (a) What is the chromosomal count of these primary oocytes?
- (b) How are these primary oocytes converted to ovum?
25. Meiotic division during oogenesis is different from the in spermatogenesis. Explain how and why?
26. (a) Write the characteristics of 'stem cells'.
- (b) From where can one obtain 'stem cells' in humans?
- (c) State any two applications of 'stem cells' in curing human diseases.
27. Explain the phases in embryonic development from the morula stage till the establishment of pregnancy in a human female.

OR

Describe the process of Parturition in humans.

28. Given below is a diagrammatic representation of blastocyst, external and internal view.



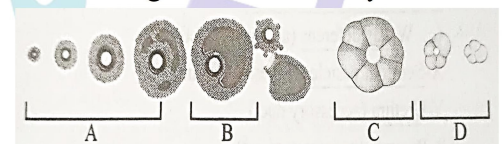
- (a) During the formation of this structure, two distinct cell populations arise. Name these and identify which one is visible in the external view of the structure.
- (b) Which stage precedes the formation of blastocyst?

SECTION-D

29. The functions of mammary glands are secretion and ejection of milk. These functions are associated with pregnancy and childbirth.
- (a) How many lobes are present in a mammary gland?
- (b) Make a flowchart indicating the flow of milk from interior to exterior in a mammary gland.
- (c) Colostrum protects the infant during the initial months of life. How?
30. With reference to the Spermatogenesis and Oogenesis, answer the following questions:
- (a) About 300 million spermatozoa may be present in a human male ejaculation at one time. Calculate how many primary spermatocytes will be involved to produce this number of spermatozoa.
- (b) How many spermatids will be formed from the primary spermatocyte, with reference to (a)?

SECTION-E

31. The given diagram represents the ovarian events during the menstrual cycle.



- (a) Identify following stages A, B, C and D of follicular development.
- (b) Draw the graph of hormones LH and FSH during ovulation and oestrogen and progesterone during luteal phase?
- (c) At which day LH surge occurs and what does LH surge indicate?
- (d) What does cyclic menstruation indicate?
32. (a) Where and how in the testes process of spermatogenesis occur in humans.
- (b) Draw diagram of human sperm and label four parts.
33. (i) Explain the formation of placenta after the implantation in a human female.
- (ii) Draw a diagram showing human foetus within the uterus and label any four parts in it.