
	<b>INDIAN SCHOOL AL WADI AL KABIR</b>		
<b>Class: XII</b>	<b>Department: SCIENCE 2022 – 23</b> <b>SUBJECT : BIOLOGY</b>		<b>Date of submission:</b> <b>First week of May 2022</b>
<b>Worksheet No: 2</b> <b>with answers</b>	<b>UNIT: HUMAN REPRODUCTION</b>		<b>Note:</b> <b>A4 FILE FORMAT</b>
<b>NAME OF THE STUDENT</b>		<b>CLASS &amp; SEC:</b>	<b>ROLL NO.</b>

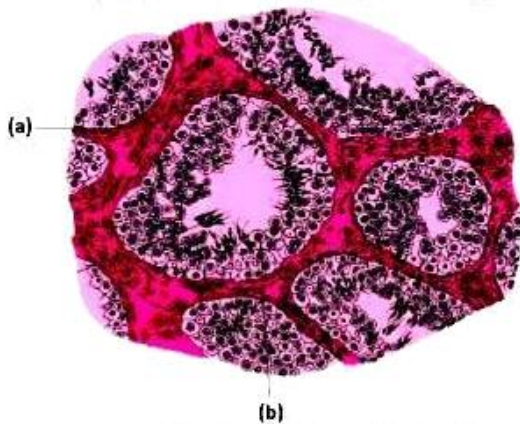
### OBJECTIVE TYPE QUESTIONS (1Mk)

1. How many spermatozoa are formed from one secondary spermatocyte.
2. State the significance of cervix in the female reproductive system.
3. At what stage of life oogenesis is initiated in a human female? When is it completed.
4. When and Where do chorionic villi appear in Humans.
5. Read the passage carefully and answer the Questions that follows (**CASE STUDY**)

Humans are sexually reproducing and viviparous it involves male and female reproductive systems. The male reproductive system is located in the pelvis region. It includes a pair of testis along with accessory ducts, glands and the external genitalia. The testes are situated outside the abdominal cavity within a pouch called the scrotum. The testis is covered by a dense covering. Each testis has about 250 compartments. Each lobule contains one to three highly coiled seminiferous tubules in which sperms are produced. Each seminiferous tubule is lined on its inside by two types of cells. The regions outside the seminiferous tubules called interstitial spaces contain small blood vessels. Seminiferous tubules of the testis open into the vasa efferentia through rete testis. The vasa efferentia leave the testis and open into epididymis located along the posterior surface of each testis.

- i. The vas deferens receives duct from the seminal vesicle and opens into the urethra as
  - a. epididymis
  - b. ejaculatory duct
  - c. efferent ductule
  - d. ureter

- ii. Which one of the following is not a male accessory gland?
- Seminal vesicle
  - Ampulla
  - Prostate
  - Bulbourethral gland
- iii. The temperature of the scrotum which is necessary for the functioning of the testis is always \_\_\_\_\_ around below body temperature.
- 2-2.5°C
  - 4-5°C
  - 6-6.5°C
  - 7-8°C
- iv. The nutritive cells found in seminiferous tubules are.
- Leydig's cells
  - Male germ cells
  - Sertoli cells
  - Chromaffin cells.
- v. Identify (a) and (b) in the given image.



- a - Sertoli cell, b - interstitial cell
- a - interstitial cell, b - spermatogonia
- a - spermatozoa, b - Sertoli cell
- a - spermatozoa, b - spermatogonia

#### Multiple Choice Questions.

1. What would happen if corpus luteum is not degenerated
- Progesterone will not be secreted
  - Endometrium will disintegrate
  - Proliferation of endometrium will take place

(d) Ovulation will take place

2. Identify the wrong statement from the following:

- a. High levels of estrogen triggers the ovulatory surge.
- b. Oogonial cells start to proliferate and give rise to functional ova in regular cycles from puberty onwards.
- c. Sperms released from seminiferous tubules are poorly motile /non-motile.
- d. Progesterone level is high during the post ovulatory phase of menstrual cycle.

3. Spot the odd one out from the following structures with reference to the male reproductive system:

- a. Ret testis
- b. Epididymis
- c. Vasa efferentia
- d. Isthmus

4. Seminal plasma, the fluid part of semen, is contributed by.

- i. Seminal vesicle
- ii. Prostate
- iii. Urethra
- iv. Bulbourethral gland

(a) i and ii

(b) i, ii and iv

(c) ii, iii and iv

(d) i and iv

5. Spermiation is the process of the release of sperms from:

- a. Seminiferous tubules
- b. Vas deferens
- c. Epididymis
- d. Prostate gland

6. Mature Graafian follicle is generally present in the ovary of a healthy human female around

- a. 5 – 8 day of menstrual cycle
- b. 11 – 17 day of menstrual cycle
- c. 18 – 23 day of menstrual cycle
- d. 24 – 28 day of menstrual cycle

7. Acrosomal reaction of the sperm occurs due to:

- a. Its contact with zona pellucida of the ova
- b. Reactions within the uterine environment of the female
- c. Reactions within the epididymal environment of the male
- d. Androgens produced in the uterus

8. Which one of the following is not a male accessory gland?
- Seminal vesicle
  - Ampulla
  - Prostate
  - Bulbourethral gland
9. The immature male germ cell undergo 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
10. Which of the following hormones is not secreted by human placenta?
- HCG
  - Estrogen
  - Progesterone
  - LH

### HINTS & SOME ANSWERS

#### Answers of objectives

- 4
- Sperm entry or along with vagina forms the birth canal.
- initiated-foetal stage + completed-entry of sperm into the ovum.
- After implantation + trophoblast

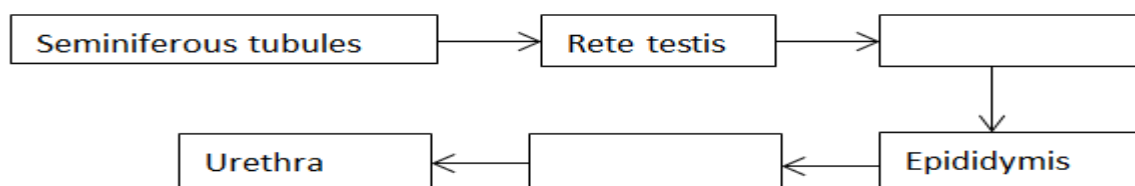
#### MCQs

1-d	2-d	3-d	4-b	5-a
6-b	7-a	8-b	9-c	10-d

### Short Answer Type Questions 2mks

Q.1. List the following events observed in human reproduction in chronological order. Fertilization, gametogenesis, insemination, gestation, parturition, implantation.

Q.2. Fill in the missing boxes exhibiting the route of sperm transport.



Q.4. What is the reason for the absence of menstrual cycles during conception or pregnancy?

Q.5. Fill up the missing data in the table where Column A shows female reproductive organs and Column B shows its respective functions.

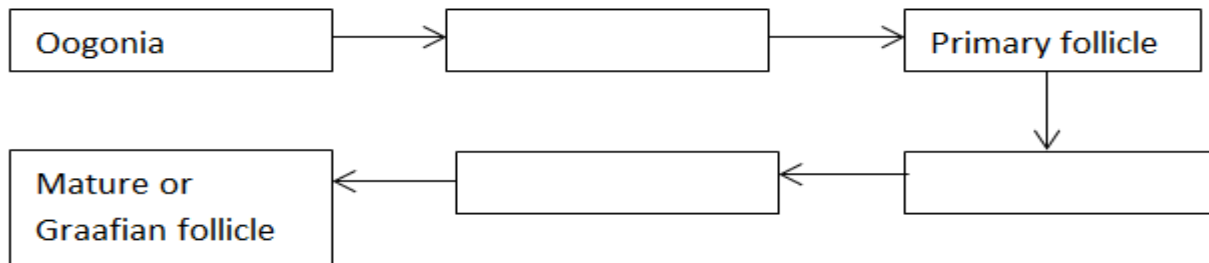
Column A (Organs)	Column B (Corresponding Functions)
Ovaries	Ovulation
Oviduct	
	Pregnancy
Vagina	Birth

Q.6. Name the hormone crucial in parturition. Does the parturition signal originate from the mother or the foetus?

Q.7. State the role of the epididymis in male fertility.

Q.8. List the names of the hormones, endocrine glands along with functions of the hormones that are crucial in causing spermatogenesis.

Q.9. Fill in the missing boxes for the levels in the transformation of mother germ cells into a mature follicle.



Q.10. How is a primary oocyte different from a secondary oocyte?

Q.11. a) State the role of the ampullary-isthmic junction in the female reproductive tract.

b) How is polyspermy checked by the zona pellucida of the ovum?

Q.12a) What is the significance of LH surge through the menstrual cycle?

b) During which stage of cell division are spermatids formed from the secondary spermatocytes?

Q.13.a. How many spermatozoa does one secondary spermatocyte produce?

b. Where in zygote does the first cleavage division occur?

Q.14. Why is breastfeeding recommended during the initial stages of infant growth?

## Long Answer Type Questions 3mks

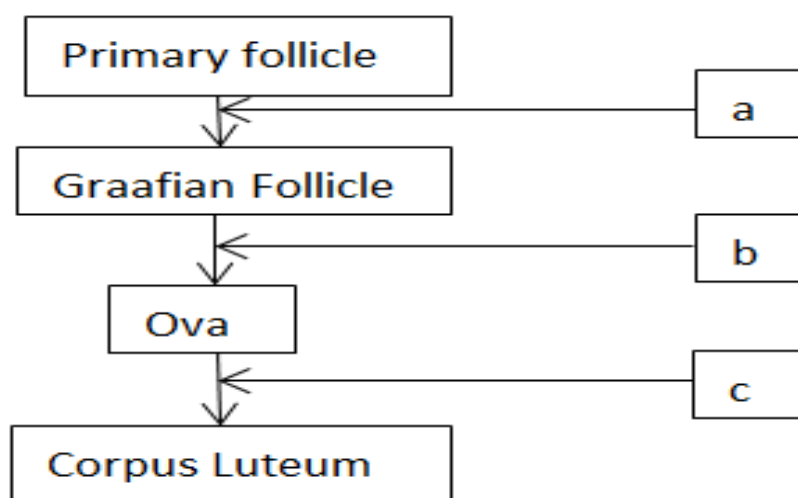
Q.1. Why does corpus luteum stay active throughout pregnancy and in the absence of fertilization, is active only for 10-12 days?

Q.2. What is foetal ejection reflex? How does it cause parturition?

Q.3a. How is the placenta formed.

b What are the functions of placenta other than its endocrine function?

Q.4. Mention the names of the hormones responsible for ovarian changes during the menstrual cycle in the boxes provided.



Q.5. Draw a schematic diagram depicting oogenesis. (Label without description)

Q.6. Write the main functions each of testis and ovary?

## Very Long Type Questions 5mks + Previous years board questions

Q.1. Explain the role of pituitary gonadotropins during the follicular and ovulatory phases of the menstrual cycle. Describe the shifts in steroidal secretions.

Q.2. Explain in detail the difference between the meiotic division of oogenesis and spermatogenesis.

Q.3. Explain in detail the various developmental stages of the zygote until implantation with suitable diagrams.

Q.4. With the help of a neat labelled diagram of the female reproductive system, depict the following sites:

- (a) production of gamete
- (b) site of fertilization
- (c) site of implantation
- (d) birth canal

Q.5. Explain the organization of the mammary gland with the help of a diagram.

Q.6a. What is Menopause?

b). What is the menstrual cycle? Name the Hormones, which controls the menstrual cycle.

Q.7

i. Explain the process of spermatogenesis in humans.

ii. Draw a human sperm and label acrosome and middle piece. Mention their functions.

OR



i. Identify the figure that illustrates corpus luteum and name the pituitary hormone that influences its formation.

ii. Specify the endocrine function of corpus luteum. How does it influence the uterus? Why is it essential?

iii. What is the difference between 'd' and 'e'?

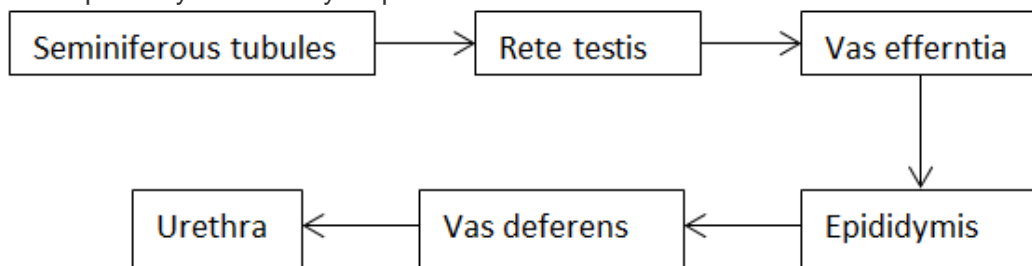
## ANSWERS

### Short Answers 2mks

A.1. Following is the sequence of events occurring in the process of human reproduction:

1. Gametogenesis
2. Insemination
3. Fertilization
4. Implantation
5. Gestation
6. Parturition

A.2. The pathway followed by a sperm.



A.3. The cervix is a narrow opening through which the uterus opens up to the vagina. The cervical canal is the cavity of the cervix which alongside the vagina goes on to form the birth canal.

A.4. During pregnancy, all the events of the **menstrual cycle** stop and there is no menstruation. Menstruation occurs only when the egg that is released is not fertilized. But in pregnancy, the released egg is fertilized and hence the uterus lining does not shed, instead nourishes the fetus. However, a woman may experience uterine bleeding during pregnancy due to various reasons. It is not due to the period.

A.5

<b>Column A (Organs)</b>	<b>Column B (Corresponding Functions)</b>
Ovaries	Ovulation
Oviduct	Fertilization
Uterus	Pregnancy
Vagina	Birth

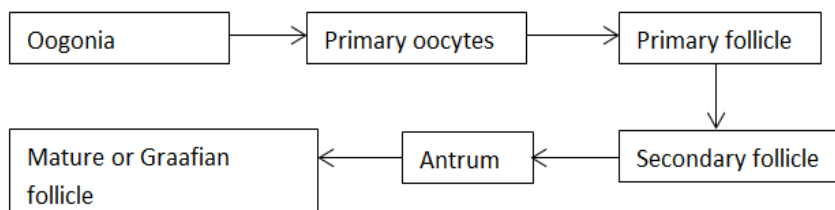
**A.6.** The hormone is Oxytocin. The signal originates from the placenta and fully developed foetus which initiate the foetal ejection reflex triggering the release of the hormone, oxytocin.

**A.7.** It is situated along the posterior surface of each testis where spermatozoa acquire motility and the capacity to fertilize the egg. The surface of the sperm is altered in response to secretions of the epididymis which is key to achieve the ability to fertilize an egg.

A.8.

<b>Name of the hormone</b>	<b>Endocrine glands where the hormone is released</b>	<b>Functions of the hormone</b>
Gonadotropin-releasing hormone(GnRH)	Hypothalamus	Increase in secretion of GnRH initiates spermatogenesis at puberty age After acting on the anterior pituitary gland – triggers the secretion of LH and FSH
Luteinising hormone(LH)	Anterior pituitary gland	Triggers the production and secretion of androgens
Follicle Stimulating Hormone (FSH)	Pituitary gland	Acts on Sertoli cells and stimulates the secretion

A.9



**A.10.** The primary oocyte is a diploid cell whereas secondary oocyte is a haploid cell. The primary oocyte is formed when oogonia are at the prophase-I of the meiotic division in the foetal ovary whereas secondary oocyte is formed from primary oocyte after meiosis – I division to produce ova in females during the stage of puberty.



A.11a) In the ampullary-isthmic junction, fertilization of the ovum takes place.

**b)** The zona pellucida is a thick layer that is girdled by corona radiata cells. During fertilization, cortical granules are released from the egg which blocks fusing of multiple sperms with an egg.

**A.12a)** It triggers the rupture of Graafian follicle and causes the release of the ovum in the fallopian tube.

**b)** The second meiotic division.

**A.13. a.** The secondary spermatocytes undergo meiotic division – II to generate four haploid spermatids which through the process of spermiogenesis are transformed into spermatozoa.

**b.** Cleavage occurs within the fallopian tube and is holoblastic, dividing the zygote completely into blastomeres. The first cleavage divides the zygote longitudinally into two blastomeres wherein one is slightly larger than the other.

**A.14.** The mammary glands in females start producing milk towards the end of pregnancy through the process of lactation which helps the mother feed the newborn. Colostrum is the milk produced during the initial few days. Colostrum contains antibodies which are crucial in developing resistance in the newborns hence it is recommended by doctors to bring up a healthy baby.

## Long Answers 3mks

**A.1.** During the luteal phase, the leftover parts of Graafian follicle transform into the corpus luteum.

It discharges large quantities of progesterone hormone which is required for the maintenance of the endometrium.

The endometrium is important for implantation of the fertilized egg and various other stages of pregnancy.

Hence corpus luteum has a long life in pregnancy.

In the absence of fertilization, upholding of the corpus luteum is not required and thus it declines within 10-12 days, which causes the lining of the endometrium to menstruate and hence the onset of the new menstrual cycle.

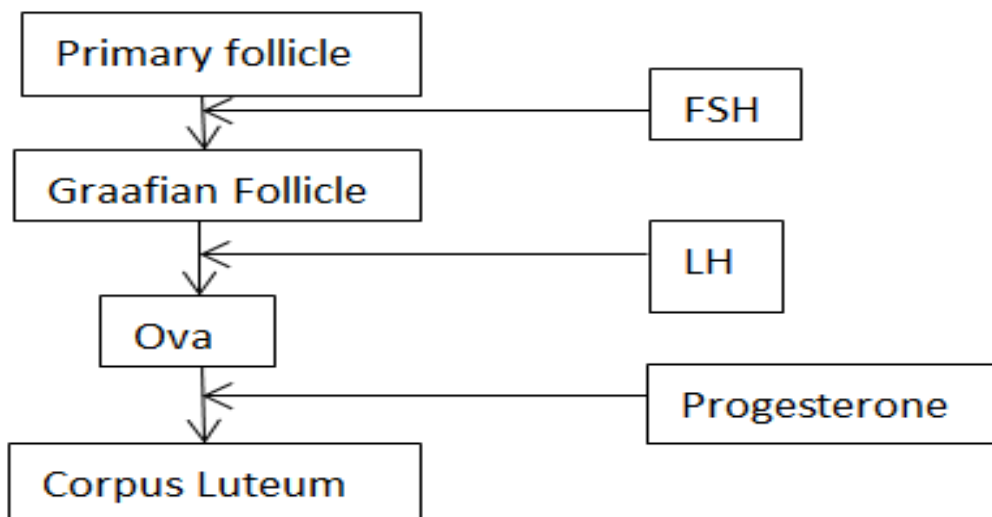
**A.2.** Foetal ejection reflex is the mild uterine contractions that arise from the parturition signals from the fully developed fetus and the placenta.

This reflex stimulates the release of oxytocin, which causes uterine contractions, in turn, stimulating the increased secretion of oxytocin.

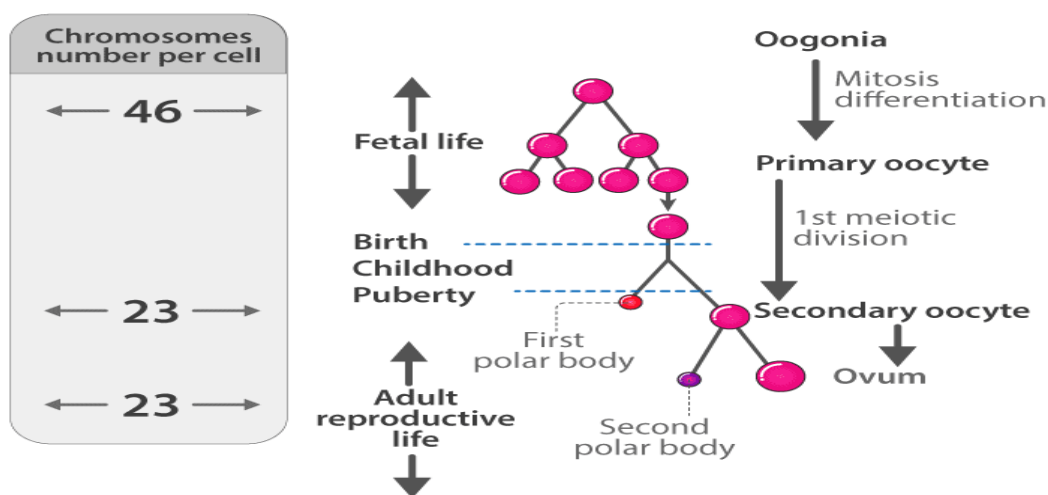
This action of uterine contractions and oxytocin secretion further results in stronger contractions leading to the dilation and hence expulsion of the baby out of the uterus through the cervical canal, expelling placenta along, thus the parturition or childbirth.

**A3.b.** The placenta promotes the supply of nutrients and oxygen to the embryo. It also facilitates the elimination of excretory wastes and carbon dioxide produced by the embryo. Placenta aids in the transportation of substances to and from the embryo as it is connected to the embryo through the umbilical cord.

A.4



A.5



**A.6.** Testis also called as the Testicles. It is a pair of oval-shaped organs masked in a pouch called the scrotum. They are responsible for the production of sperms and the male hormone testosterone.

The ovary is a ductless reproductive gland, which functions by producing a female sex hormone called estrogen and also involved in producing and storing the ovum or the egg cell.

## Very Long Answers 5mks

**A.1.** The menstrual flow is due to the breakdown of the lining of the uterine endometrium and blood vessels which forms the liquid discharged from the vagina.

The menstrual cycle is controlled through the pituitary gland by the hypothalamus.

Towards the end of the menstrual phase, the pituitary FSH eventually increases which causes the development of the follicles inside the ovaries.

Both the FSH and LH attain a peak level during the mid of the cycle.

This speedy secretion of LH leads to LH surge which induces rupture of the Graafian follicle and hence the ovulation.

During the maturation of follicles, more of estrogen is secreted causing a surge in FSH and LH from the anterior pituitary. The LH surge causes ovulation.

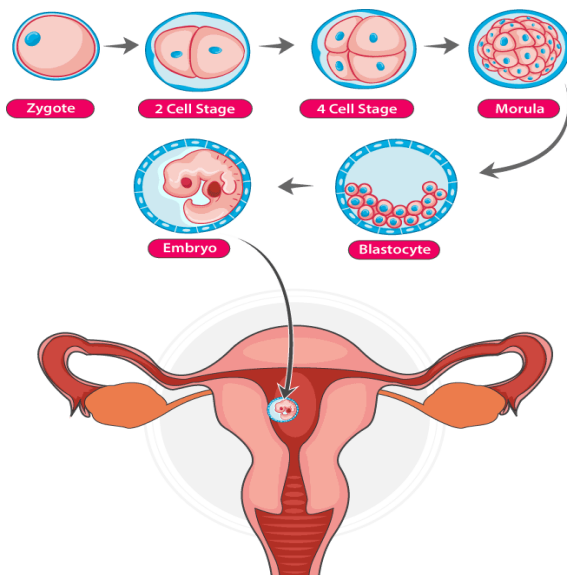
The LH also induces luteinisation. The LH hormone causes the conversion of the empty follicle into the corpus luteum.

The Corpus luteum produces steroidal hormones – progesterone and estrogen. These hormones govern the growth and maintenance of the uterine endometrium for probable implantation

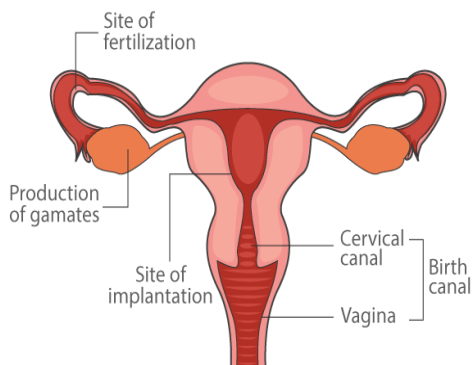
A.2

Oogenesis	Spermatogenesis
Production of eggs from oogonia	Production of sperm from spermatogonia
Takes place inside the ovary in females	Takes place inside the testes in males
All except the last phase takes place inside the ovary	All phases occur inside the testis
Early stages observed during the fetal period. Rest stages observed between puberty and menopause	A continuous process that is initiated from puberty and lasts until death

A3 Theory refer to the notes



A.4



A.5. One of the characteristics of the female mammals is that they possess functional mammary glands.

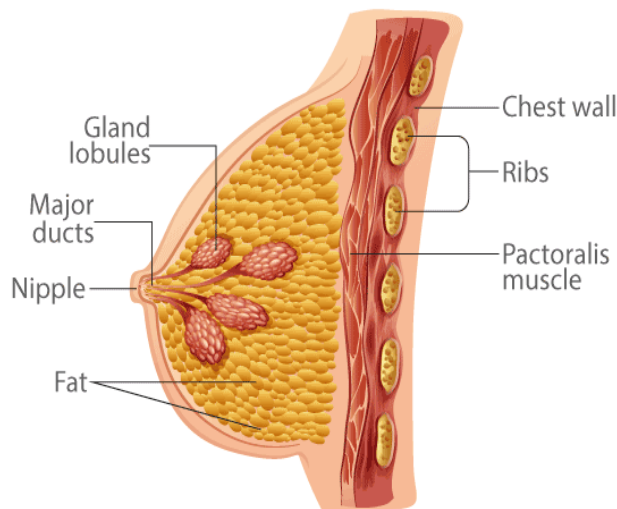
They have paired structures, containing glandular tissues and fat that varies in individuals.

The glandular tissue is organized into 15-20 mammary lobes in each breast. Which possess alveoli which are a cluster of cells.

These alveolar cells secrete milk that is stored in the lumens or cavities of the alveoli. The alveoli open into the mammary tubules.

These tubules in each of the lobes combine to form the mammary duct.

Many such mammary ducts join to form a mammary ampulla that is connected to the lactiferous ducts. Through these structures, milk is sucked



6a & b refer to the notes.

### **PREVIOUS QUESTIONS (Answers to these questions are in the above sections)**

1. Draw a diagrammatic sectional view of a seminiferous tubule and label Sertoli cells, primary spermatocytes, spermatogonium and spermatozoa in it.
2. Explain the hormonal regulation of spermatogenesis in humans
3. When and where do chorionic villi appear in humans? State their function.
4. Draw a diagrammatic sectional view of the female reproductive system of human and label the parts
  - a) Where the secondary oocytes develop.
  - b) Which help in collection of ovum after ovulation.
  - c) Where fertilization occurs.
  - d) Where implantation of embryo occurs.
5. Explain the role of pituitary and the ovarian hormones in menstrual cycle in human females.
6. (a) Describe the events of spermatogenesis with the help of a schematic representation.  
(b) Write two differences between spermatogenesis and oogenesis
7. Draw the following diagrams related to human reproduction and label them
  - (a) The zygote after the first cleavage division
  - (b) Morula stage
  - (c) Blastocyst stage( sectional view)

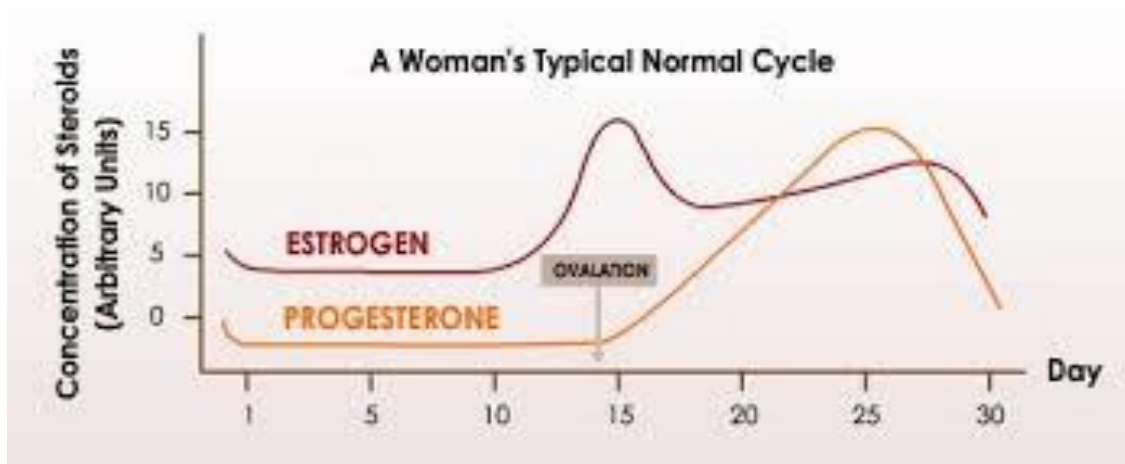
8 (a) Where do the signals for parturition originate from in humans?

(b) Why is it important to feed the new born babies on colostrum?

9. Read the graph given above and correlate the uterine events that take place according to the hormonal levels on

- (i) 6 – 15 days
- (ii) 16 – 25 days
- (iii) 26 – 28 days ( if ovum is not fertilized)

(b) Specify the sources of the hormones mentioned in the graph.



Prepared by Ms. Agnes A

Checked by: HOD - SCIENCE