

**18.0 : Introduction**

**Q.1. What is reproduction? and different types of reproduction.**

**Ans:** The process of formation of life from pre-existing life is called reproduction.

**Reproduction is of two types :**

- i) Asexual reproduction      ii) Sexual reproduction

**Q.2. What is the significance of reproduction ?**

**Ans:** Significance of reproduction:

- i) Due to reproduction the species is continued.  
 ii) Reproduction makes up for the loss of dead individuals.  
 iii) Sexual reproduction gives rise to variations due to which evolution proceeds.  
 iv) Living organisms are able to make the offspring with characters like their own characters.

**Q.3. Give an account of the following.**

- i) **Asexual Reproduction.**      ii) **Sexual Reproduction.**

**Ans:i) Asexual Reproduction :**

- a) Production of offspring is carried out by a single parent.  
 b) There is absence of fusion of gametes (agamogenesis or agamogeny). It is also called somatogenic reproduction.  
 c) It involves only mitotic division.  
 d) The offsprings produced are genetically similar to parents.  
 e) The offsprings do not show variations.  
 f) It is a very quick method of multiplication.  
 g) It is commonly seen in animals like protists, sponges, coelenterates and flatworms.

**ii) Sexual Reproduction :**

- a) Production of offspring is carried out by a single parent or two different parents.  
 b) There is fusion of two dissimilar gametes. Gametes are haploid and are produced by mitotic division.  
 c) It involves both mitotic and meiotic division.  
 d) The offsprings produced are genetically different from the parents.  
 e) The offsprings show variations.  
 f) It is slow and elaborate process.  
 g) It occurs in almost all animals, including those which reproduce asexually.

**Q.4. Distinguish between asexual and sexual reproduction.**

**Ans:**

No.	Asexual Reproduction	Sexual Reproduction
i.	Formation of offspring without the union of gametes is called <b>asexual reproduction</b> .	The reproduction in which new individuals are produced from parents by formation and fusion of gametes is called <b>sexual reproduction</b> .
ii.	Individual formed are genetically identical to the parent.	Individual formed are not genetically identical but resemble the parents.
iii.	Occurs only by mitotic division.	First gametes are produced by meiotic division and then zygote multiplies by mitotic division.
iv.	Rate of reproduction is faster.	Rate of reproduction is slower.
v.	No variation seen.	Variation seen.
vi.	Found in only lower invertebrates and lower chordates – Paramecium, Sponges, Hydra Planaria, etc.	Found in higher plants and animals like earthworms, insects, prawns and all vertebrates.

**Q.5. What is asexual reproduction? Explain different modes of asexual reproduction.**

**Ans:** Formation of offspring without the union of gametes is called **asexual reproduction**.

**Modes of asexual reproduction :****i) Fission :**

**Binary fission:** It is the division of parent body into two small and nearly equal sized daughter individuals.

e.g. Amoeba, Euglena, Paramecium.

**ii) Budding :** In budding the new individual arises as an **outgrowth** i.e. bud from the parent. The bud grows, develops organs like that of the parent and then usually detaches itself. e.g. Hydra, Sycon.**iii) Regeneration :** Parental body breaks up into two or more fragments. Each fragment develops into a new organism. Anterior part exerts a pull over a posterior part which holds on. Due to pull, middle part constrict and finally breaks. Two complete worms are formed from each parent worm. e.g. Sponges, Hydra, Planaria, Sea anemone, Platyhelminthes, etc.**Q.6. What is asexual reproduction? Which animals reproduce asexually ?**

**Ans:**i) Asexual reproduction is a primitive type of reproduction in which fusion of gametes do not take place.

ii) It is a quick method of reproduction in which a single parent can form the genetically identical offspring.

iii) Offspring produced by asexual reproduction do not show variation.

iv) Asexual reproduction is seen in protists, sponges, coelenterates and certain flatworms.

**Q.7. Describe the process of budding with suitable diagrams.**

OR

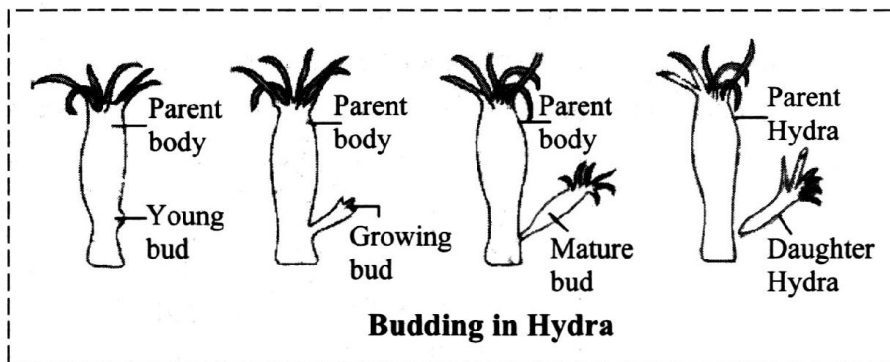
**Write a note on budding in Hydra.**

**Ans:**i) Budding is the type of asexual reproduction seen in Coelenterates (e.g., Hydra) and Ascidians.

ii) These multicellular animals form a small bud which grows gradually.

iii) The bud grows slowly into a young animal and then detaches itself from the parent body.

iv) This bud then grows into an independent new organism.

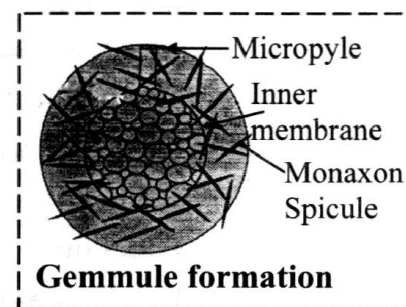
**Q.8. Write a note on gemmule formation in sponges.**

**Ans:**i) Formation of gemmules takes place by aggregation of archeocytes.

ii) A layer of amoebocytes secrete hard, chitinous membrane around these archeocytes.

iii) Gemmule formation is the formation of internal bud to overcome unfavourable conditions.

iv) On return of favourable conditions gemmules hatch and develop into new individuals e.g. Spongilla.

**18.1 : Human Male Reproductive System****Q.9. Explain the peculiarities of human reproduction.**

**Ans:**i) Human beings are unisexual (males or females).

ii) The human males and females show differences in their primary and secondary sexual characteristics

iii) Male gonads are testis while female gonads are ovaries.

iv) Testes produce male gametes or sperms while ovaries produce ova or female gametes.

v) Secondary sexual characters like mammary glands are well developed in females whereas in males they are rudimentary.

- vi) Males develop mustache, beard, low bass voice while female develop mammary glands and other feminine characteristics.
- vii) Human reproduction is sexual and exhibits viviparity.
- viii) Major sequences occurring during sexual reproduction are gametogenesis, copulation, fertilization of gametes and development of zygote.
- ix) Lactation i.e. production of milk for nourishment of young ones also occurs.
- x) All the reproductive functions are under the control of pituitary gland and gonads.

**Q.10. Describe the male reproductive system in human beings.**

**Ans:** The male reproductive system consists of the following:

- i) Primary sexual organs : Testes
- ii) Secondary or accessory sexual organs
- iii) External genitalia: Penis

**i) Primary sex organ**

**a) Scrotum (Scrotal sac) :**

It is a pouch of pigmented skin arising from lower abdominal wall. The wall of scrotum consists of smooth muscles called dartos tunic. Scrotum is divided into two compartments (right and left) by muscle septum. Each compartment encloses a testis, epididymis and a testicular end of spermatic cord. It lies below the pubic symphysis in front of upper part of thigh and behind the penis.

**Functions :** Scrotum protects testes and acts as thermo-regulator.

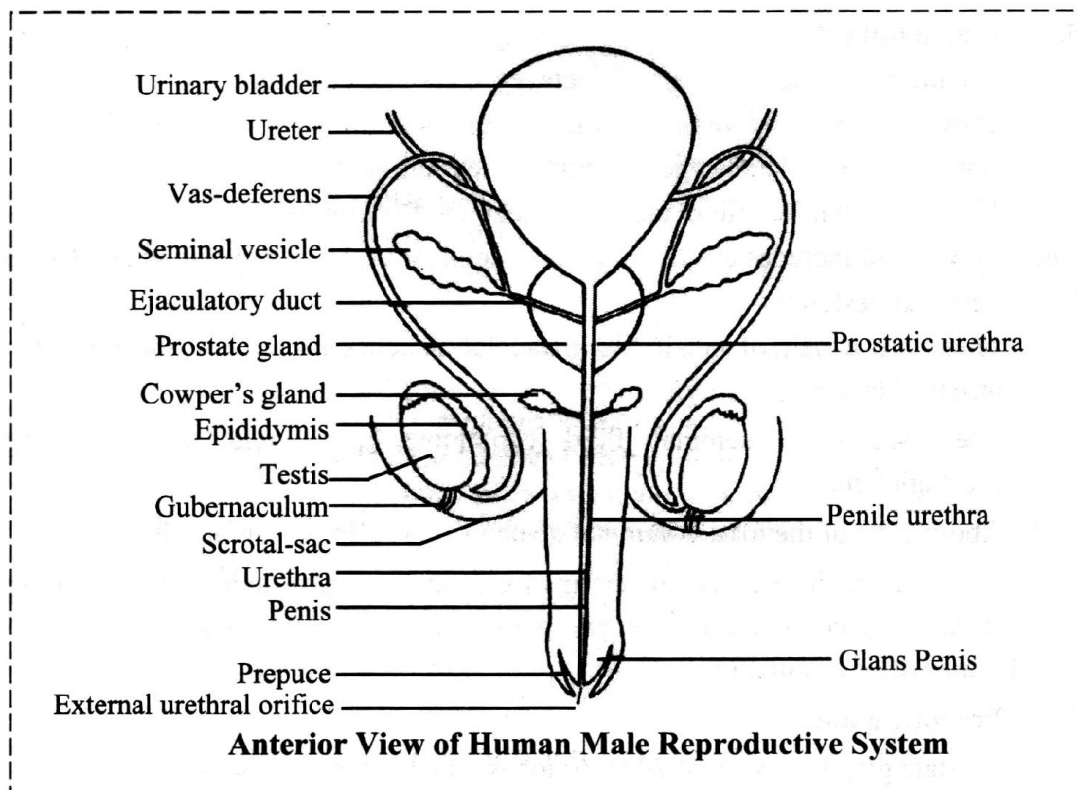
**b) Testes :**

Testes are a pair of primary sex organs which are mesodermal in origin. Testes are located outside the abdomen in scrotum i.e. extra abdominal in position. They are suspended in the scrotal sac by the spermatic cord. Each testis is connected to the wall of scrotum by short fibromuscular band called gubernaculum.

They are soft, smooth, pinkish oval organs about 4.5cm long, 2.5cm wide and 3,cm thick. The outermost covering of the testis is formed of dense fibrous membrane called tunica albuginea.

**Function:**

- i) Testes produces sperms.
- ii) It secretes male sex hormone called testosterone.



**ii) Secondary or accessory sex organs :**

It includes a. accessory ducts b. accessory glands.

a) Accessory ducts: It includes rete testis, vasa efferentia, epididymis and vas deferens.

**i) Rete testis :**

The seminiferous tubules are closed at one end but on the other end they join to a network of tubules called rete testis. The rete testis open into vasa efferentia.

**ii) Vasa efferentia :**

Vasa efferentia are 15 to 20 fine convoluted ductules arising from the rete testis and join to the epididymis by piercing through tunica albuginea.

**iii) Epididymis:**

Epididymis are a pair of 'C' shaped organs situated on the posterolateral side of each testes. They are highly coiled duct and are about 6 meters long. They are further differentiated into three regions viz. upper wider head or caput, middle narrower body or corpus and lower duct called tail or cauda.

Caput epididymis receive the vasa efferentia while cauda epididymis continues further as vasa deferentia. In caput (head) epididymis, sperms undergo maturation acquiring increased motility and fertilization capacity. They are stored for a short period in cauda (tail) epididymis before entering into the vas deferens.

**iv) Vasa deferentia :**

Vasa deferentia are a pair of tubular structures arising from cauda epididymis. Each vas deferens is about 40 cm long and enters into abdominal cavity through inguinal canal. It continues as spermatic cord and later joins seminal duct from seminal vesicle to form ejaculatory duct. They carry the sperms from epididymis to urethra.

**v) Ejaculatory ducts:**

Ejaculatory ducts are a pair of ducts, each about 2 cm long.

They are formed by joining of vas deferens and duct of seminal vesicle.

Both ejaculatory ducts open into prostatic urethra.

They carry seminal fluid and spermatozoa to the urethra.

**vi) Accessory gland includes** ejaculatory ducts, seminal vesicles, prostate gland, Cowper's glands.

**1) Seminal vesicles :**

These are a pair of small fibromuscular pouches present on the posterior side of the urinary bladder.

They secrete a seminal fluid containing citric acid, fructose, fibrinogen and prostaglandins. About 60% of the total volume of semen is made up of seminal fluid. Fructose provides energy to sperms for swimming, prostaglandins help in fertilization by stimulating contraction of female genital tract while fibrinogen helps in coagulation of semen after ejaculation.

**2) Prostate gland :**

Prostate gland consists of 20 to 30 lobes which open into the urethra. It secretes a white, alkaline fluid called prostatic fluid. Prostatic fluid forms about 30% of the total volume of semen. It neutralizes the acidity of vaginal secretion. At pH around 6.5, sperms become motile which helps fertilization.

**3) Cowper's glands :**

Cowper's glands are also known as bulbourethral glands. These are pea sized and lie on either side of membranous urethra. They secrete a viscous, alkaline fluid which neutralizes the acids that may be present in the penile urethra due to previous urination. It also lubricates the vagina of female genital tract at the time of copulation.

**4) Semen :**

Semen is a whitish fluid containing spermatozoa and a mixture of secretions from seminal vesicles, prostate gland and Cowper's glands. It is ejaculated during sexual intercourse known as coitus. 3 – 4 ml of semen is released on single ejaculation. It contains about 300 million sperms.

**iii) External genitalia** includes penis and urethra :

**a) Urethra :**

Urethra is the common passage for flow of urine and semen, hence called urinogenital passage. It includes three parts. The first part is called prostatic urethra. It is surrounded by prostate gland and carries urine. The second part is the membranous urethra. It is situated between the ends of prostate gland and root of penis and carries both urine and semen. The third part is penile

urethra. It is situated in the penis and carries both urine and semen. It passes through corpus spongiosum of penis. Hence, also called spongy urethra. The urethra has two sphincters- an internal sphincter made up of smooth muscles and external sphincter made up of striated muscles.

**b) Penis :**

Penis is cylindrical, erectile and pendulous organ situated in the pubic region in front of scrotum. Generally, it is small and limp but on sexual arousal becomes long, hard and erect. The penis has three columns of erectile tissues: two postero-lateral tissues called corpora cavernosa and a median corpus spongiosum. Erectile tissue consists of blood sinuses, in which blood flows, making penis erect and helping in copulation. The tip of penis is called glans penis which is enlarged due to corpus spongiosum. Glans penis is covered by a loose retractable fold of skin called prepuce or foreskin.

**Q.11. Describe the histological structure of human testis.**

OR

With the help of a suitable diagram describe the T.S. of testis.

[Sep 09]

OR

Draw a neat labeled diagram of T.S. of Testis.

OR

Sketch and label seminiferous tubule as seen in the T.S. of testis.

[Mar 2013]

**Ans: Histology of Testis :**

i) Externally each testis is covered by three layers. These are :

**a) Tunica vaginalis :**

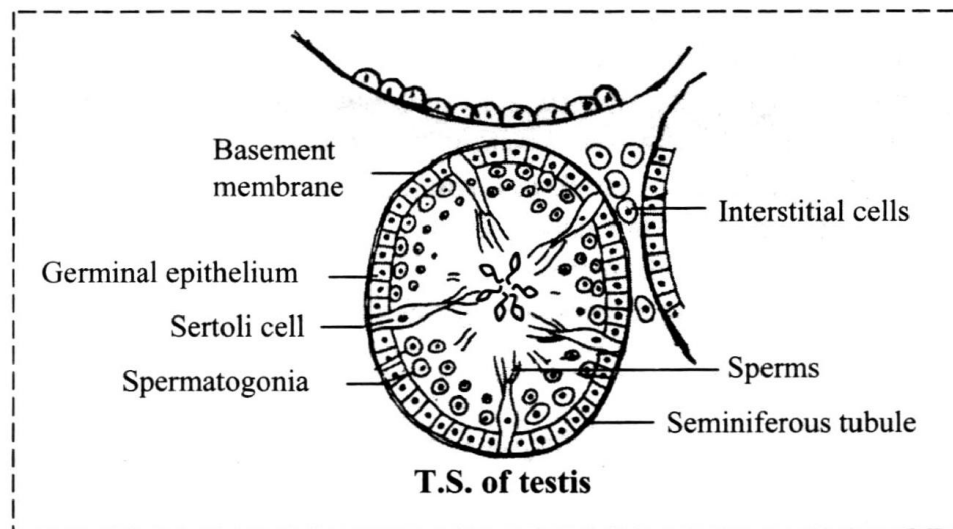
It is the outermost incomplete peritoneal covering made up of connective tissue and epithelium.

**b) Tunica albuginea :**

It is middle layer formed by fibrous connective tissue.

Tunica vasculosa:

c) It is innermost layer formed of delicate connective tissue, supporting a network of blood capillaries.



ii) Each testis contains about 900 tubules called **seminiferous tubules**.

ii) These are lined by a single layer of **cuboidal germinal epithelium** which undergo **spermatogenesis**.

iv) On this germinal epithelium various stages of developing sperms are seen such as spermatogonia, primary spermatocytes, secondary spermatocytes, spermatids and sperms.

v) Between these cells, few large and pyramidal cells called nurse cells or sertoli cells are present.

vi) Bundles of sperms are seen attached to Sertoli cells.

vii) These cells provide nourishment to the sperms till maturation.

viii) In between seminiferous tubules connective tissue containing blood vessels, nerves, lymph vessels and groups of interstitial cells (cells of leydig) is present.

ix) Interstitial cells produce male hormone testosterone.

**Q.12. Why are testes present outside the body cavity ?**

**Ans:** Testes are located outside the body in a sack of skin called the scrotum because optimal temperature is

maintained at 2°C below body temperature in scrotum which is required to maintain viability of sperms.

**Q.13. What is cryptorchidism ?**

**Ans:** Failure of testes to descend from abdomen into scrotum leads to sterility called cryptorchidism.

**Q.14. Write two major functions of each of testis and ovary.**

**Ans: i) Functions of testis :**

- a) Formation of sperms by the process of spermatogenesis.
- b) Secretion of testosterone hormone.

**ii) Functions of ovary :**

- a) Formation of ova by the process of oogenesis.
- b) Secretion of female hormones like estrogens, progesterone and relaxin.

**Q.15. Describe structure of a seminiferous tubule.**

- Ans: i)** Seminiferous tubule is lined by a germinal epithelium having two types of cells: Germ cells and sertoli cells.
- ii) Germ cells are cuboidal, form bulk of epithelium and produce spermatozoa by spermatogenesis through intermediate stages like spermatogonia, primary spermatocytes, secondary spermatocytes and spermatids.
  - iii) Sertoli cells are pyramidal shaped and provide nutrition to developing sperms.

**Q.16. What are major components of seminal plasma?**

**Ans:** Seminal fluid is the secretion of accessory sex glands of male (i.e., of seminal vesicles, prostate gland and Cowper's glands). It is rich in fructose, calcium and certain enzymes.

**Q.17. Give reason - Urethra is called urinogenital duct in human male.**

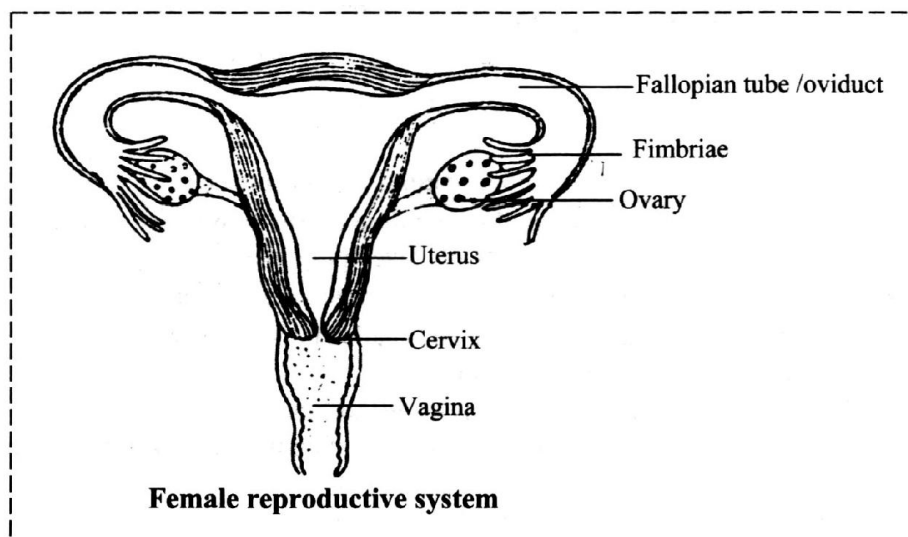
- Ans: i)** In human beings, the male urethra is a common passage for urine and semen.
- ii) Semen contains male gamete the sperms.
  - iii) Hence, it is also called genital duct.

## 18.2. Human Female Reproductive System

**Q.18. Describe the female reproductive system in human beings.**

**Ans:** The human female reproductive system has two sets of organs, viz.,

- i) Internal genitalia
  - ii) External genitalia.
- i. Internal genitalia** includes ovaries, fallopian tubes, uterus, vagina.



**a) Ovaries :**

These are a pair of female primary sex organs situated in the lower part of the abdomen. Ovaries are almond-shaped bodies measuring about 3 cm in length, 1.5 cm in width and 1 cm thick. Each ovary is suspended from the dorsal body wall by a fold of peritoneum called mesovarium. Ovary is connected to uterus by an ovarian ligament, and it is connected to lateral body wall by a suspensory ligament. The outer region of the ovary is composed of developing follicles and middle region from the stroma which contains connective tissues, blood vessels and mature follicles. Stroma is divided into two regions: a peripheral cortex and an inner medulla

**Functions:** Ovaries produce female gametes i.e. ova as well as female sex hormones - oestrogen and progesterone which control menstrual cycle and secondary sexual characters.

**b) Fallopian tubes (oviducts) :**

Fallopian tubes are a pair of horizontal tubes situated close to the uterus. Each tube is about 10 to 12 cm long, narrow, muscular structure lined by ciliated epithelium. It is supported by a double fold of peritoneum called **mesosalpinx**. Each fallopian tube has three distinct parts, viz. funnel shaped infundibulum with finger like projections called **fimbriae**, middle ampulla and cornua or isthmus opening into the uterus. Fimbriae surround the opening of the fallopian tube called ostium. Through the ostium the released ovum from the ovary is picked up by the fallopian tube.

**Functions :**

Fallopian tubes carry the released egg from the ovary to the uterus. Ampulla provides the site for fertilization of the ovum.

**c) Uterus :**

Uterus is a pear - shaped, highly muscular, thick walled bag like organ.

It is about 8 cm long, 5 cm wide, and 2 cm thick.

It is present in the pelvic cavity between the rectum from behind and urinary bladder in front.

It is attached to body wall by a double fold of peritoneum called mesometrium or broad ligament. .

The uterus has three regions, viz, fundus, corpus or body and cervix. **Fundus** is the dome-shaped upper part of uterus lying above the openings of fallopian tubes. **Corpus or body** is the upper middle part in which the fallopian tubes open. **Cervix** is a narrow cylindrical part which opens into the vagina. Near the cervix there are internal os and external os. **Internal os** is an aperture connecting the body of uterus with **cervix**, while external os connects cervix with vagina on its lower side. The uterine walls consist of an outer serous peritoneum called perimetrium, middle myometrium and inner highly vascular endometrium. Endometrium layer shows cyclic changes during menstrual cycle.

**Functions:**

Uterus receives the ovum. It provides site for implantation, gestation and parturition. It forms placenta for development of foetus.

**d) Vagina :**

The vagina is highly distensible fibro-muscular canal which opens into the vestibule of vulva. It measures about 7.5 cm to 10 cm in length. The inner lining cells of vagina secrete glycogen. The bacteria *Lactobacilli* present in vagina convert this glycogen into an acidic substance, hence vaginal medium is acidic.

**Functions:**

The vagina is a copulatory passage. It also acts as a passage for the discharge of menstrual flow. At the time of parturition, it acts as birth canal.

**ii. External genitalia :**

The external genitalia or vulva consists of labia majora, labia minora, mons pubis and clitoris. Other structures like vestibule, hymen and vestibular glands are also present.

**a) Labia majora :**

These are two large folds that form the boundary of the vulva. They are homologous to scrotum of males. They are composed of skin, fibrous tissue and fat. They are present on either side of vestibule.

**b) Labia minora :**

These are two small and thin lip-like folds located medially to labia majora. Posteriorly both labia minora fuse to form the fourchette.

**c) Mons pubis :**

Mons pubis is elevated part above the labia majora.

**d) Clitoris :**

It is small and erectile and is situated at the anterior end of the labia minora.

It is homologous to the penis of males and shows presence of erectile tissues.

**e) Vestibule :**

Vestibule is median vertical depression of vulva enclosing vagina and urethral opening.

**f) Hymen :**

Hymen is a thin layer of mucous membrane which occludes the vaginal opening.

g) **Vestibular glands :**

Vestibular glands or Bartholin's glands are present on either side of vagina and are homologous to the Cowper's glands of the male. They secrete a lubricating fluid.

h) **Mammary glands :**

Accessory glands are mammary glands or breasts. They are not part of external genitalia. These are a pair of rounded structures found on ventral thoracic wall in the pectoral region. These are modified sweat glands. Each breast has a nipple having an erectile tissue. Areola is the dark brown region surrounding the nipples. Each breast contains fatty connective tissue and numerous lactiferous glands. Lactiferous glands has 15 – 20 openings of lactiferous ducts which carry milk from mammary glands to nipples. Lactiferous ducts dilate and form lactiferous sinuses just beneath the nipple to store the milk.

**Q.19. Draw a labeled diagram of female reproductive system.**

Ans: Refer Q. 18.

**Q.20. Give the functions of Uterus. [Oct 08]**

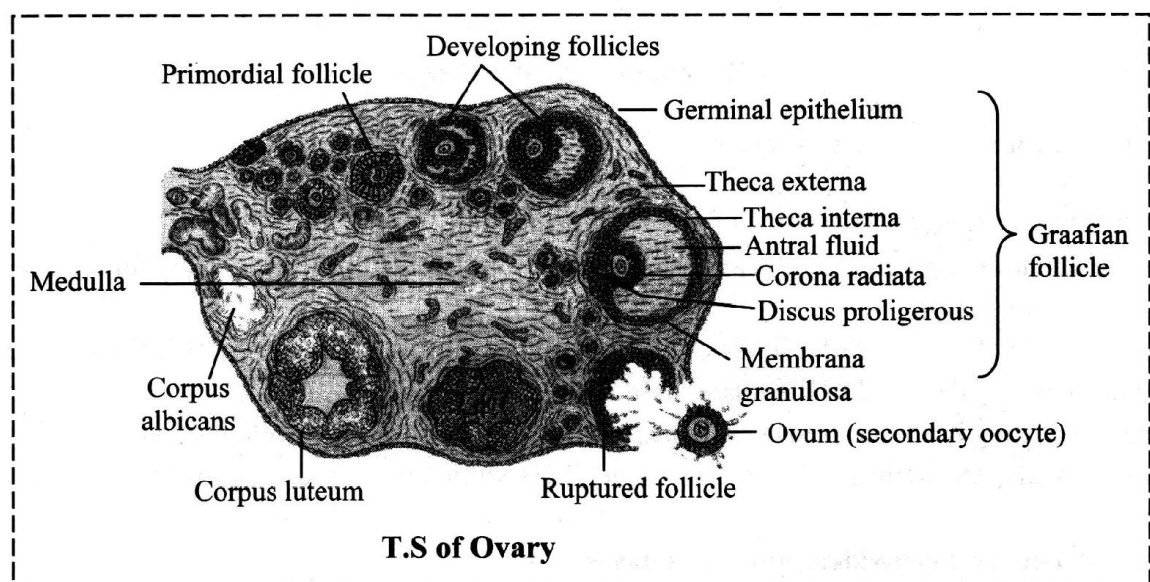
Ans: Functions of uterus :

- It provides place for the **development of embryo.**
- It forms connection between mother and foetus i.e. **placenta**, which provides nutrition to the developing embryo and removes waste from it.
- It is a pathway for sperms from vagina to fallopian tube.
- The cervical gland secretes mucus with protective antibodies which prevent growth and spread of **harmful bacteria** during and after menstruation.
- It expels **baby during parturition.**

**Q.21. Describe the histological structure of human ovary.**

Ans: **Histological structure of Ovary :**

- Ovary is made up of an inner medulla and outer cortex.
- The medulla contains connective tissue called stroma.
- The cortex has lining of germinal epithelium, below which is present tunica albuginea, a capsule of dense irregular connective tissue.
- The cortical region shows various developing stages of ovarian follicles viz., primordial follicle, secondary follicle, maturing follicle etc. The matured follicle is called Graafian follicle.
- Graafian follicle shows presence of eccentric secondary oocyte surrounded by radially arranged corona radiata cells.
- Antrum is the fluid filled cavity surrounded by granulosa cells.



- Connective tissue stroma from ovarian medulla surrounds membrane granulosa cells and forms theca interna and theca externa.
- One ovum from mature follicle is released from each ovary in every menstrual cycle (alternately in right and left ovary).



- xi) It may also show presence of mass of yellow cells called corpus luteum, formed in the antrum or follicular cavity of an empty Graafian follicle after the release of its ovum (ovulation).
- x) If the ovum is fertilized corpus luteum secretes progesterone to maintain pregnancy and relaxin towards the end of pregnancy.
- xi) The ovarian cortex may also show white body or corpus albicans representing a degenerating corpus luteum when the ovum is not fertilized.

**Q.22. Draw a labelled diagram of section through ovary.**

**Ans:** Refer Q. 21.

**Q.23. What is the function of corpus luteum ?**

**Ans:** Corpus luteum secretes progesterone which causes further growth of endometrial glands and maintains thickness of endometrium.

**Q.24. What is corpus luteum? Under which conditions does it undergo degeneration ?**

**Ans:** It is a yellow coloured body formed from remaining parts of the graafian follicle after ovulation. It acts as endocrine gland. Corpus luteum degenerates in the absence of fertilization and implantation of fertilized ovum.

**Q.25. What is puberty? What is the age of puberty ?**

**Ans:** Puberty is the age at which the internal reproductive organs attain maturity. It is also called as menarche. Age of puberty varies between 10 to 14 years.

**Q.26. What is menopause? Which changes occur during menopause? .**

- Ans:**
- i) Menopause is the ceasing of menstrual cycle.
  - ii) It occurs between the age of 45 to 50 years.
  - iii) During menopause ovaries gradually become less responsive to the FSH and LH. Menstrual cycle becomes irregular and then stops.
  - iv) Secondary effects of menopause are osteoporosis, increase in blood cholesterol and hot flushing, sweating and palpitation.

### 18.3 : Menstrual Cycle

**Q.27. What is beginning of menstrual cycle called ?**

**Ans:** Beginning of menstrual cycle is called menarche.

**Q.28. Describe the phases of female reproductive cycle in human being. [Mar 2013 old course]**

**OR**

**What is menstrual cycle? Which hormones regulates menstrual cycle?**

**OR**

**Describe the phase of menstrual cycle.**

**[Mar 10]**

**Ans: Menstrual cycle:**

The menstrual cycle starts at the time of puberty (menarche).

It lasts for about 28 days/26-30 days and is repeated throughout child-bearing years for about next 32 years.

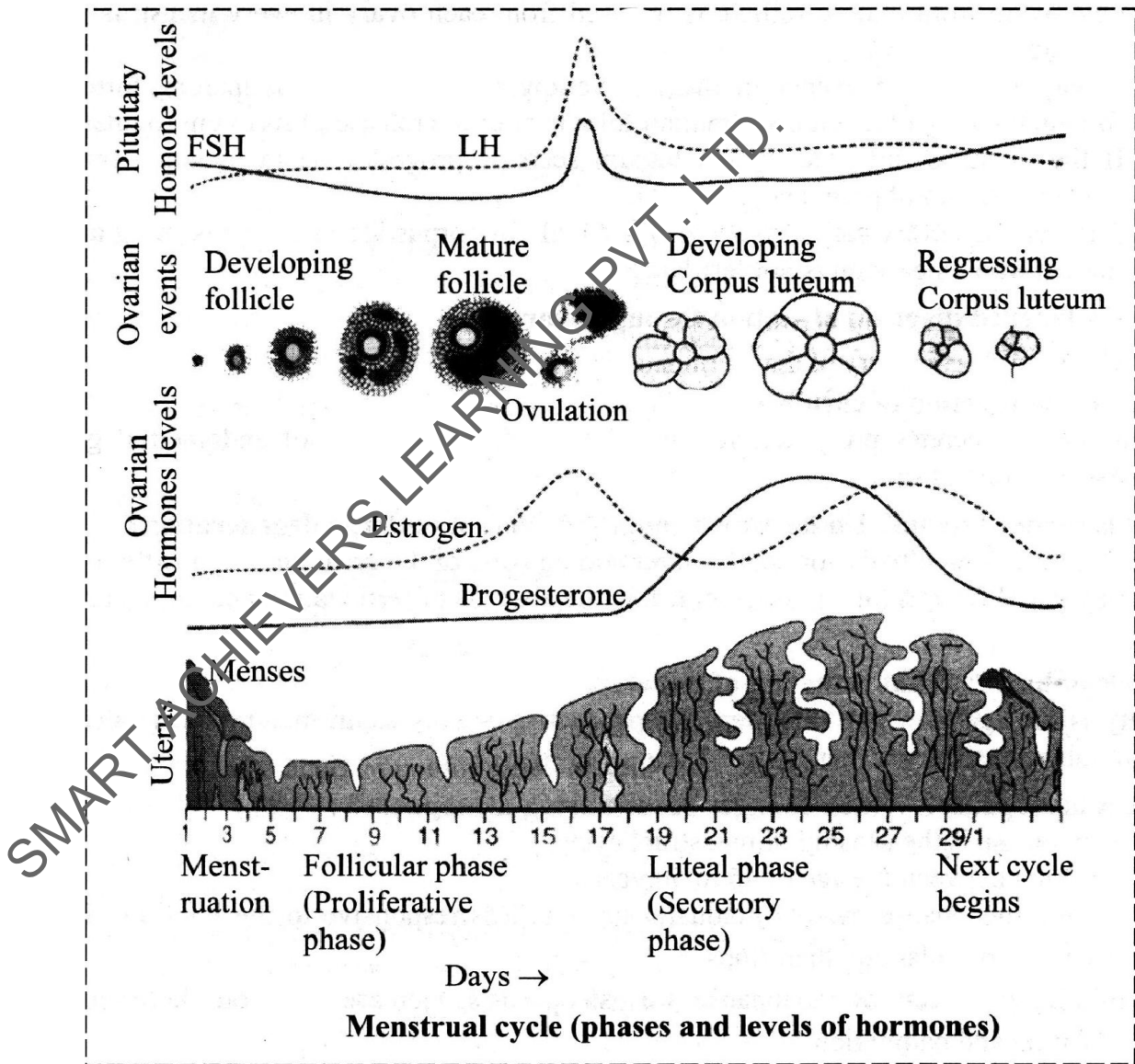
It stops with menopause.

The menstrual cycle consists of a series of changes in the ovaries and uterine wall (endometrium). Gonadotropins like FSH and LH regulate these changes. Follicle stimulating hormone (FSH) promotes the maturation of ovarian follicles and secretion of oestrogen leading to ovulation while luteinising hormone (LH) stimulates the development of corpus luteum and secretion of progesterone.

**The menstrual cycle is divided into four phases.**

These are:

- i) Menstrual phase
- ii) Proliferative phase
- iii) Ovulatory phase
- iv) Post ovulatory or secretory phase or luteal phase.



**i) Menstrual Phase (bleeding or destructive phase) :**

This phase extends from 15<sup>th</sup> to 4<sup>th</sup> day of menstrual cycle.

Menstruation occurs in the absence of fertilization.

During this phase bleeding occurs as the endometrium of uterus is sloughed off. Menstrual flow consists of the secretion of endometrial glands, cell debris, unfertilized ovum along with 35 to 45 ml of blood.

The thickness of endometrium becomes 1 mm.

After about 4<sup>th</sup> day of bleeding, when progesterone level decreases once again the FSH secretion from the pituitary is resumed and the new follicle starts developing.

**ii) Proliferative phase :**

This phase extends from 5<sup>th</sup> to 13<sup>th</sup> day of menstrual cycle.

**Changes in ovary :**

During this phase, the primordial follicle of the ovary develops into Graafian follicle.

Theca interna cells of the follicle secrete female sex hormone oestrogen.

Only one follicle develops in one cycle.

**Changes in uterus :**

Oestrogen secreted by follicular cells of ovary stimulate endometrial glands.

This causes repair of endometrium.

The endometrial cells proliferate and thickness of endometrium grows to about 3mm to 5mm.

**iii) Ovulatory phase :**

During this phase, ovulation takes place. It usually occurs on the 14<sup>th</sup> day of the cycle. The mature Graafian follicle ruptures due to LH secreted by the pituitary.

Due to LH the Graafian follicle bursts and releases the ovum in abdominal cavity.

This ovum along with follicular fluid is picked up by the fimbriae of infundibulum of fallopian tube.

It passes through the fallopian tube. On its way if it happens to meet sperms, it is fertilized. If unfertilized the ovum degenerates.

**iv) Secretory phase/Luteal phase :**

This phase extends from 15<sup>th</sup> to 28<sup>th</sup> day of the menstrual cycle.

**Changes in ovary :**

After ovulation, the ruptured follicle develops into a yellow body called corpus luteum.

It acts as temporary endocrine gland which secretes progesterone, which helps in maintaining the thickness of endometrium. So it is also called pregnancy hormone. Corpus luteum remains active till placenta starts secretion of HCG (Human chorionic gonadotropin). HCG is similar to LH.

If corpus luteum becomes inactive before placenta formation it leads to abortion.

If the ovum is not fertilized the corpus luteum degenerates and transforms into a whitish scar called corpus albicans.

**Changes in Uterus :**

Corpus luteum formed in ovary secretes progesterone.

It causes further growth of endometrial glands.

If fertilization occurs, embryo is implanted in thickened endometrium.

**Q. 29. Draw a neat and well labelled diagram showing T.S. of ovary and describe the menstrual cycle in human female. [Mar 2014]**

**Ans:** Refer diagram of Q. 21 & Answer of Q. 28.

**Q.30. Give reasons for the following:**

**i) Missing of menses is the first indication of pregnancy.**

**Ans:**a) Menstruation is a series of cyclic changes taking place in the ovary and endometrium of uterine wall.

b) During this cycle uterine wall prepares itself to receive fertilized ovum while graafian follicle is being developed in ovary.

c) If fertilization takes place, the corpus luteum formed after ovulation, continues to secrete progesterone for further development of uterine wall for gestation.

d) Hence, endometrium wall remains intact and menstruation does not take place.

e) Thus, missing of menses marks possibility of pregnancy.

**ii) Progesterone is called pregnancy hormone.**

**Ans:**a) Progesterone helps maintaining thickness of endometrial wall of uterus.

b) If progesterone secretion stops, endometrium will start breaking and lead to abortion.

c) In this process fertilized ovum will also get washed off.

d) Hence, progesterone is called pregnancy hormone.

## 18.4 : Gametogenesis (Production of Gametes)

**Q.31. Define gametogenesis.**

**Ans:** Gametogenesis is the process of formation of gametes in sexually reproducing animals.

**Q.32. What is gametogenesis?**

**Ans:** Production of gametes from reproductive cells of gonads.

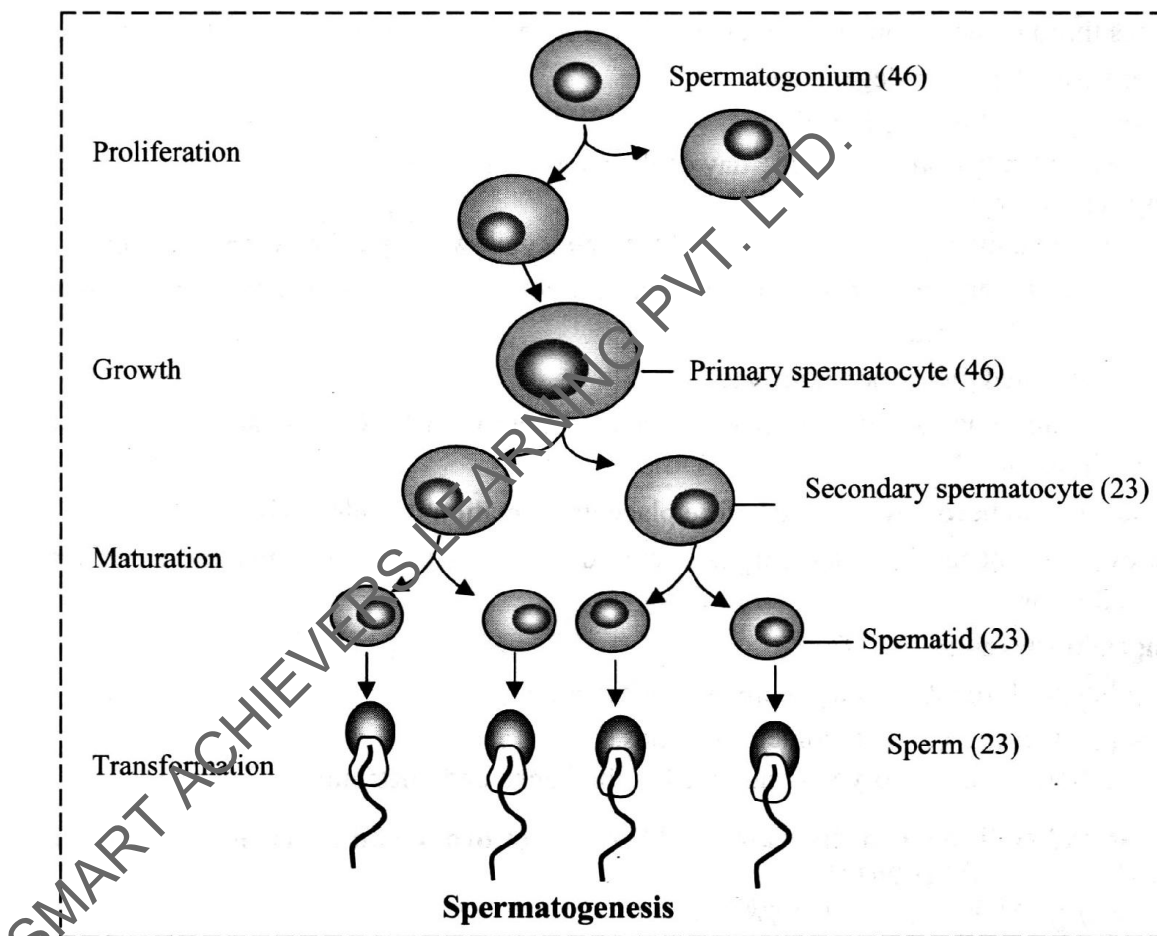
Spermatogenesis- It is process of formation of sperms.

Oogenesis – It is the process of formation of ova.

**Q.33. Describe the spermatogenesis and give its significance. OR**

What is spermatogenesis? Briefly describe the process of spermatogenesis.

**Ans:** i) Spermatogenesis is process of formation of haploid, microscopic and motile male gametes, called spermatozoa, from the diploid spermatogonia of the testis of male organism.



Each testis has seminiferous tubules which are lined by cuboidal epithelium called germinal epithelium. Germinal cells in testes are known as primary germinal cells. Primordial cells pass through three phases namely.

- Multiplication Phase:** Primordial cells undergo repeated mitotic divisions to produce large number of spermatogonia. Each spermatogonium is diploid (2n).
- The growth phase:** Spermatogonium cell accumulates food and grows in size. Now it is called primary spermatocyte.
- The maturation phase:** The primary spermatocyte undergoes first meiotic or maturation division. The homologous chromosomes start pairing. Each homologous chromosome splits longitudinally. Chiasma formation results in exchange of genetic material. At the end of I meiotic division, two haploid, secondary spermatocytes are formed. Each secondary spermatocyte undergoes II meiotic division and produces spermatids. So at the end of maturation phase each spermatogonium produces four haploid spermatids. Spermatid is non motile so it has to undergo spermiogenesis to become functional, motile male gamete i.e. spermatozoan.

**Significance:** It produces haploid sperms. Crossing over during meiosis I may produce variation. It proves evolutionary relationship.

#### Q.34. Describe the structure of human sperm.

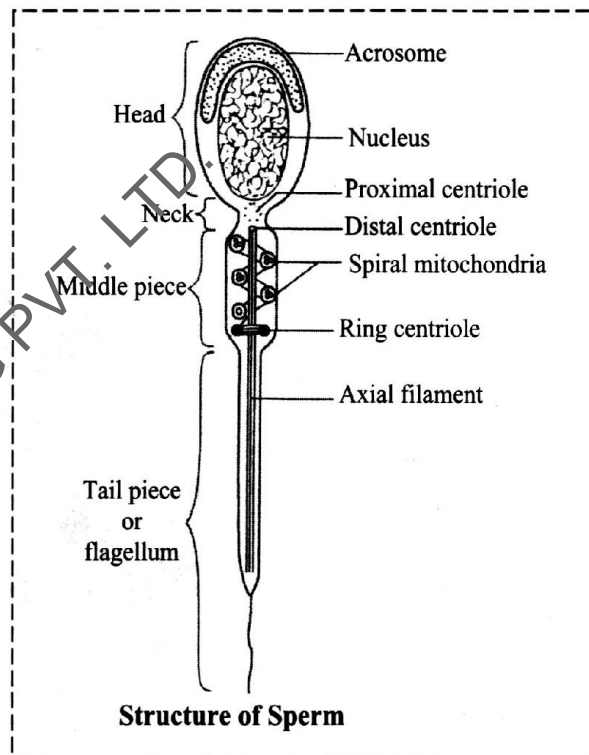
Write a note on structure of sperm.

Ans: Structure of human sperm:

- The human sperm is a haploid, elongated and motile male gamete. Acrosome It is microscopic, measuring about 0.060 mm in length.
- Sperms are produced by the process of spermatogenesis in testes.
- The body of sperm is divided into four parts, viz., head, neck, middle piece and tail.
  - Head :** It is flat and oval consisting of large haploid nucleus and an acrosome formed from Golgi complex. The

acrosome secretes an enzyme hyalourinidase which helps in penetration of egg during fertilization. The anterior half of the nucleus is covered by a fibrous sheath.

- b) **Neck :** It is a narrow constricted region consisting of two centrioles (proximal and distal) and cytoplasm. The proximal centriole plays an important role in first cleavage of the zygote and distal centriole forms the axial filament present in the tail of the sperm.
- c) **Middle piece:** Middle piece has many mitochondria spirally coiled around axial filament. The mitochondria provide energy for the sperm during its movement, hence it is called the powerhouse of the sperm.
- d) **Tail:** The tail is long, slender and tapering. It is made up of cytoplasm. The axial filament passes through the tail.



**Q.35. Draw a well-labelled diagram of sperm.**

**Ans:** Refer Q. 34.

**Q.36. Name the cell organelle that forms acrosome of sperm.**

**Ans:** Acrosome of the sperm is derived from golgi apparatus.

**Q.37. Explain the process of oogenesis and give its significance .**

OR

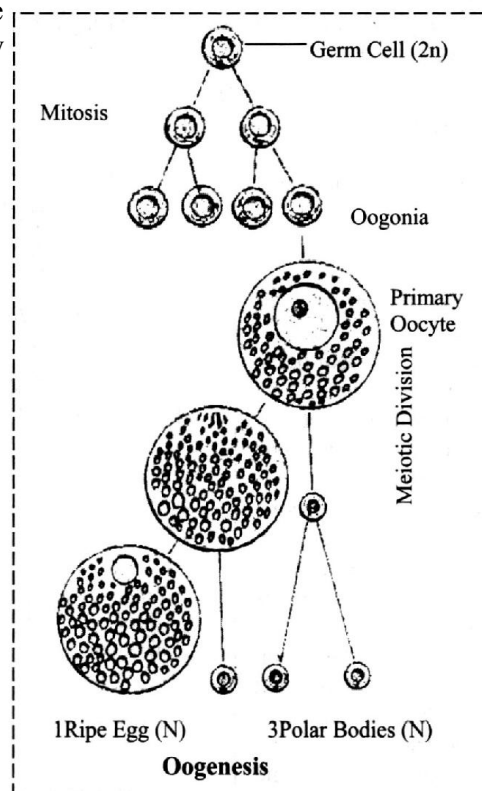
**What is oogenesis? Give a brief account of oogenesis.**

OR

**Sketch and label phases in oogenesis. [Mar 2013]**

**Ans: i)** Oogenesis is the process of formation of haploid female gametes, called ova, from the diploid oogonia of the ovary of female organism. It is completed in three stages:

- Multiplication phase
- Phase of Growth
- Maturation Phase



- a) **Multiplication phase:** Germinal cells undergo mitosis to form large number of oogonia. Oogonia in human beings are formed in ovary of female baby even before her birth.
- b) **Phase of Growth :** Just before puberty, under the influence of follicle stimulating hormone, one of the oogonium grows in size. Growth in size of oogonium is larger than that seen in spermatogenesis. This grown up cell is called primary oocyte
- c) **Maturation Phase :** Primary oocyte undergoes maturation or meiotic division. Meiotic I division of primary oocyte shows equal nuclear division but unequal cytoplasmic division. So at the end of meiosis. I division, large sized haploid secondary oocyte and haploid small sized polar body are formed. Unequal division is meant for sufficient supply of food for developing embryo. Secondary oocyte and polar bodies undergo II meiotic division. II meiotic division is arrested at metaphase stage and secondary oocyte is released from ovary. Remaining part of division is completed at the time of fertilization. This division is also unequal by which functional female gamete ovum is formed. This ovum is ready for fertilization.

**Significance:**

It produces haploid ovum by releasing 2 or 3 haploid polar bodies. Variation may appear due to crossing over during meiosis I.

**Q.38. Describe the structure of a human ovum.**

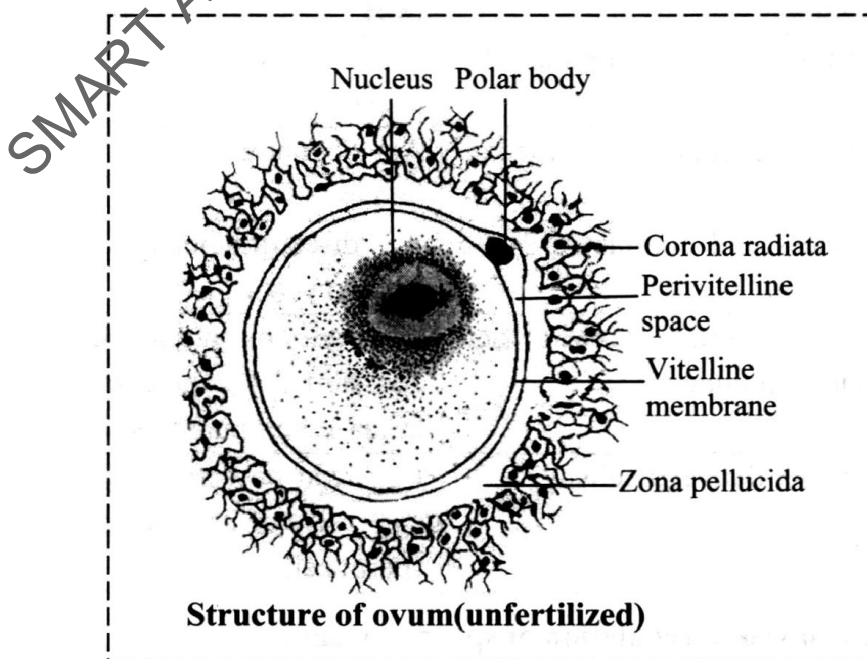
OR

**With suitable diagram describe the structure of unfertilized ovum. [Mar 09J]**

OR

**Write a note on the structure of ovum.**

**Ans: Structure of Ovum :**



- i) The ovum discharged by the ovary during ovulation is actually a secondary oocyte.
- ii) It is round, non-motile, haploid female gamete.
- iii) It is the largest cell of the body and measures about 0.1 mm or 100  $\mu$  in diameter.
- iv) The human egg is almost free of yolk, hence called microlecithal.
- v) It shows abundant cytoplasm called ooplasm.
- vi) Ooplasm has a large eccentric nucleus called germinal vesicle.
- vii) Ovum is surrounded by plasma membrane called vitelline membrane.
- viii) The ovum lack centrioles and therefore does not undergo further divisions.
- ix) The ovum contains two poles. The pole which shows presence of polar body is called animal pole while the opposite side is termed vegetal pole. The ovum shows two covering layers viz. an outer, thicker, cellular corona radiata and an inner, thinner, non-cellular zona pellucida.
- xi) The zona pellucida is secreted by ovum itself while corona radiata is formed of radially elongated follicular cells which are glued together by hyaluronic acid.

**Q.39. Why is zona pellucida retained around the egg till it reaches uterus? [Mar 2014]**

**Ans:** Zona pellucida prevents the implantation of blastocyst at an abnormal site such as fallopian tube and it keeps trophoblast cells unexposed till it reaches uterus. Hence zona pellucida is retained around the egg till it reaches uterus.

**Q.40. Differentiate between spermatogenesis and oogenesis.**

**Ans:**

No.	Spermatogenesis	Oogenesis
i.	It occurs in testes	It occurs in ovaries
ii.	It starts and completes within the testes	It starts inside ovary but is generally completed outside ovary in oviduct.
iii.	Spermatogonia are not found in follicles	Oogonia are found in follicles
iv.	Spermatogonia change to primary spermatocytes (2n)	Oogonia change to primary oocytes (2n)
v.	Primary spermatocyte divides to form two secondary spermatocytes	Primary oocyte divides to form one secondary oocyte and one polar body
vi.	Secondary spermatocyte divides to form two spermatids (n)	Secondary oocyte divides to form one ootid (n) and one polar body
vii.	Upto the formation of spermatids the cells often remain interconnected	Oogonia are separated and surrounded by follicle cells
viii.	Spermatids differentiate into sperms by spermiogenesis	No obvious differentiation, but egg cell increases in size.
ix.	A spermatogonium forms four spermatozoa / sperms	An oogonium forms one ovum and 2-3 polar bodies.
x.	It is continuous process and completed in 74 days in human	It is discontinuous process and completed in a few days to years
xi.	All sperms are motile, adapted to swim, and produced in much larger number	Eggs are non-motile, adapted to receive the sperm and start developmental process and are produced in far lesser numbers.
xii.	Sperms are much smaller than egg cells.	Eggs can be very large (birds' eggs) but even the egg cell (of mammals) is much larger than the sperm cell.

**Q.41. Name the hormones involved in regulation of spermatogenesis.**

- Ans:**
- GnRH of hypothalamus stimulates adenohypophysis to secrete gonadotrophins.
  - FSH of adenohypophysis stimulates Sertoli cells to secrete certain factors which help in spermatogenesis.
  - ICSH of adenohypophysis stimulates interstitial cells to secrete testosterone which stimulates spermatogenesis. It also controls the development of secondary sexual characters in male.

**Q.42. Define spermiogenesis and spermiation.**

- Ans:**
- Spermiogenesis** is the process of transformation of non-motile and rounded spermatid into a motile and flagellated spermatozoa.
  - Spermiation** is the process of release of mature sperms from the Sertoli cells in - the lumen of seminiferous tubules.

**Significance of fertilization :**

- It stimulates the secondary oocyte to undergo second maturation division to release second polar body and to form haploid ovum.
- It restores diploidy in the zygote (2n).
- Fertilization membrane prevents the polyspermy.
- It combines the character of two parents and introduces variation in offspring, which helps in evolution.
- Centrioles of sperm from the spindle initiate the cleavage of zygote.
- It determines the sex of the offspring.
- Fertilization stimulates the zygote to undergo further development.

**Q.44. Define syngamy.**

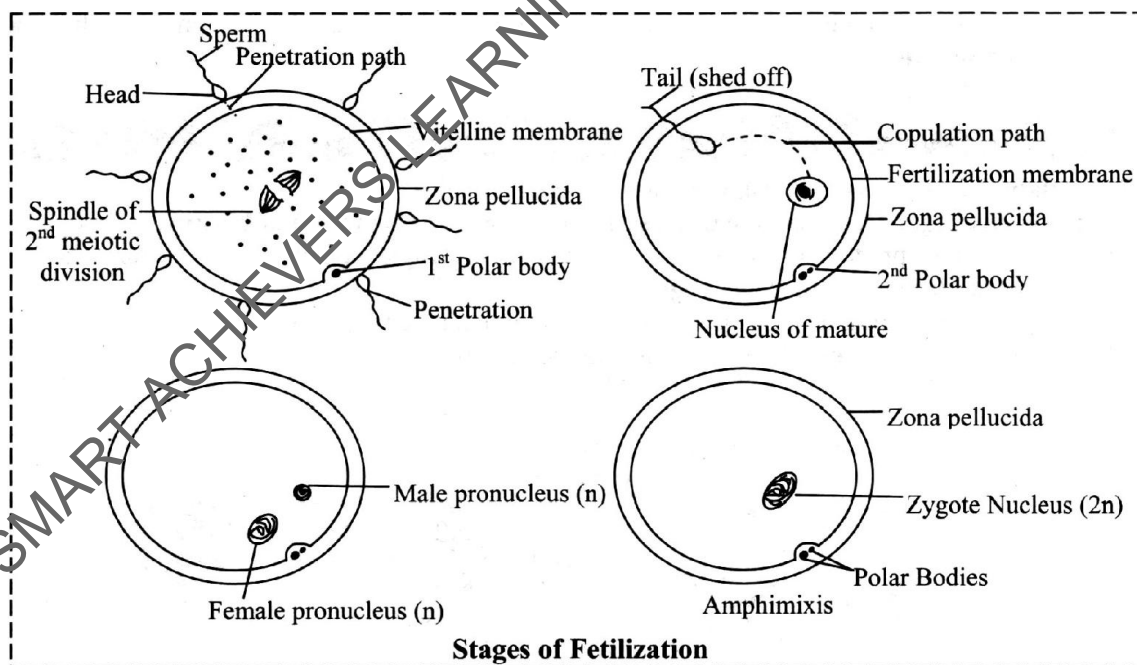
**Ans:** The fusion of a haploid male gamete (spermatozoa) and a haploid female gamete (ovum) to form a diploid zygote is called fertilization (syngamy).

**Q.45. Explain the process of fertilization in human beings.**

**Ans: Fertilization:** The fusion of a **haploid male gamete** (spermatozoa) and a **haploid female gamete** (ovum) to form a **diploid zygote** is called **fertilization**.

In human female, fertilization is internal and it takes place in the **ampulla** of the **fallopian tube**. During copulation, the semen is discharged into vagina which contains about 200-300 millions of sperms. Fertilization includes four steps :

- i) Approach of sperm to ovum
- ii) Penetration of sperm into ovum
- iii) Activation of ovum
- iv) Fusion of gametic nuclei

**i) Approach of sperm to ovum :**

After discharge of sperms into genital duct (insemination) of female, sperms swim by flagellar movement towards the fallopian tube. Many sperms are killed by the acidity of female genital tract and many sperms are engulfed by the phagocytes of the vaginal epithelium, so that about 100 sperms reach the fallopian tube through the **uterus**.

The sperms swim (at the speed of about 1.5 to 3 mm per minute) in the seminal fluid by the lashing movement of their tail at the rate of **1–4 mm/per minute**.

A sperm takes 2-3 hours to reach the egg from lower part of uterus by peristalsis and ciliary action. The viability of sperm is about **72 hours**. But it can fertilize the ovum in first 12 to 24 hrs.

**ii) Penetration of sperm into the ovum :**

Before the entry of sperm into the ovum, they undergo a maturing process called **capacitation**. The oocyte secretes a glycoprotein called fertilizin. Sperm head produces anti-fertilizin. Adhesion of sperm surface of oocyte is fertilizin-antifertilizin reaction. The ovum gets surrounded by many sperms.

Penetration of sperm is chemical mechanism.

Acrosome of sperm release lysin enzymes called **hyaluronidase**, Acrosin and Zona lysin.

**Hyaluronidase** and Acrosin neutralize the acidic effect of hyaluronic acid of corona radiata and penetrate corona cells.

Zona lysin penetrate zona pellucida. This makes the way for the entry of sperm at animal pole called **penetration path**.

**iii) Activation of Ovum :**

After entry of sperm the vitelline membrane is converted into fertilization membrane which prevents the entry of other sperm.



Sperm entry stimulates the ovum to undergo second-maturation division as a result it releases II<sup>nd</sup> polar body which join the 1<sup>st</sup> polar body in the perivitelline space.

Head of sperm gets detached from middle piece.

Sperm nucleus is now called male pronucleus.

#### Fusion of gametic nuclei:

After penetration, the nucleus of sperm and nucleus of ovum **swell up**.

These nuclei are called male pronucleus and female pronucleus.

The nuclear membrane of gametic nuclei degenerates and two sets of chromosomes initially lie on two poles of spindle but later these sets of chromosome mix up (Karyogamy) and the process is called **Amphimixis**.

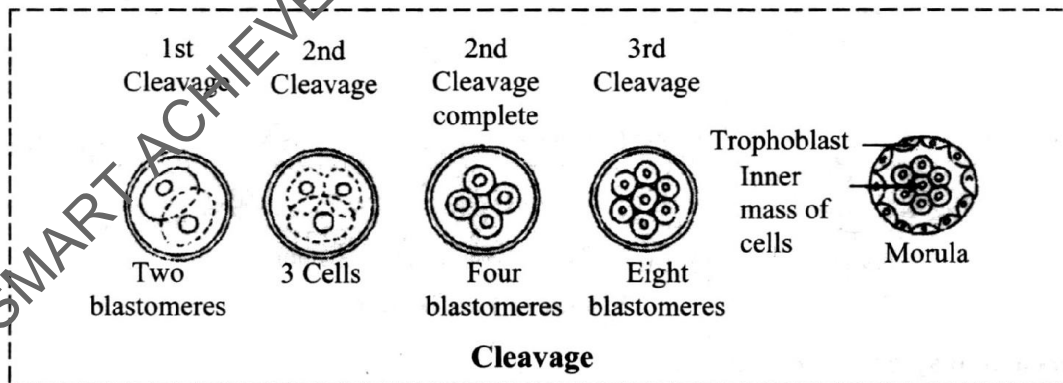
The fertilized egg is now called zygote.

## 18.6 : Embryo development upto three germinal layers

Q.46. Explain the process of cleavage in human beings. OR

What is cleavage? Describe the process of cleavage upto formation of blastula. [Mar 09]

Ans: **Definition:** The process of rapid mitotic division of single celled zygote to form hollow, spherical, multicellular blastula is called cleavage. Cleavage occurs during its passage through the Fallopian tube to the uterus. In human, cleavage is **complete** or **holoblastic** and equal.



#### 1st Cleavage:

It is completed about 30 hours after fertilization.

It is vertical i.e. it takes place from animal pole to vegetal pole.

Two daughter cells or blastomeres are formed.

#### 2<sup>nd</sup> Cleavage :

It is completed about 60 hours after fertilization.

The second cleavage is also vertical but at right angle to the first one.

The second cleavage occurs first in one blastomere resulting in transitory **three cells stage** followed by four cell stage.

#### 3<sup>rd</sup> Cleavage:

It takes place about 3 days (72 hours) after fertilization.

It is longitudinal and horizontal and forms 8 cells.

The cleavage continues and results in the formation of a solid mass of cells known as Morula.

#### Morula:

It is about 16 to 32 celled stage, look like a **small mulberry**, so it is called morula.

It reaches the uterus 4 – 6 days after fertilization.

It is still surrounded by zona pellucida.

Zona pellucida prevents implantation at abnormal site.

It does not expose trophoblast cells till it reaches implantation site.

It has two types of blastomeres.

**Morula** continuously absorbs the uterine fluid. The morula increases in size.

The outer layer of cells becomes flat called **trophoblast**.

It absorbs the uterine fluid and collects between inner mass cells and trophoblast.

The space between inner mass cells and trophoblast is called central cavity of **blastocoel**.

Embryo at this stage is known as **blastula**.

**Q.47. Explain the process of blastulation. OR**  
**Describe the structure of Blastula. [Oct 2013]**

**Ans: Blastulation (Formation of Blastula):**

The process of rearrangement of blastomeres and formation of central fluid filled cavity in the morula is called blastulation.

**Site:** It occurs in upper part of uterus.

**Duration:** It is completed after 5 to 6 days of fertilization.

Morula continuously absorbs the uterine fluid.

The morula increases in size from 0.15 mm to 0.30 mm in diameter.

The outer layer of cells becomes flat called **trophoblast or trophoectoderm**.

It absorbs the uterine fluid and collects between inner mass cells and trophoblast.

As more and more fluid is absorbed, trophoblast layer gets separated from inner mass of cells except at one point where inner mass of cell remains attached to trophoblast layer.

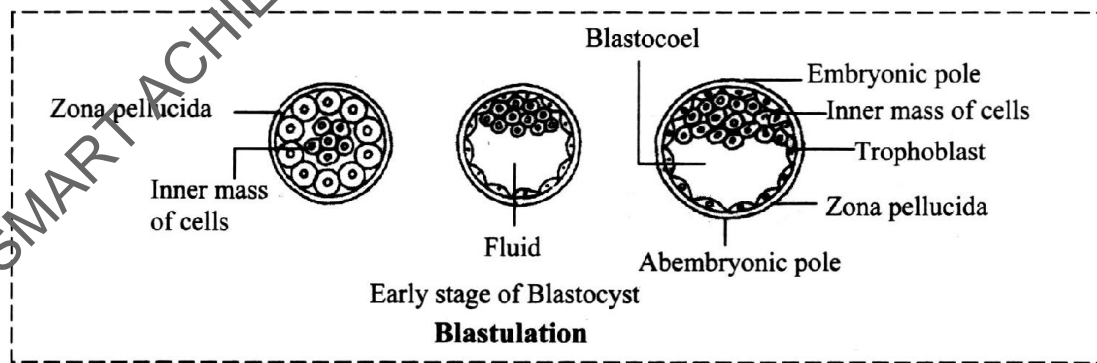
The space between inner mass cells and trophoblast is called central cavity of **blastocoel**.

Inner mass cell forms embryonal knob. The trophoblast cells in contact with embryonal knob is known as **cells of Rauber**.

Trophoblast layer does not participate in development of embryo proper.

It forms extra embryonic layer.

The side of blastocyst to which embryonal knob is attached is known as the **embryonic or animal pole**, and the opposite side as the **abembryonic pole/ Vegetal pole**.



**Significance of blastulation:**

- i) Embryoblast develops into embryo proper.
- ii) Trophoblast forms extra embryonic membranes called amnion and chorion. They hold and nourish embryo.
- iii) Trophoblast also takes part in formation of placenta.

**Q.48. What is implantation? Where does it occur? Give its significance.**

**Ans:** Implantation: The attachment of the embryo deep inside the wall of the uterus is called implantation. The blastocyst after 6<sup>th</sup> to 7<sup>th</sup> day of fertilization is implanted on the endometrium of the uterus.

**Significance of implantation :**

- i) It helps in deriving nourishment from the mother's body.
- ii) It protects embryo.

**Q.49. Define gastrulation.**

**Ans:** Gastrulation is process during which primary germinal layers are formed by morphogenetic movements and rearrangement of the cells.

**Q.50. With the help of suitable diagrams describe the process of gastrulation.**

**OR**

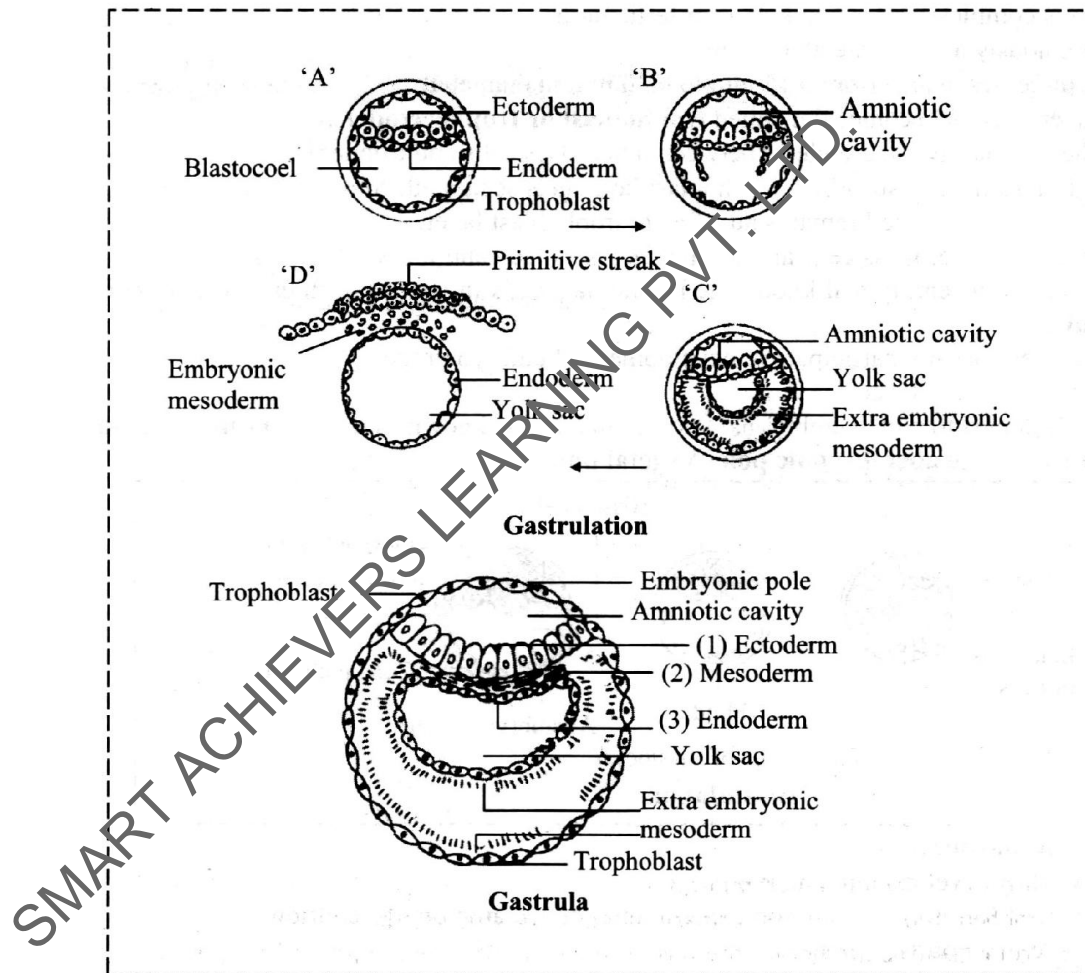
**Describe the fate of three germinal layers in human embryonic development. [Oct 09]**

**OR**

**Describe the changes involved during gastrulation. [Oct 2013]**

**Ans: Gastrulation:**

Formation of gastrula from blastula is known as gastrulation. During gastrulation, three primary germinal layers ectoderm, mesoderm and endoderm are formed by morphogenetic movements and rearrangement of the cells. Gastrulation and implantation take place simultaneously. **Gastrulation involves following changes:**



**i) Formation of endoderm :**

Some cells covering the free surface of the embryonic knob (exposed to the cavity of blastocyst) become flat and form first endodermal cells. Ectodermal cells multiply, spread out in all directions and form a complete lining inside the trophoblast of blastodermic vesicle. This lining is called the endoderm. The endoderm located under the embryonic knob is embryonic endoderm.

The remaining endoderm along with trophoblast forms the primary yolk sac. It encloses a fluid and not yolk.

**ii) Formation of embryonic disc :**

The blastocyst continues to grow in size. With the growth of blastocyst, after the formation of endoderm, the embryonic knob becomes columnar to form embryonic disc.

**iii) Formation of amniotic cavity :**

A space appears between embryonic disc and the trophoblast, called amniotic cavity. It is filled with amniotic fluid. The roof of this cavity is formed by amniogenic cells derived from trophoblast and its floor is made up of embryonic disc.

**iv) Formation of mesoderm :**

At the hind end of the embryonic disc, cells start proliferating at an increased rate. The new layer of cells so formed, is mesoderm, which separates the yolk sac and the amniotic cavity from the trophoblast.

**v) Formation of ectoderm :**

The remaining cells of embryonic disc get arranged in a layer called ectoderm.

**vi) Formation of extra embryonic coelom :**

A large cavity called extra embryonic coelom is formed in the extra embryonic mesoderm.

**vii) Formation of chorion and amnion :**

Chorion consists of trophoblast lined by parietal extra embryonic mesoderm. Amnion consists of amniogenic cells covered by visceral extra embryonic mesoderm.

**Q.51. Give significance/importance of gastrulation.****Ans: Significance of Gastrulation:**

- i) It develops three germ layers.
- ii) It slows down the cleavage rate.
- iii) It increases the metabolic activities without increasing the size of the cells.
- iv) **Primitive streak** marks the **posterior end** of the embryo.
- v) It develops different organs in the embryonic development.

**Q.52. Describe the fate of three germinal layers.**

[Sep. 09]

OR

**Write a note on fate of three germinal layers.****Ans:** Fate of germinal layer :

The embryo after gastrulation develops the three germ layers viz., ectoderm, mesoderm and endoderm. Later a process starts which leads to the development of different tissues and organs (histogenesis).

**Fate of ectoderm :**

Ectoderm gives rise to epidermis of skin and epidermal derivatives like hair, nails and sweat glands, conjunctiva, cornea, lens, retina, internal and external ear, enamel of teeth and nasal cavity, adrenal medulla, stomodaeum and proctodaeum, posterior pituitary and entire nervous system.

**Fate of mesoderm :**

Endoderm develops into epithelium of mid-gut (pharynx to colon), glands of stomach and intestine, tongue, tonsils, lungs, trachea, bronchi, larynx, urinary bladder, vagina, vestibule, liver and pancreas, anterior lobe of pituitary, thyroid gland, parathyroid, thymus, eustachian tube, epithelium of urethra including associated glands.

**Q.53. From which germinal layer nervous system is derived ?****Ans:** Nervous system is derived from ectoderm.**Q.54. How many eggs are released by a human ovary in a month? How many eggs do you think would have been released if the mother gave birth to identical twins? Would your answer change if the twins born were fraternal ?**

- Ans:**
- i) Human ovary produces only one egg in a month.
  - ii) As the identical twins are monozygotic and are produced from two parts of same zygote so only one egg was released from the ovary.
  - iii) As the fraternal twins are dizygotic and are produced from two different zygotes which is possible only if two eggs are released from the ovaries in a month.

**18.7 : Pregnancy, Placenta, Parturition and Lactation****Q.55. Write short note on pregnancy.**

**Ans:** The condition of carrying one or more embryos in the uterus is called Pregnancy or Gestation. Human pregnancy lasts for average 266 days from fertilization of the egg or 280 days from the start of the last menstrual cycle.

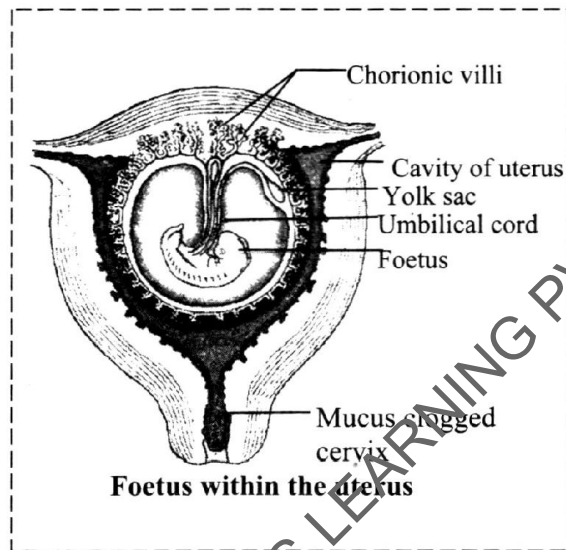
Human pregnancy can be divided for convenience into **three trimesters** of about three months each.

**i) The first trimester :**

It is the time of most radical change for both the mother and the embryo. During its first 2-4 weeks of development, the embryo obtains nutrients directly from the endometrium. The first trimester is the main period of organogenesis and the development of body organs. At 8 weeks, all the major structures of the adult : are present in the rudimentary form and the embryo is called a foetus. It is only 5 cms long. Meanwhile, the mother also undergoes rapid changes. High levels of progesterone initiate changes in her reproductive system, the maternal part of placenta grows, the uterus becomes larger, ovulation and menstrual cycle stops.

**ii) Second trimester :**

In second trimester the uterus grows enough for the pregnancy to become obvious. The foetus is very active and grows to about 30 cms. Long. Hormone levels stabilize as HCG declines, the corpus luteum deteriorates and the placenta completely takes over the production of progesterone which maintains the pregnancy.



iii) **Third (final) trimester :**

In third trimester the foetus grows to about 3-4 kg in weight and 50 cms in length. As the foetus grows, the uterus expands around it, the mother's abdominal organs become compressed and displaced, leading to frequent urination, digestive blockages and strain in the back muscles.

**Q.56. Define placenta.**

**Ans:** In the eutherian a temporary structural and functional unit formed between foetus and maternal tissues, is called placenta.

**Q.57. What is placenta? Describe the structure of placenta.**

**Ans:** In the eutherian a temporary structural and functional unit formed between foetus and maternal tissues is called placenta.

**Structure of placenta :**

- i) Human placenta consists of chorion only. Hence, it is called a chorionic placenta. Allantois remains small. The allantoic blood vessels, however, extend to vascularise it.
- ii) A large number of branching villi from the vascular chorion penetrate the corresponding pits, the crypts, formed in the uterine wall.
- iii) The latter becomes very thick and highly vascular to receive the villi.
- iv. The intimate connection established between the foetal membrane and the uterine wall is known as the placenta.
- v) The placenta has two part.
  - a) Chorionic villi.
  - b) Part of uterine wall.

**Chorionic villi :**

The part of placenta contributed by the foetus is called chorionic villi.

It is also called the foetal placenta.

It receive blood from the embryo by umbilical artery and return it by umbilical vein.

**Part of uterine wall:** The part of placenta shared by mother called the maternal placenta.

- vi) The placenta is fully formed by the end of the third month and it lasts throughout pregnancy.
- vii) When complete, it is reddish-brown disc.
- viii) In the placenta, the foetal blood comes very close to the maternal blood, and this permits the exchange of materials between the two.

**Functions:**

- ix) The placenta, thus, serves as the nutritive, respiratory and excretory organ of the foetus. The continuous up take of oxygen by foetal blood is ensured by the difference in affinity for oxygen between foetal and maternal haemoglobin.

**Q.58. What are the functions of placenta ?**

**Ans:** Functions of placenta :

- i) Food materials pass from mother's blood into the foetus through placenta.

- ii) It helps in exchange of gases between the mother and foetus.
- iii) Antibodies against certain diseases and hormones also pass through placenta to the foetus.
- iv) It stores little amount of glycogen for the foetus, before the formation of liver.
- v) It also acts as an endocrine tissue and produces several hormones like human chorionic gonadotropin (HCG), human placental lactogen (HPL), estrogen, progesterone etc.
- vi) It stimulates the corpus luteum to secrete progesterone until the end of pregnancy.

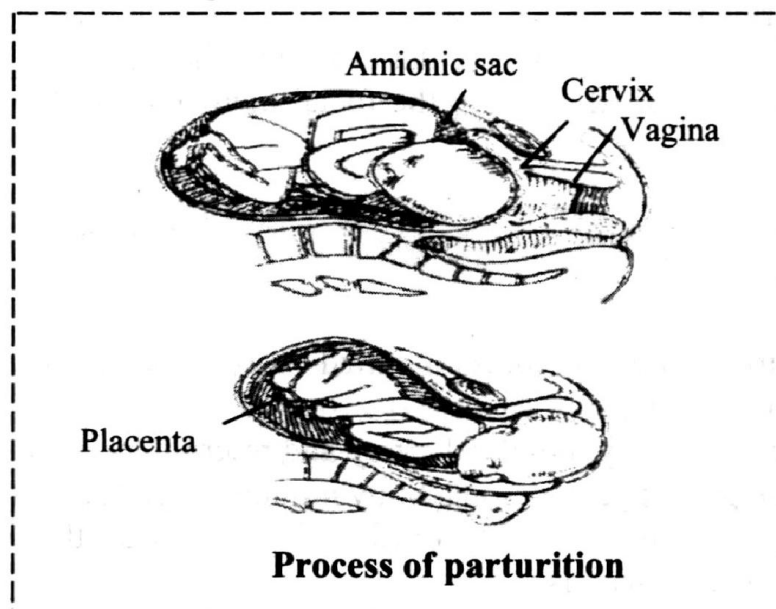
**Q.59. What is parturition? Give a brief account of hormonal control of parturition.**

- Ans:**
- i) Parturition is the process of expelling fully formed young ones or baby from the mother's uterus after the gestation period.
  - ii) Parturition is induced by following hormones:
    - a) Oxytocin stimulates forceful contraction of myometrium of uterus and induces labor pain.
    - b) Relaxin of corpus albicans widens the pelvis for easy child birth.
  - iii) The foetal ejection reflex is caused by the fully developed foetus and hormones from placenta.
  - iv) The foetal ejection causes the release of oxytocin from posterior pituitary which causes stronger contraction of uterine muscles.
  - v) The stronger contraction stimulates further release of oxytocin and with continued powerful contraction, the child is expelled from the uterus through the birth canal.

**Q.60. Describe the process of parturition.**

**Ans:** Parturition involves forceful muscular contractions, called labour, of the uterine wall. About two weeks before birth, the foetus normally settles head downward into the pelvic cavity. On the completion of gestation, labour starts. It causes labour pains. Parturition may be divided into 3 stages:

- i) **First Stage (Dilation) :**
  - a) It lasts for about 12 hours.
  - b) Regular peristaltic contractions of the uterine wall begin, passing from its top downward.
  - c) These contractions move the foetus down towards the cervix which expands fully.
  - d) Amnion and chorion rupture.
  - e) The amniotic fluid passes out, lubricating the vagina.
  - f) The foetal placenta is pulled out from the uterine wall, making the baby free.



- ii) **Second Stage (Expulsion) :**
  - a) It lasts for about 20 minutes to one hour.  
The uterine contractions become more powerful and are accompanied by contractions of the abdominal wall.
  - b) With these contractions the baby is gradually pushed outward through the dilated cervix and vagina, with the head foremost, and is finally "delivered" (born) out of the cervix.
  - c) The umbilical cord is ligatured at two places close to the baby and cut between the ligatures. This free the baby totally from the mother. Cervix and vagina are dilated and the ligaments of the

pelvic girdle are relaxed by the hormone relaxin from the corpus luteum for easy birth of the baby.

**iii) Third (placental) Stage :**

- a) It lasts for just 10 – 45 minutes after the infant's birth, Now the placenta, umbilical cord and foetal membrane are expelled by series of uterine contractions.
- b) Further contractions of the uterus close the cervix and prevent excessive bleeding. Bleeding, throughout the process, is kept low by contraction of smooth muscle fibres of uterine blood vessels supplying the placenta.

**Q.61. Which part of the body secretes relaxin? What is its function?**

- Ans:**
- i) Relaxin is secreted from corpus luteum of ovary.
  - ii) It softens the pubic symphysis for dilation of cervix for parturition.

**Lactation**

**Q.62. What is lactation ?**

**Ans:** Lactation is the process of producing milk from mammary glands at the end of pregnancy.

**Q.63. State the significance of the lactation.**

- Ans:**
- i) Milk helps the mother in feeding the newly born .
  - ii) Milk produced during initial few days of lactation is called colostrum which is rich in proteins and calories.
  - iii) It also contains certain antibodies which provides passive immunity to the new born baby.

**Q.64. What is colostrum:**

**Ans:** Colostrum is milk produced during initial few days of lactation is called colostrum.

## 18.8 : Reproductive Health

**Q.65. What do you think is the significance of reproductive health in a society.?**

**Ans:** In a reproductively healthy society, the people, especially those in adolescent age group will be physically, emotionally, behaviourally and socially well being in all the sex-related aspects.

- i) It helps to eradicate the myths and misconceptions about the reproductive activities from the mind of the people.
- ii) They will follow more safer and hygienic sexual practices and will have less chances of incidence of STDs, AIDS etc.
- iii) Such persons will be more aware about the problems of population explosion, sex abuses and sex related crimes.

**Q.66. Suggest the aspects of reproductive health which need to be given special attention in the present scenario.**

- Ans:**
- i) Creating awareness among the people: It can be done through government and non- government agencies. sex-education in the schools, parents and other relatives, teachers etc.
  - ii) To provide strong infrastructural facilities, professional expertise and material support for the prevention of STDs, birth control. pre-natal care of mother and child, sex abuses. sex-related crimes, etc.
  - iii) To develop new methods or to improve the existing facilities.

**Q.67. Which strategies should be followed to improve the reproductive health?**

**Ans:** Following strategies should be followed to improve the reproductive health:

- i) Government and non- government organisation should create awareness about reproduction related aspects.
- ii) Sex education in schools should be encouraged.
- iii) People in adolescent age should be given the information about the reproductive organs, their functioning, safe sexual practices and sexually transmitted diseases.

**Q.68. Is sex education necessary in schools? Why?**

**Ans:** Sex education is necessary in schools because

- i) It gives proper information about reproductive organs, adolescence and related changes.
- ii) It gives the right information and avoids myths and misconceptions about sex related aspects.
- iii) It gives information about safe and hygienic sexual practices.
- iv) It gives information about sexually transmitted diseases.

**Q.69. Is the use of contraceptives justified? Give reasons.**

- Ans:** i) These do not interfere with the sexual desire or sexual act.  
 ii) These help in reducing the birth rate as prevent the formation of gametes or fertilization or implantation of the embryo.  
 iii) Some of these prevent the incidence of sexually-transmitted diseases, AIDS etc.

**Q.70. Describe the birth control measures. OR**

**Which barriers are used to prevent pregnancy?**

**Ans:** These methods are of 2 main types: Temporary and permanent.

- i) **Safe period (Rhythm Method):** A week before and a week after menstrual bleeding is considered the safe period for sexual intercourse.
- ii) **Coitus Interruptus:** This is the oldest method of birth control. It involves withdrawal of the penis by the male before ejaculation so that semen is not deposited in the vagina and there is no fertilization. This method also has some drawbacks. Before final ejaculation male produces some pre-ejaculating fluid. This fluid may cause fertilization.
- iii) **Chemical Means (Spermicides):** Foam tablets, jellies, pastes and creams, if introduced into the vagina before sexual intercourse, adhere to the mucous membrane and immobilize and kill the sperms.
- iv) **Mechanical Means** – These are of 3 types :
  - a) **Condom :** is rubber sheath to cover the erect penis "Nirodh" .  
It is cheap and easily available.  
It checks pregnancy by preventing deposition of semen in the vagina. Condom should be used regularly and put on before starting coital activity.
  - b) **Diaphragm and cervical cap:** are rubber plastic covers that are fitted on the cervix in the female's vagina and check the entry of sperms into the uterus.
  - c) **Intrauterine contraceptive device (IUCD):** are plastic or metal objects placed in the uterus by a doctor. These include loop, copper- T, Spiral ring, bowl, shield, etc. They prevent. the fertilization of the egg or implantation of the embryo.
- v) **Physiological (oral) Devices:** Birth control pills (oral contraceptive pills) check ovulation by inhibiting the secretion of follicle stimulating hormone (FSH) and luteinizing hormone (LH) that are necessary for ovulation. Hence, no eggs are released in a woman on taking the pill and conception cannot occur.
- vi) **Other Contraceptives:** Certain contraceptives are implanted under the skin of the upper arm. They prevent pregnancy for 3 to 4 years.
- vii) **Permanent Method:** Surgical methods called sterilization are generally advised for males and females. Surgical intervention blocks gamete transport and prevent pregnancy.

**Q.71. Explain the mechanical methods of birth control. [Mar 2013]**

**Ans:** Refer Q.70.

**Q.72. Expand IUCDs. Explain the mode of action of IUCD.**

**Ans:** IUCD means intrauterine contraceptive device. These are the metallic or plastic objects placed in the uterus of a female by a qualified nurse or a doctor; it is the most widely accepted method of contraception in India. These include loop, copper-T, spiral ring, bowl, shield etc. They prevent the fertilization of egg or implantation of the embryo.

**Mode of Action of IUCD :**

The intra-uterine devices function in the following ways:

- i) IUCDs increase the phagocytosis of sperms within the uterus.
- ii) The copper ions released from the IUCDs suppress the sperm motility and hence the fertilizing capacity of sperms.
- iii) The hormone-releasing IUCDs works in two ways:
  - a) Make the cervix hostile to the sperms.
  - b) Render the uterus unsuitable for implantation.

**Sexually transmitted diseases**

**73. What is STD ? Name some important STD and their causative agents.**

**Ans:** Infection of disease that are transmitted through sexual intercourse are collectively called sexually transmitted diseases (STD) or venereal disease (VD) or reproductive tract infections (RTI)



These include gonorrhoea, syphilis, genital herpes, chlamydia, genital warts, trichomoniasis, hepatitis - B, HIV.

No.	Name of STD	Causative agent
i.	Gonorrhoea	<i>Neisseria gonorrhoeae</i> (a bacterium)
ii.	Syphilis	<i>Treponema pallidum</i> (a bacterium)

**Q.74. Write symptoms, methods of control and treatment of syphilis.**

**Ans: Syphilis :** This disease is caused by a bacterium, *Treponema pallidum*.

It spreads by sexual contact with infected person.

Incubation period is 3 – 4 weeks.

The parasite first cause a primary lesion called chancre.

Chancre formed on the external genitalia but in women it may be formed in the vagina.

Secondary lesion appear in the form of a rash anywhere on the body.

After many year tertiary lesions appear in skin, bones and liver.

Degenerative changes occur in the heart and brain.

**Symptoms of Syphilis:**

- Lesions in the mucous membrane of urinogenital tract, mouth or throat.
- Skin, tissues and bones are affected.
- It can lead to death in the late stage.

**Methods of Control :** Prevention by avoiding prostitution and homosexuality.

**Treatment of Syphilis :** Syphilis is cured with big doses of antibiotics prescribed by the doctors.

**Q.75. How is gonorrhoea caused? Write its symptoms and cure of the disease.**

**Ans:i) Gonorrhoea :** This disease is caused by a bacterium, *Neisseria gonorrhoeae*.

- It spreads by sexual intercourse with infected person.
- Incubation period is 2-14 days in males and 7- 21 days in females.

**Symptoms of Gonorrhoea :**

- Swelling (inflammation) of mucous membrane in urinogenital tract.
- Burning on urination and pain around genitals.
- Infection may spread to other body parts and causes arthritis and female sterility.
- Child born to infected mother may suffer from eye infection.

**Cure:** It can be cured by antibiotics.

**Q.76. Which preventive measures should be adapted to prevent gonorrhoea?**

**Ans:** Prevention and Cure of Gonorrhoea:

- Prostitution and homosexuality must be banned.
- Antibiotics, drugs and medicines.
- Education of STD.

**Q.77. What are the measures one has to take to prevent from contracting STDs?**

**Ans:i)** Avoid sex with unknown partner/multiple partners.

- Always use condoms during coitus.
- Consult a qualified doctor for early detection and treatment, in case of doubt.

### **MTP, IVF, GIF**

**Q.78. What is MTP? In which cases MTP is generally used ?**

**Ans:** MTP is medical termination of pregnancy. It is the termination of pregnancy before foetus becomes viable.

In the following cases MTP is generally used.

- To get rid of unwanted pregnancies that have occurred due to rape or casual unprotected intercourse.
- If the continuation of pregnancy may be fatal or harmful to the foetus or mother or both.

**Q.79. Explain the term Test tube baby.**

**Ans:i)** It is also called IVF (In vitro-fertilization).

- This technique is used when fallopian tubes are blocked and fertilization does not take place.
- In such event, ova are taken into petri dish, sperms are transferred into the dish.
- Zygote is developed till morula stage and embryo is introduced in uterus where it develops into baby.

**Q.80. What is IVF? Describe the techniques used in IVF.**

**Ans:** i) It is also called as test tube baby programme.

- ii) In this kind of fertilization, fusion of gametes take place outside the female body. It takes place in laboratory condition similar to female uterus.
- iii) If woman is unable to have normal conception. Ova of such woman are taken in aseptic condition and fertilized by sperm of her husband. Fertilized egg is then implanted in woman's uterus.
- iv) It is used in **Zygote intra-fallopian transfer:** Zygote or blastocyst upto 8- blastomeres is transferred into the fallopian tube, the embryo moves to the uterus where it becomes implanted and continues further development. **Gamete intra-fallopian transfers** In GIFT ovum collected from a donor is transferred into the fallopian tube of another female who can provide suitable environment for fertilization and development

**Q.81. Give the merits and demerits of MTP.**

**Ans: Merits:**

- i) MTP is useful in some cases where continuation of pregnancy may be harmful or fatal to either mother, or foetus (or both).
- ii) This is mostly done to get rid of unwanted pregnancy due to rapes or causal relationship.

**Demerits:**

It is "intentional termination of pregnancy before full term". It should not be misused. Indiscriminate and illegal female foeticide must be checked.

**Q.82. What is amniocentesis? What is its use?**

**Ans:** i) Amniocentesis is a technique of withdrawing amniotic fluid from pregnant mother uterus for this hypodermic needle is used.

- ii) Amniotic fluid contains foetal cells. These cells are the basis of amniocentesis.
- iii) It helps in checking chromosomal defects in foetus.

**Q.83. Write a short note on GIFT.**

**Ans:** i) GIFT is called gamete intra-fallopian transfer.

- ii) This technique is employed for the females with prolonged sterility but having at least one patent fallopian tube.
- iii) This is useful where fimbriae fail to capture the ovum or females having sperm antibodies in their cervical secretions.
- iv) This technique involves transfer of washed sperms and harvested ova to the ampulla of fallopian tube with the help of laparoscope.

## Quick Review

### Male Reproductive System at a Glance:

Structure	Location	Function
<b>Cowpers gland or Bulbourethral glands</b>	Present about 5 cm below the prostate gland on either side of membranous urethra	Lubrication secretions. Neutralizes traces of acidic urine in the urethra.
<b>Epididymis:</b> tubular coiled, 6 meter long divided into a) caput epididymis b) corpus epididymis c) cauda epididymis	Along the posterior border of each testis (head / globus major) (body / globus normal) (Tail / globus minor)	Nourishment, transport and storage of sperm cells. Receive and stores sperms temporarily supply food to sperms and transports to epididymis
<b>Ejaculatory duct:</b> Each duct is about 2 cm (about 0.8 inch)	Lie on either side of the prostate gland and are formed by the union of the duct of the seminal vesicle.	Carry semen, to the urethra
<b>Penis:</b> cylindrical, erect, muscular genital organ	In front of scrotum	Copulatory organ, urination
<b>Prostate gland:</b> is a walnut-shaped gland partly glandular and partly muscular	Surrounds the urethra	Its secretion plays a role in activating sperm and accounts for 1/3 of semen volume.
<b>Testis:</b> oval, muscular and pink colour. 4.5cm x 2.5 cm x 3 cm	Outside the abdominal cavity of the male within the scrotum	Produces sperms secretes male sex hormone testosterone
<b>Scrotum:</b> divided into two lobe by septum called scroti	It lies in front of upper region of the thigh before pubic symphysis	Protects the testis from mechanical injuries. Act as thermoregulator
<b>Seminal vesicles:</b> two small musculoglandular sac also called corpus masculina	Lie directly above the prostate gland, attached to the vas deferens near the base of the bladder.	Their secretion from 60% seminal fluid, contain vitamin C, sugar, fructose, hormone prostaglandins, fibrinogen
<b>Urethra:</b> 20 cm long, open outside by an urethral orifice	Arises from urinary bladder and passes through penis	Common pathway for urine and semen
<b>Vas deferens:</b> muscular duct, 20 -30cm in length	Connects the epididymis to the seminal vesicle at the back of the bladder	It carries sperms from epididymis to ejaculatory duct.
<b>Vasa efferentia:</b> 15–20 cm, fine convoluted ductules	From rete testis to head of epididymis	Carry sperms from rete-testis to caput epididymis.

#### Female Reproductive System at Glance :

Structure	Location	Function
<b>Clitoris</b> (homologous to penis)	Small erectile organ directly in front of the vestibule.	Sexual excitation
<b>Fallopian tubes or oviduct</b>	Extending upper part of the uterus on either side.	Egg transportation from ovary to uterus (fertilization usually takes place here).
<b>Hymen</b>	Thin membrane partially covering vagina in young females.	Close the vaginal orifice in virgin female
<b>Ovaries</b> (female gonads)	Pelvic region on either side of the uterus.	Produce ova & secrete sex hormones (estrogen & progesterone).
<b>Uterus or womb:</b> inverted pear shaped, hollow, thick wall muscular organ. It consists of Fundus, Body , Cervix	Located inside the body between rectum and urinary bladder Upper dome shaped— <b>fundus</b> , Middle part— <b>body</b> , Lower narrower part— <b>cervix</b>	Passes sperms from vagina to oviduct. Implantation of fertilized embryo, protection & nourishment of foetus upto birth.
<b>Vagina:</b> fibro muscular tube, about 10 cm long, Extends from the cervix of the uterus to the outside	It is located between the rectum and the urinary bladder.	Serves as a pathway for menstrual flow, copulation, birth canal during childbirth.
<b>Vulva:</b> consists labia majora, mons pubis, labia minora, clitoris, and glands within the vestibule.	External genitalia of female which means covering. Located between the legs, the vulva covers the opening to the vagina.	Responds to sexual stimulation, closure of the vaginal opening

## Menstrual Cycle at a Glance:

No.	Name of phase	Duration	Hormonal change	Changes in Endometrium and ovarian changes	Synonym of Phase
1.	Menstrual	Lasts for 3-5 days of menstrual cycle	Level of <b>progesterone</b> and <b>estrogen</b> decreases	<b>Endometrium:</b> breakdown leads to bleeding. Becomes thin about 0.5 to 1.00 mm thick. <b>Ovarian changes:</b> corpus luteum degenerates.	Post luteal/ Prefollicular / Destructive phase
2.	Follicular/ Proliferative	Lasts for 6 <sup>th</sup> to 14 <sup>th</sup> day of menstrual cycle	Increases secretion of <b>FSH</b> . Stimulates the ovarian follicle to secrete <b>estrogen</b> .	<b>Endometrium:</b> becomes thick (about 2-3 mm), more vascular and more glandular. Uterine glands become elongated and well developed. Uterine glands become cork screw shaped. <b>Ovarian changes:</b> Graafian follicles mature	Late follicular or estrogen phase
3.	Ovulatory	Occurs on 14 <sup>th</sup> day of menstrual cycle & lasts for only one day	Production of <b>FSH</b> decreases while that of <b>LH</b> increases	<b>Endometrium:</b> No remarkable changes. <b>Ovarian changes:</b> Graafian follicles ruptured to release ovum. Graafian follicle changes into corpus luteum	Post follicular/ pre-luteal phase
4.	Secretory	Between 15 <sup>th</sup> – 28 <sup>th</sup> days of menstrual cycle	<b>Progesterone</b> level in blood gradually increases. Decreases secretion of <b>FSH</b> and <b>LH</b>	<b>Endometrium:</b> becomes more thick glandular, vascularised and ready for implantation. <b>Ovarian changes:</b> corpus luteum growing	Luteal / Progestational /Premenstrual/ Post ovulatory /Progravid phase

## Multiple Choice Questions

- The process of formation of life from preexisting life is called
  - germination
  - reproduction
  - fertilization
  - embryogenesis
- Hydra multiplies asexually by
  - binary fission
  - endogenous budding
  - exogenous budding
  - multiple fission
- Planaria reproduces asexually through
  - budding
  - gemmule formation
  - regeneration
  - binary fission
- In the human penis, urethra passes through
  - corpus cavernosum
  - corpus spongiosum
  - corpus luteum
  - corpus albicans
- About 60% of semen is formed by the secretion of
  - cowper's gland
  - seminiferous tubule
  - prostate gland
  - seminal vesicle
- Smooth muscles lining the wall of scrotum are called
  - Deltoid muscles
  - Dartos tunic muscles
  - Gluteal muscles
  - Latissimus dorsi muscles
- Testis are attached to scrotum by
  - rete testis
  - gubernaculum
  - ejaculatory ducts
  - Cowper's glands
- The role of Leydig cells is
  - nourishment of sperms
  - give motility to sperms
  - synthesis of testosterone hormone
  - undergo spermatogenesis
- The part that carries sperms from testis to epididymis is
  - rete testis
  - vasa efferentia
  - vasa differentia
  - ejaculatory ducts
- Seminal fluid is rich in
  - glucose
  - fructose
  - sucrose
  - lactose
- Which of the following is not a gland of male reproductive system?
  - Prostate gland
  - Cowper's gland
  - Seminal vesicles
  - Vestibule
- \_\_\_\_\_ are a pair of lobulated glands which are present at the base of urinary bladder in males.

- a) Prostate glands  
b) Seminal vesicles  
c) Cowper's glands  
d) Bulbourethral glands
13. \_\_\_\_\_ provide nutrition to sperms.  
a) Sertoli cells                      b) Interstitial cells  
c) Graafian follicles                d) Epithelial cells
14. Ovaries are attached to broad ligament by  
a) peristomium                      b) mesovarium  
c) peritoneum                        d) fimbriae
15. Which of the following is not a part of fallopian tube?  
a) Fimbriae                            b) Oviducts  
c) Infundibulum                      d) Myometrium
16. Endometrium is the  
a) internal lining of the uterus  
b) internal lining of the urethra  
c) internal lining of the ovary  
d) internal lining of the testis.
17. The term antrum is applied to  
a) cavity of graafian follicle  
b) blastocoel  
c) archenteron  
d) none of these
18. If ovum is not fertilized, the graafian follicle shrinks to form  
a) corpus luteum  
b) corpus haemorrhagicum  
c) corpus albicans  
d) graafian follicle
19. Corp luteum mainly secretes  
a) Progesterone                      b) Oestrogen  
c) FSH                                    d) Prolactin
20. Pre-ovulatory phase is also called  
a) Bleeding phase                    b) Proliferative phase  
c) Secretory phase                    d) Luteal phase
21. Decreased level of progesterone and oestrogen is observed in  
a) menstrual phase  
b) proliferative phase  
c) both a) and b)  
d) secretory phase
22. Which hormone confirms pregnancy ?  
a) Progesterone                      b) Oestrogen  
c) LH                                      d) HCG
23. Ovulation occurs on \_\_\_\_\_ day of menstrual cycle.  
a) 10<sup>th</sup>                                      b) 12<sup>th</sup>  
c) 14<sup>th</sup>                                      d) 16<sup>th</sup>
24. Onset of menstrual cycle at the time of puberty is called  
a) menopause                        b) menarche  
c) menstruation                      d) metamerism
25. On which day of menstrual cycle is estrogen level maximum ?  
a) 12<sup>th</sup>                                      b) 6<sup>th</sup>  
c) 18<sup>th</sup>                                      d) 21<sup>st</sup>
26. Which hormone does not play a role in menstruation ?  
a) Estrogen                              b) Progesterone  
c) FSH                                      d) Oxytocin
27. The lytic enzyme released by sperm is  
a) acrosome                              b) ligase  
c) androgenase                        d) hyaluronidase
28. The innermost covering of egg is  
a) vitelline membrane  
b) zona pellucida  
c) corona radiata  
d) perivitelline space
29. Which part of human egg contains hyaluronic acid?  
a) Vitelline membrane  
b) Zona pellucida  
c) Corona radiata  
d) Perivitelline space
30. During multiplication phase, primordial follicle undergo mitotic division to produce  
a) primary spermatocyte  
b) spermatogonia  
c) spermatid  
d) secondary spermatocyte
31. Middle piece of sperm consists of  
a) centriole and axial filament  
b) acrosome and mitochondria  
c) mitochondria and axial filament  
d) mitochondria
32. Which of the following is haploid?  
a) Oogonia  
b) Primary oocyte  
c) Secondary oocyte  
d) Primary spermatocyte
33. The chemical present on surface of egg is called  
a) Antifertilizin                      b) Fertilizin  
c) Hyaluronic acid                    d) Acid protein
34. Fertilization occurs in  
a) ampulla                                b) infundibulum  
c) uterus                                    d) fundus
35. Fertilization means  
a) transfer of male gamete to the female gamete  
b) adhesion of male and female reproductive organs  
c) fusion of nuclei of male and female gametes  
d) shedding of gametes from a reproductive organ.
36. In human being, the type of cleavage is  
a) holoblastic and equal  
b) meroblastic and equal  
c) holoblastic and unequal  
d) meroblastic and complete
37. The time required to complete 1st cleavage is  
a) 24 hrs                                    b) 30 hrs

- c) 50 hrs                      d) 48 hrs
38. 16 – celled stage is called  
a) Morula                      b) Late morula  
c) Blastula                    d) Gastrula
39. \_\_\_\_\_ acts as a food layer.  
a) Trophoblast                b) Blastocyst  
c) Megameres                d) Morula
40. HCG is secreted by  
a) placenta                    b) trophoblast  
c) Skene's glands            d) both a) and b)
41. Which of the following is formed by ectoderm?  
a) Spleen                      b) Gut  
c) Thymus                     d) Eyes
42. The part not formed by mesoderm is  
a) pineal gland                b) dermis  
c) heart                        d) bone marrow
43. Which one of the following is not formed from mesoderm ?  
a) Blood                        b) Bones and cartilage  
c) Kidneys                     d) Nervous system
44. Pregnancy in second trimester is maintained by \_\_\_\_\_ [Mar 2014]  
a) LH (lutening hormone)  
b) progesterone  
c) estrogen  
d) HCG (human chorionic gonadotropin)
45. Human pregnancy lasts for days from the start of the last menstrual cycle  
a) 266                          b) 300  
c) 280                          d) 225
46. The placenta is fully formed by the end of the month and lasts throughout pregnancy.  
a) 1<sup>st</sup>                            b) 2<sup>nd</sup>  
c) 3<sup>rd</sup>                            d) 4<sup>th</sup>
47. Foetus is matured by secreting hormone.  
a) LH                            b) ACTH  
c) FSH                          d) GH
48. Viability of human egg is  
a) 10 hrs                        b) 15 hrs  
c) 20 hrs                        d) 24 hrs
49. Which period of menstrual cycle is called risky period of conception?  
a) 3<sup>rd</sup> to 7<sup>th</sup> day                b) 7<sup>th</sup> to 13<sup>th</sup> day  
c) 10<sup>th</sup> to 17<sup>th</sup> day              d) 15<sup>th</sup> to 25<sup>th</sup> day
50. Contraceptive oral pills help in birth control by  
a) killing the sperms  
b) forming barriers between sperms and ova  
c) by preventing ovulation  
d) killing the ova
51. Tubectomy, a method of population control, is performed on  
a) both males and females  
b) males only  
c) females only  
d) only pregnant females
52. Which of the following is a mechanical barrier used in birth control?  
a) Loop                         b) Copper- T  
c) Diaphragm                d) Dalcon shield
53. Cu-T prevents pregnancy by preventing  
a) fertilization  
b) ovulation  
c) implantation of fertilized egg  
d) none of these
54. Causative agent of syphilis is  
a) *Neisseria*  
b) *Treponema pallidum*  
c) HIV  
d) *Trichomonas vaginalis*
55. Chancre are the primary lesions caused by [Mar 2013]  
a) *Neisseria gonorrhoeae*  
b) *Treponema pallidum*  
c) *Plasmodium vivax*  
d) *Salmonella typhi*

## Answer Keys

1.	b)	2.	c)	3.	c)	4.	b)	5.	d)	6.	b)	7.	b)	8.	c)	9.	b)	10.	b)
11.	d)	12.	b)	13.	a)	14.	b)	15.	d)	16.	a)	17.	a)	18.	c)	19.	a)	20.	b)
21.	a)	22.	d)	23.	c)	24.	b)	25.	a)	26.	d)	27.	d)	28.	a)	29.	c)	30.	b)
31.	c)	32.	c)	33.	b)	34.	a)	35.	c)	36.	a)	37.	b)	38.	a)	39.	a)	40.	d)
41.	d)	42.	a)	43.	d)	44.	b)	45.	c)	46.	c)	47.	b)	48.	d)	49.	c)	50.	c)
51.	c)	52.	c)	53.	a)	54.	b)	55.	b)										



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