Question Bank

Reproductive System

1. Name the following :
   (i) The cessation of menstrual cycle in females.
   (ii) The release of ovum from ovary into body cavity.
   (iii) Tissue to which the zygote gets implanted.
   (iv) The onset of menstrual cycle in females.
   (v) A duct which serves as a passage of sperms from testes to vas deferens.
   (vi) The state of development in human when an individual develops secondary sexual characteristics.
   (vii) The tube that leads from the ovary to the uterus.

   Ans. (i) Menopause  (ii) Ovulation
   (iii) Endometrium of uterus  (iv) Menarche
   (v) Epididymis  (vi) Puberty
   (vii) Fallopian tube

2. Fill in the blanks :
   (i) An embryo is formed by repeated ________________ of the zygote.
   (ii) The development of a fully-formed animal directly from an unfertilised ovum is called ____________.
(iii) The organs which perform important functions in reproduction but produce neither gametes nor sex hormones are called ____________ sex organs.

(iv) Distinctive characters which distinguish the two sexes of a species in appearance but do not directly play any role in reproduction are called ________________ sex characters.

(v) In humans, the uterus is lined by mucous membrane called ________________.

(vi) The fertilisation of the human egg normally occurs in the _____________.

(vii) The expulsion of the foetus from the body of the mother in a human female is called _____________.

(viii) Human gestation period is for about ______________ days.

Ans. (i) Mitosis   (ii) Parthenogenesis
     (iii) Secondary   (iv) Accessory
     (v) Endometrium   (vi) Oviduct (fallopian tube)
     (vii) Parturition   (viii) 280

3. Mention if the following statements are true or false. If false, rewrite the sentence by changing the words written in bold face.

(i) **Blastocyst** is the product of fusion of male and female gametes.

(ii) **Cilia** lining the fallopian tube push the released ovum into the **uterus**.

(iii) Menarch is the **stoppage** of menstruation.

(iv) **Amniotic fluid** acts as shock-absorber.
(v) Vas deferens transports sperms into urethra

(vi) Cowper’s glands pour alkaline secretion into the semen as it passes through the urethra.

(vii) Vasectomy is the surgical method of sterilisation in man.

Ans. (i) False (zygote) (ii) True
(iii) False (beginning) (iv) True
(v) True (vi) False (Prostate gland)
(vii) True

4. Name four homologous parts in the male and female reproductive system.

Ans. Male                Female
(i) Testes               Ovaries
(ii) Vas deferens        Oviducts
(iii) Scrotum            Labia Majora
(iv) Penis               Clitoris.

5. Write short notes on:

(i) Sperm                (ii) Oogenesis                (iii) Amnion (2005)
(iv) Labour              (v) Implantation (2005)
(vi) Gestation (2005)    (vii) Menstrual cycle

Ans. (i) Sperm: The sperm is composed of a head, midpiece and tail, and is adapted to reach and penetrate the female ovum.

1. The tail propels the sperm along its way.
2. The midpiece has abundant mitochondria that provides the energy for locomotion.

3. The head contains acrosome as specialised golgi body which releases chemicals known as sperm lysins. They help in breaking down the cell cluster around the mature ovum and facilitate penetration by the sperm.

(ii) Oogenesis : The process by which the female germ cells, oogonia, transform into ova is termed as oogenesis. It begins at the age of 9-15 years. Each ovary produces one mature ovum every alternate month.

(iii) Amnion : One of the embryonic membranes, which develops from the outer layer of cells of the blastocyst, the trophoblast. The amniotic cavity is filled with amniotic fluid which acts as a cushion for the embryo and protects it from jerks and also prevents sticking of the foetus to the amnion.

(iv) Labour : The process by which the foetus is expelled from the uterus of waves of muscular contraction starting from the top of the uterus to the end of cervix is called labour.

(v) Implantation : After fertilization, by the seventh day of conception the zygote increases by mitosis to the size of a small ball and sinks into the uterine wall. This is known as ‘implantation’.

(vi) Gestation : The period during which foetus remains in the uterus is called gestation period.

(viii) Menstrual Cycle :
Menstrual cycle is a series of changes in the endometrium of a non-pregnant female that prepares the lining of the uterus to receive the fertilised egg.

<table>
<thead>
<tr>
<th>Changes in Uterus</th>
<th>Changes in Ovaries</th>
<th>Name of phase</th>
<th>Duration of phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>The uterus lining (endometrium) which had thickened earlier in readiness to receive the embryo breaks down (because no fertilisation has occurred), causing discharge of blood and mucus.</td>
<td>Corpus luteum degenerates. New follicle (containing egg) begins to develop, follicle matures, oestrogen secreted from follicle influences uterine wall to thicken to receive the embryo</td>
<td><strong>Menstruation</strong></td>
<td><strong>3 to 4 days</strong></td>
</tr>
<tr>
<td>Uterus lining thickens, blood supply increases, gland tissue proliferates.</td>
<td>Egg is released from ovary and enters fallopian tube.</td>
<td><strong>Follicular phase</strong> (also called proliferative phase)</td>
<td><strong>6 to 14 days</strong></td>
</tr>
<tr>
<td>Uterus lining thickens further to receive the</td>
<td>Emptied follicle turns into corpus luteum which</td>
<td><strong>Ovulatory phase</strong></td>
<td><strong>1 day</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Luteal phase (or pre-menstrual phase)</strong></td>
<td><strong>14 days</strong></td>
</tr>
<tr>
<td>fertilised egg.</td>
<td>produces progesterone that influences further thickening of uterus.</td>
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<tr>
<td>If fertilisation has occurred around 14-17 days, the uterus lining thickens further and receives the developing egg and the menstrual cycle temporarily stops for the entire period of pregnancy. <strong>If no fertilisation has occurred, the menstrual cycle begins afresh.</strong></td>
<td>If pregnancy has occurred, corpus luteum persists to maintain pregnancy. If pregnancy has not occurred, the corpus luteum degenerates with the restart of the menstrual cycle.</td>
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6. Explain briefly why?

(i) At the time of birth, the testis descend into the scrotal sac.

(ii) A large number of sperms (400-500 million) are released in a single ejaculation.

(iii) Gametes have an haploid (n) number of chromosomes.

(iv) The oviducal funnel is lined with cilia.

(v) The ‘Cry’ of the new-born is critical for its survival.
Ans. (i) Testis develop on the posterior wall and descend into the scrotum a little prior to birth. The production and survival of sperms requires a temperature that is lower than the normal body temperature. Since the scrotum is outside the body cavity, it provides an environment about 3°C below normal body temperature.

The contraction of scrotum muscles also regulates the temperatures. When it is too hot, the skin of the scrotum loosens so that the testes hang down away from the body. When it is cold the skin contracts and draws the testis closer to the body for warmth from the body.

(ii) About 2.5 to 5 ml of semen per ejaculation contains nearly 50 - 150 million/ml sperms. This number is large because:
(a) Millions of sperms perish due to the acidic environment of the uterus.
(b) Millions of sperms are unable to travel the distance to the fallopian tube against the fluid current and other chemical barriers.
(c) Millions of sperms enter the fallopian tube which does not contain the egg.

(iii) Gametes and Somatic Cells

Gametes are reproductive cells which differ from other body cells in that they contain haploid (one half) chromosome number.

Body cells(somatic cells) contain diploid chromosome number. A human body cell has 46 chromosome number.

During spermatogenesis and oogenesis, the sperm and ova undergo meiosis in which the chromosome number is reduced to half, i.e., each cell now has 23 chromosomes instead of 46.
Thus, when the sperm cell (23 chromosomes) fuses with the ovum (23 chromosome), the zygote formed has 46 chromosomes like its parent. The zygote then divides \textbf{mitotically}.

\textbf{(iv)} The ovum released by the ovary is swept into the uterine tube by the ciliary action of the fimbriae. The further movement of ovum along the oviduct is by:

(a) Ciliary action of the epithelium.

(b) Fluid currents in the oviduct.

(c) Peristaltic contraction of muscles of oviduct.

\textbf{(v) Cry of the new-born}

Emerging from the warm and safe environment of the mother’s womb, the new-born baby heralds its survival into the external world with a full-throated cry.

‘Cry’ is critical for its survival. It sweeps the first breath of air into the lungs of the baby, which until the moment of birth remain inactive and collapsed. It may be noted that in the foetus the blood is diverted from the right side of the heart to the left side instead of being sent to the lungs for oxygenation since oxygen supply comes from the mother.

At the moment of birth, the tiny opening in the heart closes and blood is sent to the lungs. when this opening fails to close properly, a “blue baby; is born.
7. Differentiate between:

(a) Puberty and Menopause

(b) Fertilisation and implantation

Ans. (a) Puberty: The stage in humans when under the stimulus of pituitary gland, the gonads—ovaries in females and testes in males, begin to produce their own hormones, which leads to the beginning of oogenesis and spermatogenesis in the respective cases, accompanied by development of secondary sexual characters.

Menopause: The cessation of menstrual cycle is known as menopause. Women usually experience it around the age of 45 to 50 years.

(b) Fertilisation: The fusion of two gametes, male and female, to form the zygote is known as fertilisation.

Implantation: The attachment of the mammalian blastocyst to the uterine wall, from where it derives further nourishment is known as implantation.

8. (a)

(i) Label the diagram.
(ii) Name the major ducts and their functions.
(iii) Name the accessory glands and give their function.
(iv) What is semen?

(b)

(i) Label the structures numbered 1 to 10.
(ii) What is the function of 1?
(iii) Describe the movement of ova from 2 to 1.
(iv) Which organ permits passage of the baby out of the womb?

Ans. (a) (i) 1 – Seminal vesicle     2 – Cowper’s glands
            3 – Epididymis       4 – Scrotum
            5 – Kidney          6 – Ureter
            7 – Urinary bladder 8 – Prostate gland
            9 – Vas deferens    10 – Urethra
           11 – Testis         12 – Glans penis.
(ii) (a) Vas efferentia - Carry sperms from the seminiferous tubules to the epididymis.

(b) Epididymis - This is the site for the storage and maturation of sperms.
(c) Vas deferens - Transports the sperms from epididymis to the urethra.
(d) Ejaculatory ducts - They eject the sperms into the urethra just prior to ejaculation.

(iii) (a) Seminal vesicles - They secrete an alkaline and sugary fluid which constitutes 60% of the volume of semen. The sugary fluid provides energy source for the sperms and the alkaline nature neutralises the acidic environment in the female tract.

(b) Prostate gland- Its secretion contributes to sperm motility and viability.
(c) Cowper’s glands - Secrete mucus which lubricates the end of the penis during sexual intercourse. They also provide an alkaline medium that protects the sperm in the acidic environment of the urethra.

(iv) Semen - It is a mixture of sperms and the secretions of the accessory glands. It is slightly alkaline. 2.5 - 5 ml of semen contains nearly 50 - 150 million per ml of sperms. During sexual intercourse, it is ejaculated from the urethra to the female tract.

(b) (i) 1 – Cavity of uterus       2 – Ovary
       3 – Vagina                   4 – Kidney
       5 – Ureter                   6 – Oviduct
       7 – Urinary bladder         8 – Cervix
       9 – Urethra                  10 – Vulva
(ii) The uterus protects and nourishes the developing embryo. Its mucous secretion supplements the energy requirements of the sperms.

(iii) The ovum released by the ovary is swept into the uterine tube by the ciliary action of the fimbriae. The ovum then moves along the oviduct by:

(a) Ciliary action of the epithelium

(b) Peristaltic contractions of the muscles of oviduct.

(c) Fluid currents in the oviduct.

(iv) The cervix dilates and makes the passage big enough for the baby to pass out of the mother’s womb.

9. Write the functions of the following.

(i) Corpus luteum   (ii) Uterus   (iii) Sertoli cells.

Ans. (i) **Corpus luteum**: It secretes two hormones, estrogen and progesterone, that help in maintaining pregnancy.

(ii) **Uterus**: The uterus or the womb is the organ where the developing foetus implants itself and grows to its full term. The wall of the uterus along with the villi given out by the amnion layer of the blastocyst form the placenta through which all nutrients reach the foetus and wastes are carried away.

(iii) **Sertoli cells**: These provide nourishment to the developing sperms.

10. The diagram shows the structure of part of a human placenta.

(i) Name the structures labelled 1 – 6.

(ii) What substances diffuse into the placenta and what diffuse out of it?

(iii) What are the functions of placenta?

(iv) Placenta functions as an endocrine organ. Comment.
(v) Mother’s blood does not circulate through the embryo. Comment.

**Ans.** (i) 1 - Umbilical artery
2 - Umbilical vein
3 - Uterine artery
4 - Uterine vein
5 - Maternal position of placenta
6 - Foetal portion of placenta

(ii) Substances diffusing:

<table>
<thead>
<tr>
<th>Into the placenta</th>
<th>Out of the placenta</th>
</tr>
</thead>
<tbody>
<tr>
<td>(a) Oxygen</td>
<td>Carbon dioxide</td>
</tr>
<tr>
<td>(b) Glucose, amino acids, salts and</td>
<td>Nitrogenous, metabolic wastes, minerals.</td>
</tr>
<tr>
<td>Hormones</td>
<td></td>
</tr>
</tbody>
</table>


(iii) **Functions of placenta:**

(a) Transfers oxygen, water, nutrients and hormones from the mother to the foetus.

(b) Transfers wastes from the foetus to the mother’s blood.

(c) Provides protection to the foetus as it does not allow micro-organisms in mother’s blood to pass through it to the foetus.

(d) Produces hormones like oestrogen, progesterone and relaxin which are necessary to maintain pregnancy.

(iv) As pregnancy progresses, the placenta takes over the role of hormone production. It produces progesterone and oestrogen which prevent ovulation and menstruation and maintain pregnancy. They also help to trigger the onset of birth. Placenta also secretes human chorio-gonadotrophin hormone whose presence in the urine of pregnant women is the basis of most pregnancy tests.

(v) The maternal arteriole carries nutrients, oxygen, water and hormones to the placenta, where they are passed on to the foetus through the blood vessels of the umbilical cord. The waste products of the foetus are brought to the placenta and transferred to the mother’s blood which carries them to the kidneys and lungs for removal.

Ans.

12. (i) What is meant by artificial insemination?
    (ii) What are test-tube babies?

Ans. (i) Artificial insemination: When sperms of mature male are transferred to the female body by means other than the natural process. The procedure is called artificial insemination.

   This means is usually adopted to improve cattle breed. It involves collection of sperms of good quality bull, proper storage of sperms and their transfer into the vagina of a cow having desirable qualities.

(ii) Test-tube babies: In some women, normal conception is not possible.

   In such cases, ovum from the female and sperm from the male is collected and fertilisation is effected in a test tube under controlled conditions.

   When the zygote reaches the 32-cell stage, it is implanted inside the uterus of the mother, where the foetus grows to full term.
13. (a) Give the course of passage of sperms in male.
   (b) Give the course and the fate of egg inside the female body.

Ans. (a)  
- Seminiferous tubules
  - Vasa efferentia
  - Epididymis
  - Vas deferens
  - Urethra
  - Penis

(b)  
- Ovary
  - Fallopian tube
  - If fertilised: Divides and becomes early embryo → Uterus → Implantation in the endometrium of mother
  - If unfertilised: Degenerates → Uterus → Degenerates, passes out in menstrual discharge

14. Give the exact location and one function of Seminiferous tubules

Ans. **Location:** Testis.

**Function:** The wall of these tubules form or develop the sperm.

15. Given below is the outline of the cross section of the male reproductive system:
(i) Copy the outline on to your answer sheet in pencil and label the following parts — testis, epididymis, seminal vesicles, vas deference.

(ii) Name the hormone produced by the testis.

(iii) Why are sperms produced in large numbers?

(iv) State the function of the seminal vesicles.

Ans. (i) See the diagram below.

(ii) Testosterone.

(iii) The sperm fertilizes the ovum, by chance. Hence to ensure the fertilization of ovum, a large number of sperms are produced. Also, due to acidity of uterus in female, many sperms get killed. So they have to be produced in large numbers.

(iv) Their secretion provides energy for the sperms and also neutralise the acidity in the urethra of the female tract.
16. The diagram given below is that of a developing human foetus in the womb. Study the same and then answer the questions that follow:

(i) Name the parts ‘1’ to ‘5’ indicated by guidelines.
(ii) What term is given to the period of development of the foetus in the womb?
(iii) How many days does the foetus take to be fully developed?
(iv) Mention two functions of the part labelled ‘2’ other than its endocrine function.
(v) Name the hormone (any one) produced by the part labelled ‘2’.
(vi) What is the function of the part marked ‘3’?

Ans. (i) 1. Umbilical Cord.
   2. Placenta.
   3. Amniotic fluid.
   4. Cervix/Mouth of Uterus.
   5. Uterine wall

(ii) Gestation Period.
(iii) 280 days.
(iv) Provides nutrition and exchange of respiratory gases by diffusion.
(v) Progesterone.
(vi) Protects foetus from jerks and shocks by acting as shock absorber. Also protects foetus from dessication.
17. Given below is a diagrammatic representation of the ventral sectional view of the female reproductive system—

(i) Redraw the same on your answer sheet and then fill in and label the following parts:
   5. Oviductal funnel.

(ii) State the function of the:
   1. Placenta 2. Amniotic fluid

(iii) Using the symbol ‘X’ indicate the region in the diagram where fertilization occurs.

(iv) Differentiate between identical twins and fraternal twins.

Ans. (i) See along side the figure

(ii) State the function of the:

   (1) Placenta

   (a) It provides nutrition to foetus.
(b) It provides oxygen and removes carbon dioxide from the foetus to the mother’s blood through diffusion.

(c) It prevents the entry of some germs into the foetus and gives protection from infection.

(d) It secretes hormones.

(2) Amniotic fluid.

(a) It acts as a cushion for the embryo and protects it from jerks or mechanical shocks.

(b) It prevents sticking of the foetus to the amnion.

(iii) See along side the figure X-marked is oviduct/fallopian tube.

(iv)

<table>
<thead>
<tr>
<th><strong>Identical twins</strong></th>
<th><strong>Fraternal twins</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>They are formed when a single fertilized egg splits and produces two individual.</td>
<td>They are formed when two different eggs are fertilized by two different sperms.</td>
</tr>
<tr>
<td>They are exactly the same.</td>
<td>They are like normal brother or sisters.</td>
</tr>
<tr>
<td>They are of the same sex.</td>
<td>They may be of same sex or different.</td>
</tr>
<tr>
<td>They have similar genotype and phenotype.</td>
<td>They have different genotype and phenotype.</td>
</tr>
</tbody>
</table>
18. Given below are different stages in the fertilization of an egg.

(i) Arrange and redraw the stages in the correct order.

Ans.

(ii) In the female reproductive system where does this process take place?

Ans. In the oviduct or the fallopian tubes.

(iii) Differentiate between identical and fraternal twins.

Ans. The **identical twins** are formed when a fertilized egg splits into two and each part develops into a separate individual. These are always of the same sex bearing striking resemblance to each other.

**Fraternal twins** are formed when two separate eggs are fertilized at the same time by different sperms. These may be of the same or opposite sex and may not bear resemblance to each other.

(vi) What is meant by colostrum? State its function.
Ans. Colostrum is the thin fluid (milk) secreted by the mother during the first few days after child birth. It protects the infants from diseases as it is particularly rich in protein and antibodies.

19. The diagram shown below is the lateral section of a testis of man. Study it carefully and answer the questions that follow:

(i) Label the parts 1 to 4 of the diagram.

(ii) State the functions of the parts labelled 1 and 2.

(iii) Draw a labelled diagram of sperm.

Ans. (i) (1) Sperm Duct (Vas deferens)
(2) Seminiferous Tubule
(3) Lobes of Testis (lobule)
(4) Epididymis
(ii) **The function of Sperm Duct**: It carries sperms from testis to urethra.

**The function of Seminiferous tubule**: Sperms are produced here. The process is called spermatogenesis.

(iii)

20. The following diagram represents the vertical view of the female reproductive system.

(i) Label the part indicated by the guidelines 1 to 6.

(ii) How does the uterus prepare for the reception of a zygote?

(iii) What happens to the uterus if fertilization takes place?

(iv) What happens to the uterus if fertilization has failed to take place?

**Ans.(i)**

1. Oviduct
2. Uterus
3. Ovary
4. Urinary bladder
5. Vagina
6. Urethra
(ii) The uterus lining gets thickened in readiness to receive the zygote.

(iii) The fertilized egg starts developing and when it reaches the uterus it already forms a ball of numerous cells. The embryo forms a pit in the wall of the uterus and gets fixed in it.

(iv) The uterus lining (endometrium), which had got thickened earlier in readiness to receive the embryo, breaks down causing discharge of blood and mucus resulting in menstruation.