

**Topic :- Human Reproduction**

1 (a)

**Rout of milk secretion**

Mammary Tubule (T)



Mammary Duct (M)



Mammary Ampulla (A)



Lactiferous Duct (L)

Internally, the breast consists of the glandular tissue forming mammary glands, the fibrous tissue (connective tissue) and the fatty or adipose tissue. Mammary glands are modified **sweat glands**

2 (c)

I. Oestrogen – D

II. Ovulation – G

III. Repair of endometrium – F

IV. Luteinising hormone – C

V. Menstruation – H

VI. Luteal phase – B

VII. Progesterone – E

VIII. Ovarian phase - A

3 (d)

Gastrulation is the process of the formation of gastrula from the blastula. It is characterized by formation of three primary germ layers and morphogenetic movements including epiboly, emboly, involution, invagination and delamination.

4 (a)

Among prostaglandin, oestrogen and oxytocin, it is oxytocin contract the uterine wall strongly.

**Parturition**

(i) The average duration of human pregnancy is about 9 months which is called the gestation period

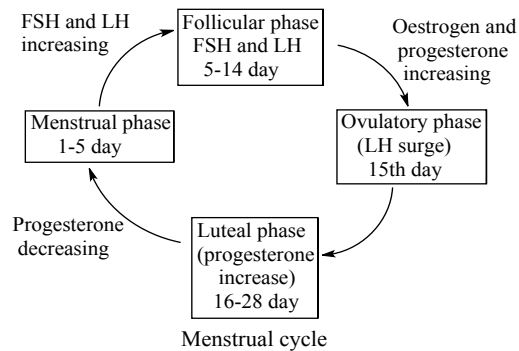
(ii) The act of expelling the full term foetus from the mother's uterus at the end of gestation period is called parturition

(iii) It is induced by a complex neuroendocrine mechanism

(iv) Parturition signals originates from the fully developed foetus and the placenta, which induce mild uterine contractions called foetus ejection reflex

- (v) This triggers the release of oxytocin from the maternal pituitary
- (vi) Oxytocin induces stronger uterine muscle contractions
- (vii) Relaxin increases the flexibility of the pubic symphysis and ligaments that helps to dilate the uterine cervix during labour pain
- (viii) This leads to the expulsion of baby

5 (c)



Generally, menstrual cycle have four phases

- (i) **Menstrual phase** (a) The soft tissue of endometrial lining of the uterus disintegrates causing bleeding.
  - (b) The unfertilized egg and soft tissue are discharged.
  - (c) It lasts 3-5 days.
- (ii) **Follicular Phase/Proliferative Phase** (a) The primary follicles in the ovary grow and become a fully mature Graafian follicle.
  - (b) The endometrium of the uterus is regenerated due to the secretion of LH and FSH from anterior pituitary and ovarian hormone, estrogen.
  - (c) It least for about 10-14 days.
- (iii) **Ovulatory Phase** (a) Rapid secretion of LH (LH surge) induces rupture of Graafian follicle, thereby leading to ovulation (release of ovum).
  - (b) It lasts for only about 48 hr.
- (iv) **Luteal Phase/Secretor Phase** (a) In this phase the ruptured follicle changes into corpus luteum in the ovary and it begins to secrete the hormone progesterone.
  - (b) The endometrium thickens further and their glands secrete a fluid into the uterus.
  - (c) If ovum is not fertilized, the corpus luteum undergoes degeneration and this causes disintegration of the endometrium leading to menstruation

6 (c)

In isolecithal eggs, yolk is uniformly distributed (*e.g.*, mammals). In centrolecithal eggs, yolk is in the centre of the egg (*e.g.*, insects). In polyleithal eggs, yolk is in patches, (*e.g.*, insects) and in telolecithal eggs, yolk is concentrated at one of the egg (*e.g.*, frog, birds). Eggs of human being are microlecithal and isolecithal.

7 (d)

Capacitation takes about 5-6 hours.

**Capacitation of Sperm** The sperms in the female is genital tract are made capable of fertilizing the egg by the secretion of female genital tract. These secretions of the female genital tract removes the coating substances deposited on the surface of the sperms, particularly those on

acrosome. Thus, the receptor sites on the acrosome are exposed and sperm become active to penetrate the egg. This phenomenon of sperm activation in mammals is called capacitation. It takes about 5-6 hr for capacitation of sperm

8 (c)

The grey crescent area is an area just opposite to the entry of sperm into ovum.

9 (c)

Corpus luteum is the yellow endocrine body formed in the ovary at the site of a ruptured Graafian follicle, while macula lutea is a yellow spot on the retina. The common feature between the two is that both (corpus luteum and macula lutea) are characterized by yellow colour.

10 (c)

A cross section at the midpoint of the middle piece of a sperm will show mitochondria and 9+2 arrangement of microtubules.

11 (a)

Fusion of male and female gametes is called fertilization. It can be external (outside the female genital tract) like frog, fishes or internal (inside the female genital tract) like mammals, birds, etc.

12 (b)

Rapid mitosis in zygote into the blastomeres

Gametes. *The major reproductive events in human beings are as follows*

(i) **Gametogenesis** It is the formation of gametes. It includes **spermatogenesis** (formation of sperms) and **oogenesis** (formation of ova/eggs)

(ii) **Insemination** It is the transfer of sperms by the male into the genital tract of the female

(iii) **Fertilization** Fusion of male and female gametes to form zygote is called fertilization

(iv) **Cleavage** It is rapid mitotic divisions of the zygote which convert the single celled zygote into a multicellular structure called blastocyst (blastula)

(v) **Implantation** It is the attachment of blastocyst to the uterine wall

(vi) **Placentation** It involves the formation of placenta which is the intimate connection between the foetus and uterine wall of the mother to exchange the materials

(vii) **Gastrulation** It is the process by which blastocyst is changed into gastrula with three primary germ layers

(viii) **Organogenesis** It is the formation of specific tissue, organs and organ systems from three primary germ layers

(ix) **Parturition** (child birth) it involves expelling of the baby from the mother's womb (uterus)

13 (c)

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(b) The endometrium thickens further and their glands secrete a fluid into the uterus.

c) If ovum is not fertilized, the corpus luteum undergoes degeneration and this causes disintegration of the endometrium leading to menstruation.

(d) Oestrogen and progesterone levels rise during this phase. It lasts for only 1 day. (e) During pregnancy all events of the menstrual cycle stop and there is no menstruation. The menstrual cycle permanently stops in females at the age of around 50 years. This is called **menopause**

14 **(d)**

In the ovulatory phase, both LH and FSH attain a peak level in middle of cycle (about 14 day). Rapid secretion of LH induces rupturing of Graafian follicle and thereby releasing the ovum in human beings (secondary oocyte is released). This is called ovulation. Infact increase level of LH causes ovulation

15 **(b)**

The phase of menstrual cycle in women that lasts for 7-8 days, is ovulatory phase.

16 **(a)**

Correct sequence in development is fertilisation (union of male of male and female gamete)

↓

Zygote (syngamy or amphioxys) leads to the zygote)

↓

Cleavage (series of rapid mitotic division of the zygote)

↓

Morula (8-16 blastomere structure called morula having similar types of cells)

↓

Blastula (more than 16 blastomere (approx.-64) it is hollow structure With blastocoel cavity in center)

↓

Gastrula (Transformation of the blastocyst in the gastrula with primary germ layer by rearrangement a cell called gastrulation and structure is called gastrula)

17 **(b)**

In rabbit, man and other placental mammals, fertilization takes place in the upper part of the fallopian tube (ampulla).

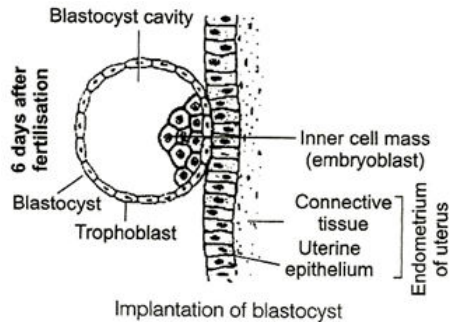
18 **(a)**

Placenta release oestrogens, progesterone, hCG and relaxin. That's why it can be considered as endocrine gland

19 **(b)**

Trophoblast.

The trophoblast encircles the blastocoel and inner mass cell. The inner mass cell is the precursor of the embryo. It means that inner mass give rise to embryo. The cells of the trophoblast helps to provide the nutrition to the embryo. The cells of the trophoblast form extra embryonic membranes namely chorion and amnion. The cells of the trophoblast which are in contact with inner mass are called cells of raubers



20 (a)

Extra embryonic membrane are also called foetal membrane.

### Extraembryonic or Foetal Membranes

The growing embryo/foetus develops four membranes called the extraembryonic or foetal membranes. These include chorion, amnion, allantois and yolk sac

(i) **Chorion** It is made up of trophoblast outside and somatopleuric extraembryonic mesoderm inside. It completely surrounds the embryo and protects it. It also takes part in the formation of placenta

(ii) **Amnion** It is composed of trophoblast inside and somatopleuric extraembryonic mesoderm outside. The space between the embryo and the amnion is called the amniotic cavity, which is filled with a clear, watery fluid secreted by both the embryo and the membrane. The amniotic fluid prevents dessication of the embryo and acts as a protective cushion that absorbs shocks

(iii) **Allantois** The allantois is composed of endoderm inside and splanchnopleuric extraembryonic mesoderm outside. It is a sac like structure, which arises from the gut of the embryo near the yolk sac. In human the allantois is small and non-functional except for furnishing blood vessels to the placenta

(iv) **Yolk Sac** The primary yolk sac consists of endoderm inside and splanchnopleuric extraembryonic mesoderm outside. The yolk sac is non-functional in human beings except that it functions as the site of early blood cell formation

<b>ANSWER-KEY</b>										
<b>Q.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>A.</b>	<b>A</b>	<b>C</b>	<b>D</b>	<b>A</b>	<b>C</b>	<b>C</b>	<b>D</b>	<b>C</b>	<b>C</b>	<b>C</b>
<b>Q.</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>A.</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>B</b>	<b>A</b>	<b>B</b>	<b>A</b>	<b>B</b>	<b>A</b>

**PE**