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Answers Key:

SECTION -D

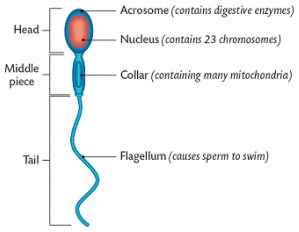
1. A. Acrosome
   (i) The secretions.enzymes of acrosome dissolve the egg envelopes and help the sperm enter the cytoplasm of the ovum.
   B. Mitochondria
   (i) The mitochondria in the middle piece provide energy for the sperm motility in the female reproductive tract towards ovum.
   C. Tail
   (i) It facilitates the movement of sperm towards the ovum for fertilisation.
2. (A) (i) - (d), (ii) - (b), (iii) - (c), (iv) - (e)
   (b) (i) - Luteinising hormone
   (ii) - Progesterone
3. (a) Both assertion and reason are true and reason is the correct explanation of assertion.
4. (a) : Clitoris of female is the small, spongy and erectile structure which hangs freely from the front end of vulva. It represents the underdeveloped penis. Whereas penis is a finger-like cylindrical outgrowth of abdomen projecting in between the scrotal sacs. Clitoris and penis both originate from the same origin, therefore are homologous.
   Homologous organs are those organs which have the same origin and mayor may not have the same function. Clitoris and penis both are the reproductive organs present in female and male respectively. They are originated from the mesoderm layer and both are supplied with the nerves and blood vessels.

SECTION -E

5.

Spermatogenesis	Oogenesis
The process of formation of sperms in males starts from puberty.	The process of formation of ova in females,starts from embryonic developmental stages.
It is not a cyclic process;it occurd continuously.	It is a cyclical process,completed every 28/29 days.
One primary spermatocyte forms four functional sperms.	One primary oocyte forms only one functional ovum.

6. (b) Morula is formed in the isthmus of the oviduct/fallopian tube.
   The zygote undergoes mitotic divisions in quick succession,called cleavage,forming 2,4,8 and 16 daughter cells,called blastomeres.
   The embryo with 8-16 blastomeres is called a morula.
7. Oogenesis is the production of egg cells inside the ovaries. During foetal development, few germinal cells in human ovary differentiate and divide mitotically to produce egg mother cell/oogonia. Further, oogonia become larger and divide to produce diploid primary oocyte. In follicular prenatal phase, the primary oocytes start first meiotic division but are transitionally suspended into prophase stage of meiosis I and are stored in the follicle. After puberty, primary oocyte resumes the division and completion of first meiotic division produce one secondary oocyte (egg cell) and one polar body (non-functional cell).
8. The sperm cells are the haploid gametes which are produced in the male. There are different parts of the sperm cell.
   (a) Acrosome: This structure contains enzymes used for penetrating the female egg.
   (b) Nucleus: There is the genetic material which is a haploid genome because it contains only one copy of each chromosome.
   (c) Middle piece: The middle piece has a central filamentous core with many mitochondria spiralled around it which is used for ATP production for the journey through the female cervix, uterus and uterine tube.
   (d) Tail: There is a long tail which is used for swimming and reaching near the egg.



SECTION -C

9. a) **Structure of ovum.** Most animal eggs are spherical or oval, non-motile but on close examination. it is noted that one pole is different from the other. The pole from which polar bodies are given off is called animal pole while the opposite is termed as vegetal pole. Thus it is said to have polarity. Thus various cytoplasmic substances are distributed along the axis in unequal manner. The nucleus also called (germinal vesicle) having chromatin network is surrounded by nuclear membrane. It also contains prominent nucleolus. All animal eggs contain some reserve material to provide food called yolk. The cytoplasm of ovum is called ooplasm. It lacks centrosome but contains cortical granules derived from Golgi bodies in its outer region termed cortex.
   (b) Function of Zona pellucida. During fertilisation as a result of cortical reaction, zona pellucida hardens and prevents the entry of additional sperms (polyspermy).
10. The menstrual phase (menstruation) is followed by follicular or proliferative phase;it is under the influence of follicle stimulating hormone (FSH) from the anterior pituitary. The primary follicle matures into Graafian follicle;the follicular cells secrete estrogens,which control the growth and maintenence of the secondary sex organs like uterus,fallopian tube,ect. The FSH and lutenising hormone reach their peak level around the 14th day of menstrual cycle. The peak level of LH or LH surge causes the rupture of Graafian follicle and release of ovum;this process is called ovulation. It is followed by luteal

phase,where LH influences the ruptured Graafian follicle to transform into corpus luteum. Corpus luteum secretes large quantity of progesterone in the luteal phase,which is necessary for the growth and maintenance of endometrium of uterus for implantation. If fertilisation does not occur,corpus luteum degenerates and progesterone is not secreted. The endometrium degenerates and menstruation occurs.

11. The target cells for luteinising hormone in males are the Leydig cells and in females are the mature follicles.
LH in males stimulates the Leydig cells of testes to secrete androgens (testosterone) which controls spermatogenesis.
LH in females stimulates ovulation formation of corpus luteumfrom the reptured follicle and secretion of progesterone by corpus luteum.

12. Gondotropins are secreted by the anterior pituitary.
Follicle stimulating hormone (FSH) and luteinising hormone (LH) are the gonadotropins.
FSH stimulates follicular development and secretion of estrogens by the follicle cells.
Both FSH and LH attain a peak level around the middle of the cycle(about 14th day).
The maximum level of LH (also called LH surge) induces ovulation,i.e.,rupture of the mature follicle and release of ovum/secondary oocyte.
LH stimulates the formation of corpus luteum from the ruptured follicle and secretion of progesterone from the corpus luteum.

13. Spermatogenesis is the process of the production of sperms from the immature germ cells in males. It takes place in seminiferous tubules present inside the testes. During spermatogenesis, a diploid spermatogonium (male germ cell) increases its size to form a diploid primary spermatocyte. This diploid primary spermatocyte undergoes first meiotic division (meiosis I), which is a reductional division to form two equal haploid secondary spermatocytes. Each secondary spermatocyte then undergoes second meiotic division (meiosis II) to form two equal haploid spermatids. Hence, a diploid spermatogonium produces four haploid spermatids. These spermatids are transformed into spermatozoa (sperm) by the process called spermiogenesis.

14. **(a) Corpus luteum**
It secretes large amounts of progesterone, which is essential for maintenance of the endometrium, implantation of embryo and other events of pregnancy.
(b) Endometrium
It is the inner most glandular lining of the wall of the uterus. - It undergoes cyclical changes during menstrual cycle and prepares itself for the implantation of embryo.
(c) Acrosome
The acrosome contains enzymes which help in dissolving the envelopes (zona pellucida and plasma membrane) of the ovum and facilitate the entry of sperm into the cytoplasm of the ovum.
(d) Sperm tail
It facilitates the movement of sperm inside the female reproductive tract to reach the ovum for fertilisation.
(e) Fimbriae
They help in collection of the ovum after ovulation, into the fallopian tube.

QB TM 365 Study Material

SECTION -B

15. Gametogenesis → Insemination → Fertilisation → Implantation → Gestation → Parturition.
16. Primary oocyte is a diploid cell formed in foetal ovary when the gamete mother cell, oogonia is arrested at prophase-I of meiosis. Secondary oocyte is the haploid cell formed from primary oocyte that completes its first meiotic division, during puberty and produces the female gamete ova (n).
17. During pregnancy,the corpus luteum secretes large quantity of progesterone,which inhibits maturation of any other follicle or ovulation;hence menstrual cycles are absent.
18. Morula and 3.15 (G)Blastocyst
19. The external thin membranous,perimetrium.
The middle,thick layer of smooth muscles,myometrium.
The inner glandular layer lining the uterine cavity,endometrium.Endometrium undergoes cyclic changes.
20. Endometrium is the glandular layer,where implantation occurs;it also forms a part of the placenta.
Myometrium is the muscular layer,whose vigorous contractions at the end of gestation lead to parturition.

SECTION -A

21. (d) maintenance of high conc. of sex hormones in the blood stream
22. (c) spermatogonia-spermatocyte-spermatid-sperms
23. (c) Pattern of cleavage
24. (c)

A	B	C	D
vas deferens	seminal vesicle	prostate	bulbo urethral gland

25. (c) A-(III), B-(I), C-(II), D-(I)
26. (a) Formation of first polar body