



SHRI KRISHNA ACADEMY

NEET, JEE & BOARD EXAM(10th, +1, +2) COACHING CENTRE
SBM SCHOOL CAMPUS, TRICHY MAIN ROAD, NAMAKKAL

CELL: 99655 31727 , 94432 31727

STD: XII

05.08.2019

Marks : 50

SUBJECT: ZOOLOGY

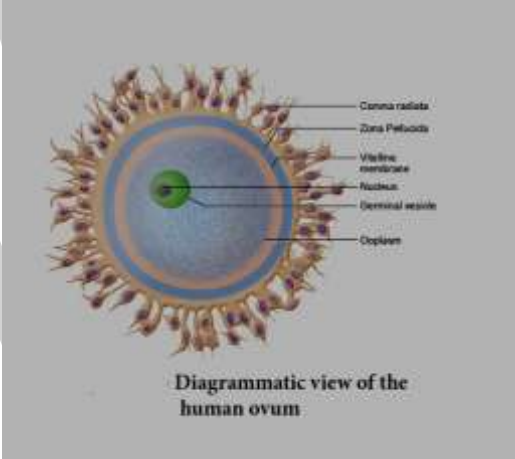
TENTATIVE ANSWER KEY

SECTION - I

| CHOOSE THE CORRECT ANSWER | | 10 x 1 = 10 |
|---------------------------|-------------------------------------|-------------|
| Q.No | | Marks |
| 1 | c) Sexual reproduction | 1 |
| 2 | a) LCG, LPL. Progesterone, Estrogen | 1 |
| 3 | b) LNG-20 | 1 |
| 4 | c) Sertoli cells | 1 |
| 5 | c) Epididymis | 1 |
| 6 | (a) Inhibition of spermatogenesis. | 1 |
| 7 | a) 13-Trisomy | 1 |
| 8 | c) Francis Galton | 1 |
| 9 | b) AB | 1 |
| 10 | b) Transcription | 1 |

SECTION - II

| | | |
|-----|---|--------|
| | | 1 |
| 11. | ❖ Development of an egg into a complete individual without fertilization is known as parthenogenesis. ❖ e.g. Honey bees, Solenobia | 1 |
| 12. | ❖ Sexual reproduction is more effective than asexual reproduction ❖ In asexual reproduction there is no variation ❖ In sexual reproduction due to fusion of two gametes, variation is found | 1 1 |
| 13. | Gametogenesis is the process of formation of gametes i.e., sperms and ovary from the primary sex organs in all sexually reproducing organisms. | 2 |
| 14. | ❖ Fertilization is accomplished when sperm fuses with an ovum. ❖ Next, the cortical granules from the cytoplasm of the ovum form a barrier around the ovum. This is called fertilization membrane. ❖ It prevents the further penetration of other sperms. Thus polyspermy is prevented. | 1 1 |
| 15. | ❖ Menstrual phase (5-7 days) ❖ Follicular or proliferative phase (5-14 days) ❖ Ovulatory phase (14 day) ❖ Luteal or secretory phase (15-28 days) | 2 |
| 16. | ❖ Avoid sex with unknown partner/ multiple partners ❖ use condoms ❖ In case of doubt, consult a doctor for diagnosis and get complete treatment. | 1 1 |

| | | | | | |
|--------------------|---|-------|---|--|------------|
| 17. | Intersex | | Supersex | | |
| | 1. Combination of chromosomal genotypes and sexual phenotype other than XY male and XX female. | | 1. Super females They are Poly X females. | | |
| | 2. Variations in Sex characteristics like chromosomes, gonads, sex hormones or genitals. They do not fit into typical male or female. | | 2. They have 47 autosomes and 3x chromosomes. | | |
| | 3. Previously they were called as hermaphrodites | | 3. It is called triple X syndrome | | 2 |
| | 4. They have one extra X and Y chromosome | | 4. They are mentally retarded and sterile. Supermales (XYY males) | | |
| | 5. They have both ovarian and testicular tissues. | | 5. They have an extra 'Y' chromosome. | | |
| 18. | 6. External genitalia is not well defined. | | 6. This is called xyy syndrome. They show mental retardation and criminal attitude. | | |
| | | CODON | Anticodon | | 2 |
| | | AAU | UUA | | |
| | | CGA | GCU | | |
| | | UAU | AUA | | |
| | | GCA | CGU | | |
| SECTION - C | | | | | |
| 19. | Syngamy | | Fertilization | | 3 |
| | ❖ It is the fusion of male and female pronuclei after fertilization. | | ❖ It is the fusion of male and female gamete. | | |
| | ❖ It confirms the diploid state of the zygote. | | ❖ It refers to the process of confirming fertility. | | |
| 20. | ❖ Sertoli cell or nurse cell is in the stratified epithelium of sertoli cell. They secrete a hormone called inhibin. ❖ It is involved in the negative feedback control of sperm production. | | | | 1 2 |
| 21. | <div><p>Diagrammatic view of the human ovum</p></div> <div>❖ Human ovum is non-cleidoic, alecithal and microscopic in nature. ❖ Its cytoplasm called ooplasm contains a large nucleus called the germinal vesicle. ❖ The ovum is surrounded by three coverings namely an inner thin transparent vitelline membrane, middle thick zona pellucida and outer thick coat of follicular cells called corona radiata.</div> | | | | 1 1 |

[illegible]

Spermatogenesis

Multiplication Phase: Spermatogonia (2n)

Growth Phase: Mitotic division → Primary spermatocyte (2n)

Meiosis I: Primary spermatocyte (2n) → Secondary spermatocyte (n)

Meiosis II: Secondary spermatocyte (n) → Spermatid (n)

Maturation Phase: Spermiogenesis → Spermatozoa (n)

Oogenesis

Fetal life: Oogonia (2n)

Growth Phase: Mitotic division → Primary oocyte (2n)

Meiosis I completed prior to ovulation: Primary oocyte (2n) → First polar body (n) and Secondary oocyte (n)

Adult reproductive life: Secondary oocyte (n) → Second polar body (n) and Ovum (n) (Completion of meiosis II)

| | | |
|-----|---|---|
| | <p>spermatocytes which are diploid with 23 pairs i.e., 46 chromosomes.</p> <ul style="list-style-type: none"> ❖ Some of the primary spermatocytes undergo first meiotic division to form two secondary spermatocytes which are haploid with 23 chromosomes each. The secondary spermatocytes undergo second meiotic division to produce four haploid spermatids. The spermatids are transformed into mature spermatozoa (sperms) by the process called spermiogenesis. Sperms are finally released into the cavity of seminiferous tubules by a process called spermiation. ❖ The whole process of spermatogenesis takes about 64 days. At any given time, different regions of the seminiferous tubules contain spermatocytes in different stages of development. The sperm production remains nearly constant at a rate of about 200 million sperms per day. ❖ Oogenesis is the process of development of the female gamete or ovum or egg in the ovaries. During foetal development, certain cells in the germinal epithelium of the foetal ovary divide by mitosis and produce millions of egg mother cells or oogonia. No more oogonia are formed or added after birth. ❖ The oogonial cells start dividing and enter into Prophase I of meiotic division I to form the primary oocytes which are temporarily arrested at this stage. The primary oocytes then get surrounded by a single layer of granulosa cells to form the primordial or primary follicles. A large number of follicles degenerate during the period from birth to puberty, so at puberty only 60,000 to 80,000 follicles are left in each ovary. ❖ The primary follicle gets surrounded by many layers of granulosa cells and a new theca layer to form the secondary follicle. A fluid filled space, the antrum develops in the follicle and gets transformed into a tertiary follicle. The theca layer gets organized into an inner theca interna and an outer theca externa. At this time, the primary oocyte within the tertiary follicle grows in size and completes its first meiotic division and forms the secondary oocyte. ❖ It is an unequal division resulting in the formation of a large haploid secondary oocyte and a first polar body. The first polar body disintegrates. During fertilisation, the secondary oocyte undergoes second meiotic division and produces a large cell, the ovum and a second polar body. The second polar body also degenerates. ❖ The tertiary follicle eventually becomes a mature follicle or Graafian follicle. If fertilisation does not take place, second meiotic division is never completed and the egg disintegrates. At the end of gametogenesis in females, each primary oocyte gives rise to only one haploid ovum. | <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> <p>$\frac{1}{2}$</p> |
| 28. | <p>The contraceptive methods are of two types – temporary and permanent. Natural, chemical, mechanical and hormonal barrier methods are the temporary birth control methods.</p> <p>1. Natural method is used to prevent meeting of sperm with ovum. i.e., Rhythm method (safe period), coitus interruptus, continuous abstinence and lactational amenorrhoea.</p> <p>a. Periodic abstinence/rhythm method Ovulation occurs at about the 14th day of the menstrual cycle. Ovum survives for about two days and sperm remains alive for about 72 hours in the female reproductive tract. Coitus is to be avoided during this time.</p> <p>b. Continuous abstinence is the simplest and most reliable way to avoid pregnancy is not to have coitus for a defined period that facilitates conception.</p> <p>c. Coitus interruptus is the oldest family planning method. The male partner withdraws his penis before ejaculation, thereby preventing deposition of semen</p> | <p>any two methods ($2\frac{1}{2} + 2\frac{1}{2}$)</p> |

into the vagina.

d. Lactational amenorrhoea Menstrual cycles resume as early as 6 to 8 weeks from parturition. However, the reappearance of normal ovarian cycles may be delayed for six months during breast-feeding. This delay in ovarian cycles is called **lactational amenorrhoea**. It serves as a natural, but an unreliable form of birth control. Suckling by the baby during breast-feeding stimulates the pituitary to secrete increased prolactin hormone in order to increase milk production. This high prolactin concentration in the mother's blood may prevent menstrual cycle by suppressing the release of GnRH (Gonadotropin Releasing Hormone) from hypothalamus and gonadotropin secretion from the pituitary.

2. Barrier methods In these methods, the ovum and sperm are prevented from meeting so that fertilization does not occur.

a. Chemical barrier Foaming tablets, melting suppositories, jellies and creams are used as chemical agents that inactivate the sperms in the vagina.

b. Mechanical barrier Condoms are a thin sheath used to cover the penis in male whereas in female it is used to cover vagina and cervix just before coitus so as to prevent the entry of ejaculated semen into the female reproductive tract. This can prevent conception. Condoms should be discarded after a single use. Condom also safeguards the user from AIDS and STDs. Condoms are made of polyurethane, latex and lambskin.

Diaphragms, cervical caps and vaults are made of rubber and are inserted into the female reproductive tract to cover the cervix before coitus in order to prevent the sperms from entering the uterus.

c. Hormonal barrier

It prevents the ovaries from releasing the ova and thickens the cervical fluid which keeps the sperm away from ovum.

Oral contraceptives — Pills are used to prevent ovulation by inhibiting the secretion of FSH and LH hormones. A combined pill is the most commonly used birth control pill. It contains synthetic progesterone and estrogen hormones. **Saheli**, contraceptive pill by Central Drug Research Institute (CDRI) in Lucknow, India contains a non-steroidal preparation called **centchroman**.

d. Intrauterine Devices (IUDs)

Intrauterine devices are inserted by medical experts in the uterus through the vagina. These devices are available as copper releasing IUDs, hormone releasing IUDs and non-medicated IUDs. IUDs increase phagocytosis of sperm within the uterus. IUDs are the ideal contraceptives for females who want to delay pregnancy. It is one of the popular methods of contraception in India and has a success rate of 95 to 99%.





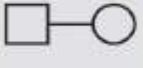

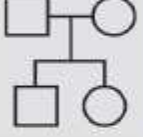






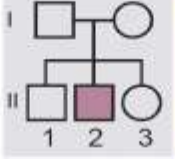



Copper releasing IUDs differ from each other by the amount of copper. Copper IUDs

such as **Cu T-380 A, Nova T, Cu 7, Cu T 380 Ag, Multiload 375, etc.** release free copper and copper salts into the uterus and suppress sperm motility. They can remain in the uterus for five to ten years.

Hormone-releasing IUDs such as **Progestasert and LNG – 20** are often called as intrauterine systems (IUS). They increase the viscosity of the cervical mucus and thereby prevent sperms from entering the cervix.

Non-medicated IUDs are made of plastic or stainless steel. Lippes loop is a double S-shaped plastic device.

(OR)

| Symbol | Explanation | Symbol | Explanation |
|---|--|---|--|
|  | Male |  | Affected individuals |
|  | Female |  | Heterozygotes for autosomal recessives |
|  | Mating |  | Carrier of sex-linked recessives |
|  | Parents and children (1 boy: 1 girl in order of birth) |  | Death |
|  | Dizygotic twins |  | Abortion or still birth (sex unspecified) |
|  | Monozygotic twins |  | Propositus (proband) |
|  | Sex unspecified |  | Method of identifying persons in a pedigree : here the propositus in child 2 in generation 2 or II 2 |
|   | Number of children of sex indicated |  | Consanguineous marriage |

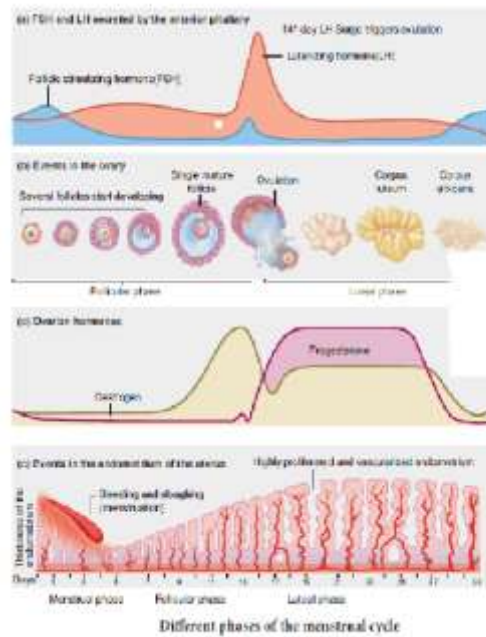
any 5

29.

The **menstrual or ovarian cycle** occurs approximately once in every 28/29 days during the reproductive life of the female from **menarche** (puberty) to **menopause** except during pregnancy. The cycle of events starting from one menstrual period till the next one is called the menstrual cycle during which cyclic changes occurs in the endometrium every month. Cyclic menstruation is an indicator of normal reproductive phase.

Menstrual cycle comprises of the following phases

1. Menstrual phase
2. Follicular or proliferative phase
3. Ovulatory phase
4. Luteal or secretory phase



1. Menstrual phase

The cycle starts with the menstrual phase when menstrual flow occurs and lasts for 3-5 days. Menstrual flow is due to the breakdown of endometrial lining of the uterus, and its blood vessels due to decline in the level of progesterone and oestrogen. Menstruation occurs only if the released ovum is not fertilized. Absence of menstruation may be an indicator of pregnancy. However it could also be due to stress, hormonal disorder and anaemia.

2. Follicular or proliferative phase

The follicular phase extends from the 5th

day of the cycle until the time of ovulation. During this phase, the primary follicle in the ovary grows to become a fully mature Graafian follicle and simultaneously, the endometrium regenerates through proliferation. These changes in the ovary and the uterus are induced by the secretion of gonadotropins like FSH and LH, which increase gradually during the follicular phase. It stimulates follicular development and secretion of **oestrogen** by the follicle cells.

3. Ovulatory phase

Both LH and FSH attain peak level in the middle of the cycle (about the 14th day). Maximum secretion of LH during the mid cycle called **LH surge** induces the rupture of the Graafian follicle and the release of the ovum (secondary oocyte) from the ovary wall into the peritoneal cavity. This process is called as **ovulation**.

4. Luteal or secretory phase

During luteal phase, the remaining part of the Graafian follicle is transformed into a transitory endocrine gland called corpus luteum. The corpus luteum secretes large amount of progesterone which is essential for the maintenance of the endometrium. If fertilisation takes place, it paves way for the implantation of the fertilized ovum. The uterine wall secretes nutritious fluid in the uterus for the foetus. So, this phase is also called as **secretory phase**. During pregnancy all events of menstrual cycle stop and there is no menstruation.

In the absence of fertilisation, the corpus luteum degenerates completely and leaves a scar tissue called **corpus albicans**. It also initiates the disintegration of the endometrium leading to menstruation, marking the next cycle.

(OR)

| Name of the Disease | Causative agent | Symptom |
|--------------------------|------------------------------------|--|
| Bacterial STI | | |
| Gonorrhoea | <i>Neisseria gonorrhoeae</i> | Affects the urethra, rectum and throat and in females the cervix also get affected. Pain and pus discharge in the genital tract and burning sensation during urination. |
| Syphilis | <i>Treponema palladium</i> | Primary stage Formation of painless ulcer on the external genitalia. Secondary stage Skin lesions, rashes, swollen joints and fever and hair loss. Tertiary stage Appearance of chronic ulcers on nose, lower legs and palate. Loss of movement, mental disorder, visual impairment, heart problems, gummas (soft non-cancerous growths) etc |
| Chlamydiasis | <i>Chlamydia trachomatis</i> | Trachoma , affects the cells of the columnar epithelium in the urinogenital tract, respiratory tract and conjunctiva. |
| Lymphogranuloma venereum | <i>Chlamydia trachomatis</i> | Cutaneous or mucosal genital damage, urithritis and endocervicitis. Locally harmful ulcerations and genital elephantiasis. |
| Viral STI | | |
| Genital herpes | Herpes simplex virus | Sores in and around the vulva, vagina, urethra in female or sores on or around the penis in male. Pain during urination, bleeding between periods. Swelling in the groin nodes. |
| Genital warts | Human papilloma virus (HPV) | Hard outgrowths (Tumour) on the external genitalia, cervix and perianal region. |
| Hepatitis-B | Hepatitis B virus (HBV) | Fatigue, jaundice, fever, rash and stomach pain. Liver cirrhosis and liver failure occur in the later stage. |
| AIDS | Human immunodeficiency virus (HIV) | Enlarged lymph nodes, prolonged fever, prolonged diarrhoea, weight reduction, night sweating. |

(any 5)

| | <table><tr><th>Name of the Disease</th><th>Causative agent</th><th>Symptom</th></tr><tr><td colspan="3">Fungal STI</td></tr><tr><td>Candidiasis</td><td><i>Candida albicans</i></td><td>Attacks mouth, throat, intestinal tract and vagina. Vaginal itching or soreness, abnormal vaginal discharge and pain during urination.</td></tr><tr><td colspan="3">Protozoan STI</td></tr><tr><td>Trichomoniasis</td><td><i>Trichomonas vaginalis</i></td><td>Vaginitis , greenish yellow vaginal discharge, itching and burning sensation, urethritis, epididymitis and prostatitis</td></tr></table> | Name of the Disease | Causative agent | Symptom | Fungal STI | | | Candidiasis | <i>Candida albicans</i> | Attacks mouth, throat, intestinal tract and vagina. Vaginal itching or soreness, abnormal vaginal discharge and pain during urination. | Protozoan STI | | | Trichomoniasis | <i>Trichomonas vaginalis</i> | Vaginitis , greenish yellow vaginal discharge, itching and burning sensation, urethritis, epididymitis and prostatitis | |
|---------------------|--|---|-----------------|---------|------------|--|--|-------------|-------------------------|---|---------------|--|--|----------------|------------------------------|--|--|
| Name of the Disease | Causative agent | Symptom | | | | | | | | | | | | | | | |
| Fungal STI | | | | | | | | | | | | | | | | | |
| Candidiasis | <i>Candida albicans</i> | Attacks mouth, throat, intestinal tract and vagina. Vaginal itching or soreness, abnormal vaginal discharge and pain during urination. | | | | | | | | | | | | | | | |
| Protozoan STI | | | | | | | | | | | | | | | | | |
| Trichomoniasis | <i>Trichomonas vaginalis</i> | Vaginitis , greenish yellow vaginal discharge, itching and burning sensation, urethritis, epididymitis and prostatitis | | | | | | | | | | | | | | | |
| 30. | <p>Forensic analysis - It can be used in the identification of a person involved in criminal activities, for settling paternity or maternity disputes, and in determining relationships for immigration purposes.</p> <p>Pedigree analysis – inheritance pattern of genes through generations and for detecting inherited diseases.</p> <p>Conservation of wild life – protection of endangered species. By maintaining DNA records for identification of tissues of the dead endangered organisms.</p> <p>Anthropological studies–It is useful in determining the origin and migration of human populations and genetic diversities</p> | 1 ½ 1 ½ 1 1 | | | | | | | | | | | | | | | |
| | <p style="text-align: center;">(OR)</p> <p>Although human genome contains 3 billion nucleotide bases, the DNA sequences that encode proteins make up only about 5% of the genome.</p> <ul style="list-style-type: none">• An average gene consists of 3000 bases, the largest known human gene being dystrophin with 2.4 million bases.• The function of 50% of the genome is derived from transposable elements such as LINE and ALU sequence.• Genes are distributed over 24 chromosomes. Chromosome 19 has the highest gene density. Chromosome 13 and Y chromosome have lowest gene densities. The chromosomal organization of human genes shows diversity.• There may be 35000-40000 genes in the genome and almost 99.9 nucleotide bases are exactly the same in all people.• Functions for over 50 percent of the discovered genes are unknown.• Less than 2 percent of the genome codes for proteins.• Repeated sequences make up very large portion of the human genome. Repetitive sequences have no direct coding functions but they shed light on chromosome structure, dynamics and evolution (genetic diversity).• Chromosome 1 has 2968 genes whereas chromosome 'Y' has 231 genes.• Scientists have identified about 1.4 million locations where single base DNA differences (SNPs – Single nucleotide polymorphism – pronounce as 'snips') occur in humans. Identification of 'SNIPS' is helpful in finding chromosomal locations for disease associated sequences and tracing human history. | (any 5) | | | | | | | | | | | | | | | |

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ZOOLOGY