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UNIT

17

Reproduction in Plants and Animals

POINTS TO REMEMBER

Vegetative reproduction	–	New plants are formed from vegetative cell buds or organs of plants.
Vegetative parts	–	Root, stem, leaf, buds.
Bulbils	–	The flower bud modifies into globose bulbs.
Fragmentation	–	Breaking of the filamentous algae into many filament
Regeneration	–	Ability of the lost body parts of an individual organisms to give rise to an whole new organisms.
Sporangium	–	Spore formation of a structure.
Calyx	–	Consisting of sepals.
Corolla	–	Consisting of petals.
Androecium	–	Consisting of stamens (or) male part
Gynoecium	–	Consisting of carpels (or) female part
Micropyle	–	Nucellus is enclosed by two integuments leaving a opening.
Funiculus	–	Ovule attached to ovary wall by a stalk
Synergids	–	In the egg apparatus one is egg cell and the remaining two cells are synergids.
Pollination	–	Transfer of pollen grain from anther to stigma.
Autogamy	–	Self pollination.
Cross pollination	–	Transfer of pollen grain from anther of a flower to the stigma of a flower on another plant.
Anemophily	–	Pollination by winds
Entomophily	–	Pollination by insects.
Hydrophily	–	Pollination by water.
Zoophily	–	Pollination by animals

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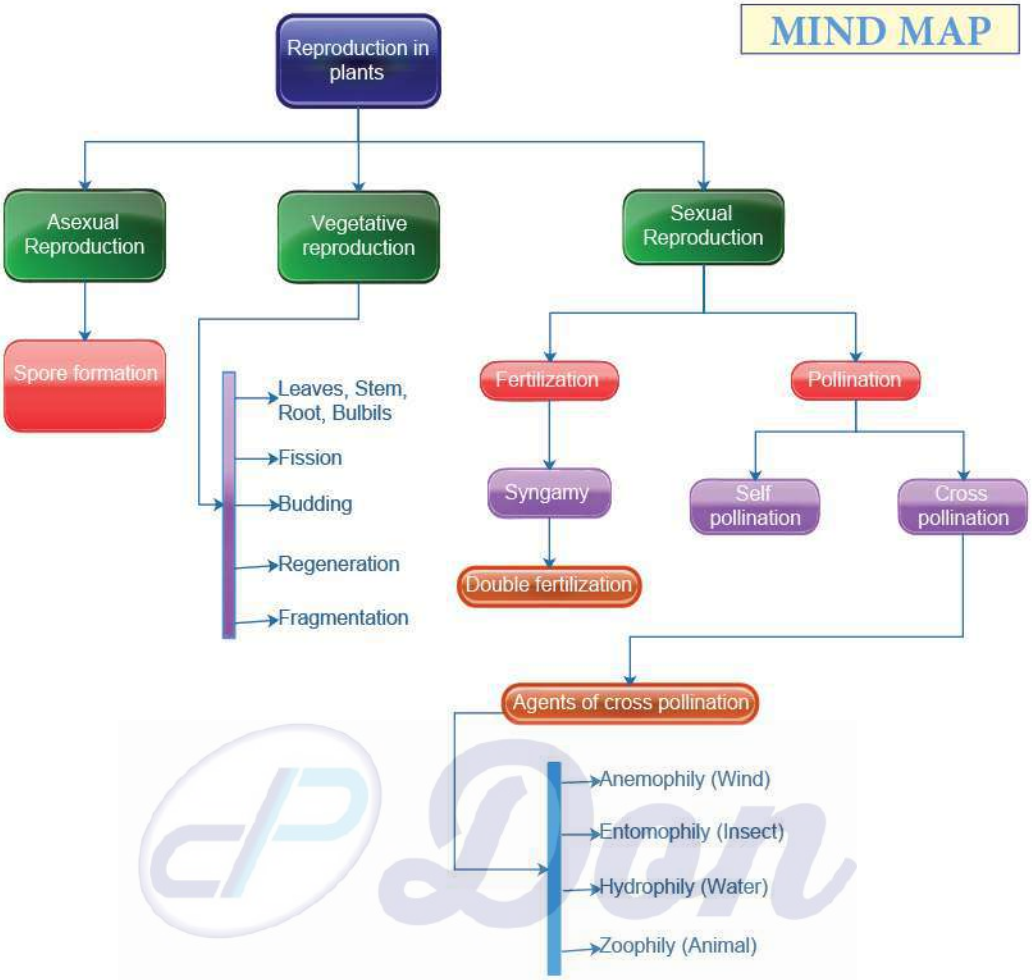
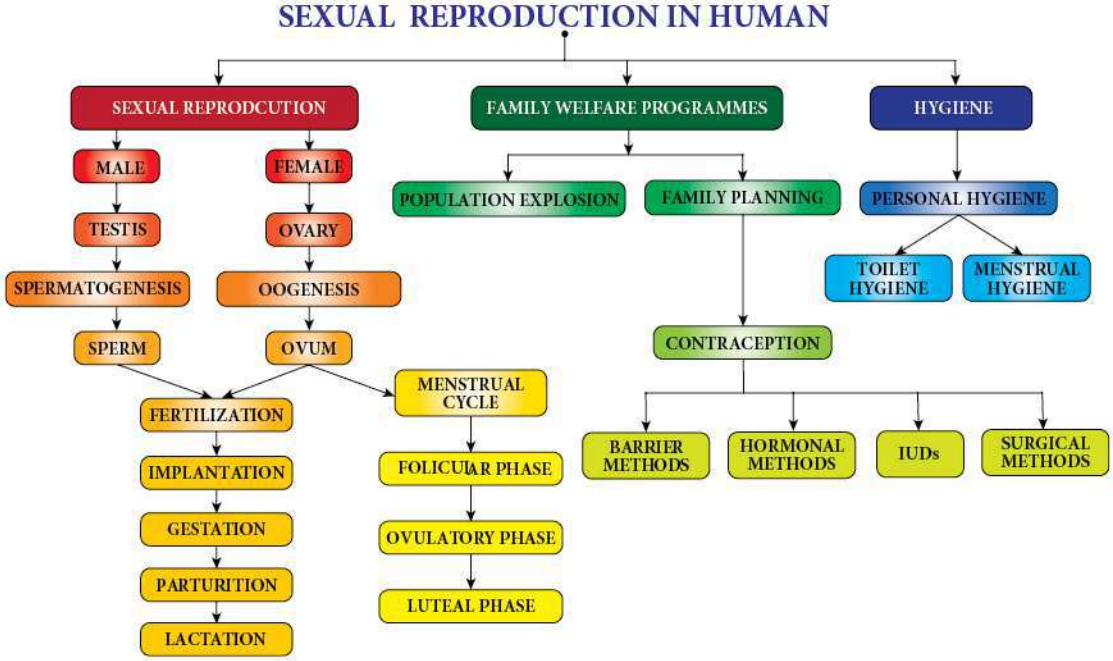
MIND MAP



SEXUAL REPRODUCTION IN HUMAN



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Scrotum	–	male reproductive part lie outside the abdominal cavity of in a sac like structure
Gametogenesis	–	Formation of sperm in male and the ovum in female.
Spermatogenesis	–	Formation of spermatozoa.
Oogenesis	–	Formation of ova.
Vitelline membrane	–	Membrane forming the surface layer of the ovum.
Menarche	–	In human females the menstrual cycle starts at the age of 11- 13 years which marks onset of puberty.
Menopause	–	In human female the menstrual cycle ceases around 48 - 50 years. This stage is called menopause.
Zygote	–	Fertilized ovum
Cleavage	–	Series of rapid mitotic divisions of the zygote to form many celled blastula.
Uterus	–	Muscular organ in which mammalian embryo develops.
Menarche	–	The menstrual cycle starts at the age of 11 - 12 which marks the onset of puberty and is called menarche.
Menstruation	–	Uterine bleeding that occurs at approximately four-week intervals resulting from the degeneration of the inner lining of uterus.
Gestation	–	Period of complete growth and development of a foetus in the uterus of a mammal.
Ovulation	–	Ovulation is the rupture of the follicle releasing the egg or ovum.
Puberty	–	Period of growth during which humans become sexually mature.
Parturition	–	Expulsion of young one from the mother's uterus at the end of gestation.
Placenta	–	Disc shaped structure which is a temporary association between the developing embryo and maternal tissues.
Umbilical cord	–	Cord containing blood vessels that connects the placenta with foetus.
Lactation	–	The process of milk production after child birth from mammary glands of mother.
Contraceptive device	–	Device used for contraception.

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Contraception	–	It is one of the best birth control measures.
Vasectomy	–	It is a surgical method of males to prevent pregnancy.
Tubectomy	–	It is a surgical method of females to prevent pregnancy.
Intra-Uterine device	–	Lipper's loop, Copper - T.
Double fertilization	–	Two types of fusion syngamy and triple fusion takes place an embryo sac.

Textbook Evaluation

I. Choose the most suitable answer from the given four alternatives and write the option code and corresponding answer:

1. **The plant which propagates with the help of its leaves is _____ .**
   a) onion b) neem
   c) ginger d) bryophyllum

2. **Asexual reproduction takes place through budding in _____ .**
   a) amoeba b) yeast
   c) plasmodium d) bacteria

3. **Syngamy results in the formation of _____ .** ★
   a) zoospores b) conidia
   c) zygote d) chlamydospores

4. **The essential parts of a flower are _____ .** ★★
   a) calyx and Corolla b) calyx and Androecium
   c) corolla and Gynoecium d) androecium and Gynoecium

5. **Anemophilous flowers have _____ .** ★★
   a) sessile stigma b) small smooth stigma
   c) colored flower d) large feathery stigma

6. **Male gametes in angiosperms are formed by the division of _____ .**
   a) generative cell b) vegetative cell
   c) microspore mother cell d) microspore

7. **What is true of gametes?**
   a) They are diploid b) They give rise to gonads
   c) They produce hormones d) They are formed from gonads

8. **A single highly coiled tube where sperms are stored, get concentrated and mature is known as**
   a) Epididymis b) Vasa efferentia
   c) Vas deferens d) Seminiferous tubules

9. **The large elongated cells that provide nutrition to developing sperms are** ★★
   a) Primary germ cells b) Sertoli cells
   c) Leydig cells d) Spermatogonia

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10. **Estrogen is secreted by**
    a) Anterior pituitary
    b) Primary follicle
    c) Graffian follicle
    d) Corpus luteum

11. **Which one of the following is an IUCD?**
    a) Copper – T
    b) Oral pills
    c) Diaphragm
    d) Tubectomy

Ans:

1.	d) Bryophyllum	7.	d) They are formed from gonads
2.	b) Yeast	8.	a) Epididymis
3.	c) Zygote	9.	b) Sertoli cells
4.	d) Androecium and Gynoecium	10.	c) Graffian follicle
5.	d) Large feathery stigma	11.	a) Copper – T
6.	a) Generative cell		

II. Fill in the blanks

1. **The embryo sac in a typical dicot at the time of fertilization is _____ .**
2. **After fertilization the ovary develops into _____ .**
3. **Planaria reproduces asexually by _____ .**
4. **Fertilization is _____ in humans.**
5. **The implantation of the embryo occurs at about _____ day of fertilization.** ✶✶
6. **_____ is the first secretion from the mammary gland after child birth.** ✶✶
7. **Prolactin is a hormone produced by _____ .** ✶✶

Ans:

1.	nucellus	2.	fruit
3.	regeneration	4.	internal
5.	6 to 7th	6.	colostrum
7.	pituitary gland		

III. Match the following

A.

Column I		Column II	
1) Fission	-	a) Spirogyra	(b)
2) Budding	-	b) Amoeba	(c)
3) Fragmentation	-	c) Yeast	(a)

B.

Column I		Column II	
1) Parturition	-	a) Duration between pregnancy and birth	(c)
2) Gestation	-	b) Attachment of zygote to endometrium	(a)
3) Ovulation	-	c) Delivery of baby from uterus	(d)
4) Implantation	-	d) Release of egg from Graafian follicle	(b)

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IV. State whether the following statements are true or false. Correct the false statement

1. **Stalk of ovule is called pedicle.** ✶ ✶ **False**
   Stalk of the ovule is called funiculus.

2. **Seeds are the product of asexual reproduction.** **False**
   Spores are the product of asexual reproduction.
   or
   Seeds are the product of sexual reproduction.

3. **Yeast reproduces asexually by means of multiple fission.** **False**
   Yeast reproduces asexually by means of budding.

4. **The part of the pistil which serves as a receptive structure for the pollen is called as style.** ✶ ✶ **False**
   The part of the pistil which serves as a receptive structure for pollen is called stigma.

5. **Insect pollinated flowers are characterized by dry and smooth pollen.** **False**
   Insect pollinated flowers are characterised by brightly coloured, have smell and nector.
   or
   Wind pollinated flowers are charaterised by dry and smooth pollen.

6. **Sex organs produce gametes which are diploid.** **False**
   Sex organs produce gametes which are haploid.

7. **LH is secreted by the posterior pituitary.** ✶ ✶ **False**
   Oxytocin hormone is secreted by the posterior pituitary.

8. **Menstrual cycle ceases during pregnancy.** **True**

9. **Surgical methods of contraception prevent gamete formation.** ✶ ✶ **False**
   Surgical methods of contraception prevent entry of sperm.

10. **The increased level of estrogen and progesterone is responsible for menstruation.** **False**
    The decreased level of estrogen and progestrone is responsible for menstruation.

V. Answer in a word or sentence

1. **If one pollen grain produces two male gametes, how many pollen grains are needed to fertilize 10 ovules?**
   10 pollen grains are needed to fertilize 10 ovules.

2. **In which part of the flower germination of pollen grains takes place?**
   The germination of pollen grains takes place in **stigma**.

3. **Name two organisms which are reproduced through budding.**
   Hydra and **yeast** are the organisms which are reproduced through budding.

4. **Mention the function of endosperm.** ✶ ✶
   Endosperm provides food to the **developing embryo.**

5. **Name the hormone responsible for the vigorous contractions of the uterine muscles.**
   Hormone responsible for the vigorous contractions of the uterine muscles is **oxytocin**. ✶

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6. What is the enzyme present in acrosome of sperm? ✶ ✶
The enzyme present in acrosome of sperm is **hyaluronidase.**

7. When is World Menstrual Hygiene Day observed?
Every year **May 28** is observed as menstrual hygiene day.

8. What is the need for contraception ?
The need for contraception is **control birth.**

9. Name the part of the human female reproductive system where the following occurs. a. Fertilization b. Implantation
a) Fertilization occurs in the **oviduct** of the **female genetal tract.**
b) Implantation occurs in **uterus**.

VI. Short answer questions.

1. What will happen if you cut planaria into small fragments?

If I cut planaria into small fragments it will regenerate the organs and produce a new planaria.

2. Why is vegetative propagation practiced for growing some type of plants?

It has only mitotic division, no gametic fusion and daughter plants are genetically similar to the parent plant. So some plants grow by propagation practices.

3. How does binary fission differ from multiple fission? ✶ ✶

S.No	Binary fission	Multiple fission
1.	**Two daughter cells** are produced from a single parent cell.	Two or **multiple daughter cells** are produced from a single parent cell.
2.	Cytoplasm **divides** after each nuclear division.	Cytoplasm **does not divide** after each nuclear division.
3.	It occurs in **favourable** conditions.	It occurs in **unfavourable** conditions.

4. Define triple fusion. ✶ ✶ ✶

- In the fertilization one sperm fuses with egg and forms a diploid zygote.
- The other sperm fuses with **secondary nucleus** to form **primary endosperm** nucleus.
- This fusion is called triple fusion.

5. Write the characteristics of insect pollinated flowers.

- Insect pollinated plants characters are **brightly coloured,** have **smell** and **nectar**.
- The pollen grains are **larger** in **size** the exine is **pitted** and **spiny**.

6. Name the secondary sex organs in male.

The secondary sex organs in male are vas deferens, epididymis, seminal vesicle, prostate gland and penis.

7. What is colostrum? How is milk production hormonally regulated ? ✶ ✶

- The first fluid which is released from the mammary gland **after child birth** is called as colostrum.
- Milk production from alveoli of mammary glands is stimulated by prolactin secreted from the **anterior pituitary.**
- The ejection of milk is stimulated by **posterior** pituitary hormone **oxytocin**.

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8. How can menstrual hygiene be maintained during menstrual days?

- Maintaining menstrual hygiene is important for the overall health of women.

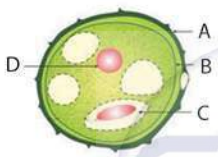
The basic menstrual hygiene ways are:

- Sanitary pads should be **changed regularly,** to avoid infections due to microbes from vagina and sweat from genitals.
- Use of **warm water t**o clean genitals helps to get rid of **menstrual cramps.**
- Wearing **loose clothing** rather than tight fitting clothes will ensure the **airflow** around the genitals and prevent sweating.

9. How does developing embryo gets its nourishment inside the mother's body? ★★

- The **placenta** is a disc shaped structure attached to the uterine wall and is a temporary association between the developing embryo and maternal tissues.
- It allows the exchange of food materials, diffusion of oxygen, excretion of nitrogenous wastes and elimination of carbon dioxide.
- A cord containing blood vessels that connects the placenta with the foetus is called the **umbilical cord.**

10. Identify the parts A, B, C and D



A - Exine
B - Intine
C - Generative cell
D - Nucleus

11. Write the events involved in the sexual reproduction of a flowering plant.
a. Discuss the first event and write the types.
b. Mention the advantages and the disadvantages of that event.

Pollination :

- Transfer of pollen grains from anther to stigma of a flower is called pollination.

Types of Pollination:

- Self-pollination
- Cross pollination

Self-pollination (Autogamy)

- Self-pollination is also known as autogamy.
- The transfer of pollen grains from the anther to the stigma of same flower or another flower borne on the same plant is known as self pollination. e.g. Hibiscus.

Advantages of self-pollination

- Self-pollination is possible in certain bisexual flowers.
- Flowers do not depend on agents for pollination.
- There is no wastage of pollen grains.

Disadvantages of self-pollination

- The seeds are less in numbers.
- The endosperm is minute. Therefore, the seeds produce weak plants.
- New varieties of plants cannot be produced.

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12. Why are the human testes located outside the abdominal cavity? Name the pouch in which they are present. ✶✶

- The formation of sperm is in a **particular temperature** which is less than our body temperature. So it is located in the outside of the body.
- The name of the pouch is **scrotum**.

13. Luteal phase of the menstrual cycle is also called the secretory phase. Give reason

- Corpus leuteum produces progestrone and its level increases followed by a decline if menstrual bleeding occurs.
- Uterine wall ruptures bleeding starts and infertilized egg is expelled.

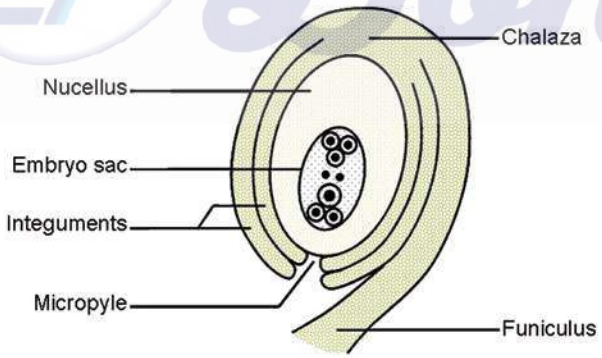
14. Why are family planning methods not adopted by all the people of our country?

Uneducated, fear, not understanding the population explosion are the factors affect the family planning methods.

VII. Long answer questions

1. With a neat labelled diagram describe the parts of a typical angiospermic ovule.

- The main part of the ovule is the **nucellus** which is enclosed by two integuments leaving an opening called as **micropyle**.
- The ovule is attached to the ovary wall by a stalk known as **funiculus**.
- **Chalaza** is the basal part.



Structure of the Ovule

- The embryo sac contains **seven cells** and the **eighth nuclei** located within the **nucellus**.
- Three cells at the **micropylar** end form the **egg apparatus** and the three cells at the **chalaza end** are the antipodal cells.
- The remaining two nuclei are called **polar nuclei** found in the centre.
- In the egg apparatus one is the egg cell (female gamete) and the remaining two cells are the **synergids.**

2. What are the phases of menstrual cycle? Indicate the changes in the ovary and uterus.

- Menstrual or Destructive Phase ✶✶✶
- Follicular or Proliferative Phase
- Ovulatory Phase
- Luteal or Secretory Phase

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Phase	Days	Changes in Ovary	Changes in Uterus	Hormonal Changes
Menstrual phase	4-5 days	Development of primary follicles	Breakdown of uterine endometrial lining leads to bleeding	Decrease in progesterone and oestrogen
Follicular phase	6th-13th day	Primary follicles grow to become a fully mature Graafian follicle	Endometrium regenerates through proliferation	FSH and oestrogen increase
Ovulatory phase	14th day	The Graafian follicle ruptures, and releases the ovum (egg)	Increase in endometrial thickness	LH peak
Luteal phase	15th-28th day	Emptied Graafian follicle develops into corpus luteum	Endometrium is prepared for implantation if fertilization of egg takes place, if fertilizaiton does not occur corpus luteum degenerates, uterine wall ruptures, bleeding starts and unfertilized egg is expelled.	LH and FSH decrease, Corpus luteum produces progesterone and its level increases followed by a decline, if menstrual bleeding occurs.

VIII. Higher Order Thinking Skills (HOTS)

1. In angiosperms the pollen germinates to produce pollen tube that carries two gametes. What is the purpose of carrying two gametes when single gamete can fertilize the egg?

- Vegetative cell degenerates and the generative cell divides to form two sperms (or male gametes).
- Tip of pollen tube bursts and the two sperms enter the embryo sac.
- One sperm fuses with the egg (syngamy) and forms a diploid zygote.
- The other sperm fuses with the secondary nucleus (Triple fusion) to form the primary endosperm nucleus which is triploid in nature.
- Since two types of fusion syngamy and triple fusion take place in an embryo sac the process is termed as double fertilization.
- After triple fusion, primary endosperm nucleus develops into an endosperm.
- Endosperm provides food to the developing embryo.
- The purpose of carrying two gametes is one is to form zygote another is to form endosperm to provide food to the devloping embryo.

2. Why menstrual cycle does not take place before puberty and during pregnancy ?

- Before puberty and during development, the secretion of estrogen and progesterone are not secreted.
- So it does not form ovary.
- So menstrual does not take place before puberty and during pregnancy.

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3. Read the following passage and answer the questions that follow

Rahini and her parents were watching a television programme. An advertisement flashed on the screen which was promoting use of sanitary napkins. Rahini's parents suddenly changed the channel, but she objected to her parents and explained the need and importance of such advertisement.

a) What is first menstruation called? When does it occur ?

b) List out the napkin hygiene measures taken during menstruation .

c) Do you think that Rahini's objection towards her parents was correct? If so, Why?

a) The first menstruation is called menarche. It occurs at the age of 11 to 13 years.

b) Napkin hygiene measures are:

- The sanitary pad and tampons should be wrapped properly and discarded because they can spread infections.
- Sanitary pad or tampon should not be flushed down the toilet.
- Napkin incinerators are to be used properly for disposal of used napkins.

c) Rahini's objection is correct.

- The advertisement gives some knowledge about the napkin.
- How to use the napkin and what is the purpose of it.
- The advertisement is answers some more questions.
- It create the awareness among the females. So the object are correct.

Additional Questions

I. Choose the most suitable answer from the given four alternatives and write the option code and corresponding answer:

1. Among the following _____ is the vegetative part of plant. ★

a) root and stem b) flower and dry leaf
c) ovule and stigma d) Anther and stigma

2. Vegetative reproduction by stem is in _____ plant.

a) bryophyllum b) sweet potato
c) hibiscus d) yeast

3. _____ roots can be used for vegetative propagation.

a) Fibrous b) main
c) Tap d) Tuberous

4. Bulbil is the vegetative part in _____ plant.

a) Agave b) Asparagus c) Hydra d) strawberry

5. Spore formation is the most common method of asexual reproduction in _____

a) plants b) animals c) fungi d) None of these

6. In sexual reproduction male and female organs are needed to produce _____ ★

a) stem b) leaf c) flower d) gametes

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7. Calyx is other wise called as _____
   a) sepal b) petal c) stamen d) carpel

8. _____ is the male part of flower.
   a) sepal b) stigma c) Androecium d) Gynoecium

9. In flower each stamen consist of a stalk called _____.
   a) anther b) stigma c) style d) filament

10. In the pollen grain the intine layer is made up of _____ and cellulose.
    a) hemi cellulose b) pectin c) chitin d) starch

11. _____ is the basal part of ovule. ✶
    a) Funiculus b) Nucellus c) Chalaza d) Micropyle

12. No wastage of pollen grains occur in _____ pollination.
    a) cross b) bisexual c) self d) polar

13. The _____ flowers produce enormous amount of pollen grains.
    a) entomophilous b) anemophilous c) hydrophilous d) zoophilous

14. Approximately 80 % of the pollination, done by _____
    a) butterflies b) houseflies c) honeybees d) mosquitoes

15. Pollination by water occurs in _____ plant.
    a) grass b) vallisneria c) silk cotton tree d) mango tree

16. Pollen grain reach the stigma to form a tube like structure called _____.
    a) germ pore b) micropyle c) style d) pollen tube

17. The _____ is the male secondary sex organ. ✶
    a) fallopian tube b) vas deferens c) cervix d) vagina

18. The _____ is the female secondary sex organ.
    a) fallopian tube b) vas deferens c) epididymis d) seminal vesicle

19. Each testes is covered with a larger fibrous tissue called _____.
    a) graafian follicle b) seminiferous tubules
    c) tunica albuginea d) scrotum

20. _____ hormone initiates the process of spermatogenesis.
    a) Testosterone b) Hyaluronidase c) Estrogen d) Progesterone

21. The corona radiata is formed as _____ cells in ovum.
    a) leydig cells b) sertoli cells c) vitelline cells d) follicle cells

22. Generally boys attain puperty between the age of _____ years. ✶ ✶
    a) 13 - 14 b) 11 - 13 c) 12 - 17 d) 10 - 14

23. The process of attachment of blastocyst to the endometrium is called _____.
    a) fertilization b) blastula formation c) implantation d) gastrulation

24. _____ is the rupture of the follicle releasing the egg or ovum.
    a) Fertilization b) Implantation c) Gastrulation d) Ovulation

25. The ejection of milk is stimulated by posterior pituitary hormone _____.
    a) prolactin b) oxytocin c) progesterone c) estrogen

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26. _____ is the Urinary Tract Infection that affect both women and men.

a) cystitis b) fever
c) lephtospirosis d) AIDS

27. The inverted _____ triangle is a symbol of family planning in India.

a) blue b) green c) red d) yellow

28. _____ vegetative reproduction is found in strawberry plant.

a) Stem b) Root c) Leaf d) Bud

29. In egg apparatus the remaining two cells are called _____.

a) somatic cell b) generative cells
c) reproductive cells d) synergids

30. Sunbird pollinates flowers of _____. ★

a) canna b) hydrilla c) vallisneria d) grass.

31. The number of primordial follicles in newborn female child ranges over _____.

a) 1 million b) 2 million c) 7 million d) 300

32. The first cleavage of fertilized ovum takes place about _____ hours after fertilization.

a) 24 b) 48 c) 30 d) 15

33. During pregnancy the uterus expands upto _____ times of its normal size.

a) 500 b) 2 c) 100 d) 50

34. _____ is the method of permanent birth control.

a) Cervical cap b) Hormonal methods
c) Copper. T. d) Surgical methods

Ans:

1.	a) root and stem	18.	a) fallopian tube
2.	c) Hibiscus	19.	c) tunica albuginea
3.	d) Tuberous	20.	a) Testosteroane
4.	a) Agave	21.	d) follicle cells
5.	c) fungi	22.	a) 13 - 14
6.	d) gametes	23.	c) implantation
7.	a) sepal	24.	d) ovulation
8.	c) Androecium	25.	b) oxytocin
9.	d) Filament	26.	a) cystitis
10.	b) pectin	27.	c) red
11.	c) Chalaza	28.	a) Stem
12.	c) self	29.	d) Synergids
13.	b) anemophilous	30.	a) Canna
14.	c) honeybees	31.	c) 7 million
15.	b) vallisneria	32.	c) 30
16.	d) pollen tube	33.	a) 500
17.	b) vas deferens	34.	d) Surgical methods.

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II. Fill in the blanks

1. _____ reproduction may takes place through leaf, stem and root.
2. In filamentous algae breaking of the filament into many fragments is called _____
3. _____ takes place by specialized mass of cells in planaria.
4. Asexual reproduction occurs by _____ formation.
5. During spore formation _____ develops from the fungal hypha.
6. A _____ is a reproductive organ of a flowering plant.
7. _____ consists of stamens in a flower.
8. _____ is a female part of flower.
9. In the pollen grains hard outer layer is known as _____.
10. Self pollination is otherwise called as _____.
11. Pollination by water is called as _____.
12. _____ pollinate flowers of silk cotton tree.
13. After triple fusion primary endosperm nucleus develops into an _____. ✶
14. The _____ enlarges and develops into a fruit in post fertilization time.
15. The process of spermatogenesis takes place in the _____.
16. Man will produce over _____ billion sperms in their life time. ✶
17. The formation of ova is called as _____.
18. The _____ gives energy for the movement of tail in sperm.
19. The menstrual cycle contains _____ phases.
20. The graafian follicle rupture and releases the ovum during _____ phase.
21. _____ is a periodical phenomena that continuous from puberty to menopause.
22. Lack of menstruation generally indicates _____.
23. The _____ is a fertilized ovum.
24. A cord containing blood vessel that connects the placenta with the foetus is called _____.
25. Gestation period of human last for about _____ days.
26. Milk production from alveoli of mammary glands is stimulated by _____. ✶
27. In India nation wide family planning programme is launched in _____.
28. _____ prevents deposition of sperms in the vagina.

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Ans:

1.	vegetative	2.	fragmentation
3.	regeneration	4.	spore
5.	sporangium	6.	flower
7.	androecium	8.	gynoecium
9.	excine	10.	autogamy
11.	hydrophily	12.	squirrels
13.	endosperm	14.	ovary
15.	seminiferous tubules	16.	500
17.	oogenesis	18.	mitochondria
19.	four	20.	ovulatory
21.	menstruation	22.	pregnancy
23.	zygote	24.	umblical cord
25.	280	26.	prolaction
27.	1952	28.	condom

III. Match the following

A.

Column I Vegetative part		Column II Organism	
1) Leaves	-	a) Strawberry	(c)
2) Stems	-	b) Agave	(a)
3) Root	-	c) Bryophyllum	(d)
4) Bulbils	-	d) Sweet potato	(b)

B.

Column I		Column II	
1) Calyx	-	a) Stamen	(d)
2) Corolla	-	b) Carpel	(c)
3) Androecisum	-	c) Petal	(a)
4) Gynoecium	-	d) Sepal	(b)

C.

Column I		Column II	
1) Self pollination	-	a) Apple	(c)
2) Cross pollination	-	b) Prostate gland	(a)
3) Male accessory organ	-	c) Hibiscus	(b)
4) Female accessory organ	-	d) Uterus	(d)

D.

Column I		Column II	
1) Anemophily	-	a) Honey bee	(d)
2) Entomophily	-	b) Vallisneria	(a)
3) Hydrophily	-	c) Squirrels	(b)
4) Zoophily	-	d) Grasses	(c)

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E.

Column I	Column II	
1) Spermatozoa	- a) Copper-T	(c)
2) Ovum	- b) Family planning	(d)
3) Intra uterine device	- c) Acrosome	(a)
4) Inverted red triangle	- d) Zona pellucida	(b)

IV. Assertion and Reason

Answer the following questions using the data given below.

i) A and R are correct, R explains the A.
ii) A is correct, R is wrong.
iii) A is wrong, R is correct.
iv) A and R are correct, R doesn't explains A.

1. **Assertion:** Bryophyllum is a best example of vegetative reproduction.
Reason: In Bryophllum small plants grow at the leaf notches.
Ans: i) A and R are correct, R explains the A.

2. **Assertion:** Androecium and gynoecium are the essential part of the flower.
Reason: Androecium and gynoecium take part directly in reproducion.
Ans: i) A and R are correct, R explains the A.

3. **Assertion:** Self pollination as known as autogamy.
Reason: Transfer of pollen from anther to stigma of a flower on to another plant.
Ans: iv)A and R are correct, R doesn't explains A.

4. **Assertion:** Insect pollination is called anemophilly.
Reason: Pollen grains are produced in large number.
Ans: iii)A is wrong, R is correct.

5. **Assertion:** The secondary sex organs are involved in the development of foetus.
Reason: The process of spermatogenesis takes place in the seminiferous tubulus.
Ans: i)A and R are correct, R explains the A.

V. Answer in a word or sentence

1. **Which type of reproduction takes place in planaria?**
Vegetative reproduction - regeneration.

2. **Which type of cell division is involved in asexual reproduction?**
Mitotic cell division.

3. **What is a flower?**
Modified shoot with limited growth.

4. **The seeds which are produced as a result of self pollination are weak in nature. Why?**
Because the endosperm is minute.

5. **What are the adaptations found in the flowers to attract insects for cross pollination?**
To attract insects the flowers are brightly coloured, with smell and nectar.

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6. What is known as Gametogenesis?
The formation of **sperm** in **male** and the **ovum** in **female** is called gametogenesis.

7. Where is the perivitelline space situated?
The fluid filled space between Zona pellucida and the surface of egg is called perivitelline space.

8. What are the hormones that control the secretion of both male and female hormones?
The secretion of both male and female hormones are controlled by the **pituitary gonadotropins** luteinizing hormone (L.H) and follicle stimulating hormone (FSH)

9. What is known as menarche?
In females the **onset of puberty** is called menarche.

10. What is called menopause?
The menstrual cycle ceases in female around **48-50 years** and this stage is called menopause.

11. Define 'Ovulation'. ✶ ✶
Ovulation is the rupture of the follicle releasing the egg or ovum.

12. What is the name of the cord containing blood vessels that connects the placenta with the foetus?
Umbilical cord

13. What is population explosion?
Population explosion is defined as the **sudden and rapid rise** in the size of population.

14. Which micro organism causes cystitis or bladder infection?
Bacteria

15. What is called lactation? ✶
The process of milk production **after child birth** from mammary glands of the mother is called lactation.

16. What are the actions taken by National Health programmes?
- Family Welfare Programme
- Reproductive and Child Health Care (RCH) programme.

VI. Short answer questions.

1. Identify the follows with their type of reproduction.
I-Algae, II-Amoeba, III-Yeast, IV-Hydra
- Algae – fragmentation
- Amoeba – fission
- Yeast – budding
- Hydra – budding, regeneration.

2. What is fragmentation? Give one example. ✶
- In filamentous algae, breaking of the **filament** into **many fragments** is called fragmentation.
- Each fragment having atleast one cell, may give rise to a new filament of the algae by cell division e.g. Spirogyra.

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3. What is regeneration? Give an example.

- The ability of the lost body parts of an individual organism to give rise to a whole new organism is called regeneration.
- It takes place by **specialized mass of cells.** e.g *Hydra and Planaria.*

4. List the parts of flower.

- Calyx – consisting of sepals
- Corolla – consisting of petals
- Androecium – consisting of stamens
- Gynoecium – consisting of carpels

5. Define - Androecium.

- Androecium, the **male part** of flower is composed of **stamens.**
- Each stamen consists of a stalk called the **filament** and a small bag like structure called **anther** at the tip.
- The pollen grains are produced in the anther within the pollen sac.

6. Define - Pollination.

The transfer of pollen grains from **anther to stigma** of a flower is called as pollination.

7. Give the importance of pollination.

- It results in fertilization which leads to the formation of fruits and seed.
- New varieties of plants are formed through new combination of genes in case of cross pollination.

8. Mention the post fertilization changes.

- The **ovule** develops into a seed.
- The **integuments** of the ovule develop into the seed coat.
- The ovary enlarges and develops into a fruit.

9. Mention the significance of fertilization.

- It **stimulates** the ovary to develop into fruit.
- It helps in development of new characters from two different individuals.

10. List out the male and female accessory sex organs. ✶

Male:

- Vas deferens, epididymis, seminal vesicle, prostate gland and penis.

Female:

- Fallopian tubes, uterus, cervix and vagina.

11. What are the function of accessory sex organs. ✶

It is involved in the:

- Process of ovulation
- Fusion of the male and female gametes (fertilization)
- Division of the fertilized egg upto the formation of embryo
- Pregnancy
- Development of foetus
- Child birth

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12. Define - Puberty. ✶

The reproductive system in both males and females becomes functional with an increase in sex **hormone production** resulting in puberty.

13. List out phases of menstrual cycle.

The menstrual cycle consists of 4 phases.

- Menstrual or Destructive phase.
- Follicular or Proliferative Phase
- Ovulatory Phase
- Luteal or Secretory Phase

14. Define - Menstruation. ✶

- Menstruation is a **periodical phenomenon** that continues from puberty to menopause.
- This will happen if the released ovum is **not fertilized** by the sperm.
- **Lack** of **menstruation** generally indicates pregnancy.

15. What is implantation?

- The **blastocyst** (fertilized egg) reaches the uterus and gets implanted in the uterus.
- The process of attachment of the blastocyst to the uterine wall (**endometrium**) is called implantation.
- The fertilized egg becomes implanted in about **6 to 7 days** after fertilization.

16. What is gestation?

- It is the time period during which the **embryo** attains its development in the uterus.
- Normally gestation period of human lasts for about **280 days.**
- During pregnancy the uterus expands upto **500 times** its normal size.

17. What is parturition? ✶

- Parturition is the **expulsion** of young one from the mother's uterus at the end of gestation.
- **Oxytocin** from the posterior pituitary stimulates the **uterine contractions** and provides force to expel the baby from the uterus, causing birth.

18. Give the methods followed in contraception.

- Barrier methods
- Hormonal methods
- Intra-Uterine Devices (IUDs)
- Surgical methods

19. What is vasectomy and tubectomy?

- Surgical contraception or sterilization techniques are terminal methods to prevent any pregnancy.
- This procedure in males is **vasectomy (ligation of vas deferens)** and in females it is **tubectomy (ligation of fallopian tube)**.
- These are methods of permanent birth control.

20. Give the measures of toilet hygiene.

- The floors of the toilet should be maintained clean and dry.

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- This helps to reduce the bad odour and also infection.
- Toilet flush handles, door knobs, faucets, paper towel dispensers, light switches and walls should be cleaned with disinfectants to kill harmful germs and bacteria.
- Hands should be washed thoroughly with soap before and after toilet use.

21. Write few words about napkin hygiene.

- The sanitary pad and tampons should be wrapped properly and discarded because they can spread infections.
- Sanitary pad or tampon should not be flushed down the toilet.
- Napkin incinerators are to be used properly for disposal of used napkins.

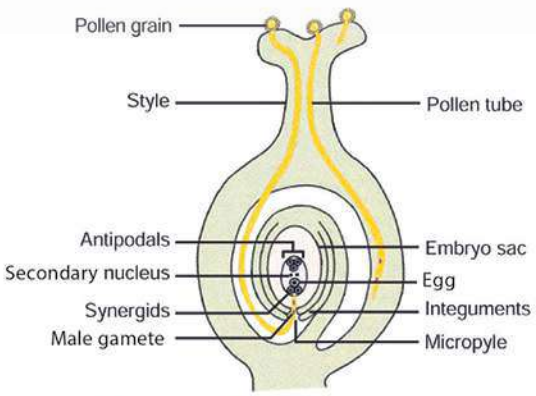
22. Define – menstrual cycle.

The cyclic events that take place in a rhythmic fashion during the reproductive period of a woman's life is called menstrual cycle.

VII. Long answer questions

1. Describe fertilization in plants with diagram.

- Pollen grains reach the right stigma and begin to germinate.
- Pollen grain forms a **small tube-like** structure called pollen tube which emerges through the germ pore. The contents of the pollen grain move into the tube.
- Pollen tube grows through the tissues of the stigma and style and finally reaches the ovule through the micropyle.
- Vegetative cell degenerates and the generative cell divides to form two sperms (or male gametes).
- Tip of pollen tube bursts and the two sperms enter the embryo sac.



Process of Fertilization

- One sperm fuses with the egg (syngamy) and forms a **diploid** zygote.
- The other sperm fuses with the secondary nucleus (Triple fusion) to form the primary endosperm nucleus which is triploid in nature.
- Since two types of fusion syngamy and triple fusion take place in an embryo sac the process is termed as double fertilization.
- After triple fusion, primary endosperm nucleus develops into an endosperm.
- Endosperm **provides food** to the developing embryo.
- Later the synergids and antipodal cells degenerate.

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2. Describe the types of pollination and write its advantages and disadvantages. ★

Self-pollination (Autogamy)

- Self-pollination is also known as **autogamy**.
- The transfer of pollen grains from the **anther to the stigma** of same flower or another flower borne on the same plant is known as self pollination. e.g. Hibiscus.

Advantages of self-pollination

- Self-pollination is possible in certain bisexual flowers.
- Flowers do not depend on agents for pollination.
- There is no wastage of pollen grains.

Disadvantages of self-pollination

- The seeds are less in numbers.
- The endosperm is minute. Therefore, the seeds produce weak plants.
- New varieties of plants cannot be produced.

Cross pollination

Cross-pollination is the transfer of pollen from the anthers of a flower to the stigma of a flower on another plant of the same species e.g. apples, grapes, plum, etc.

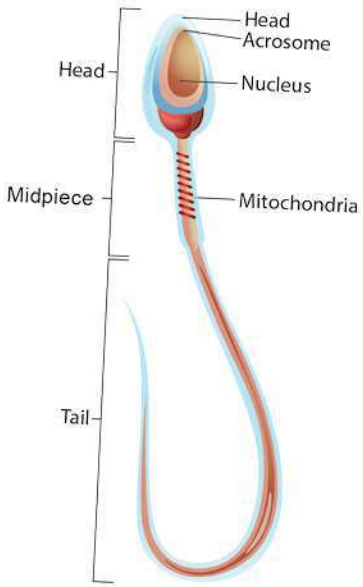
Advantages of cross pollination

- The seeds produced as a result of cross pollination, develop and germinate properly and grow into better plants, i.e. cross pollination leads to the production of new varieties.
- More viable seeds are produced.

Disadvantages of cross-pollination

- Pollination may fail due to distance barrier.
- More wastage of pollen grains.
- It may introduce some unwanted characters.
- Flowers depend on the external agencies for pollination.

3. Describe the structure of human sperm. ★



Structure of sperm

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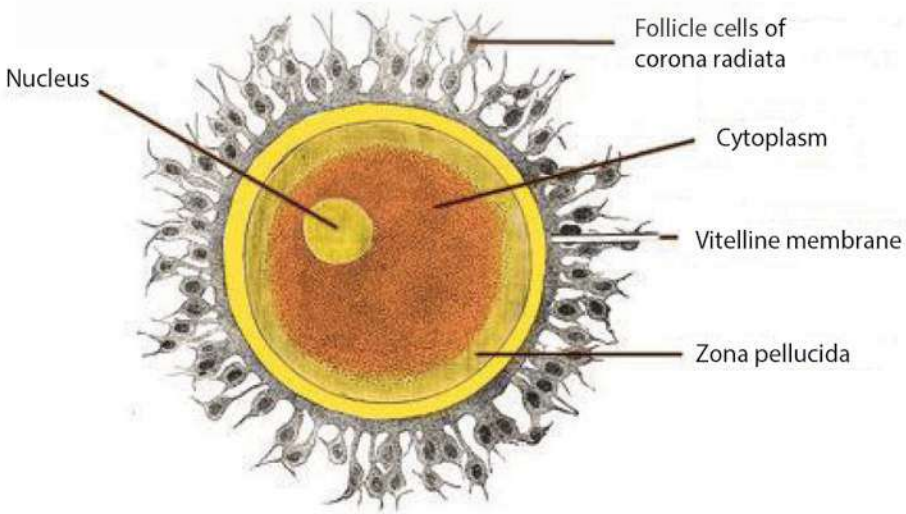
- The **spermatozoan** consists of head, a middle piece and tail.
- The sperm head is elongated and formed by the condensation of nucleus.
- The anterior portion has a cap like structure called acrosome.
- It contains hyaluronidase an enzyme that helps the sperm to enter the ovum during fertilization.
- A short neck connects the head and middle piece which comprises the centrioles.
- The middle piece contains the mitochondria which provides energy for the movement of tail.
- It brings about sperm motility which is essential for fertilization.

4. Describe the structure of ovum with diagram.

- The mature **ovum or egg** is spherical in shape.
- The ovum is almost free of yolk.
- It contains abundant cytoplasm and the nucleus.
- The ovum is surrounded by three membranes.
- The **plasma membrane** is surrounded by inner thin **zona pellucida** and an outer thick **corona radiata.**
- The corona radiata is formed of **follicle cells.**
- The membrane forming the surface layer of the ovum is called **vitelline membrane**.
- The fluid-filled space between zona pellucida and the surface of the egg is called **perivitelline space.**



Structure of ovum

5. Desribe about contraception and its methods. ★

- Contraception is one of the best **birth control measures**.
- A number of techniques or methods have been developed to prevent pregnancies in women.
- The devices used for contraception are called **contraceptive devices**.

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Common contraceptive methods used to prevent pregnancy are discussed here.

- Barrier methods
- Hormonal methods
- Intra-Uterine Devices (IUDs)
- Surgical methods

Barrier Methods

- This method prevents sperms from meeting the ovum.
- Its entry into the female reproductive tract is prevented by barrier.

(a) Condom:

- Condom prevents **deposition of sperms** in the vagina.
- Condoms are made of thin rubber or latex sheath.
- Condom also protect against sexually transmitted diseases (STD) like syphilis, AIDS.

(b) Diaphragm (Cervical cap):

- Vaginal diaphragm fitting into the vagina or a cervical cap fitting over the cervix.
- This prevents the entry of sperms into the uterus.

Hormonal Methods

- Hormonal preparations are in the form of **pills** or **tablets** (contraceptive pills).
- These hormones stop (**interfere with ovulation**) the release of egg from the ovary.

Intra-Uterine Devices (IUDs)

- The intrauterine device (IUD) are **contraceptive devices** inserted into the uterus.
- There are two synthetic devices commonly used in India are Lippe's Loop and Copper-T made of copper and plastic (non irritant).
- This can remain for a period of 3 years.
- This reduces the sperm fertilizing capacity and prevents implantation.
- This also helps to give adequate time interval between pregnancies.

Surgical Methods

- Surgical contraception or sterilization techniques are terminal methods to prevent any pregnancy.
- This procedure in males is **vasectomy** (ligation of vas deferens) and in females it is **tubectomy** (ligation of fallopian tube).
- These are methods of permanent birth control.

6. Write notes on Cleavage and formation of Blastula:

- The first cleavage takes place about **30 hours** after fertilization.
- Cleavage is a series of rapid mitotic divisions of the zygote to form many celled blastula (Blastocyst) which comprises an outer layer of smaller cells and inner mass of larger cells.

Implantation:

- The blastocyst (fertilized egg) reaches the uterus and gets implanted in the uterus.
- The process of attachment of the blastocyst to the uterine wall (endometrium) is called implantation.
- The fertilized egg becomes implanted in about 6 to 7 days after fertilization.

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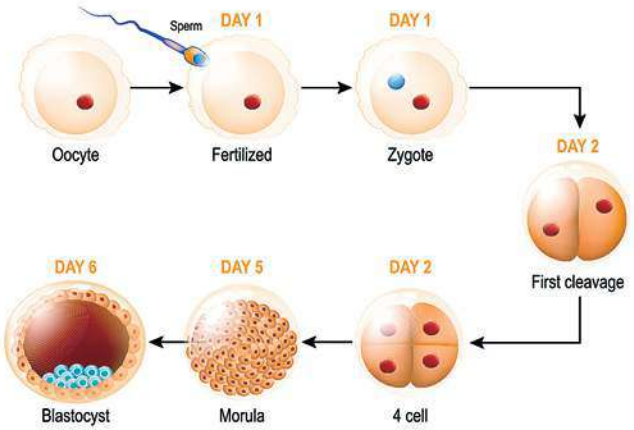
Gastrulation:

- The transformation of **blastula into gastrula** and the formation of primary germ layers (ectoderm, mesoderm and endoderm) by rearrangement of the cells is called gastrulation.
- This takes place after the process of implantation.



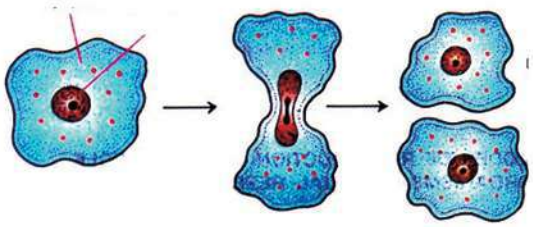
Developmental stages of zygote fromcleavage to blastocyst formation

Organogenesis:

- The establishment of the germ layers namely ectoderm, mesoderm and endoderm initiates the final phase of embryonic development.
- During organogenesis the various organs of the foetus are established from the different germ layers attaining a functional state.

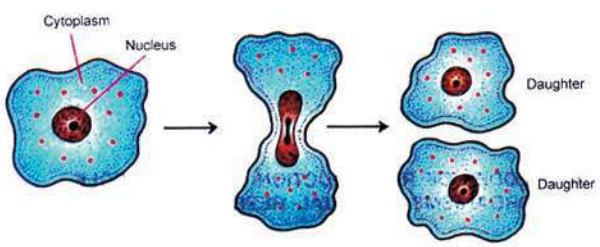
VIII. Label the parts

1. Redraw the diagram and label the parts.



Fission in Amoeba without parts

Ans:



Fission in amoeba with parts

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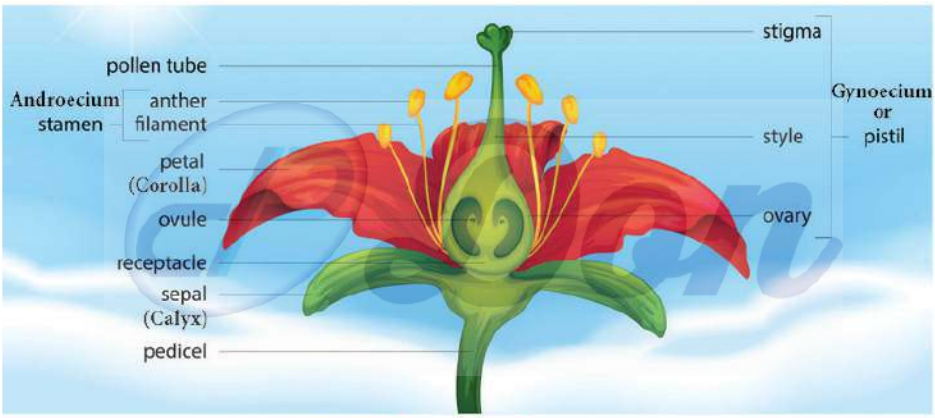
2. Redraw the diagram and label the parts (any four parts)

Parts of a flower without parts

Ans:



Parts of a flower with parts

3. Redraw the diagram and label the parts (stigma, style, ovary, female gamete)

Gynoecium without parts

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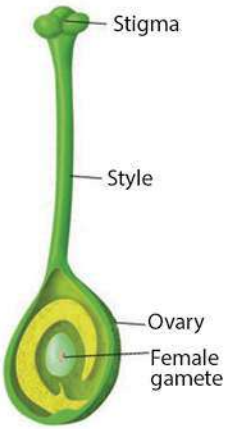
Ans:



Gynoecium with parts

IX. Higher Order Thinking Skills (HOTS)

1. **In some houses a leaf is tied with a thread and is hung from the windows door. How is it possible? Tell the name of the plant.**
   - The name of the plant is Bryophyllum.
   - The Bryophyllum reproduction takes through leaves of the plant.
   - This reproduction is the type of vegetative reproduction
   - The leaves have small plants that grow at the leaf notches. If can take water from the atomosphere.
2. **In a flower A is green colour. Part A is covered the basal part of 'B'. B is colourfull. The innerside the essential part C and D is present. Part C is the male part and D is the female part. Identify A, B, C and D.**
   - A is Calyx (sepal)
   - B is Corolla (petals)
   - C is Androecium
   - D is Gynoecium.
3. **How does identical and non identical twins develope?**
   - Sometimes ovaries releases two eggs and each is fertilized by a different sperm, resulting in non identical twins.
   - If a single egg is fertilised and then divided into two foetus, identical twins developed.

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Unit Test - 17

Reproduction in Plants and Animals

Time : 1 hr | Marks : 30

I. Choose the most suitable answer and write the code with the corresponding answer. 5 × 1 = 5

1. Asexual reproduction takes place through budding in _____ .
   a) Amoeba b) Yeast
   c) Plasmodium d) Bacteria
2. Syngamy results in the formation of _____ .
   a) Zoospores b) Conidia
   c) Zygote d) Chlamydospores
3. Vegetative reproduction by stem is in _____ plant.
   a) Bryophyllum b) sweet potato
   c) Hibiscus d) yeast
4. In sexual reproduction male and female organs are needed to produce _____
   a) stem b) leaf c) flower d) gametes
5. _____ is the male part of flower.
   a) sepal b) stigma c) Androecium d) Gynoecium

II. Answer the following questions in one or two lines. 5 × 2 = 10

1. Why is vegetative propagation practiced for growing some type of plants?
2. Define triple fusion.
3. Name the secondary sex organs in male
4. What is colostrum? How is milk production hormonally regulated ?
5. How can menstrual hygiene be maintained during menstrual days?

III. Answer the following questions in brief. 2 × 4 = 8

1. With a neat labelled diagram describe the parts of a typical angiospermic ovule.
2. Why menstrual cycle does not take place before puberty and during pregnancy ?

IV. Answer the following questions in detail. 1 × 7 = 7

1. i) Desribe about contraception and its methods.
   ii) Describe the structure of ovum with diagram.

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