

Chapter Three : *Reproduction in living organism*

“Part one”

Choose the correct answer:-

- 1- Embryonic sac in plants is formed from cells contain..... (N - 2N-3N-0.5N)
- 2- Plasmodium malaria produce merozoites by.....
(Sexual reproduction – **shizogony** - sporogony - regeneration)
- 3 - The smallest egg cell in size is the egg cell of
(Crocodile - **tiger** – duck – ant insect)
- 4- Ciliated sperms in Polypodium
(in sori - produced by meiosis – **produced by mitosis** –produced in Archegonium)
- 5- The no. of floral parts that don't share in pomegranate fruit(**1** - 2 - 3 - A)
- 6- organisms are with internal fertilization and external development.
(Amphibians - **Reptiles** - Mammalia - none of them)
- 7- Sexual reproduction in honey bee produces
(**Females only**- males only - male or female - sometimes males and females)
- 8- Crossing between two closely related plants, the cells of the first one contain 28 chromosomes and the cells of the other contain 14 chromosomes, the no. of chromosome in the resulting plant will be (**21** -42 -35 - 60)
- 9- In the life cycle of Adiantum, which of the following divides by meiosis to produce haploid cells?(Zygote -Archegonia – Gametophyte- **Sporophyte**)
- 10- No. of chromosomes in the generative nucleus of pollen grain equals the no. of chromosomes in.....(Endosperm nucleus –**antipodal cells** - embryo cells)
- 11- The no. of spore mother cells which produce 20 microspores is (10-20-80-**5**)
- 12- Meiosis happens before fertilization in all the following except.....
(Mammals - Fern plants – **Plasmodium**- female honeybee)
- 13- External fertilization and internal embryonic development happens in
(Bony fish - reptiles - birds –**test tube baby**)

- 14- Which of the following reproduce by spores?
(Bread mold - Adiantum - Algae – **all the previous**)
- 15- The calyx share in fruit formation in (Orange – **egg plant**– apple -onion)
- 16- Pollen grains are produced by.....
(Only mitosis- only meiosis - mitosis followed by meiosis- **meiosis followed by mitosis**)
- 17- In Adiantum, male gametes are formed inside organs called.....
(Archegonia - **antheridium** - androecium - sori).
- 18- Spores in fern are(tetraploid –triploid - diploid -**haploid**)
- 19- Fertilization is completed in petunia flower in the.....
(Stigma -micropyle -style –**embryonic sac**)
- 20- Yeast fungus reproducesby under unsuitable conditions.
(**Conjugation** – budding - gametes - sporogony)
- 21- Females of honeybee grow to queens and workers according to.....
(Chromosomal number -temperature -amount of light – **Type of food**)
- 22- is asexual reproduction that happens in unicellular organisms only.
(Regeneration -Parthenogenesis –**Binary fission** - Budding)
- 23- Incubation period of plasmodium malaria happens in cells.
(**Human liver** - human RBC -female Anopheles stomach -anopheles salivary glands)
- 24- Germination of pollen grain happens.....
(in anther- in ovary- **on stigma**- in style)
- 25- All the following organisms produce zygote except.....
(Adiantum –**Amoeba** - Spirogyra Plasmodium)
- 26- Tomato seeds are.....
(**mature ovule** - mature ovary -mature egg cell - mature zygote)
- 27-In triple fusion, polar nuclei fuse with.....
(Tube nucleus – **male nucleus** -generative nucleus -endospermic nucleus)
- 28- Flowers of beans are..... (Solitary apical -solitary axial -**inflorescence**)
- 29-transfer food to the ovule (micropyle-**funicle**-style- filament)
- 30-is an example of endospermic seeds (**wheat**- pea-beans -none of them)

- 31- If the no. of chromosomes in generative nucleus is X, the no. of chromosomes in tube nucleus is..... (2X-3X-X-0.5X)
- 32- Stages which produced from asexual reproduction of plasmodium in anopheles mosquito are..... (Merozoites –gametocytes-sporozoites -Oocyst)
- 33- Parthenogenesis happens in all the following except.....
(Worms- Crustacea - sponge- insects)
- 34- The no. of male nuclei in pollen grains that can produce from 4 spore mother cells
(4-8-16-32)
- 35- In the life cycle of plasmodium malaria, zygote is converted to ookinete that penetrate stomach wall to produce.....
(Sporozoites - oocyst - merozoites - gametocytes)
- 36- Organisms produced from parthenogenesis in honeybee are.....
(Drones - queen - worker- any of the previous)
- 37- During life cycle of fern plants, 2N is formed.
(Gametophyte -spores -gametes -sporophyte)
- 38- All the following produce gametes by mitosis except.....
(Gametophyte -male honeybee –female honeybee -aphid insects)
- 39- The chromosomal no, of egg cell of aphid insect..... (N -2N -3N-0.5N)
- 40- Floral whorl that consists of one carpel or more is called
(Calyx - corolla – gynoecium - archeonium)
- 41- Tube that connects between stigma and ovary is called.....
(Filament- style - pollen tube - funicle)
- 42- Incomplete flowers consists of..... floral whorl. (2-3–4-5)
- 43- Plasmodium zygote is produced in.....
(Human liver -human RBC -salivary glands of anopheles -Stomach of anopheles)
44. The reproductive capacity differ between the lion and the rat according to
(dangers – size - age – all the previous)

45. The main target (aim) from the surrounding of the Amoeba to itself by a chitinous sheath is
- (production of large number of small amoebae – the mitotic division of the Amoeba – **protection of the Amoeba from the unfavorable condition** – all the previous)
46. Production of new individuals from cells of the same type is called.....
- (parthenogenesis – renucleation – polyploidy – **tissue culture**)
47. The male sperm of the honey bee contains.....
- (Half the no. of the chromosomes of its somatic cell – **the same no. of chromosomes of its somatic cells** – double the no. of chromosomes of its somatic cell)
48. The females in honey bee are developed from the eggs which produced from.....
- (unfertilized worker – unfertilized queen – fertilized worker – **fertilized queen**)
49. The drones in honey bee are produced from
- (Fertilized workers – unfertilized workers – fertilized queen – **unfertilized queen**)
50. The spirogyra algae reproduce asexually in
- (change in water temperature – change in water purity – change in water temperature and purity – **purity of water and abundance of oxygen**)
51. The zygote differs from the zygospore in
- (the chromosomal number – **thickness of the surrounding wall** – type of conjugation – the chromosomal number and the thickness of the surrounding wall)
52. In unicellular organisms, budding isn't considered as binary fission due to:.....
- (number of offspring is great – **size of the resulting cells is unequal** – resulting cells are equal in size – number of the resulting cells is limited).
53. Alternation of generation takes place in these organisms except
- (Bilharzia – ferns – plasmodium – **flowering plants**).
54. All of the following are advantages of asexual reproduction except the
- a-new organisms are resemble the parents.**
- b-production of a great number of individuals.
- c-production of individuals in short time.
- d-new generations are able to tolerate the hard conditions.

55. The cells of spirogyra containthe number of chromosomes in the zygote.
(triple – double – same – **half**)
56. The receptacle share in fruit formation in.....(Pea – date – **apple** – tobacco)
57. calyx and stamens remain with the fruit in
- (Egg plant – **pomegranate** – marrow – dates)
58. The unisexual (incomplete) flowers consists of Whorls. (2 – **3** – 4 – 5)
59. From the ex-endospermic seeds is.....(Maize – wheat – **pea** – date)
60. Some plants such as banana & pine apple, naturally form seedless fruits by
- (**parthenocarpy** – spraying flower with insecticide – the absence of the flower formation – none of the above)
61. The flower functions include all of the following except :
- a- the formation of pollen grains and ovules
 - b- the production of fruits and seeds
 - c- the production of buds**
 - d- the occurrence of pollination and fertilization
62. After the fusion between one male nucleus with the nucleus of egg cell,nucleus is formed. (Endospermic – embryo sac – **zygote** – spore)
63. The reproduction of plasmodium malaria to produce merozoites occurs by :
(Binary fission – **fragmentation** – sporulation – regeneration)
64. An example of endospermic seed is: (beans – peas- **wheat** – lentil)
65. Sporogony takes place in all of the following organisms except :
- (adiantum – plasmodium – mushroom – **hydra**)
66. Some of the algae can reproduce by:.....
- (conjugation – sporogony – binary fission – **all of the above**)
67. The number of the pollen grains which are resulted from the division of 3 spore mother cells in a plant anther are (6 – 9 – **12** – 15)
68. If the number of chromosomes in the generative nucleus is X, so the number of chromosomes in the tube nucleus will be (0.5X – **X** – 2X – 3X)

69. If the number of chromosomes in the pea plant cell is 7 pairs of chromosomes, so the number of chromosomes in the embryo of the plant will be
(7 – 14 pairs – 21 – **14**)
70. The number of nuclei which share in the formation of the wheat grain
(2 – 3 – 4 – **5**)
71. If the number of the chromosomes in endosperm cells of the maize grain is 33 chromosomes, so the number of chromosomes in the embryo of this grain will be...
(11 – **11 pairs** – 33 – 22 pairs)
72. In early maleness hermaphrodite flowers, the plant depends on self-pollination.
a- The two statements are true and there is a relation between them.
b- The two statements are true and there is no relation between them.
c- The first statement is true while the second is false.
d- The two statements are false.
73. The no. of cells which degenerate after the fertilization of the ovule in the plant
(2 – 3 – 4 – **5**)
74. The no. of cells which degenerate during the maturation of the ovule in the plant is
(2 - **3** - 4 - 5)
75. The number of the ovules in ovary of apricot flower is (**1** – 2 – 3 – many)
76. The number of pollen grains required for the formation of one pea fruit containing five seeds is /are (1 – 3 – **5** – 6)
77. The number of the pollen grains required for the fertilization of the mango fruit is / are..... (**1** – 2 – 3 – 4)
78. If the nucleus of a plant cell contains 30 chromosomes, the endospermic nucleus of the same plant contains chromosomes. (15- 60- **45**- 30)
79. the gametes of plasmodium malaria are formed in.....
(**mosquito's stomach** – mosquito's salivary glands – blood of the infected individual – liver of the infected individual)
80. The edible part of the apple fruit is (Stamen – ovary – carpel – **receptacle**)

92. The biological cost is higher in case of the
(binary fission – **conjugation** – sporogony – budding)
93. The biological variation is greater in case of the reproduction by
(spores – **gametes** – tissue culture – repeated binary fission)
94. If the number of chromosomes in the nucleus of the Oocyst is X, so the number of chromosomes in the nucleus of the merozoite will be (0.5X – **X** – 2X – 3X)
95. In which of the following cases the number of chromosomes is reduced to the half.....
a- during the production of the ova in the bee to drones.
b- during the production of the ova in the aphid.
c- After the zygote formation in the spirogyra.
d- After the zygote formation in the polypodium.
96. The conjugation in spirogyra depends on the occurrence of
(meiosis division only – **meiosis division followed by mitosis division** – mitosis division only – mitosis division followed by meiosis)
97. The pollen grain are formed in the anthers as a result of
(meiosis division only – **meiosis division followed by mitosis division** – mitosis division only – mitosis division followed by meiosis)
98. All the following are haploid except.....
(**Ovum of aphid** - ovum of human - somatic cells of male honeybee- ovum of bee)
99. Amoeba surrounds itself with chitinous coat to.....
(Divide by mitosis–new amoeba - **Protect itself from hard conditions** - all the previous)
100. Algae can reproduce by.....
(Conjugation - sporogony -binary fission - **all the pervious**),
101. The biggest - sized egg cell is the egg cell of(Elephant-**bird** - human - lion)
102. After fertilization, the leaflets of corolla may remain in
(Eggplant - dates - pomegranate – **marrow**)
103. Each of the following organisms reproduce by regeneration except.....
(**Crustacean** - sponge - some worms - sea star)

104. The no. of antipodal cells produced in 10 ovules is (10-20-**30**-40)
105. One of asexual reproduction that causes variation in individuals is.....
(Sporogony - **parthenogenesis**- tissue culture - binary fission)
106. If the chromosomal number in the endosperm of rice is 36, the no. of chromosomes in the embryo will be (**12 pairs** - 12- 36-24 pairs)
107. The no. of pollen grains required for fertilization of olive ovary is.....(**1**-2-3-4)
108. The infective stage of plasmodium malaria to human RBCS is
(Sporozoites - **merozoites** - gametophytes - oocyst)
109. Spirogyra reproduces asexually by mitosis in the case of.....
(Change in water purity -dryness - change in water temp.- **high oxygen and purity**)
110. Organisms regain (restore) their diploid nature by.....
(Mitosis – meiosis-**fertilization**- pollination)
111. Ovule in plant is formed by.....
(Mitosis only -meiosis only -mitosis then meiosis –**meiosis then mitosis.**)
112. Budding in unicellular organisms is not considered as binary fission because.....
(No. of offspring is large - **size of resulting cells are unequal** - No. of offspring is limited)
113. After fertilization, the two integuments harden to produce
(Fruit – **testa**-micropyle-2 cotyledons)
114. The infective stage of plasmodium malaria is formed in.....
(Patient blood -stomach cavity of anopheles mosquitoes-salivary gland anopheles mosquitoes - **stomach wall of anopheles mosquitoes**)
115. If the no. of DNA molecules in the sperm of male honeybee is X, the no. of DNA in its brain will be..... (2X – 0.5X -**X**-3X)
116. If the no. of DNA molecules in the ovum of female honeybee is X, the no. of DNA in its brain will be..... (**2X** – 0.5X -X-3X)
117. are produced by meiosis then mitosis of spore mother cell.
(Human ova - sperms of honeybee- Polypodium egg cell -**plant ovule**)
118. Egg cells which devoid of yolk are produced by.....
(Reptiles - **mammals**- Amphibians-birds)

119. All the following gonads produce gametes by mitosis except.....
(Archegonia-**ovary of human female**-ovary aphid -testis of honey drone)
120. The no. of antipodal cells produced in 10 ovules is.....(10-20-**30**-40)
121. The infective stage of plasmodium malaria is found in.....
(Patient blood -human liver - **salivary gland anopheles mosquitoes**- stomach wall of anopheles mosquitoes)
122. Hormones that stimulate conversion of the ovary to fruit is secreted from.....
(Pollen grain -**ovary** - receptacle-stigma)
123. Conversion of the ovary to fruit without fertilization is called
(False fruit -seedless fruit --**parthenocarpy** -tissue culture)
124. The total no. of chromosomes in the mature pollen grains is
(N - **2N**- 3N - 6N)
125. Process (es) that stimulate conversion of ovary to fruit.
(Fertilization - **pollination** - fertilization and pollination- triple fusion)
126. Onion flower is.....
a. Typical flower that contains calyx and corolla
b. **typical flower that contains perianth**
c. incomplete flower that contains calyx and corolla
d. incomplete flower that contains perianth)
127. All the following are typical flowers except.....(Bean -apple -onion -**palm**)
128. In sexual reproduction, The ovum of the aphid insect contains.....number of chromosomes in aphid somatic cell. (**same** – double – half – quarter)

Write the scientific term:-

- 1- The dominant stage in the life cycle of Polypodium (fern plants).
(Stage in the life cycle of Polypodium where meiosis happens)
(Stage in the life cycle of Polypodium where asexual reproduction followed by meiosis)
(Sporophyte)
- 2- Haploid stage in the life cycle of fern plant that produces reproductive organs.
(Stage in the life cycle of fern plant that divide by mitosis to produce gametes)
(Organism in which sexual reproduction depends on meiosis)
(Gametophyte)
- 3- The male organ in Polypodium plant (Organs that produce ciliated sperms)
(Plant reproductive organ that produces male gametes by mitosis only)
(Antheridium)
- 4- The female organ in Adiantum (Site of occurrence of fertilization in fern plant)
(Site of formation of female gamete in Adiantum plant)
(Archegonia)
- 5- The male organ in flowering plants (Organ that consists of stamens)
(Androecium)
- 6- The ability of egg cells to form new individual without fertilization by male gamete
(Production of new individual from female gamete by radiation)
(Type of asexual reproduction that depends on gametes)
(Type of asexual reproduction that causes variation)
(Formation of new individual from unfertilized ovum)
(Parthenogenesis)
- 7- Isolation of body parts either a spore cell, tissue or a part of body to form new organism by mitosis
(Asexual reproduction)
- 8- The infective stage of plasmodium malaria (Minute spindle shaped structure in the life cycle of plasmodium malaria).
(Sporozoite)
- 9- Green scum that grows on the surface of still water
(Spirogyra)
- 10- Tube that transfer protoplasmic contents from one spirogyra cell to another cell in another filament
(Conjugation tube)
- 11- Formation of new individual by mitosis from lateral protrusion
(Budding)
- 12- Male gametes of fern plants (mobile structure in the life cycle of fern plants)
(Ciliated sperm)
- 13- Stage in the life cycle of plasmodium that reproduces by shizogony in human
(Merozoites , Sporozoite)
- 14- Group of seeded Plants (flowering plants) whose seeds developed in pericarp
(Angiosperm)

- 15- Type of asexual reproduction in which divides by divides to form two equal-sized cells (in unicellular only)
(Binary fission)
- 16- The ability organisms to restore the cut parts
(Regeneration)
- 17- Group of cells on one side in hydra and sponge for bud formation
(Interstitial cells)
- 18- Stalk that connects between flower ovary and its stigma
(Style)
- 19- Cells containing one haploid nucleus in pollen sacs of anther
(Cells that grow directly to mature pollen grains)
(Cells produced division of spore mother cell in the pollen sac of anther)
(Microspore)
- 20- Flat, green, heart -shaped leaf that produces reproductive organs in fern plants
(Gametophyte)
- 21- Production of new individual from cut parts by mitosis
(Asexual by regeneration)
- 22- Haploid stage of plasmodium produced in the stomach of Anopheles mosquitoes
(Gametes)
- 23- Type of sexual reproduction that happens under unsuitable conditions
(Type of sexual reproduction that happens in lower forms as fungi and algae.)
(Type of sexual reproduction that depends on somatic cells [doesn't depend on gametes])
(A method of sexual reproduction in the primitive organisms in which the contents of cells fuses with the contents of another cell).
(Conjugation)
- 24- Protozoa that attack human and causes malaria fever
(Plasmodium malaria)
- 25- Liquid that contains all nutrients and hormones for growth of plant tissues
(Coconut milk)
- 26- Haploid stage produced from meiosis of ookinete of plasmodium
(Oocyst)
- 27- Sacs that contain spore mother cells on the lower surface of fern plants
(Sori)
- 28- Stage of plasmodium that attacks human liver cells
(Sporozoite)
- 29- Fusion of male gamete nucleus with female gamete nucleus to form zygote
(Fertilization)
- 30- Type of asexual reproduction that happens in some insects, worms and crustacean
(Parthenogenesis)
- 31- Cells contain two haploid nuclei in the pollen sac
(Mature pollen grain)
- 32- Type of reproduction that happens in Amoeba under unsuitable conditions
(Repeated Binary fission)

- 33- Stages in life cycle of plasmodium malaria formed after infection of liver cells
(Merozoites)
- 34- Type of asexual reproduction, which is common in plants and few animals
(Regeneration)
- 35- Protozoa that reproduce sexually by gametes
(Protozoa that produces gametes by mitosis)
(Plasmodium malaria)
- 36- Formation of seedless fruits without fertilization
(Parthenocarpy)
- 37- Nutritive tissue around embryonic sac in the ovule to feed zygote
(Nucellus)
- 38- Two haploid cells around the egg cell in the ovule
(Synergid cell)
- 39- Hole between integuments around ovule for passage of pollen grains
(Minute opening in the ovule for fertilization)
(Micropyle)
- 40- Type of seeds in which the endosperm remains outside the embryo and occupies part from the seed
(Endospermic seed)
- 41- Liquid used to store tissues of tissue culture for long time
(liquid Nitrogen)
- 42- Process that stimulates conversion of plant ovary to fruits
(Pollination)
- 43- Type of seeds in which the endosperm is consumed and replaced by Cotyledons
(Non /ex-endospermic seed)
- 44- 3 haploid cells inside embryonic sac a way from micropyle
(Antipodal cells)
- 45- Floral whorl that protects the inner part of flower against wind and rain
(Calyx)
- 46- Transmission of pollen grains from the anther to the stigma of another flower in the same plant
(Self-pollination)
- 47- Transmission of pollen grain from the anther to the stigma of another flower on another plant of the same species
(Cross pollination)
- 48- fusion of male nucleus with the 2 embryonic nuclei to form the endospermic nucleus
(Triple fusion)
- 49- The fusion of one male nucleus with the egg cell and the other male nucleus with the 2 nuclei of the embryo sac.
(Double fertilization)
- 50- Flower leaflet consists of anther and filament and found in the Androecium.
(Stamen)

- 51- Large nucleated cells, diploid fill the pollen sacs of the immature anther.
(Spore mother cell)
- 52- The female reproductive organs in ferns.
(Archegonia)
- 53- The male reproductive organs in ferns.
(Antheridia)
- 54- A single cell can germinate directly into a whole plant.
(Spore)
- 55- The stage which is divides by meiosis in plasmodium life cycle.
(Ookinete)
- 56- The part which is responsible for regeneration in the star fish.
(Central disc)
- 57- The asexual reproduction of plasmodium in human liver and red blood cells to produce the Merozoites.
(Shizogony – fragmentation)
- 58- Fruits in which any part except the ovary grows, enlarge and storing food.
(False fruit)
- 59- Processes exist in the gametophyte for absorption of water and salts.
(Rhizoids)
- 60- The type of cells that some primitive plants reproduce by them.
(Spores)
- 61- Plants their seeds develop inside a pericarp and called covered seeds
(Angiosperms)
- 62- Plants In their flowers it's difficult to differentiate between sepals of calyx & petals of corolla.
(Monocot plants (onion & Tulip))
- 63- The infective stage for human in plasmodium malaria.
(Sporozoite)
- 64- Nutritive tissue surrounds the embryonic sac in the flower ovary.
(Nucellus)
- 65- Stored food in the ovule and consumed during its development.
(Nucellus)
- 66- Nutritive tissue in the seed supplies the embryo with food during early germination
(Endospermic tissue)
- 67- The 4 cells resulted from the meiosis division of the spore mother cell during the formation of the pollen grains
(Microspores)
- 68- The transportation of the pollen grains to stigma of another plant of the same species
(Cross-pollination)
- 69- They are formed in the seed to replace the consumed endospermic tissue.
(2 cotyledons)
- 70- Formation of pollen tube after transmission of pollen grain to the stigma
(Pollen grain generation)

- 71- A method by which the oocyst reproduces to produce sporozoites
(Sporogony)
- 72- Floral whorl that protects reproductive organs in dicot flowers
(Corolla)
- 73- Short stem with modified leaflets for reproduction in plants
(Organs of reproduction in angiosperm)
(Flower)
- 74- Life cycle that includes one generation that reproduces sexually alternates with one or more generations that reproduce asexually with variation in chromosomal number.
(Type of reproduction that depends on sexual and asexual reproduction)
(Alternation of generation)
- 75- Modern technology that depends on the genetic information in one or more cells.
(Growth of plant tissue in semi natural nutritive medium into complete plant)
(Formation of complete plant from plant cells without pollination or fertilization)
(Type of asexual reproduction applied on plants with desirable strains to increase in no.)
(Tissue culture)
- 76- The mobile stage in the life cycle of plasmodium
(ookinete)
- 77- Group of flowers carried on the same aggregation of flowers on the same axis
(Inflorescence)
- 78- Stages of plasmodium malaria produced only in human RBC
(Gametocyte)
- 79- The infective stage of plasmodium malaria to female anopheles
Stages of plasmodium that transfer from human to female anopheles mosquito.
(Gametocyte)
- 80- Tube in stamen for formation of pollen grains
(Pollen sac)
- 81- Diploid stage in the life cycle of plasmodium that divides to complete the life
(ookinete)
- 82- Type of conjugation between the cells of different spirogyra filaments
(Scalariform conjugation)
- 83- Type of conjugation that happens between adjacent cells in the same spirogyra
(Lateral conjugation)
- 84- Single cell that adapted for direct growth to form new individual
(Spore cell)
- 85- Type of reproduction that produce identical individuals to their parents
(Type of reproduction, which is common in plants and rare in animals)
(Asexual By regeneration)
- 86- Part that produces fruit in apple
(Receptacles)
- 87- Group of cells on one side in hydra and sponge for bud formation
(Interstitial cells)

- 88- Type of asexual reproduction that happens in unicellular organisms only
(Binary fission)
- 89- Stalk carries anther of the flower
(Filament)
- 90- Tube that transfers food from ovary to ovule of flower
(Funicle)
- 91- Calyx and corolla which the same shape, color and can't be differentiated
(Perianth)
- 92- Type of asexual reproduction in primitive plants
(Sporogony)
- 93- Stage in the life cycle of plasmodium malaria that can't divide in human
(Gametocyte)
- 94- Part in flower that produced fruit and seeds
(Part of flower that stores food and forms fruits in most plants)
(ovary of the flower)
- 95- Single seed fruit in which the integuments fuse with the ovarian wall
(Grains)
- 96- Unicellular fungus that reproduces by budding
(Yeast fungus)
- 97- Insects that transfer plasmodium parasite to the human
(Anopheles female mosquitos)
- 98- Site of formation of pollen grains
(Anther)
- 99- Site of germination of pollen grains, sticky disc where pollen grains adhere
(Stigma)
- 100- Stalk that connects between flower and stem
(Pedicel)
- 101- Leaf from its axle a flower extends
(Bract)
- 102- Two haploid nuclei in the center of the ovule
(2 Polar nuclei)
- 103- Spirogyra zygote which is covered with thick coat
(Zygospore)
- 104- Ornamental plant that grows in nurseries and reproduces by spores
(Polypodium)
- 105- Nutritive tissue in the seed for feeding of embryo
(Endospermic tissue)
- 106- Nutritive tissue in the grain that stores food for embryo
(Endospermic tissue)
- 107- Simple swell that contains one spore mother cell in ovary
(Ovule)
- 108- Structure formed inside flower ovary that contain egg cell, synergid cells, antipodal cells and embryonic sac nuclei
(Embryonic sac)

- 109- A flower that consists of four floral whorls alternated with each other
(Typical flower)
- 110- The infective stage of plasmodium malaria for human RBC.
(Merozoites)
- 111- Stage in the life cycle of plasmodium malaria formed in human cells and can't reproduce in human cells
(Gametocyte)

Give reason for:-

1. The symptoms of malaria fever appear each 2 days?

-Because the Merozoites infect the red blood cells and pass through several cycles in which the Merozoites reproduce asexually by shizogony to produce huge no. of Merozoites that are released every 2 days with the destruction of the infected red blood cells and formation of toxic substances so the symptoms of malaria fever appear (heat, chill and sweating)

2. Some flowers are called solitary apical while the others are called solitary axial?

-Because some plants produce single (solitary) flowers and so the flower may arise from terminal bud which stops the growth of the stem and called terminal solitary flower as the Tulip, or the flower arises from lateral bud and called axillary solitary flowers as the Petunia.

3. Although there are bisexual flowers, the type of pollination in these flowers is cross pollination?

a - when organs of one sex mature before those of the other sex.

-Early maleness (Anthers mature before ovaries)

-Early Femaleness (ovaries mature before Anthers)

b- The Anther is lower than the Stigma

4. The micropyle hole is found in both ovule and seed?

-the micropyle in the ovule is the site of fertilization as through which the 2male nuclei pass to fertilize the ovule, while the micropyle in the seed allows water to get inside the seed during the germination.

5. Sexual reproduction may occur although the presence of one individual only?

As in the lateral conjugation in the spirogyra, where the protoplasmic contents of one cell pass through opening in the cell wall to the adjacent cell in the same filament.

In the Polypodium and Adiantum plants, the male organs (antheridia) and female organs (archegonia) are carried on the same plant (gametophyte).

In case of self-pollination when the pollen grains transfer from the anther to the stigma of the same flower or to stigma of another flower on the same plant.

6. The aim of pollination in flowering plants differ from the aim of pollination in ferns?

-The pollination in flowering plants provides the flower with the male cells which fertilize the ovule to develop into seed and also stimulates the activity of auxins which are necessary for the growth of the ovary into a fruit.

-while the pollination in ferns leads to fertilization of the egg cell in the archegonia with the ciliated sperm of the antheridium to form zygote which develops into sporophyte.

7. The spermatogenesis in the bee male is formed by mitotic division and not by meiotic division?

-Because the somatic cells of the male bee is haploid (n) as the male is developed from haploid ovum (n) without fertilization by parthenogenesis.

8. In honey bee insect, the production of gametes is different in males than females?

-as drones of bee are haploid (n) so they produce their gametes (n) by mitosis division while the queens are diploid (2n) so they produce their gamete (n) by meiosis division where some unfertilized ova (n) develop naturally without fertilization and by parthenogenesis into drones (n) while the fertilized ova (2n) develop into females (queens and workers) according the type of the food provided later

9. Sometimes the spirogyra reproduces by lateral conjugation?

-Because in unfavorable conditions (the algae is exposed to drought or change in water temperature or purity),the protoplasmic contents of the algae cell is transferred through an opening in the cell wall to the adjacent cell in the same filament and that is due to presence of one filament & absence of another for Scalariform conjugation.

10.The activation of star fish's eggs and frog's eggs is not considered as a natural parthenogenesis?

-Because it takes place artificially and by exposure of the unfertilized ovum (n) to one of these stimuli such as: a. electric shock b. heat shock c. irradiation d .some salts e. agitation f. prickling with a needle , which cause the duplication of the chromosomes no. in the ovum (2n) and so, the ovum can develop by the parthenogenesis into complete individual

11.An extract of pollen grains is sprayed over stigma of some flowers?

- in order to produce seedless fruits without pollination nor fertilization and that is called artificial parthenocarpy.

12.The endospermic tissue is triploid (3n)?

-because this tissue is resulted from the mitotic division of the 3n endospermic nucleus which is formed from the fusion of one male nucleus(n) from the pollen grain with the nucleus (2n) resulted from the fusion of the 2 embryo sac nuclei of the ovule during the triple fusion.

13.The ripening of the fruits and the seeds leads to the discontinuity of the plant growth or its death.

-due to the consumption of the stored food and the inhibition of the plant hormones

14. The variation in the characteristics of the gametophytes.

As the gametophytes in ferns are developed from the germination of spores (n) in damp soil and the spores are produced by meiosis division from spore mother cells (2n) in the sporangia of sori on the lower surface of the leaf.

15. The ability to adapt with the environment is reduced in the individuals that reproduce asexually?

-Because it requires only one parent so, no variation in the characters as the young receives the nuclear material from one parent only, as a result most of the offspring become exposed to destruction as they can't face the environmental changes.

16. The gametophyte stage in ferns is haploid?

-Because the spore mother cells in the sporangia of the sporophyte (2n) divide by meiosis to produce haploid spores (n) which spread in air and germinate in moist soil into haploid gametophyte.

17. The timing of meiosis division varies according the type of sexual reproduction?

In conjugation, in the spirogyra algae (meiosis division takes place after the formation of zygote) as the somatic cells of spirogyra are haploid and so, after their fusion during the conjugation, the zygote is formed (2n) and when the surrounding conditions improve, the zygote divides by meiosis division to restore the haploidy of its cells again, while in, sexual reproduction by gametes in higher plants and animals, (meiosis division takes place before the zygote formation) where the gonads are diploid and divide by meiosis to produce haploid gametes which fuse together to form the zygote (2n)

18. The parthenogenesis is considered as a special case of asexual reproduction?

-because it is restricted only on females (the progeny comes only from one parent), as the parthenogenesis is the ability of the ovum to develop into a complete individual without being fertilized by the male gamete.

19. The offspring of the drones (males) of bee is females.

- As the females only (queens or workers) develop from ova (2n) fertilized by the male gametes of the drones, while the males (drones) in bee develop from unfertilized ova (n) by natural parthenogenesis.

20. The method of the production of the ova in the queen of bee differs from that in the aphid insect.

-because the ova of queen of bee are produced by meiosis division as some unfertilized ova (n) develop by parthenogenesis into drones, while the fertilized ova (2n) develop into females (queens or workers)

-but in the aphid insect the ova (2n) are produced by mitosis division which develop by parthenogenesis and without fertilization into complete individuals (2n).

21. The spores of the bread mould differ the spores of the Adiantum (polypodium)

-Where the spores in the bread mould are produced by mitosis inside the sporangia and when the spores mature they liberate from the mother plant and spread in the air till

reach suitable medium where the coat of each spore ruptures and the spore absorbs water and divides several times by mitosis and germinate into a complete plant.

-While the spores in ferns are produced by meiosis division of the spore mother cells inside the sporangia of the sori which found on the lower surface of the sporophyte and when the spores mature they liberate and spread in the air till reach a moist soil where it germinates into a gametophyte.

22. It is possible to convert hermaphrodite flower into unisexual flower and not the reverse.

-that can take place by removing the organs of one sex from the flower before their maturation (removing of stamens or carpels) and so the flower is converted from bisexual flower to unisexual flower, while the unisexual flower can't be converted into bisexual flower because it is missing the organs of one sex (stamens or carpels)

How true are the following statements and explain:-

1. All forms of sexual reproduction depends on the meiosis division.

-the statement is false because in some organisms the gametes are formed without meiosis division such as:

a- in the life cycle of plasmodium the gametes (n) are developed from mitosis division of the gametocytes (n) which are developed from the merozoites (n).

b- in the life cycle of Polypodium the gametophyte (n) carries the male organs antheridia (n) which produce the male gametes ciliated sperms (n) by mitosis and also the gametophyte carries the female organs archegonia (n) which produce the female gametes egg cells (n) by mitosis.

2. As soon as the ovule is fertilized in the plant its micropyle disappears.

-the statement is false, because the micropyle remains after the fertilization of the ovule to allow the water to get into the seed for its germination.

3. All hermaphrodite flowers depends on self-pollination.

-the statement is false because the self-pollination takes place in hermaphrodite flowers when the organs of the two sexes (anthers and ovaries) mature at the same time and when the level of anthers is higher than that of the stigma while in some flowers the organs of one sex mature before the organs of the other sex (anthers mature before ovaries or ovaries mature before anthers) or the level of the anthers is lower than the level of the stigma in these cases the flowers depend on the cross-pollination.

4. The fruit can be formed if the flower is pollinated and not fertilized.

-the statement is true because the pollination stimulate the activity of the auxins which are responsible for the developing of the ovary into fruit (even if the fertilization didn't occur)

5. The chromosomes number is duplicated in artificial parthenogenesis.

- the statement is true where the unfertilized ova (n) are activated by using some stimulants such as -electric shock, heat shock, irradiation, agitation, some salts or by pricking with a needle and that leads to the duplication of the chromosomes number in the ova to be (2n) and so can develops without fertilization into complete individuals similar to the mother entirely.

6. All forms of asexual reproduction depends on the mitosis division.

-the statement is false where in:

a- in the natural parthenogenesis the drones (n) of bee develop from unfertilized ova (n) produced from the queen (2n) by meiosis division.

b- in the Sporogony in Polypodium plant the spores are produced by meiosis division from the sporophyte (2n).

7. In the spirogyra algae the Scalariform conjugation is better genetically than the lateral conjugation.

-the statement is true because the Scalariform conjugation takes place between two opposite cells in two different filaments which are different genetically and that leads to genetic variation in the resulting filament, while the lateral conjugation take place between two adjacent cells in the same filament which have the same genetic information and so no variation in the resulting filament.

8. In spirogyra the Scalariform conjugation is easier than the lateral conjugation.

-the statement is false because the lateral conjugation takes place between two adjacent cells in the same filament while the Scalariform conjugation requires two different filament and needs the formation of conjugation tube to allow the conjugation between the two opposite cells.

Mention the no. of chromosomes (haploid or diploid):-

- | | |
|------------------------------------|------|
| 1-Spirogyra | (N) |
| 2-Spirogyra Zygosporangium | (2N) |
| 3-Endoplasmic nucleus | (3N) |
| 4-Bract cells | (2N) |
| 5-Human sperm | (N) |
| 6-Aphid female gamete | (2N) |
| 7-Plasmodium Sporozoite | (N) |
| 8-Ookinete | (2N) |
| 9-Fern gametophyte | (N) |
| 10-Fern sporophyte | (2N) |
| 11-Antheridium | (N) |
| 12-Somatic cells of drone | (N) |
| 13-Somatic cell of honeybee worker | (2N) |
| 14-Polar body | (N) |

15-Sori of Polypodium

(2N)

Mention the type of asexual reproduction in the following organisms:-

| | |
|-----------------------------|----------------------------------|
| 1-Yeast | <u>(Budding)</u> |
| 2-Hydra, sponge animal | <u>(Budding , regeneration)</u> |
| 3-Amoeba, bacteria | <u>(Binary fission)</u> |
| 4-Sea star, planaria | <u>(Regeneration)</u> |
| 5-Plasmodium in human | <u>(Shizogony)</u> |
| 6-Aphid, honeybee | <u>(Natural Parthenogenesis)</u> |
| 7-Algae | <u>(Binary fission)</u> |
| 8-Carrot, tobacco | <u>(Tissue culture)</u> |
| 9-Bread mould, Mushroom | <u>(Sporogony)</u> |
| 10-The sporophyte of a Fern | <u>(Sporogony)</u> |

What happens when:-

1. If the pollen grains were not germinated on the stigma of the flowers.

-that leads to hormonal activation of auxins and so the ovary stores food, ripens and transformed into seedless fruit

2. Spraying indol acetic acid on male flowers.

-the male flowers wither and fall out without formation of fruit due to the absence of the ovaries.

3. The exposure of the unfertilized ovum of honey bee to electric shock?

-The chromosomes number in the unfertilized ovum (n) will be duplicated into (2n) and then it will develop by artificial parthenogenesis into a female (2n) queen or worker according to the type of the food provided later.

4. In plants the embryo consumed the endospermic tissue during its development?

-The plant has to store another food in 2 cotyledons for the development of the embryo as in dicot plants (bean and pea) and the seed is called (ex-endospermic seed)

5. The transmission of gametocytes with the blood of infected person to the female Anopheles mosquito.

-In the stomach cavity of the mosquito, gametocytes (n) develop into male and female gametes (n) which fuse together to form zygote (2n) – sexual reproduction – and then the zygote changes into movable stage called ookinete (2n) which penetrates the stomach wall and divides by meiosis to form oocyst (n) which its nucleus divides by mitosis several times to produce large number of merozoites (n) – asexual reproduction by sporogony.

6. Spraying the extract of pollen grains on the stigma of flower.

-It leads to formation of seedless fruit (artificial Parthenocarpy).

7. Separating cells from the tobacco leaves and cultivating them in moist soil.

-the cells will die and can't grow into a complete tobacco plant because they need a

semi- natural nutrient medium (coconut milk) which contains the plant hormones with certain ratio.

8. Absence of cilia from the sperms of the gametophyte in ferns.

-The sperms can't swim in the water of the soil solution and so, no fertilization occurs for the egg cell in the archegonium and the zygote is not formed and the sporophyte will not developed.

9. The gametophyte of ferns is pollinated but not fertilized.

-The zygote is not formed and the sporophyte will not developed.

10. Absence of nucellus in the pea plant ovule.

As the nucellus is a stored food in the ovule and consumed during its development so, in absence of nucellus the ovule wouldn't be mature and the seed wouldn't formed.

11. Cut of anthers (stamens) before its maturartion in hermaphrodite flower.

The flower becomes unisexual and so it will depend on cross pollination by pollen grains from anther of flower of another plant of the same species.

12. fertilizing the flower of the egg plant.

-the corolla, androecium, the stigma and the style wither and fall out, only the calyx and ovary remain as the ovary stores food , ripens and transformed into fruit due to the hormonal activation (auxins) secreted by the ovary while the calyx shares in fruit formation

Compare :-

1)

| The pollen sac | The Oocyst |
|---|--|
| -The anther in the flowering plants consists of 4 pollen sacs which are filled with the spore mother cells (2n) which divides by meiosis into microspores (n) which finally develop into pollen grains. | The movable stage of plasmodium penetrates the stomach wall of the female <u>anopheles</u> mosquito and divides by meiosis to produce the <u>Oocyst</u> (n) and then the nucleus of the <u>Oocyst</u> divides by the mitosis to produce great number of <u>sporozoites</u> . |

2)

| Pollination in flowering plants | Pollination in ferns |
|--|---|
| It occurs by the transfer of pollen grains | It occurs by the transfer of the ciliated sperms |
| It provides the flower with the male cells which fertilize the ovule to develop into seed b –it stimulates the secretion of auxins which are necessary for the growth of the ovary into a fruit. | it leads to the fertilization of the egg cell in the archegonia with the ciliated sperm to form zygote which develops into sporophyte |
| The pollen grains can be transferred by insect, air, water or man | The ciliated sperms can transfer only by water. |

3)

| Antheridia | Anther |
|---|--|
| They are the male organs in the ferns plants | They are the male organs in the flowering plants |
| They produce the male gametes (ciliated <u>sperms</u>) by mitosis. | They produce the male gametes (pollen grains) by meiosis division. |

Most important Graphs, Diagrams and Essay questions :-

(1) In the opposite figure:

a- Mention the function of this structure?

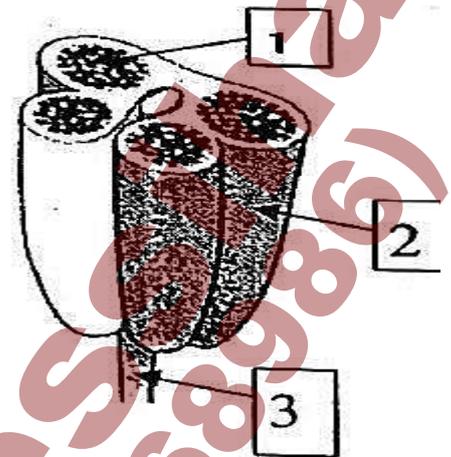
produce pollen grain

b- What happens if this part is cut before its maturity?

no formation of pollen grain so plant would die or the flower must receive pollen grain another flower

c-Which types of cell division happen in this part?

meiosis



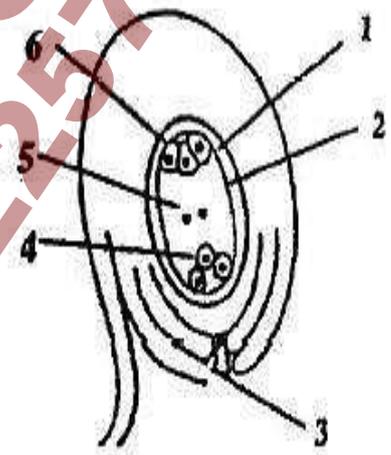
(2) In the opposite diagram:

Write the number and name of the following

1-Is produced from meiotic division of spore mother cell...

2-Will fuses with male nucleus to produce a zygote

3- Pollen tube enters through it.....



(Ans.:

1- (2) embryo sac

2- (4) egg cell

3- (3) micropyle

(3) What is the number, which indicates each of the following:

1. The number of microspores resulted from the division of 10 spore mother cells in the anther of flowering plant.

2. The number of pollen grains resulted from the division of 5 spore mother cells in each sac in the anther of flowering plant.

3. The number of the antipodal cells resulted from the division of 10 spore mother cells in the ovary of flowering plant.

Ans.:

1. $10 \times 4 = 40$

2. $5 \times 4 \times 4 = 80$

3. $10 \times 3 = 30$

(4) Some living organisms reproduce by sexual reproduction followed by asexual one in their life cycle.

- a- what is the scientific term of this statement and how can they make use of it?
- b- Why is it common between parasites?
- c- Mention two examples, one from the plant kingdom and the other from the animal kingdom in which this phenomenon occurs.

Answer:-

a- **Alternation of generation,**

1-benefits from asexual reproduction: Rapid reproduction and production of high number of organisms and leads to wide dispersal of the organism.

2-benefits from sexual reproduction: genetic diversity makes these organisms adapted to the changes in the environmental conditions.

b- **It is common in parasites for:**

-Production of great number of the parasite stages since, many of them are subjected to loss or destruction during their transport between hosts.

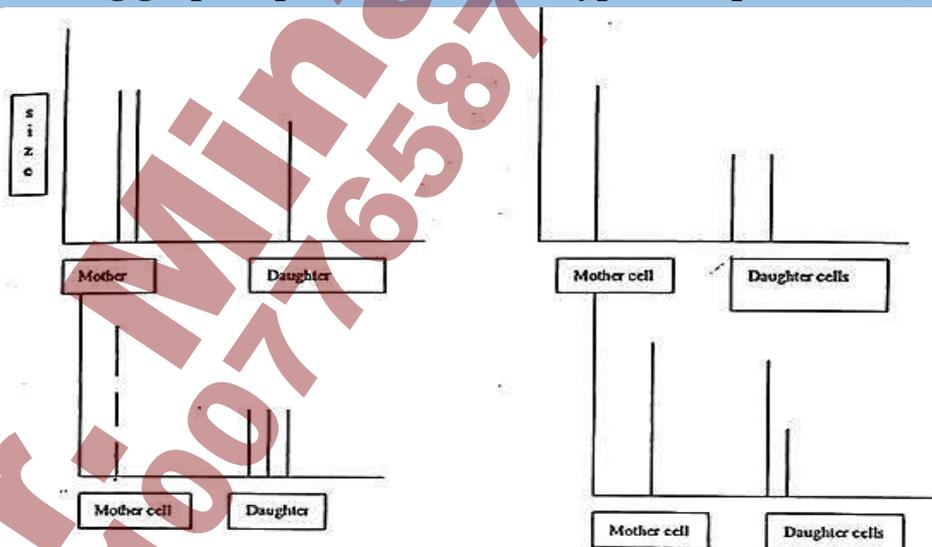
-Both types of reproduction enable the parasite to face the surrounding conditions in a better way.

c- **Examples:**

-from the plant kingdom – Ferns (**Adiantum** and **Polypodium**)

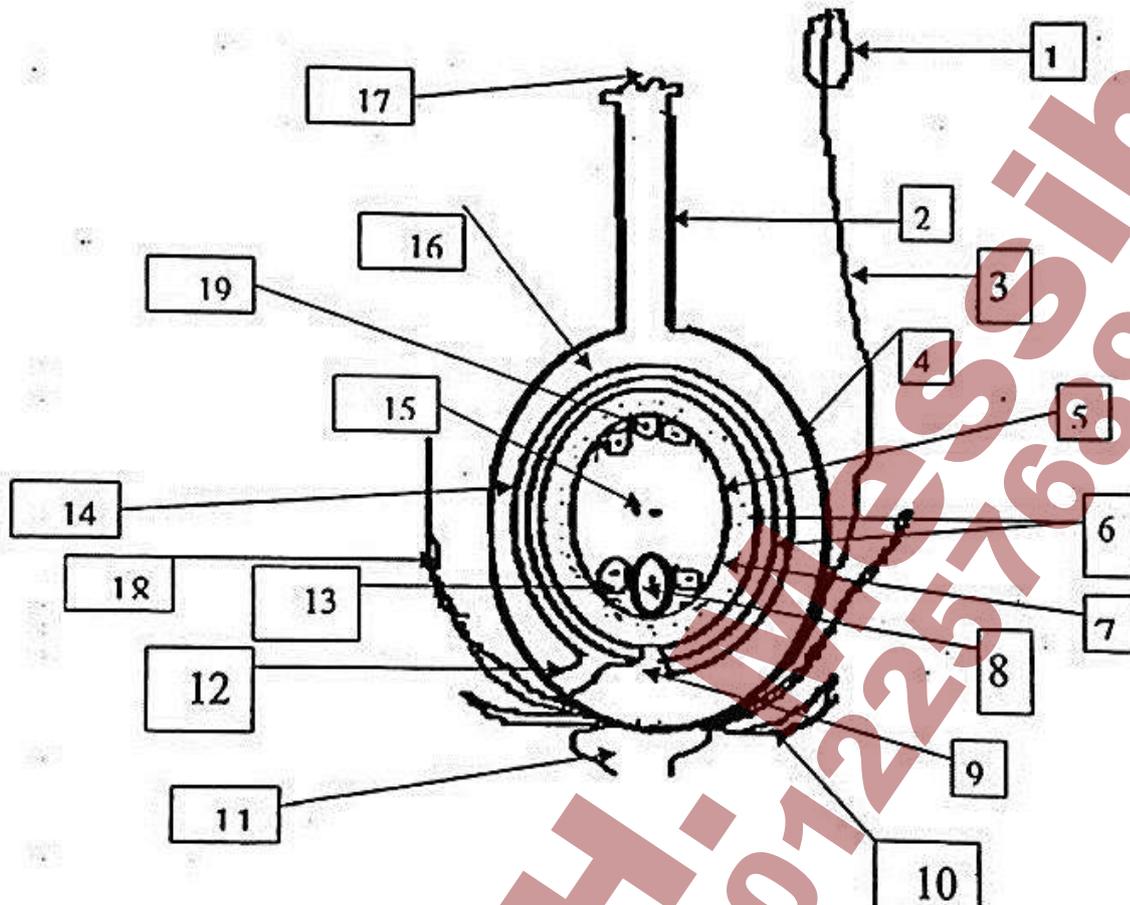
-from the animal kingdom –unicellular animal (protozoa) which is the plasmodium and multicellular animal which is the bilharzia.

(5)The following graph represents different types of reproduction, mention them:-



Ans.: Sexual – asexual binary fission – regeneration – budding

(6) Mention the structure that:



- 1- Produces pericarp, fruit and seed after fertilization
- 2- Harden to produce seed testa
- 3- Contain stored food to feed the zygote
- 4- Allows passage of pollen grains to the embryonic sac
- 5- Part without it pollination never happens
- 6- Part without it ovule can't receive food from the ovary
- 7- Fuse with male nucleus to produce endosperm
- 8- Fuse with male nucleus to produce embryo
- 9- Share in fruit formation in some plants
- 10- Remains after fertilization in all plants
- 11- Allows passage of pollen tube through it to reach the ovary
- 12- Produced from spore mother cells
- 13- How many nuclei degenerate after fertilization?
- 14- How many nuclei share in formation of seed?
- 15- Which factor determines the no. of seed in the fruit?
- 16- Mention the process that produces seeds and fruit
- 17- Mention the process that produces fruit
- 18- Allow passage of water to the seed

- 19- Stored food to feed the embryo in the seed
- 20- Which factor determine the kind of the seed monocot or dicot?
- 21- Mention he no. of chromosomes in no. 15 cell 8, cell 18
- 22- Does this plant belong to angiosperm plants?

Ans.: Mention the structure:-

- 1- 4 -16 -14
- 2- 6
- 3- 7
- 4- 9
- 5- 17
- 6- 12
- 7- 15
- 8- 8
- 9- 11
- 10- 16
- 11- 2
- 12- 5
- 13- 5
- 14- 5
- 15- Fertilized ovule
- 16- Pollination and fertilization
- 17- Pollination
- 18- Micropyle (9)
- 19- Endosperm
- 20- Endosperm
- 21- 15→N , 8→N , 18 → 2N
- 22- Yes

(7) If the number of chromosomes in a queen wing's cell of honey bee is 30 chromosomes, what is the number of chromosomes in the following:

- a- Somatic cell in worker
- b- Sperm of drone
- c- Somatic cell in drone
- d- Ovum of queen

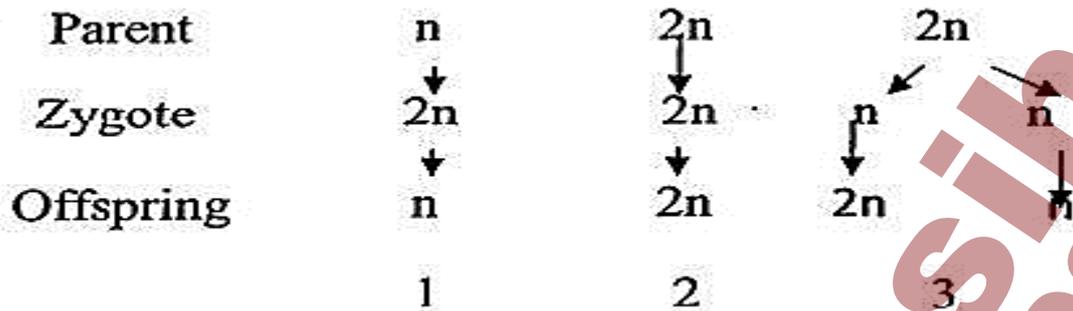
Ans.: a→ 30 Chromosomes. (2n)

b→15 Chromosomes. (n)

c→15 Chromosomes. (n)

d→15 Chromosomes. (n).

(8) Examine the opposite figure then answer:



a- Mention example for each of the previous cycle?

Ans.: 1- spirogyra 2- aphid insect 3- honeybee

(9) If the diploid number in a plant is 14 chromosomes, what is the expected number of chromosomes in each of the following:

- | | | | |
|----------------------------|---------------------|-----------------------|---------------------|
| 1. antipodal cell | $7 \rightarrow n$ | 2. endosperm nucleus | $21 \rightarrow 3n$ |
| 3. Nucellus cell | $14 \rightarrow 2n$ | 4. embryo cell | $14 \rightarrow 2n$ |
| 5. nucleus of the egg cell | $7 \rightarrow n$ | 6. tube nucleus | $7 \rightarrow n$ |
| 7. pericarp cell | $14 \rightarrow 2n$ | 8. embryo sac nucleus | $7 \rightarrow n$ |

(10) If each of pollen sac contains 5 spore mother cells ,

- a-How many pollen grains are produced by the anther of this flower?
 b-Mention the no. of male nuclei in pollen grains at germination
 c-No. of tube nuclei in pollen grains.

Ans.: (a) 80 (b) 160 (c) 80

(11) If no. of chromosomes in sepal of a plant is 8 pairs , what is the no. of chromosomes in each of them

Endosperm – embryo – spore mother cell – egg cell – each antipodal cell

Ans.: $3N-24$ $2N-16$ $2N-16$ $N-8$ $N-8$

(12) Orange fruit contains 15 seeds , mention

- The no. of ovaries 1
- The no. of ovules 15 or more
- The no. of fertilized embryonic sacs 15
- The no. of polar nuclei , antipodal and synergid cells 30 , 45 , 30

(13) If the chromosomal number in the wing of the queen honeybee is 32 ,

mention the number of chromosomes in the somatic cell of male honeybee , somatic cell of female , female gamete , somatic cell of worker?

Ans.: 16 , 32 , 16 , 32 respectively.

(14) Complete the following table:-

| Cells | Medium | Example of organism | Type of asexual rep. |
|----------|----------------------|---------------------|----------------------|
| X | Active, semi natural | | |
| Y | Saline solution | | |
| Z | Moist environment | | |

Ans.:-

| Example of organism | Type of asexual reproduction |
|-------------------------|-----------------------------------|
| <i>Carrot - tobacco</i> | <i>Tissue culture</i> |
| <i>Frog - sea star</i> | <i>Artificial parthenogenesis</i> |
| <i>Spores of bread</i> | <i>Sporogony</i> |

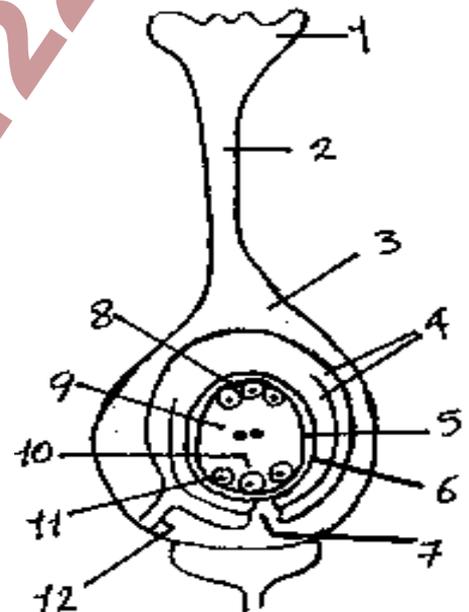
(15) Examine the opposite figure:

1- Label the numbered organs?

Ans.: 1-Stigma 2-style 3-ovary 4-2integuments

5-embryo sac 6-ovule 7-micropyle 8-3antipodal cells

9-2polar nuclei 10-egg cell 11-synergid cell 12-funicle



2-What is the importance of floral pollination?

a. It supplies the flower with the male cells to fertilize the ovule to form the seed.

b. It causes the hormonal activation of the ovary so, it enlarges, stores food and ripens to form the fruit.

3-What will happen if the flower isn't pollinated?

-the flowers wither and drop off without fruit formation.

4-What will happen if the flower is pollinated and not fertilized?

-that causes the formation of seedless fruit.

5- How is the seed formed? And how its kind, monocot or dicot, is determined?

-the seed is formed from fertilized ovule and there are two kinds of the seed according to the type of the food provides the embryo:

| Endospermic seed ((grain)) | Ex-endospermic seed ((seed)) |
|--|---|
| 1- Embryo keeps the endosperm so, the endospermic tissue remains outside the embryo occupying a part of the seed. | 1-The embryo consumes the endospermic tissue during its development, so the plant has to store another food in the 2 cotyledons necessary for growth of plumule and radicle during early germination. |
| 2- The 2 integuments of ovule fuse with the ovary wall to form (a single seeded fruit) so, they are called grains e.g.:- wheat and maize. → one cotyledon seeds, (Monocot plants) | 2- The 2 integuments of ovule harden forming seed testa while the ovary wall becomes a pericarp So, they are called seeds e.g.: bean and pea →2 cotyledons seeds (Dicot plants). |

6- How can you get seedless fruit artificially ?

-by using some stimulants such as indol acetic acid / naphthol acetic acid or extract of pollen grains in water or ether solution and spraying them on the flower or the stigma to produce seedless fruits without pollination nor fertilization.

(16)How can we obtain a complete individual from unfertilized ovum of frog by two different methods (without fertilization)?

1-Artificial parthenogenesis:-

by activating the ovum through its exposure to one of these stimuli as: a)heat shock b) electric shock c) irradiation d)some salts e) agitation or f) prickling with a needle, These stimuli lead to the duplication of the chromosomes of the ovum and so, it develops without fertilization to a complete individual that is totally identical to the mother (2n).

2-Renucleation:-

-The nucleus of unfertilized ovum was removed or destroyed by radiation, then it is replaced by a nucleus removed from embryonic cell of another individual (Frog) so, the unfertilized ovum (with the nucleus of the embryonic cell) developed normally to individual identical in characters to the individual from which the cultured nucleus was taken.

(17) In each of the following life cycles, write the location of meiosis and give

(19) If the diploid number in a plant is 10 chromosomes, what is the expected number of chromosomes in each of the following:

- | | |
|----------------------------|------------------|
| 1- antipodal cell | <u>(n) = 5</u> |
| 2- endosperm nucleus | <u>(3n) = 15</u> |
| 3- Nucellus cell | <u>(2n) = 10</u> |
| 4- embryo cell | <u>(2n) = 10</u> |
| 5- nucleus of the egg cell | <u>(n) = 5</u> |
| 6- tube nucleus | <u>(n) = 5</u> |
| 7- pericarp cell | <u>(2n) = 10</u> |
| 8- embryo sac nucleus | <u>(n) = 5</u> |

(20) In opposite figure:

a-Mention the type of reproduction in this organism and the conditions of if its occurrence? Does this type happens in some other organisms?

sexual by conjugation , unsuitable condition, fungi , algae ,bacteria

b- Write the name of structures number (1) and (2).

1→ Conjugation tube , 2→ Zygospor (2n)

c- Write the letter which represents the following process:

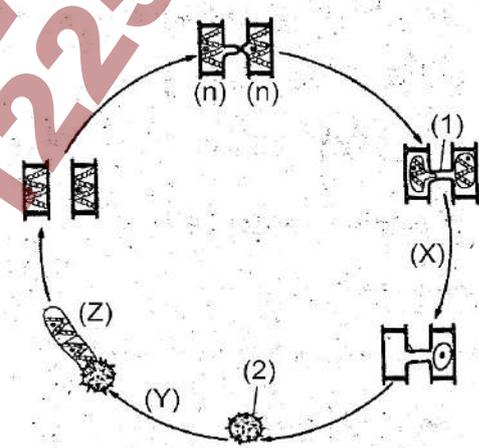
- | | |
|--|------------|
| 1) Suitable conditions for germination of new filament | <u>(Z)</u> |
| 2) Meiosis division | <u>(Y)</u> |
| 3) Fusion of the protoplasm to form zygote | <u>(X)</u> |

d- What is the importance of the coat in structure no. (2)?

Protects the zygote from the unfavorable conditions

e- Which type is easier, between one filament or between two filaments?

between one filament



(21) In opposite figure:

A. Write the numbered structures?

1-rhizome

2-advantitious roots

3-sori

4-sporangium containing spores

5-rhizoids

6-antheridium

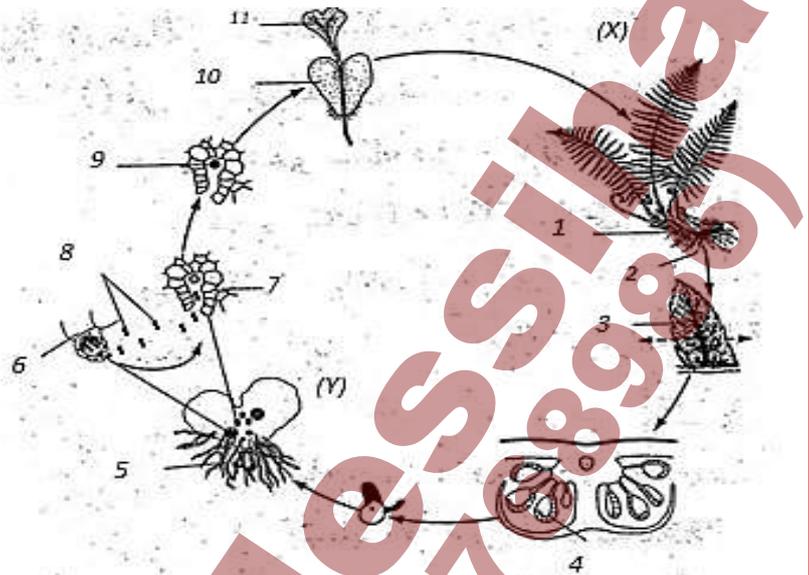
7-archegonium

8-ciliated sperms

9-zygote

10-remains of gametophyte

11-young sporophyte



B. What is the importance of the structures (6) and (7)?

-No.(6)antheridia: male organs produce the male gametes (ciliated sperms)

-No.(7) archegonia : female organs produce the female gamete (egg cell)

C. Which of the stages (X) and (Y) is haploid and diploid?

-Stage (x) is the sporophyte (diploid-2n),Stage (Y) is the gametophyte (haploid-n)

D. What is the importance of the stage (Y)?

a. The gametophyte is responsible for sexual reproduction, as after maturation of Antheridia the male gametes (ciliated sperms) liberate and swim over soil water to reach the mature archegonia to fertilize the egg cell to form the zygote (2n).

b. On the gametophyte, the young sporophyte depends for short time till developing its own root, shoot and leaves.

E. What is the importance of water for this plant?

1-It is needed for spores, which germinate in damp (moist) soil to gametophyte.

2-The ciliated sperms liberate and swim over soil water to reach the mature archegonia to fertilize the egg cell inside it.

F. What is the type of processes in the stage (Y)?

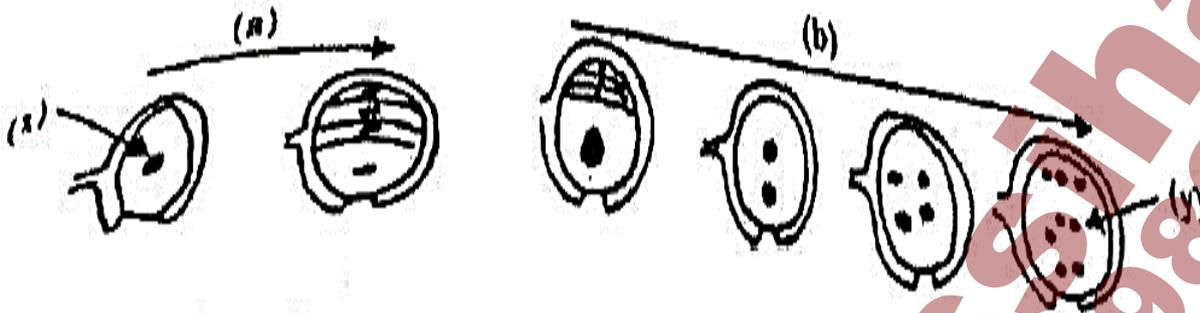
-The gametophyte carries rhizoids processes that penetrate into the soil to absorb water and salts.

G. What is the importance of alternation of generation for this plant?

1- benefits from asexual reproduction: Rapid reproduction and production of high number of organisms and leads to wide dispersal of the organism.

2- benefits from sexual reproduction: genetic diversity makes these organisms adapted to the changes in the environmental conditions.

(22) In opposite figure:



- a- What is the type of cell division in A and B? **(a) (A) meiosis – (B) mitosis**
 b- What does X indicate? **(b) spore mother cell**
 c- What does Y indicate? What its fate after fertilization?
(c) Y polar nuclei that fertilized by male nucleus to give endospermic nucleus (3N)

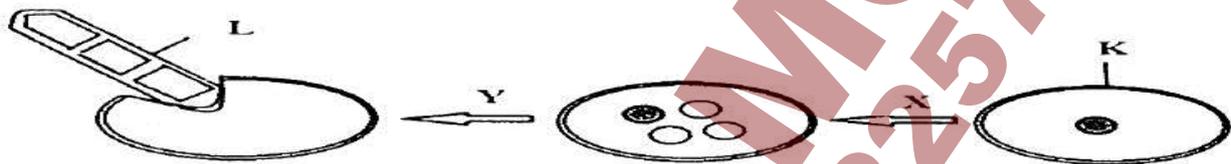
(23) The diagram represents the life cycle of fern plants (Polypodium).



- a- Which of these stages divide by mitosis and which divide by meiosis?
 b- Mention the type of reproduction happen in X and Y?
 c- Which stage repeats the life cycle (starts a new life cycle)?
 d- Which stage live as parasite at certain time?
 e- What is the role of water in the life cycle of this plant?
 f- What is the phenomenon that characterizes the reproduction of this plant?
 g- What do the two structures (L and M) represents?
 h- How does Y structure feed?
 i- Which of the previous stages sexual reproduction happens by mitosis?
 j- Which of the previous stage asexual reproduction followed by meiosis?

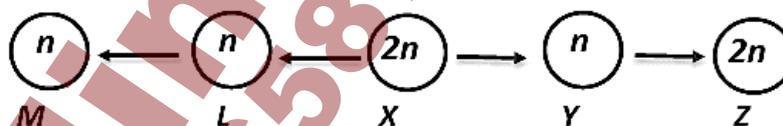
- (a) $x \rightarrow$ sporophyte divide by meiosis , $y \rightarrow$ gametophyte divide by mitosis
- (b) $y \rightarrow$ sexual reproduction by gamete , $x \rightarrow$ asexual by Sporogony
- (c) X
- (d) young sporophyte
- (e) for generation of haploid spores to form gametophyte and help ciliate sperm to swim and to reach the ovum in archegonia to form zygote
- (f) alternation and generation
- (g) they represent reproductive organs L \rightarrow Antheridium , M \rightarrow Archegonia
- (h) by rhizoid.
- (i) Y
- (j) X

(24) In opposite figure:



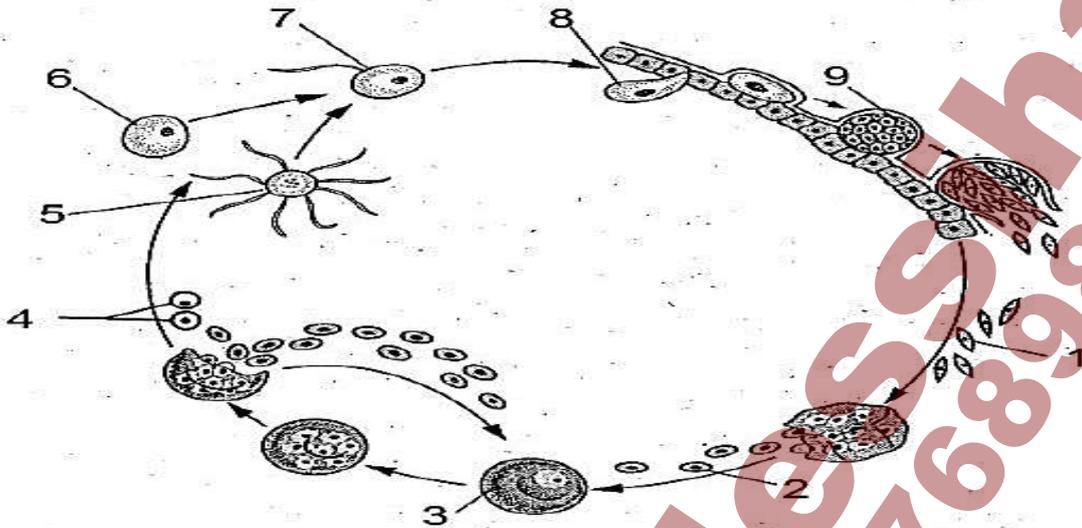
- a- When does this stage of conjugation happen?
when condition improve
- b- What is the kind of division that happen in x and y ?
(X) \rightarrow meiosis , (Y) \rightarrow mitosis
- c- What is the name of phase (K)? Mention the chromosomal number of this phase.
(c) Zygospore (2n)

(25) In the following diagram, if you know that (x) is a cell in the queen of bee, answer the following:



- 1- What do cells (Y and L) represent and how are they formed?
-They present :unfertilized ova, & are formed by meiosis division
- 2- What is the kind of reproduction from which individuals (Z) develop and what is the kind of their sex?
-Sexual reproduction by fusion of gametes – females (according to the type of food)
- 3- What is the kind of reproduction from which individuals (M) develop and what is the kind of their sex?
-Asexual reproduction by natural parthenogenesis – males (drones)

(26) The following diagram that represents the life cycle of plasmodium malaria.



a- Write the name of labeled structures .

-1-sporozoites

2-merozoites

3-red blood cell

4-gametocytes

5-male gametes

6-female gamete

7-Zygote

8-Ookinete

9-Oocyst .

b- Write the name of each stage of the following.

1. In which the meiosis division occurs.
2. It infects the hepatic cell of the human.
3. It penetrates the stomach wall of the mosquito.
4. It causes the malaria symptoms.
5. It presents in the mosquito's saliva.
6. the infective stage for the human R.B.C.s.

(Ookinete)

(Sporozoites)

(Ookinete)

(Merozoites)

(Sporozoites)

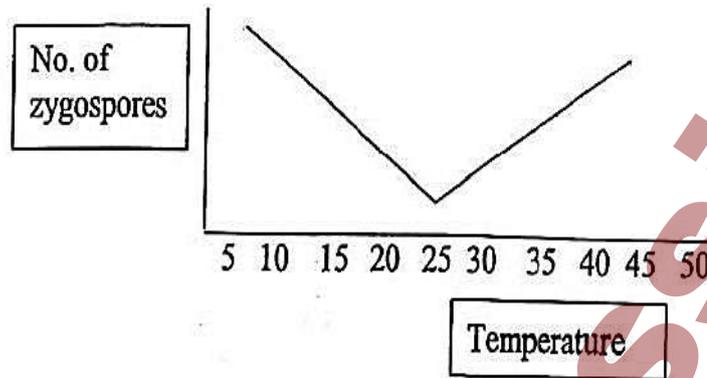
(Merozoites)

c- Mention the haploid stages in the life cycle of plasmodium.

- Gametocytes ,male and female gametes , Sporozoite , Merozoites and the oocyst.

(27) Mention the ideal temperature for growth of Spirogyra filaments?

- Ans.: 25



Draw labeled diagram to show:-

- 1-Reproduction by Sporogony in bread mould
- 2-Scalariform conjugation in spirogyra
- 3-Lateral conjugation in spirogyra
- 4-The life cycle of Polypodium
- 5-Steps of pollen grain formation (T.S. in big anther)
- 6-Steps of pollen grain germination
- 7-Steps of ovule formation
- 8-L.S. in mature flower ovary
- 9- Fertilization in plants (L.S. in plant ovary during fertilization)
- 10- Complete labeled diagram to show fertilization process starting from falling of pollen grain on the stigma.