

## BIO BOTANY 1M, 3M & 5M

1 Marks:

### I. BIO DIVERSITY

1. The basic unit of classification is  
 a. genus                      **b.species**                      c.family                      d.taxon
2. Unicellular plants found floating in oceans and freshwater are called  
 a. algae                      b.zooplanktons                      **c.phytoplanktons**                      d.epiphytes
3. Carolus Linnaeus proposed the following system of classification  
 a. Phylogenetic                      **b. Two kingdoms**                      c. Five Kingdoms                      d. Natural
4. T.M.V has the following symmetry.  
 a. Cubical                      **b. helical**                      c.atypical                      d.square
5. The infective nature of virus is due to  
 a. protein coat                      **b. nucleic acid**                      c. envelope                      d.tail fibres.
6. Developing a vaccine for SARS is difficult because  
 a. it spreads by infectious materials                      b. it is an enveloped virus  
**c. it is constantly changing it's form**                      d. it has ssRNA
7. The chlorophyll pigment found in green sulphur bacteria is  
 a. bacteriochlorophyll                      **b.bacterioviridin**                      c.phycocyanin                      d.phycoerythrin
8. Cell which keeps changing it's shape is called  
 a. Spirilla                      **b.Pleomorphic**                      c. Symbiont                      d. Gram – negative
9. The study of Fungi is called  
 a. phycology                      b. plant pathology                      c. systematics                      **d.mycology**
10. The fungal cell wall is made up of  
 a. **chitin**                      b. cellulose                      c. pectin                      d. peptidoglycan
11. Phycology is the study of  
 a. plants                      b.virus                      **c.Algae**                      d.bacteria
12. Production of gametes in Bryophytes involve  
 a. Meiosis                      **b. Mitosis**                      c. fertilization                      d. reduction division

## II.CELL BIOLOGY

13. The process in which DNA is constantly read out into a particular set of mRNA is called  
 a. translation      b.protein synthesis      c.DNA duplication      **d.transcription**
14. The process of changing the form in order to carry out a specialized function is called  
 a. **differentiation**      b.growth      c. cell division      d. cell elongation
15. An exception to cell theory is  
 a. **fungi**      b.bryophyte      c. seed plant      d.pteridophyte
16. The extra-chromosomal DNA found in the bacterium *E.coli* is called  
 a. mesosome      b. nucleoid      c. incipient nucleus      **d. plasmid**
17. The addition of wall materials within the existing one is called  
 a. accretion      **b.intussusception**      c.apposition      d. deposition
18. Active transport of molecules take place  
 a. along the concentration gradient      b. along the electric gradient  
 b. along the pressure gradient      **d. against the concentration gradient**
19. Phagocytosis is also known as  
 a. **cell eating**      b.cell death      c.cell drinking      d.cell lysis
20. The spaces inside the folds of ER membrane are known as  
 a. thylakoids      **b.cisternae**      c.mesosomes      d.periplasmic space
21. These are colourless plastids  
 a. chromoplasts      b. chloroplasts      c. elaioplasts      **d. leucoplasts**
22. The internal system of inter-connected membrane-limited sacs of chloroplasts are called  
 a. grana      b.stroma      **c.thylakoids**      d.cisternae
23. During this phase there is a duplication of DNA  
 a. G1 Phase      **b. S phase**      c. G2 Phase      d. interphase
24. Cytokinesis is the division of  
 a. **cytoplasm**      b.nucleus      c.chloroplast      d. centriole
25. Terminalisation takes place during  
 a. pachytene      b. zygotene      c. leptotene      **d. diakinesis**

### III. PLANT MORPHOLOGY

26. The type of phyllotaxy found in *Calotropis* is  
 a. alternate **b. opposite decussate**  
 c. opposite superposed d. ternate
27. Spike is a type of  
 a. **Racemose inflorescence** b. Cymose inflorescence  
 b. Mixed inflorescence d. Special inflorescence
28. *Dorstenia* an example for  
 a. raceme b. panicle c. spadix **d. coenanthium**
29. This is a homogamous head with ray florets  
 a. *Vernonia* b. *Tridax* **c. *Launaea*** d. *Helianthus*
30. *Musa* in an example for  
 a. spadix b. mixed spadix **c. compound spadix** d. none of the above
31. Flowers are unisexual in  
 a. **cyathium** b. thyrus c. verticillaster d. cyme
32. The most conspicuous and characteristic structure of Angiosperm is  
 a. **Flower** b. Seeds c. Fruits d. leaves
33. The number of whorls present in a bisexual flower is  
 a. One b. Three c. Two **d. Four**
34. A flower is said to be complete when it has  
 a. One whorl b. Three whorls c. Two whorls **d. Four Whorls**
35. Timorous Flowers are common among  
 a. Dicots b. Xerophytes **c. Monocots** d. Gymnosperms
36. In deciduous type of calyx, the sepals fall off  
 a. **As soon as flower opens** b. After fertilization  
 b. In the bud condition d. All the above
37. When anthers have two chambers, they are described as  
 a. Dioecious **b. Dithecous** c. Diadelphous d. Dimorphic
38. Gynoecium with united carpels is termed as  
 a. Apocarpous b. Multicarpellary **c. Syncarpous** d. None of the above.

39. The type of placentation seen in cucumber is  
 a. Basal                      **b. Parietal**                      c. Axile                      d. Marginal
40. Seeds are produced from the  
 a. Ovary                      b. Carpels                      **c. Ovules**                      d. Locules
41. Seedless Grapes are the  
 a. Simple Dry fruits                      b. Multiple fruits  
 b. Aggregate fruits                      **d. Parthenocarpic Fruits**
42. Which is the edible portion in berry?  
 a. Epicarp                      b. Endocarp                      c. Mesocarp                      **d. All the above**
43. Coconut belongs to  
 a. **Drupe**                      b. Syconus                      c. Baccate                      d. Aggregate
44. The type of fruit seen in Jack is  
 a. Multiple fruit                      **b. Syconus**                      c. Sorosis                      d. Aggregate

#### IV.GENETICS

45. Moist vapour theory was given by  
 a. Aristotle                      **b.Pythagoras**                      c. Delepatius                      d. Darwin
46. Blending theory was replaced by particulate theory of  
 a. Kolreuter                      b. Gaertner                      **c. Mendel**                      d. Darwin
47. The grand children may exhibit a feature of an earlier generation not seen in parents. This is called  
 a. Homunculus                      b. Pangenesis                      **c. Atavism**                      d. Blending
48. The village where Mendel was born is  
 a. Heizendors                      **b. Silisian**                      c. Brunn                      d. Austria
49. The cross which proves that sex has no influence on inheritance is  
 a. Back cross                      b. Test cross                      **c. Reciprocal cross**                      d. Monohybrid cross
50. The recessive state for seed coat colour is  
 a. Green                      b. Grey                      c. Yellow                      **d. White**
51. The smallest unit of the gene which codes for an amino acid is  
 a. Cistron                      b. Muton                      c. Recon                      **d. Codon**
52. The functional unit of a gene which can synthesize one polypeptide is called  
 a. Codon                      **b. Cistron**                      c. Muton                      d. Recon

53. The gene is present at a specific position on the chromosome called  
 a. **Locus**      b. Nucleotide      c. Nucleoside      d. Allele
54. The chromosomal basis of inheritance was given by  
 a. Schleiden & Schwann      **b. Sutton & Boveri**  
 c. Singer & Nicholson      d. Morgan & Bridges
55. Incomplete dominance is also called  
 a. Intermediate inheritance      b. Blending inheritance  
 b. Partial dominance      **d. All the above**
56. The phenomenon of intermediate inheritance is observed in  
 a. *Lathyrus*      **b. Antirrhinum**      c. *Cucurbita*      d. Maize
57. The phenotypic ratio of incomplete dominance is  
**a.1:2:1**      b.3:1      c.9:3:3:1      d.1:1
58. Inheritance of flower colour in *Lathyrus odoratus* was studied by  
 a. Morgan & Bridges      **b. Bateson & Punnett**  
 c. Sutton & Boveri      d. Schleiden & Schwann
59. The inheritance of fruit colour in *Cucurbita pepo* gives a ratio of  
 a. 13:3      **b. 12:3:1**      c.9:7      d.9:3:4
60. A ratio of 15:1 is observed in  
 a. Sweet pea      b. *Cucurbita pepo*      **c. Rice**      d. *Sorghum*

### V. PLANT PHYSIOLOGY

61. The protoplasm was considered as a polyphase colloidal system by  
 a. Altmann      b. Hemming      **c. Wilson Fisher**      d. Butschili
62. The movement of water into and out of cells is controlled by  
 a. **Water potential**      b. Endosmosis      c. Exosmosis      d. Plasmolysis
63. Flow of matter from a region of higher concentration to a region of lower concentration is called  
 a. Imbibition      b. Osmosis      **c. Diffusion**      d. Plasmolysis
64. The principle used in pickling is  
 a. Imbibition      b. Endosmosis      **c. Plasmolysis**      d. None of the above
65. During the day the guard cells experience  
 a. exosmosis      **b. endosmosis**      c. fall in turgor      d. loss of water

66. The starch -sugar interconversion theory was given by  
 a. **Steward**      b. Scarth                      c. Levitt              d. Raschke
67. The relay pump theory was put forward by  
 a. Godslewski    **b. J.C.Bose**                      c. Stocking      d. Dixon.
68. J.C. Bose gave the  
 a. **relay pump theory**                      b. root pressure theory  
 c. pulsation theory                      d. cohesion - tension theory.
69. Lignin and cellulose have affinity for water. This is called  
 a. adhesion      b. cohesion                      **c. root pressure**      d. none of the above
70. The transpiration pull theory was supported by  
 a. **Renner**      b. Curtis                      c. Clark              d. All the above
71. Hydroponics is otherwise called  
 a. soil-less agriculture (b) tank farming      (c) chemical gardening **(d) all the above**
72. This element is a constituent of chlorophyll  
 a. Manganese **(b) Magnesium**      (c) Potassium      (d) Zinc
73. The theory explaining passive absorption of mineral salts is :  
 a. **Ion exchange**      b. Carrier Concept      c. Cytochrome pump theory      d. None of the above.
74. Contact exchange theory was put forward by:  
 a. **Jenny and Overstreet**                      b. Hylmo and Kramer  
 c. Bennet and Clark                      d. De Vries and Curtis

## VI. REPRODUCTION BIOLOGY

75. In Hibiscus vegetative reproduction takes place by  
 a. **Stem**                      b. Bud                      c. Rhizome                      d. Leaf.
76. The plant which propagate with the help of its leaves is  
 a. Onion                      b. Cactus                      c. Potato                      **d. Bryophyllum**
77. The embryo sac in a typical dicot at the time of fertilization is  
 a. 8 celled      b. 6 celled                      **c. 7 celled**                      d. 5 celled
78. Process of fusion between male and egg nuclei are  
 a. **Syngamy**                      b. Conjugation                      c. Double fertilization      d. Triple fusion

79. Micropyle occurs in  
 a. Ovary                      b. Seeds                      **c. Ovule**                      d. Both (a) and (c)
80. The Micropyle in a seed helps in the entry of  
 a. Water                      b. Male gamete                      **c. Pollen tube**                      d. None of these
81. Single cotyledon of a monocot seed is  
 a. Plumule                      b. Epicotyl                      **c. Scutellum**                      d. Coleorrhiza
82. Hypogeal germination of albuminous seed is seen in  
 a. **Maize**                      b. Castor                      c. Gram                      d. Bean
83. Vivipary is a characteristic feature of  
 a. Mesophytes                      **b. Halophytes**                      c. Xerophytes                      d. Hydrophytes.
84. Germination of the seed is promoted by  
 a. Green light                      b. Red light                      c. Blue light                      **d. Infra red light**
85. Which one of the following generally increases during senescence?  
 a. Protein                      b. Chlorophyll                      c. Photosynthesis                      **d. Respiration**
86. Senescence of detached leaves can be delayed by the use of  
 a. Auxin                      b. Giberellin                      **c. Cytokinin**                      d. Ethylene
87. Yellowing and shedding of leaves in autumn in many trees is an example of  
 a. Over all senescence                      **b. Deciduous senescence**  
 c. Top senescence                      d. Progressive Senescence

## VII. ENVIRONMENTAL BIOLOGY

88. Finely dissected leaves are common in  
 a. **Submerged plants**                      b. Amphibious plants  
 c. Free floating plants                      d. Rooted floating plants
89. The root pockets are present instead of root caps in  
 a. Utricularia                      **b. Eichhornia**                      c. Hydrilla                      d. Limnophylla
90. Deforestation may reduce the chances of  
 a. **Rainfall**                      b. Land slides                      c. Soil erosion                      d. Frequent cyclones
91. Soil erosion can be checked by  
 a. Wind screen alone                      b. Restricted human activity  
 c. Checking movement of animals                      **d. Good plant cover**

92. Common sources of energy used in Indian villages is  
 a. Electricity                      b. Sun                      c. Coal                      **d. Wood and animal dung**
93. Which of the following is non- renewable?  
 a. Water                      **b. Coal**                      c. Forests                      d. Wild life

### **2&3 Marks:**

### **I.BIO DIVERSITY**

#### **1. What are the aims of classification?**

- It becomes easy to study the character of particular group or category.
- Help us to understand the diversity better.

#### **2. Define Taxonomy.**

- The branch of biology dealing with identification, naming and classifying the living organisms is known as **Taxonomy**.

#### **3. Define phylogeny.**

- The evolutionary history of a particular taxon like species is called phylogeny.

#### **4. What are Archaeobacteria?**

- Prokaryotic organism.
- Can live in extreme environmental condition like, absence of oxygen, high temperature, etc.

#### **5. Define systematics.**

- The word **Systematics** means to put together.
- Systematics may be defined as the systematic placing of organisms into groups or **taxa** on the basis of certain relationships between organisms.

#### **6. What are oncogenic viruses?**

- Viruses which have a capacity to cause cancer is called oncogenic viruses. E.g: Simian virus(S40).

#### **7. What are interferons?**

- They are the host coded proteins of cytokine family that inhibit viral replication.
- They are believed to be the part of body's first line of defense against viral infection.

**8. Name any two plant diseases / animal diseases/human diseases caused by viruses?**

- **Plant diseases** - Tobacco mosaic virus (TMV), cucumber, etc.
- **Animal diseases** - Foot and mouth disease in cattle, Rabies, etc.
- **Human diseases** - Chicken pox, AIDS, SARS, etc.

**9. Name some antibiotics obtained from bacteria.**

- Bacitracin - *Bacillus subtilis*.
- Polymyxin - *bacillus polymyxa*.
- Streptomycin - *streptomyces griceus*.

**10. What are haustoria?**

- Obligate parasites often possess specialized penetration and absorption devices called **Haustoria**.

**11. What is agar agar?**

- The substance which is used as a culture medium for the growing bacteria and fungi in lab.
- Used to prepare medicine.
- Obtain from red algae.

**12. What is SCP?**

- **SCP** - Single Cell Protein.
- Unicellular algae are rich in protein.
- They are used as protein source.

**13. Define heterospory.**

- **Heterospory** i.e they produce two types of spores **microspores** and **megaspores**.

**II.CELL BIOLOGY****1. List out the functions of Cell membrane/ plasma membrane?**

- Gives shape to the cell.
- Controls the inner organelles.

**2. List out the functions of Cell wall.**

- Gives shape to the cell.
- Gives rigidity to the cell.
- Prevent the bursting of cell.

**3. List out the Functions of nucleus?**

- It controls all the metabolic activity.
- Controls the cell division.
- Controls the inheritance of characters.

**4. Name the three kinds of plastids.**

- Chloroplast.
- Chromoplast.
- Leucoplast.

**5. What is polysomes?**

- At the time of protein synthesis many ribosomes line up and join an mRNA chain to synthesise many copies of a particular polypeptide. Such a string of ribosomes is called **polysome**.

**6. Define - Active transport?**

- Movement of molecules or ions **against the concentration gradient**.
- Moving from lower to higher concentration.

**7. Define – passive transport?**

- Passive Transport of materials across the membrane requires no energy by the cell and it is unaided by the transport proteins.

8. Draw the ultra structure of the Nucleus.

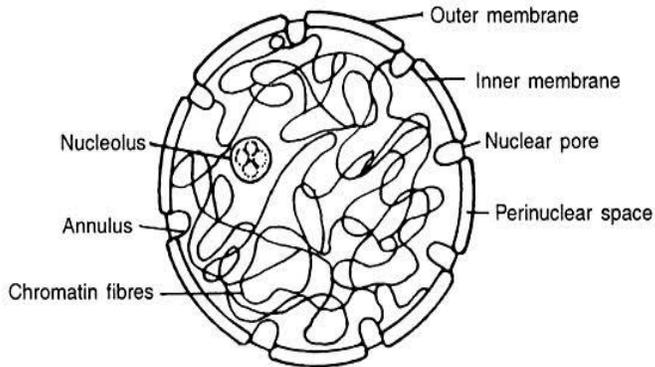


Fig. 2.1. Ultrastructure of Nucleus.

9. Draw the ultra structure of Mitochondria.

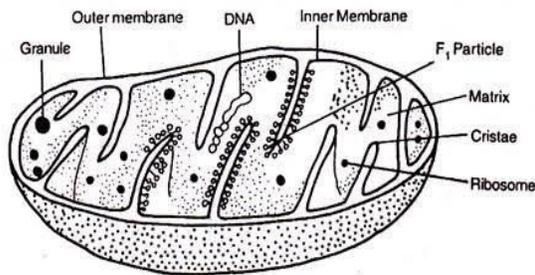


Fig. 1.19 (a) Mitochondrion cut open to show the inner structures.

10. Draw the ultra structure of chloroplast.

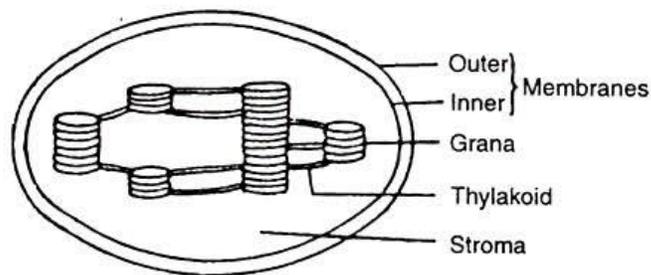
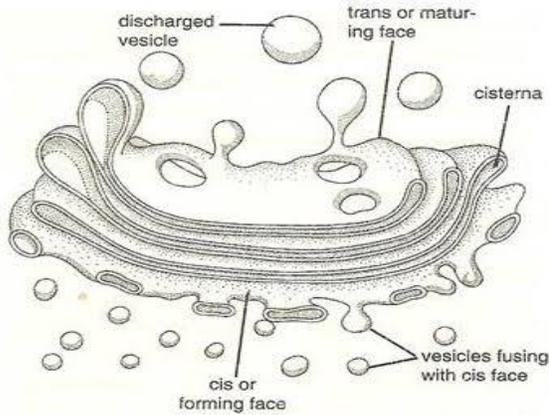
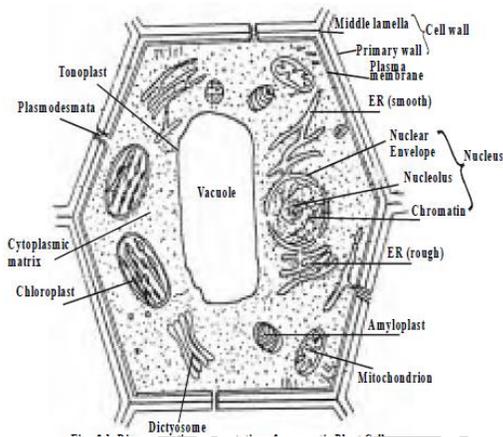


Fig. 2.3. Ultrastructure of chloroplast.

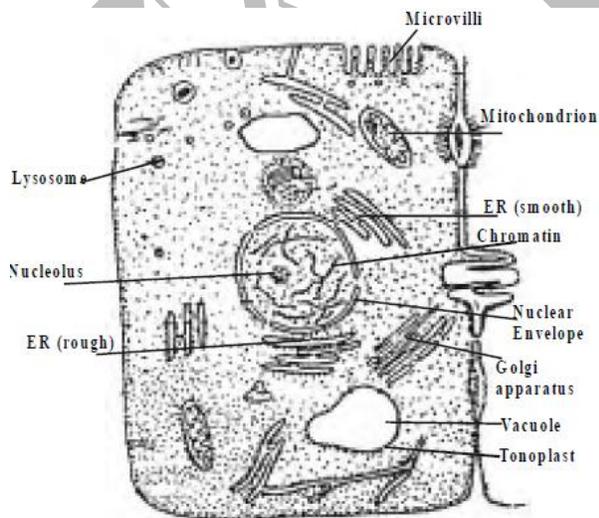
11. Draw the ultra structure of the Golgi apparatus.



12. Draw the ultra structure of an animal cell.



13. Draw the ultra structure of a plant cell.



### III. PLANT MORPHOLOGY

#### 1. Name any two vegetative organs/ reproductive organs of a flowering plant.?

- **Vegetative organs** - Root, stem and leaves.
- **Reproductive organs** - flowers, fruits and seed

#### 2. Define aestivation.

- The mode of arrangement of either **sepal** or **petal** of a flower in bud condition is called aestivation.

#### 3. What is a bisexual flower?

- When a flower has both male (**Androecium**) and female (**Gynoecium**) sex organs is called bisexual flower

#### 4. Distinguish between monothealous and dithealous anthers.

- **Monothealous** - Anthers have one lobe with two microsporangia.
- **Dithealous** - Anthers having two lobe with four microsporangia.

#### 5. Distinguish between apocarpous and syncarpous ovary.

- **Apocarpous ovary** - when the carpels are free in multicarpellary ovary E.g: polyalthia.
- **Syncarpous ovary** - when the carpels are united in multicarpellary ovary E.g: Hibiscus.

#### 6. Define fruit.

- Fruit may be defined as a fertilized and developed ovary.

#### 7. What are the three groups of fruits?

- Fruits are classified into three groups namely **simple**, **aggregate** and **multiple** fruit.

#### 8. Define simple fruit.

- It develops from a single flower which may be a monocarpellary or multicarpellary ovary.

#### 9. What are the two processes necessary for the development of fruits?

- **Pollination** and **fertilization** are the two process namely necessary for the development of seed and fruit.

#### 10. Define Aggregate fruit.

- Developed from a single flower that has multicarpellary apocarpous ovary.
- Collection of simple fruit E.g: Polyalthia.

### 11. What are monoecious plants?

- When the male and female flowers are produced in a same plant called monoecious plants.  
E.g: maize,etc.

## IV.GENETICS

### 1. Name the three scientists who rediscovered Mendel's work

- Carl correns of germany
- Hugo de vries of Holland
- Tschamak of Austria.

### 2. Define true breeding

- The breeding plants are those which produce same type of offsprings for any number of generation when selfed.

### 3. Define : Exon / Intron / Splicing / Codon.

- **Exon** - In eukaryotes the coding region of the DNA strand called Exons.
- **Introns** - DNA segment which do not carry genetic information.
- **Codon** - The sequence of three nucleotide code for an amino acid is called codon.

### 4. Define incomplete dominance.

- When two pure breeding individuals are crossed, the F<sub>1</sub> hybrids do not resemble either of the parents.
- The allelomorphic pair showed partial expression.

### 5. Define Epistasis.

- The suppression of the gene on one locus of a chromosome by the gene present at some other locus is called **Epistasis**.

## V. PLANT PHYSIOLOGY

### 1. Define Stoma.

- **Stomata** are minute openings on the epidermis of leaves and stems.
- Most of the water lost by transpiration (about 95%) takes place through the stomata.

### 2. Define Hydroponics.

- Used for the growth of the plants in water and sand culture.
- This may also referred as soil – less agriculture, Test tube forming,etc.

**3. Define Transpiration.**

- The loss of water as water vapour through the stomata of leaves is called Transpiration.

**4. Define Tyndall effect.**

- The scattering of a beam of light by the particles of a colloid is termed **tyndall effect**.
- This is a property of the protoplasm.

**5. Define Brownian movement.**

- The particles of the protoplasm show a zig-zag movement.
- This **random** motion of particles is called Brownian movement.

**6. Define Diffusion.**

- Movement of **Solid, liquid or gas** from higher to lower concentration.

**7. Define Osmosis.**

- Movement of **Solvent** from higher to lower concentration.

**5Marks:****II.CELL BIOLOGY****1. Tabulate the differences between Plant cell and Animal cell.**

	<b>Plant cell</b>	<b>Animal cell</b>
<b>1.</b>	It has cell wall made up of cellulose	Plasma membrane is outer covering layer.
<b>2.</b>	Definite and permanent shape	It can change its shape
<b>3.</b>	Plastids is present	Plastids are absent.
<b>4.</b>	Lysosome are present in Eukaryotes only	Lysosome are present in all cells
<b>5.</b>	Larger than animal cell.	Small in size.
<b>6.</b>	Starch is the storage material.	Glycogen is the storage material.
<b>7.</b>	Symmetrical	Asymmetrical

## 2. Tabulate the differences between Prokaryotes and Eukaryotes.

Property	Prokaryotic	Eukaryotic
Size	Very small.	Most are large cells.
Cell division	Binary fission	Mitosis and Meiosis
Sexual system	Absent in most forms	Present in most forms
Flagella type	Only one fibril.	9+2 type.
Cell wall	Made of peptidoglycan	Made of cellulose
Ribosomes	Smaller 70s type	Larger 80s type
DNA	Not found in chromosomes.	Found in chromosomes.

## III. PLANT MORPHOLOGY

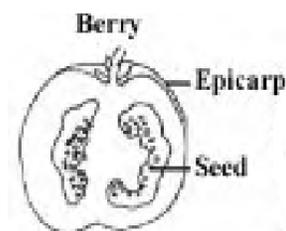
### 1. Explain different types of fleshy fruits with suitable examples.

#### Simple Fleshy Fruits:

- Part of the pericarp is juicy and ripe.
- Differentiated into Three layers **Epicarp**, **Mesocarp**, and **Endocarp**.
- Fleshy fruits are divided into **Baccate** and **drupaceous**.

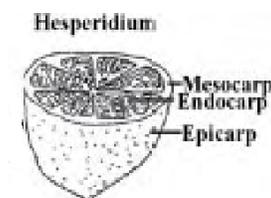
#### 1. Berry E.g Tomato:

- Many seeded fruit.
- Epicarp is thin, Mesocarp and Endocarp is Undifferentiated.
- Seeds are edible and embedded.



#### 2. Hesperidium E.g: Lemon.

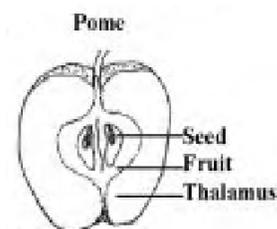
- Baccate fruit.
- Fruit wall made of three layers – Epicarp, mesocarp and endocarp.



- Seeds are covered by juicy hairs.

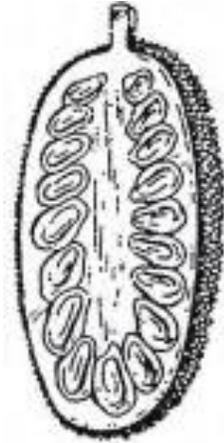
#### 3. Pome E.g: Apple

- True fruit contains seeds inside.
- It is a fleshy and a false fruit.
- Edible part is fleshy thalamus.



## 2. Describe multiple fruit with a suitable example.

- All the flowers are grouped together to give a single big fruit.
- Jack fruit - sorosis type
- All the female inflorescence fuse together form fruit.
- The edible part of the fruit represent the perianth.
- The pericarp is bag like and single seeded.
- The sterile, occurs in the form of numerous, elongated, whitish flat structure in between the edible flakes.



## 3. Give an account on different types of aestivation with example.

- The mode of arrangement of tepal or sepal in a bud condition is called aestivation.

### i. Valvate aestivation:

- Sepal or tepal in a whorl is just meet by their edges. E.g: *Hibiscus*

### ii. Twisted aestivation:

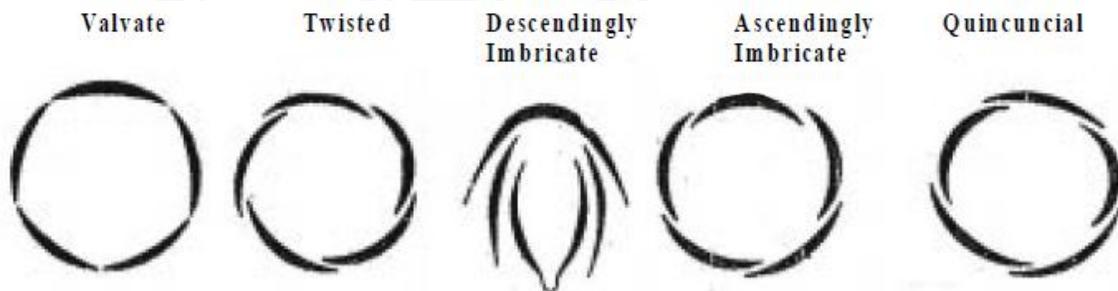
- One margin of each sepal or tepal overlaps the next one. E.g: *Petals of Hibiscus*.

### iii. Imbricate:

- One sepal or tepal is overlap on both the margins E.g: *Corolla of Fabaceae*

### iv. Quincuncial:

- In this two petals are internal two petals are internal and the fifth is internal and external.  
E.g: *Guava*



## IV.GENETICS

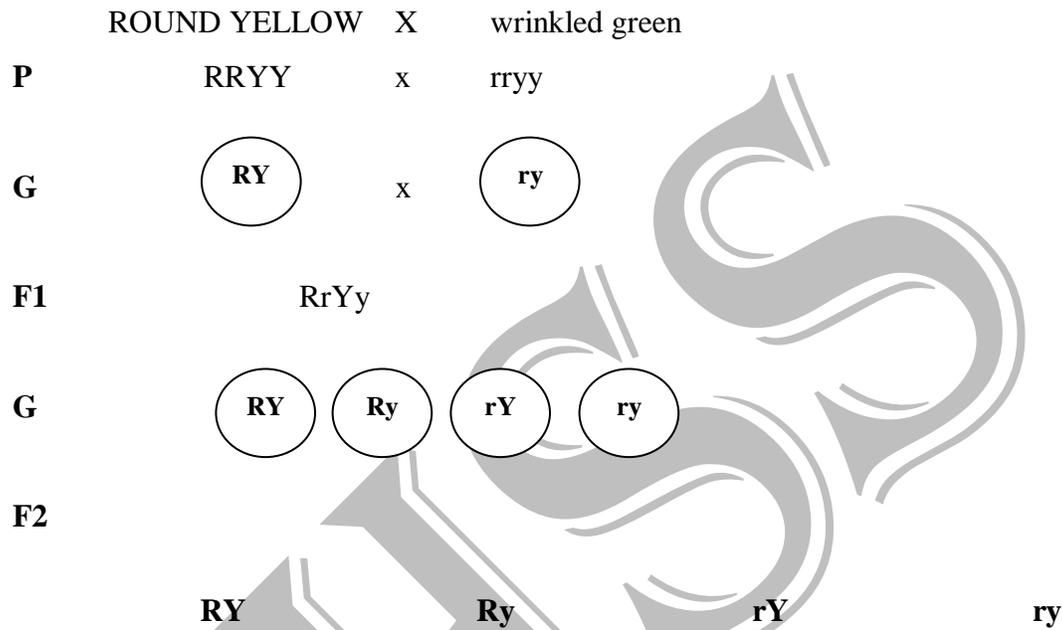
### 1. Write an essay on Mendel's Dihybrid cross.

#### DIHYBRID CROSS

- Mendel experimentally studied the segregation and transmission of two pairs of contrasting characters at a time. This was called the **Dihybrid cross**

#### F1 generation

- Yellow seeds give Yellow colour
- Green seeds give Green colour
- but in the F2 generation 4 types of combinations appeared
- **Phenotypic ratio 9:3:3:1**



<b>RY</b>	RRYY Round Yellow	RRYy Round Yellow	RrYY Round Yellow	RrYy Round Yellow
<b>Ry</b>	RRYy Round Yellow	RRyy <u>Round Green</u>	RrYy Round Yellow	Rryy <u>Round Green</u>
<b>Ry</b>	RrYY Round Yellow	RrYy Round Yellow	rrYY <u>Wrinkled Yellow</u>	rrYy <u>Wrinkled Yellow</u>
<b>Ry</b>	RrYy Round Yellow	Rryy <u>Round Green</u>	rrYy <u>Wrinkled Yellow</u>	rryy <u>Wrinkled Green</u>

2. Describe the Inheritance of glume colour in *Sorghum*.

GLUME IN SORGHUM PLANT

P PPqq x ppQQ

G  $\textcircled{Pq}$  x  $\textcircled{pQ}$

F1 PpQq

G  $\textcircled{PQ}$   $\textcircled{Pq}$   $\textcircled{pQ}$   $\textcircled{pq}$

F2

	PQ	Pq	pQ	pq
PQ	PPQQ Red	PPQq Red	PpQQ Red	PpQq Red
Pq	PPQq Red	Ppqq <u>Purple</u>	PpQq Red	Ppqq <u>Purple</u>
pQ	PpQQ Red	PpQq Red	ppQQ <u>Brown</u>	ppQq <u>Brown</u>
pq	PpQq Red	Ppqq <u>Purple</u>	ppQp <u>Brown</u>	Ppqq <u>Brown</u>

Phenotypic ratio- 9:3:4

3. Explain inheritance of fruit colour in *Cucurbita pepo*.

- In the presence of W - White
- In the absent of W and present of Y - Yellow
- In the absent of W and Y - Green

**CUCURBITA PEPO**

**P** WWYY x wwyy

**G** WY x wy

**F1** WwYy

**G** WY Wy wY wy

**F2**

	WY	Wy	wY	wy
WY	WWYY White	WWYy White	WwYY White	RrYy White
Wy	WWYy White	WWyy White	WwYy White	Rryy White
wY	WwYY White	WwYy White	wwYY <u>Yellow</u>	rrYy <u>Yellow</u>
Wy	WwYy White	Wwyy White	wwYy <u>Yellow</u>	wwyy <u>Green</u>

**Phenotypic ratio- 12:3:1**

## BIO ZOOLOGY

### 1Marks:

1. The theme of the world summit on environment held in Johannesburg in 2002 was  
a) only one earth    b) our common future    **c) sustainable earth**    d) energy crisis
2. The introduction of phylogeny in taxonomy was made by  
a) Cuvier                **b) Lamarck**                c) Charles Darwin    d) Linnaeus
3. If two or more workers describe the same organism using different names it results in  
a) homonyms            **b) synonyms**                c) a valid name        d) nomenclature
4. Which among the following is a pseudocoelomate?  
a) platyhelminthes    b) Annelids                c) Mollusca                **d) Nematoda**
5. Five Kingdom concept does not include  
a) fungi                **b) viruses**                c) flowering plants    d) bacteria
6. Which among the following is considered 'a blood fluke'  
**a) Schistostoma**    b) Taenia solium        c) Fasciola                d) Ascaris
7. The head formation or cephalization happened for the first time in the Phylum  
a) Arthropoda            **b) Annelida**                c) Mollusca                d) Echinodermata
8. Which among the following is considered as a connecting link between Annelida and Arthropoda  
a) Centipede            b) Cockroach                **c) Peripatus**                d) Spiders
9. The characteristic feature of echinoderms is the possession of  
a) compound eye                b) absence of coelom  
c) diploblastic condition                **d) water vascular system**
10. Acrania refers to  
a) fishes                b) birds                c) chordates                **d) prochordates**
11. The segmented body muscles in fishes are called as  
**a) myotomes**    b) smooth muscles    c) skeletal muscles    d) visceral muscles
12. Which among the following is considered as a defeated group  
**a) amphibians**    b) reptiles                c) mammals                d) fishes
13. The amniotes are characterised by the presence of  
a) four legs                b) amphibious life                **c) egg membranes**    d) metamorphosis

14. Which among the following is not a character of mammals  
 a) diaphragm      **b) right aortic arch**    c) mammary glands    d) corpus collosum
15. The infective stage of plasmodium is  
 a) cryptozoite    b) amoebula      **c) sporozoite**      d) merozoite
16. In earthworm the clitellum is present in segments  
 a) 5 to 10      **b) 14 to 17**      c) 13 to 18      d) 20 to 25
17. The muscle fold found in the dorsal wall in the intestine of the earthworm is  
 a) diaphragm    **b) Typhlosole**    c) myotome      d) ommatidium
18. The chlorogogen cells on the wall of the intestine in earth worm is meant for  
 a) digestion      b) circulation      **c) excretion**      d) reproduction
19. The uropygeal gland of pigeon are found  
**a) above the tail**      b) in the alimentary canal  
 c) in the brain      d) in the reproductive system
20. The hollow bones of birds are called as  
**a) pneumatic bones**    b) fused bones      c) skull bones      d) limb bones

### CELL BIOLOGY

21. Living cells which are we cannot be viewed in a / an  
 a)Compound microscope      b) Phase - contrast microscope  
 c)Electron microscope      d) Dark - field microscope.
22. The increase in size of optical image over the size of the object is known as  
 a. limit of resolution      (b) transmission      **(c) power of magnification**    (d) conductance
23. The name 'cell' was coined by  
 (a) Leeuwenhoeck      **(b) Robert Brown**    (c) Robert Hook      (d) Galileo
24. In a microscope the light is focussed on the object through  
**(a) condenser lens**      (b) objective lens      (c) ocular lens      (d) oil immersion lens
25. A three dimensional image of the object can be produced using  
 a)compound microscope      (b) dark-field microscope  
 b)transmission electron microscope      **d) scanning electron microscope**
26. In microscopy a nucleus is normally stained using  
 (a) Neutral red      (b) Janus green B      (c) Eosin      **(d) Hematoxylin**

27. In cytological technique Bouin's solution is used for  
 (a) **fixation** (b) dehydration (c) cleaning (d) embedding
28. A unit membrane hypothesis for plasma membrane structure was provided by  
 (a) Overton (b) Daveson (c) **Robertson** (d) Nicholson
29. In the plasma membrane the lipid bilayer is covered by  
 (a) **proteins** (b) carbohydrates (c) water molecules (d) nucleic acid
30. The role of mitochondria in oxidative phosphorylation was explained by  
 (a) **Leninger** (b) Embden (c) Krebs (d) Meyer hoff
31. Which of the following is called as the cell respiratory organelle  
 (a) ribosomes (b) lysosomes (c) golgi bodies (d) **mitochondria**
32. The ribosomes are meant for  
 (a) phosphorylation (b) respiration (c) **protein synthesis** (d) oxidation
33. Which of the following organelle forms the intra cellular transporting system  
 (a) mitochondria (b) lysosomes (c) **Endoplasmic reticulum** (d) ribosomes
34. Which of the following cell may not contain golgi apparatus  
 (a) epithelial cells (b) glandular cells (c) **RBC** (d) secretory cells
35. The lysosome originates from  
 (a) mitochondria (b) ribosomes (c) nucleus (d) **golgi apparatus**
36. The movement of the flagellum is regulated by  
 (a) plasma membrane (b) nucleus (c) **basal body** (d) ribosomes
37. The number of nucleus (nucleii) in matured mammalian erythrocytes is  
 (a) one (b) many (c) two (d) **nil**

### **HUMAN ANATOMY**

38. The cornified region of the skin is formed of  
 a) stratum lucidum (b) stratum basale (c) stratum spinosum (d) **stratum corneum**
39. The goose flesh is formed due to the contraction of  
 a) diaphragm (b) **errector pili** (c) trapezius muscle (d) gluteus maximus
40. The number of facial bones are  
 a) 26 (b) 25 (c) **14** (d) 22
41. The cervical vertebra supporting the head is  
 a) axis (b) **atlas** (c) sacral (d) lumbar

42. The broadest muscles are named as  
 a) deltoid      b) gracilis      c) longus      **d) lattismus**
43. The major breathing movement is due to  
 a) scalene      b) thoracic      **c) diaphragm**      d) intercostals
44. The largest salivary glands are  
**a) parotid**      b) submandibular glands      c) sublingual glands      d) labial glands
45. The length of the duodenum in human alimentary canal is  
 a) 8 cm      b) 1.8 m      c) 9 cm      **d) 25 cm**
46. Breathing process can be interfered with due to  
 a) closure of the ileo-colic valve      **b) enlargement of the tonsil**  
 c) closure of pyloric sphinctes      d) vibration of the vocal cord
47. The reduction in blood pressure may be caused due to  
 a) distributing vessels      **b) resistance vessel**      c) exchange vessels      d) reservoir vessels
48. Vaso-dilation and vaso-constriction are caused by  
 a) tunica intima      b) exchange vessels      **c) tunica media**      d) tunica adventitia
49. The wall of the blood vessels are supplied with blood by  
 a) vasa nervosum      b) exchange vessels      **c) vasa vasorum**      d) capacitance vessels
50. Spleen is located on the left side of  
**a) the abdominal cavity**      b) the thoracic cavity      c) the lung      d) the kidney
51. The synapses are formed between  
 a) nerves and muscles      **b) nerve tissues**      c) capillaries      d) organs
52. The cerebral hemispheres are connected by a sheet of nerve fibres called  
 a) corpora quadrigemina      b) choroid plexus      **c) corpus callosum**      d) cauda equina
53. The interocular pressure is maintained by  
**a) aqueous humor**      b) vitreous humor      c) cerebro spinal fluid      d) lymph fluid
54. The hypophysis is connected with the brain through  
 a) pars tuberalis      b) adeno hypophysis      **c) hypothalamus**      d) pars distalis
55. The average weight of human thyroid gland is  
 a) 10 gms      **b) 20 gms**      c) 500 gms      d) 20 kg

56. The inner layer of membrane lining the uterus is

- a) perimetrium      b) myometrium      **c) endo metrium**      d) serous layer

### GENETICS

57. ABO blood group in man is an example for

- a) Pleiotropism      **b) multiple allelism**  
c) x - linked inheritance      d) y - linked inheritance

58. Rh. factor in blood was discovered by

- a) Galton      b) Davenport      **c) Landsteiner and Wiener**      d) Clarence Mc clung

59. The type of sex determination in moths and butterflies is

- a) xx - xo type      b) xx - xy type      **c) zo - zz type**      d) zw - zz type

60. X/A ratio in super females is

- a) 1.5**      b) 1.0      c) 0.6      d) 0.5

61. Holandric genes occur exclusively on

- a) x - chromosomes      **b) y - chromosomes**      c) autosomes      d) both x and y chromosomes

### DEVELOPMENTAL BIOLOGY

62. The process of spermiogenesis involves

- a) production of sperms      **b) differentiation of spermatids into spermatozoa**  
c) formation of testis      d) differentiation of nucleus

63. Centrolecithal eggs are produced by

- a) frog      b) human beings      c) reptiles      **d) insects**

64. Discoidal cleavage is seen in the eggs of

- a) birds**      b) amphibians      c) insects      d) amphioxus

65. Sach's law is related to

- a) gametogenesis      **b) cleavage**      c) gastrulation      d) organogenesis

66. The cavity formed in a gastrula is called as

- a) gastrocoel**      b) blastocoels      c) blastopore      d) cavity

### ECONOMIC ZOOLOGY

67. Reef forming corals normally grow in

- a) cold waters      (b) deep seas  
**(c) shallow, tropical seas**      (d) polluted and muddy waters

68. The Great Barrier reef occurs in  
a) Gulf of kutch (b) Carribean islands (c) Andaman islands **(d) the coast of Australia**
69. Earthworm commonly employed in Indian vermiculture is  
**a) Lampito mauritii** (b) *Apis indica* (c) *Panaeus indicus* (d) *Pinctada fucata*
70. The degrades of organic matter by worm activity is  
a) lac (b) isinglass **(c) vermicompost** (d) guano
71. The honey bee used commonly in bee-keeping industry is  
a) *Apis dorsata* (b) *Apis florae* **(c) Apis indica** (d) all the above
72. The silk produced by *Bombyx mori* is  
a) tasar silk (b) muga silk (c) arandi silk **(d) mulberry silk**
73. The predatory insects are said to be  
**a) entomophagous** (b) larvivorous (c) parasitic (d) pests
74. The organization involved in pearl oyster culture is  
a) CIBA **(b) CMFRI** (c) NIO (d) MPEDA
75. The most common freshwater prawn used in aquaculture is  
a) *Macrobrachium* sp (b) *Metapanaeus* sp **(c) Panaeus sp** (d) *Panulirus* sp
76. The name Kal Eral in Tamil refers to  
a) Prawns (b) crabs (c) a fish **(d) lobsters**
77. The fish *Stromateus argenteus* is popularly called as  
a) guppy **(b) pomfret** (c) gold fish (d) angel fish
78. Which part of the body in fish provides isinglass  
a) skin (b) liver **(c) air bladder** (d) bone
79. Which country was economically benefitted by marketing bird excreta  
a) USA **(b) Peru** (c) Australia (d) West Indies
80. The idea of aquarium maintenance was first conceived by  
**a) Chinese** (b) Japanese (c) Red Indians (d) Africans
81. Nandankanan Biological park is situated in  
(a) Delhi **(b) Orissa** (c) Bihar (d) Assam
82. The preumonic plague affects  
(a) liver (b) brain (c) lymph glands **(d) lungs**

83. Which is the best time to have blood test for filariasis  
 (a) morning (b) evening (c) noon **(d) mid-night**
84. The characteristic feature of tail in sea snake is  
 (a) round (b) pointed **(c) compressed** (d) cylindrical
85. *Ophiophagus hannah* refers to  
 (a) Indian cobra **(b) King cobra** (c) Russell's viper (d) Sea snake
86. The silver fishes commonly live among  
 (a) rocks (b) algae (c) other fishes **(d) old books**

### ORIGIN OF LIFE

87. The resistant spores that led to origin of life on earth are named as  
 a) protozoans **b) cosmozoa** c) viruses d) bacteria
88. The proposal that living forms are animated forms of non-living matter was provided by  
 a) Empedocles b) Thales c) Lamarck **d) Aristotle**
89. The protocell model was formed of  
**a) coacervates** b) proteins c) ozone d) methane
90. Mesozoic era is commonly referred to as  
 a) age of mammals b) age of fishes **c) golden age of reptiles** d) cradle of ancient life
91. The first vertebrates were included in the group  
 a) Amphibia **b) Agnatha** c) Carinata d) Aves
92. The duration of cenozoic era was  
 a) 210 to 65m years ago **b) 65m year ago to till date**  
 c) 600 to 440 m years ago d) 210m year ago to till date
93. The coal and petroleum are obtained from the forests of  
 a) Devonian period b) Mesozoic era c) Cretaceous **d) Tertiary period**
94. The earliest ancestor of horses were  
**a) Eohippus** b) Equus c) Seymouria d) Dinosaurs
95. Fossils of woolly mammoths were obtained from  
**a) Siberia** b) Sahara c) Europe d) Bavaria
96. Identify the early ancestor of horses  
 a) Dinosaurs **b) Seymouria** c) Archaeopteryx d) Hyracotherium

**3MARKS:****BIO DIVERSITY****1. Define biosphere?**

- It represents a stable environment of various physical and biological factors which have been operating since the past. It highlights the independence of living and non-living world.

**2. What is the characteristic feature of biological taxonomy?**

- It is the study of morphological characters along with other characters such as behavior, sound, ecology, genetics, zoogeography, physiology and biochemistry.

**3. What are triploblastic animals?**

- The animals having **ectoderm, endoderm and mesoderm** as three in the body wall are called triploblastic animals.

**4. What is a trochophore?**

- The most common larva of phylum mollusca is trochophore larva.

**5. What are amniotes?**

- The tetrapods like **reptiles, birds and mammals** are referred to as amniotes.
- The amniotes have certain membranes associated with embryos inside the egg.

**6. Why do we call birds as glorified reptiles?**

- In spite of several advanced features the birds have certain reptilian characters. Hence they are known as "**glorified reptiles**". E.g: Pigeon, parrot, etc.

**7. Name the subclasses under mammalia.**

- Monotremata - Spiny ant-eater.
- Marsupialia - Kangaroo.
- Placentalia - Elephant, Tiger, etc.

**8. What are cryptozoites?**

- In the life cycle of plasmodium, the sporozoites penetrate the liver cells and develop into forms known as cryptozoites. It has a compact nucleus but no pigments.

**9. What is ookinete?**

- In the life cycle of plasmodium, the zygote elongates and becomes capable to move. This is called as ookinete.

- It is seen in mosquito.

#### 10. What is tertian malaria?

- The tertian malaria is caused by *Plasmodium vivax*.
- The fever recurs every third day or every 48 hours.

#### 11. What are 'lateral hearts'?

- In the anterior part of the body the dorsal vessel is connected with the ventral vessel by eight pairs of commissural vessels.
- They are called lateral hearts seen in circulatory system of earthworm.

#### 12. What is 'pecten'?

- Inside the eye of the pigeon a vascular pigmented process projects into the vitreous body. It is known as pecten.

## II CELL BIOLOGY

#### 1. Write a note on phase contrast microscope.

- It has special fittings to the objective lens and sub stage condenser
- Unstained cells become visible in high contrast and with good resolution.
- Avoids the need to kill cells

#### 2. What is 'limit of resolution' in the functioning of a microscope ?

- The ability to reveal minute details is expressed in terms of **limit of resolution**.
- It is "the smallest distance that may separate two points on an object and still permit their observation as distinct separate points".

#### 3. Name the various parts of a compound microscope.

- A compound microscope has a **condenser lens, objective lens, ocular lens, stage with clips, a hollow tube, a concave mirror**, etc.

#### 4. What are vital stains?

- Vital stain is the colouring substance that are taken up by living cells without killing them.
- They selectively stain intercellular structure without affecting cellular metabolism and function.

**5. Name two biochemical processes happening within the mitochondria.**

- Glycolysis
- Citric acid cycle
- Oxidative phosphorylation.

**6. What are RER and SER?**

- RER – Rough Endoplasmic Reticulum.
- SER – Smooth Endoplasmic Reticulum.

**7. What is 'autolysis'?**

- When a cell dies, its own lysosome release the enzyme that digest the remains of the cell. This process is called autolysis.

**8. When do we call centriole as a basal body?**

- Centrioles are microtubular structure found near the nucleus. When a centriole supports a flagellum or cilium, it is called basal body.

**9. What are the types of chromosomes based on the nature of their arm?**

- Telocentric
- Acrocentric
- Metacentric
- Submetacentric

**10. What is a 'fluid mosaic model' of a plasma membrane?**

- Proposed by **Singer** and **Nicholson** (1972)
- In this structure much of the protein molecules float about.
- It has a lipid bilayer.

### **III HUMAN ANATOMY**

**1. What is keratinization ?**

- The shape and chemical nature of the surface cells will get altered. Slowly they get filled with **keratin**. This process is called **keratinization**.

**2. What are floating ribs ?**

- **11<sup>th</sup> 12<sup>th</sup>** pairs are not attached to the sternum. They are called **floating ribs**.

**3. Name the kissing muscles**

- Orbicularis oris and Buccinator muscles are responsible for the lip movement.

**4. Provide the human dental formula**

- **Incisors(8), Canines(4), Premolars(8) and Molars(12)**
- Formula =  $\frac{2+1+2+3}{2+1+2+3} \times 2$

**5. What is carina ?**

- The cartilage ring found at the basal region is called the **carina**. Foreign objects reaching carina stimulate a powerful cough reflex.

**6. What is the role of B-lymphocytes ?**

- The **B-lymphocytes** or **B cells** synthesize antibodies for recognizing and neutralising alien macromolecules.

**7. What is a neuromuscular junction ?**

- In the terminal regions of the effector nerves the axon of the nerve cells are in contact with the **muscle tissue**. These joints are named as **neuro - muscular junctions**.

**8. What is choroid plexuses ?**

- These ependymal cells, their supportive tissue and the associated blood vessels together are called **choroid plexuses**.

**9. What is melbomian gland ?**

- The inner margin of the eyelids contain **Melbomian** glands. These glands produce **sebum** for lubricating the eyelids.

**10. What is Rathke's pouch?**

- During embryonic development an out pocketing of the roof the oral cavity arises. It is called rathke's pouch.

**11. What are podocytes?**

- The inner visceral layer surrounds the glomerulus. It consists of specialized cells called **podocytes**.

## **GENETICS**

**1. What are multiply alleles?**

- Some genetical characters are determined by several forms of an allele known as multiple allele. E.g. ABO blood group is controlled by multiple allele in man.

**2. Provide the genotypes for himalayan albino rabbits**

- Parent pure:  $c^h c^h$  F1 cross:  $c^h c^a$

### 3. Mention the possible genotypes of the offsprings if the parental blood groups are B and B.

- $I^B I^B$  or  $I^B I^o$

### 4. What was the opinion of biometricians in genetics

- Biometricians believed that heredity variations are basically **continuous** and **quantitative**.

### 5. Who are mulattoes?

- In U.S.A., marriages between black and white individuals have resulted in a population known as mulattoes. They have intermediate skin colour in the first generation.

### 6. What is Hermaphroditism?

- A hermaphroditic person will have **one extra X and Y chromosome**.
- The person will have both ovarian and testicular tissues. The external genitalia will not be well defined.

### 7. What is arrhenotokus parthenogenesis?

- It is a common mechanism in several insects such as ants, bees and wasps. In these insects, **fertilized eggs develop into diploid females and unfertilized egg into haploid males**.

### 8. What are holandric genes.

- The genes which occurs exclusively on Y chromosomes are called holandric genes.

## DEVELOPMENTAL BIOLOGY

### 1. What are microlecithal eggs?

- Due to short period of growth the small amount of yolk is seen in the egg. These egg are called microlecithal egg. E.g: Hydra.

### 2. What is sach's law?

- Cell tends to divide into equal daughter cells.
- Each new division plane tends to intersect the proceeding plane at right angles.

### 3. What is a centrolecithal egg.

- The yolk seen at the centre of the egg and cytoplasm in the surrounding.
- This type of egg seen in the insects.

**4. What is a 'fate map'?**

- A map showing various organ forming areas on the blastula is called **fate map**.

**ECONOMIC ZOOLOGY****1. Provide the names of zoos in the states of Tamilnadu and Andhra Pradesh (one each).**

- Arignar Anna zoological park - vandalur, Chennai.
- Nehru zoological park - Hyderabad, Andhra Pradesh.

**2. Name the two types of venom released by poisonous snakes.**

- *Neurotoxic*
- *Haemolytic*.

**3. Provide atleast one major role of CMFRI.**

- It gives necessary training culture techniques.
- It carried out studies of biology, physiology, etc.

**4. Name any two cultivable animals.**

- Prawn, Crabs, lobsters, and pearl oysters.

**5. Mention the uses of vermicompost.**

- Better source of organic manure.
- Prevent the organic pollution.
- It contains rich nutrients in plant growth.

**5MARKS:****1. Give an account of the basic principle of nomenclature?**

- Genus name – first letter capital.
- Species name – first letter small.
- Law of priority – Earlier published name is correct.
- Taxon must have one correct name.
- Scientific name – latin or Latinized or italics.

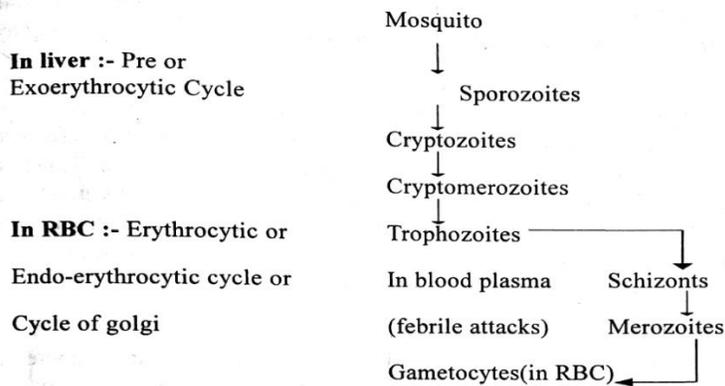
## 2. What are the types of malaria?

S.no	Plasmodium species	Fever type	Recurs
1	Plasmodium vivax	Bening tertian malaria	Every 48 hours
2	Plasmodium falciparum	Malignant tertian malaria	High death rate
3	Plasmodium malariae	Quartan fever	Every 72 hours
4	Plasmodium ovale	Ovale	Every 48 hours

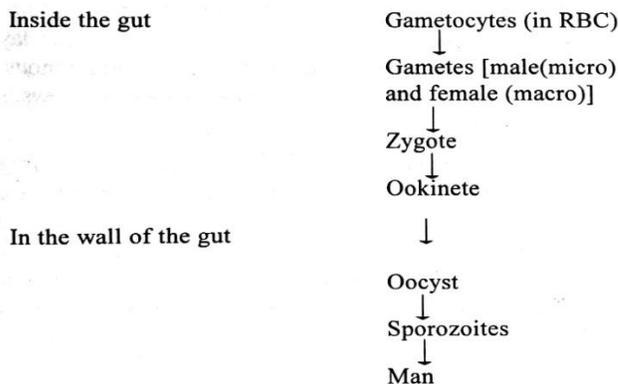
## 3. Explain the life cycle of plasmodium in man.

### Life history of Plasmodium (the malarial parasite)

#### Life cycle in Man (Schizogony)



#### Life cycle in Female anopheles mosquito (Sporogony) or Cycle of Ross



## CELL BIOLOGY

1. Explain the types of Microscope?(write like paragraph)

Or

2. Differentiate between TEM and SEM.

Transmission electron microscope (TEM)	Scanning electron microscopy (SEM)
High resolution power	Less resolution power
Very effective to see inner parts of the cell	Very effective and study the surface topography of specimen
Image formed different by the electrons are scattered by various regions of the object.	Formed by the electrons reflected from the surface of the specimen.
Two dimension (2D) image of object can be seen.	Three dimension (3D) image of object can be seen.

3. Explain the structure of Mitochondria.

- Observed by **Kolliker** in 1850
- **Citric acid cycle, oxidative phosphorylation** and **fatty acid oxidation** took place in the mitochondria.

### STRUCTURE:

- Filamentous or granular in shape.
- They vary in size from 0.5  $\mu\text{m}$  to 2.0  $\mu\text{m}$ .
- They can not be seen under light microscope.
- The **inner membrane** is highly convoluted, forming a series of infoldings known as **cristae**.
- Mitochondria are double membrane envelopes.
- **Peri-mitochondrial space**. It is found between outer and inner membranes.
- The inner compartment is the **matrix space**. It is filled with **mitochondrial matrix**.
- The matrix contains **lipids, proteins** and **circular DNA molecules**.
- It is involving in the **adenosine tri phosphate** or **ATP**.
- Mitochondria are also known as “**power houses**” of the cell.

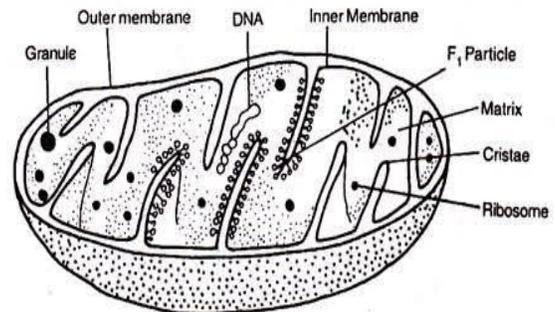
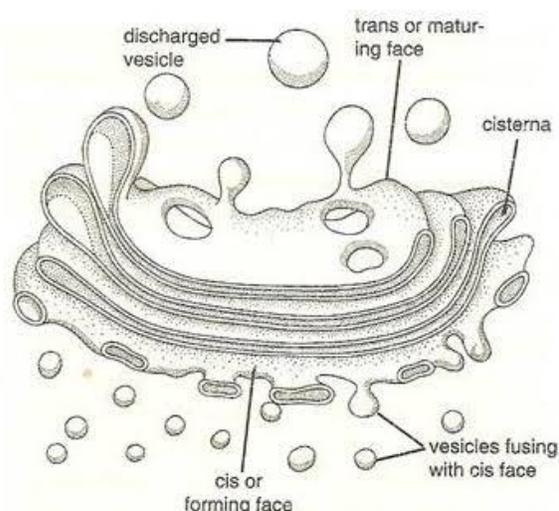


Fig. 1.19 (a) Mitochondrion cut open to show the inner structures.

#### 4. Explain the structure of Golgi Apparatus.

- Discovered by **Camillo Golgi** in 1873.
- Occurs in all animal cells except red blood cells.
- Animal cells usually have a single Golgi apparatus. Some have more of Golgi apparatus.
- The simplest unit of the Golgi apparatus is the **cisterna**.
- A cisterna is about 1  $\mu\text{m}$  in diameter.
- Space between each cisterna is 20-30 nm.
- A group of these cisternae is called the **dictyosome**.



#### FUNCTIONS:

- The Golgi apparatus is the site of synthesis of biochemicals.
- They also collect proteins and lipids made in the ER and add additional substances.

#### 5. Explain the structure of Nucleus.

- Most important organelle of cell.
- It controls all activities of the cell.
- Discovered and named by **Robert Brown** in 1833.
- Found in all the eukaryotic cells of plants and animals.

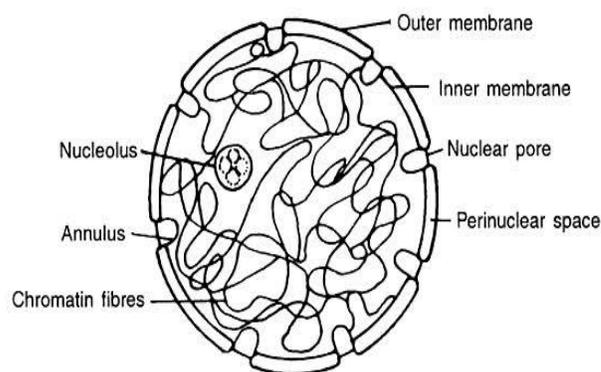


Fig. 2.1. Ultrastructure of Nucleus.

#### SHAPE:

- **Spherical, elliptical** or **discoidal**.
- Size vary from 3  $\mu\text{m}$  to 25  $\mu\text{m}$  in diameter.
- The nucleus is surrounded by a **nuclear envelope**.
- The space between the inner and outer membranes is known as **perinuclear space**.
- The nucleus is filled with **nucleoplasm** or **nuclear sap**.
- The nucleoplasm contains **chromatin fibres**.
- The chromatin is made up of **Deoxy - ribose nucleic acid (DNA)** and proteins.

The nucleus contains one or more spherical colloidal structures called **nucleoli**.

## GENETICS

**1. What will be the nature of the F2 progeny, if a coloured rabbit is crossed with an albino?**

A crossing of a homozygous coloured rabbit with an albino resulted in following F1 and F2 generation.

<b>Parents</b>	<b>CC</b>	x	<b>c<sup>a</sup> c<sup>a</sup></b>	
	(coloured)		(albino)	
<b>F1</b>	<b>Cc<sup>a</sup></b>	x	<b>Cc<sup>a</sup></b>	
	(coloured)			
<b>F2</b>	<b>CC</b>		<b>C c<sup>a</sup></b>	<b>c<sup>a</sup> c<sup>a</sup></b>
	25%		50%	25%
	(coloured)		(coloured)	(albino).

**2. Discuss how 'O' blood group is considered as an universal donor.**

- A blood group person will have A antigen.
- B blood group person will have B antigen.
- A and B naturally occurring antibodies present in blood.

Blood group	Antigen	Antibody
A	A	B
B	B	A
AB	A and B	None
O	None	A and B

- Group A will agglutinate with Antibody B.
- Group B will agglutinate with Antibody A.
- No antibodies found in AB group.
- O group will agglutinate with both A and B group.

Blood group of the donor	Blood group of the recipient
A	A and AB
B	B and AB
AB	AB
O	O,A,B,AB

Hence,

- O** - Universal donor.  
**AB** - Universal acceptor

### 3. Provide an account on turner's syndrome and klinefelter's syndrome.

#### 1. Turner's syndrome (XO Females) :

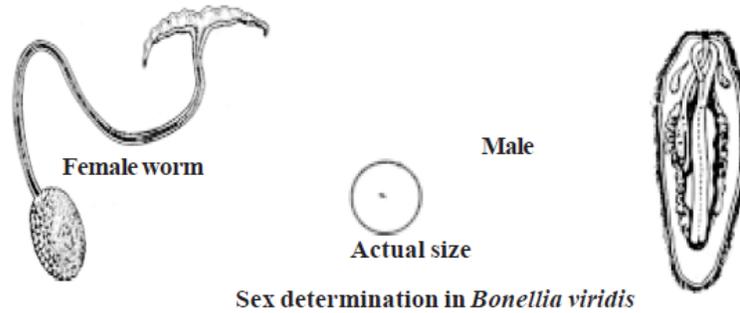
- They have webbed neck, broad shield-shaped chest, low intelligence, under developed breasts and poorly developed ovaries.
- Due to the presence of 44 autosomes and **only one X chromosome**
- This abnormality is known as Turner's syndrome.

#### 2. Klinefelter's syndrome :-

- Due to the presence of an **extra X chromosome** in males.
- The zygote will have three sex chromosomes (XXY).
- The symptoms are the presence of small testicles, mental retardation, longer arms and high pitched voice.

### 4. Describe the process of sex determination in Bonellia.

- *Bonellia verditis* is a marine worm.
- Sex determination was studied by **F.Baltzer**.
- Female worm is about **2.5cm** long - Well defined organization.
- Male worm is **very small** - Rudimentary body organ.
- Male normally live as a **parasite** attached to female.
- Developing male detached from the proboscis of female.
- Adult female secretes some hormone to suppresses femaleness and induces maleness.



### 5. Explain genic balance mechanism of sex determination.

- Described by C.B.Bridges in 1921.
- In drosophila the sex of individual is depends upon the ratio of x chromosome and autosomes.
- Autosome - male determining value equal to 1.
- X chromosome - Female determining value equal to 1.5
- Normal male ratio - 2:1
- Normal female ratio - 2:3

Pohenotype		Number of X chromosome	Sets Autosomes	X/A ratio
Super female		3	2	1.5
Normal male	Triploid	3	3	1.0
	Tetraploid	4	4	1.0
	Diploid	2	2	1.0
	Haploid	1	1	1.0
Intersex		2	3	0.67
Normal male		1	2	0.5
Super male		1	3	0.33