

# **XII** STANDARD

# **BIOLOGY**

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**Dr. N. SATHYAMOORTHY** M.Sc.,B.Ed.,Ph.D.,DFN.,P.G.ASST.,

*E. R. Hr. Sec. School, Tricky-2*

## BIO-BOTANY - TEXTUAL ONE MARK QUESTIONS

### UNIT : 1 PLANT TAXONOMY

- Artificial system of classification of plants was proposed by a \_\_\_\_\_  
a. British botanist  Swedish botanist c. German botanist d. Indian botanist
- Which of the following classification is a sexual system of classification?  
 Artificial system b. Natural system c. Phylogenetic system d. Natural selection
- The botanist who introduced binomial system is \_\_\_\_\_  
a. Carolus Linnaeus  Gaspard Bauhin c. Sir Joseph Dalton Hooker d. Adolf Engler

### BENTHAM AND HOOKER SYSTEM

- Genera plantarum of Bentham and Hooker was published in \_\_\_\_\_  
a. a single volume b. two volumes  three volumes d. four volumes
- In Bentham and Hooker classification of plants, the present day 'orders' were referred to by them as \_\_\_\_\_  
a. series  cohorts c. orders d. families
- Plants having flowers with free petals are placed under \_\_\_\_\_  
a. Monochlamydeae b. Monocotyledons c. Gamopetalae  Polypetalae
- Inferae includes \_\_\_\_\_  
a. 6 orders and 34 families b. 4 orders and 23 families  
 3 orders and 9 families d. 5 orders and 27 families
- How many families were described by Bentham and Hooker in their classification?  
a. 204 b. 212  202 d. 102
- In Bentham and Hooker's classification of plants, the present by "families" were referred to by them as \_\_\_\_\_  
a. families b. cohorts  orders d. series
- Thalamiflorae includes \_\_\_\_\_  
a. 4 orders and 23 families  6 orders and 34 families  
c. 5 orders and 27 families d. 3 orders and 12 families
- Which one of the following series includes the epigynous flowers?  
a. Thalamiflorae b. Disciflorae  Inferae d. Heteromerae
- The family included under the series Unisexuales is \_\_\_\_\_  
a. Solanaceae  Euphorbiaceae c. Malvaceae d. Musaceae

### MALVACEAE

- Thespesia populnea* belongs to \_\_\_\_\_  
a. Solanaceae b. Euphorbiaceae  Malvaceae d. Musaceae
- Malvaceae is placed in the series \_\_\_\_\_  
 Thalamiflorae b. Inferae c. Heteromerae d. Disciflorae
- Anthers are monothealous in \_\_\_\_\_  
a. Solanaceae b. Euphorbiaceae  Malvaceae d. Musaceae
- In *Abelmoschus esculentus*, the fruit is \_\_\_\_\_  
a. drupe b. schizocarp c. regma  loculicidal capsule
- Binomial of lady's finger is \_\_\_\_\_  
a. *Hibiscus cannabinus* b. *Thespesia populnea*  
c. *Gossypium barbadense*  *Abelmoschus esculentus*

### SOLANACEAE

- Solanaceae is placed under \_\_\_\_\_  
a. Malvales  Polemoniales c. Unisexuales d. Ranales.
- In which of the following plants the midrib and veins are found with yellowish spines  
a. *Solanum melongena* b. *Datura metel*  *Solanum xanthocarpum* d. *Petunia hybrida*.
- The carpels are obliquely placed in the members of \_\_\_\_\_  
a. Malvaceae  Solanaceae c. Euphorbiaceae d. Musaceae

### EUPHORBIACEAE

- Euphorbiaceae includes about \_\_\_\_\_  
a. 82 genera. b. 90 genera  300 genera d. 254 genera.

2. *Ricinus communis* is a \_\_\_\_\_  
 a. herb  b. shrub c. tree d. cladode.  
 3. An example of cladode is \_\_\_\_\_  
 a. *Phyllanthus emblica* b. *Ricinus communis* c. *Jatropha curcas*  d. *Euphorbia tirucalli*.  
 4. In *Hevea brasiliensis*, the leaves are \_\_\_\_\_  
 a. simple  b. trifoliately compound c. sessile d. palmately lobed.

### MUSACEAE

1. "The bird of paradise flower" refers to \_\_\_\_\_  
 a. *Musa paradisiaca*  b. *Strelitzia reginae*  
 c. *Ravenala madagascariensis* d. *Heliconia* sp.  
 2. The phyllotaxy in *Musa* is \_\_\_\_\_  
 a. alternate b. opposite c. distichous  d. spiral  
 3. In inflorescence in *Ravenala madagascariensis* is \_\_\_\_\_  
 a. compound cyme b. compound raceme c. branched spadix d. simple raceme  
 4. The number of fertile stamens in *Ravenala madagascariensis* is \_\_\_\_\_  
 a. three b. four c. five  d. six

### 2. PLANT ANATOMY

1. The change from meristematic tissue to permanent tissue is called \_\_\_\_\_  
 a. differentiation. b. self perpetuating c. photosynthesis. d. cell division.  
 2. The type of tissue presents in the petioles of banana and *Canna* is \_\_\_\_\_  
 a. stellate parenchyma b. prosenchyma c. aerenchyma d. chlorenchyma.  
 3. The tissue generally present in all organs of plant is \_\_\_\_\_  
 a. parenchyma b. chlorenchyma c. collenchyma d. sclerenchyma  
 4. The lamellar collenchyma is seen in the hypodermis of \_\_\_\_\_  
 a. *Datura*  b. *Helianthus* c. *Ipomoea* d. *Nicotiana*  
 5. The root hairs are produced from \_\_\_\_\_  
 a. rhizodermis b. trichomes c. accessory cells  d. trichoblasts  
 6. The osteosclereids are seen in \_\_\_\_\_  
 a. seed coat of *Crotalaria*  b. seed coat of *Pisum* c. pulp of *Pyrus* d. petioles of banana  
 7. Bicollateral vascular bundles are seen in the members of \_\_\_\_\_  
 a. Malvaceae b. Musaceae c. Solanaceae  d. Cucurbitaceae  
 8. The root hairs originate from \_\_\_\_\_  
 a. trichoblasts b. endodermis c. hypodermis d. pericycle.  
 9. The casparian strips are found in the endodermis of \_\_\_\_\_  
 a. dicot stem  b. dicot root c. monocot stem d. dicot leaf.  
 10. The passage cells are found in endodermis of \_\_\_\_\_  
 a. dicot stem b. monocot stem  c. dicot root d. dicot leaf.  
 11. The polyarch condition is found in \_\_\_\_\_  
 a. monocot leaf b. dicot leaf c. dicot stem  d. monocot root  
 12. The inner most layer of the cortex is \_\_\_\_\_  
 a. epidermis b. hypodermis  c. endodermis d. pericycle  
 13. The vascular bundle with protoxylem facing centre of the stem is \_\_\_\_\_  
 a. exarch  b. endarch c. tetrarch d. polyarch  
 14. When the xylem and the phloem lie in the same radius, the vascular bundle is called  
 a. conjoint b. radial c. open d. closed.  
 15. The vascular bundles are skull shaped in \_\_\_\_\_  
 a. dicot root b. monocot root c. dicot stem  d. monocot stem.  
 16. The protoxylem lacuna is present in the vascular bundles of \_\_\_\_\_  
 a. dicot root b. monocot root c. dicot stem  d. monocot stem  
 17. Isobilateral leaf is present in \_\_\_\_\_  
 a. grass b. *Cucurbita* c. sunflower d. bean

18. The vascular bundle in the leaf is \_\_\_\_\_  
a. collateral and open  b. collateral and closed  
c. bicollateral and open d. collateral and exarch

### 3. CELL BIOLOGY AND GENETICS

- The term chromosome was introduced by \_\_\_\_\_  
a. Bridges  b. Waldeyer c. Balbiani d. Flemming
- Who had first proved that the genes are carried by the chromosome?  
 a. Bridges b. Waldeyer c. Balbiani d. Flemming
- The coupling test cross ratio is \_\_\_\_\_  
b. a. 1:7:7:1  b. 7:1:1:7 c. 1:1:1:1 d. 9:3:3:1
- Recombination of chromosome takes place in \_\_\_\_\_ stage of prophase I of meiosis.  
a. leptotene b. zygotene  c. pachytene d. diplotene
- Hugo de Vries first used the term mutation based on his observation on \_\_\_\_\_  
a. Sorghum b. Neurospora  c. Oenothera lamarckiana d. Cicer gigas
- Biochemical mutants of \_\_\_\_\_ failed to synthesize certain amino acids.  
a. Sorghum  b. Neurospora c. Cicer arietinum d. Cicer gigas
- The gametes of *Drosophila melanogaster* carry \_\_\_\_\_  
a. three chromosomes  b. four chromosomes  
c. seven chromosomes d. eight chromosomes
- Nullisomy is represented by \_\_\_\_\_  
a.  $2n - 1$  b.  $2n + 1$  c.  $2n + 2$   d.  $2n - 2$
- Double helix DNA model was proposed by \_\_\_\_\_  
 a. Watson and Crick b. O.T. Avery et al. c. Griffith d. Stinberg
- The width of DNA molecule is  
a. 18 Å  b. 20 Å c. 34 Å d. 35 Å
- RNA is universally present in all organisms except in \_\_\_\_\_  
a. TMV b. bacteria c. algae  d. DNA viruses
- mRNA is about \_\_\_\_\_ of the RNA content of the cell  
a. 10 - 20% b. 5 - 10%  c. 3 - 5% d. 20 - 30%
- In bacterial cell, there are more than \_\_\_\_\_ tRNAs  
a. 200  b. 70 c. 300 d. 400

### 4. BIOTECHNOLOGY

- Restriction enzymes are synthesized by \_\_\_\_\_  
 a. bacteria only b. yeast and bacteria only c. eukaryotic cells only d. all kinds of cells
- Each restriction enzyme cleaves a molecule only at \_\_\_\_\_  
a. the ends of genes b. methyl groups  
 c. nucleotide sequence d. the time of DNA replication
- One of the following process is employed to introduce a foreign gene into a cell  
a. electrolysis  b. electroporation c. plasmid d. ligation
- The number of transgenic plants available to-day are approximately \_\_\_\_\_  
a. six b. two c. twelve  d. fifty
- A toxic protein called delta endotoxin is insecticidal and it is produced by  
a. *Escherichia coli* b. *Streptomyces griseus*  c. *Bacillus thuringiensis* d. *Bacillus lactii*
- Pseudomonas putida* is a engineered bacterium that can \_\_\_\_\_  
a. produce a hormone b. produce an antibiotic  c. digest crude oil slick d. pollute the soil
- The inherent potential of any living plant cell to develop into entire organism is called  
a. differentiation b. organogenesis c. morphogenesis  d. totipotency
- The function of cytokinin is to increase \_\_\_\_\_  
a. cell elongation b. fruit initiation  c. cell division d. differentiation

9. By the application of tissue culture, one important product is formed \_\_\_\_\_  
 (a) artificial synthetic seeds b. many seeded fruit  
 c. triploid endosperm d. induction of flowers
10. The two protoplasts are fused with a fusogen called \_\_\_\_\_  
 (a) polyethylene glycol (PEG) b. Polyvinyl chloride (PVC)  
 c. Polyethane glycol (PEG) d. Phosphoric ethane
11. Somatic hybrids are produced through \_\_\_\_\_  
 a. asexual fusion (b) protoplasmic fusion c. vegetative propagation d. grafting
12. One of the following organism is a SCP \_\_\_\_\_  
 a. Nostoc b. Rhizobium c. Mushroom (d) Spirulina
13. Enriched vitamin tablets are produced from the following organism for human consumption  
 a. Nostoc b. yeast c. Mushroom (d) Spirulina

### 5. PLANT PHYSIOLOGY

1. Photosynthesis takes place in \_\_\_\_\_  
 a. mitochondria b. peroxisomes (c) chloroplasts d. ribosomes
2. During cyclic electron transport, which one of the following is produced \_\_\_\_\_  
 a. NADPH<sub>2</sub> only (b) ATP only c. NADH<sub>2</sub> only d. both ATP and NADPH<sub>2</sub>
3. Which one of the following is a five carbon compound?  
 a. fructose b. erythrose (c) ribose d. DHAP
4. Which one of the following is a C<sub>4</sub> plant?  
 a. rice b. wheat (c) sugarcane d. potato
5. The essential component for the formation of chlorophyll  
 (a) Mg b. Fe c. Cl d. Mn
6. The pigment which is highly efficient in absorbing solar energy is \_\_\_\_\_  
 a. phycobilins (b) chlorophyll c. carotinoids d. xanthophyll
7. Which of the following bacterium oxidizes ammonia to nitrate  
 (a) Nitrosomonas b. Rhizobium c. Clostridium d. E. coli
8. Which of the following is a total parasite  
 (a) Cuscuta b. Viscum c. Drosera d. Monotropa
9. Which of the following wavelengths of light is most effective for photosynthesis \_\_\_\_\_  
 a. 100 nm to 200 nm b. 200 nm to 300 nm (c) 400 nm to 700 nm d. 700 nm to 900 nm
10. Dark respiration is the function of \_\_\_\_\_  
 a. peroxisomes (b) mitochondria c. chloroplast d. ribosomes
11. The gas evolved during photosynthesis is \_\_\_\_\_  
 a. carbondioxide b. nitrogen c. hydrogen (d) oxygen
12. Dark reaction is also known as \_\_\_\_\_  
 a. Krebs cycle (b) Calvin cycle c. pentosephosphate pathway d. photorespiration
13. C<sub>4</sub> pathway is otherwise known as \_\_\_\_\_  
 a. EMP pathway (b) Hatch-Slack pathway c. photorespiration d. electron transport chain
14. Photorespiration is otherwise called as \_\_\_\_\_  
 (a) C<sub>2</sub> cycle b. C<sub>3</sub> cycle c. C<sub>4</sub> cycle d. C<sub>5</sub> cycle
15. An example for insectivorous plant is \_\_\_\_\_  
 (a) Drosera b. Viscum c. Monotropa d. Vanda
16. Which of the following is regarded as primary pigment?  
 a. Carotenoid b. Xanthophyll (c) Chlorophyll 'a' d. Chlorophyll 'b'
17. The dark reactions of photosynthesis were discovered by \_\_\_\_\_  
 a. Embden and Meyer (b) Melvin Calvin c. Krebs d. Parnas
18. Which of the following is a 5C compound?  
 a. Glucose b. Fructose c. Phosphoglyceric acid (d) RuBP
19. In C<sub>3</sub> plants light reactions and dark reactions occur in Mesophyll cells

- a. bundle sheath cells b. mesophyll cells c. epidermal cells d. vascular cells
- 20. In  $C_3$  pathway acceptor molecule of  $CO_2$  is \_\_\_\_\_  
a. Phosphoenol pyruvate  b. RuBP c. PGA d. DHAP
- 21. Which of the following is not a  $C_4$  plant?  
a. Maize b. Tribulus c. Amaranthus  d. Wheat
- 22. Vanda plant is a/an \_\_\_\_\_  
a. total parasite b. partial parasite  c. epiphyte d. saprophyte
- 23. The reducing power produced in the light reaction is \_\_\_\_\_  
a. NADP b. ATP c. ADP  d.  $NADPH_2$
- 24. Which of the following is not accessory pigments?  
a. Phycobilins  b. Chlorophylls c. Carotenoids d. Xanthophylls
- 25. The photosynthetic pigments are located in \_\_\_\_\_  
a. Cristae b. Cisternae  c. Thylakoid d. Stroma

### Respiration

- 1. Which of the following is the common respiratory substrate?  
a. Proteins b. Lipids  c. Carbohydrates d. Vitamins
- 2. The number of high energy terminal bonds present in ATP is \_\_\_\_\_  
a. one  b. two c. three d. four
- 3. The first step in aerobic respiration is \_\_\_\_\_  
 a. glycolysis b. Krebs cycle c. terminal oxidation d. cyclic photophosphorylation
- 4. Glucose is phosphorylated to glucose-6-phosphate by the enzyme \_\_\_\_\_  
a. aldolase b. enolase c. pyruvic kinase  d. hexokinase
- 5. Fructose 1,6-bisphosphate is cleaved to two molecules of 3 carbon compounds by \_\_\_\_\_  
 a. aldolase b. enolase c. pyruvic kinase d. hexokinase
- 6. Cisaconitic acid is converted into isocitric acid by the addition of a molecule of water. This reaction is catalyzed by \_\_\_\_\_  
a. citric acid synthetase b. fumarase c. malic dehydrogenase  d. aconitase
- 7. Complete oxidation of one molecule of glucose yields \_\_\_\_\_  
 a. 38 ATP b. 36 ATP c. 35 ATP d. 2 ATP
- 8. Oxidative decarboxylation of pyruvic acid is catalysed by \_\_\_\_\_  
 a. pyruvic dehydrogenase b. pyruvic kinase c. pyruvic mutase d. pyruvic isomerase
- 9. a - ketoglutaric acid is a \_\_\_\_\_ carbon compound  
a. two b. three c. four  d. five
- 10. Glucose is phosphorylated to glucose-6-phosphate by \_\_\_\_\_  
a. aldolase b. kinase c. mutase  d. hexokinase
- 11. Respiratory quotient of glucose is \_\_\_\_\_  
a. zero  b. unity c. more than one d. less than one
- 12. One molecule of  $FADH_2$  on oxidation yields \_\_\_\_\_  
a. one ATP  b. two ATP c. three ATP d. four ATP
- 13. One molecule of  $NADH_2$  on oxidation yields \_\_\_\_\_  
a. one ATP b. two ATP  c. three ATP d. four ATP
- 14. Formation of ATP during electron transport chain is known as \_\_\_\_\_  
a. dephosphorylation b. phtophosphorylation  
 c. oxidative phosphorylation d. substare level phosphorylation
- 15. Which of the following is referred to as EMP pathway?  
 a. Glycolysis b. Krebs cycle c. Electron transport chain d. Pentose phosphate pathway
- 16. The total amount of energy released from one molecule of glucose on oxidation is about \_\_\_\_\_  
a. 1600 kJ b. 2300 kJ c. 2500 kJ  d. 2900 kJ
- 17. Which of the following is a 5C compound?

- a. Phosphoglyceraldehyde b. Erythrosephosphate  
 (c) Xylulose phosphate d. Sedoheptulose phosphate

#### GROWTH

- Which one of the following plant hormones was first discovered?  
 (a) Auxin b. Gibberellin c. Cytokinin d. Ethylene
- An example for synthetic auxin is \_\_\_\_\_  
 a. IAA b. PAA c. ABA (d) NAA
- Apical dominance is due to \_\_\_\_\_  
 a. ethylene (b) auxin c. gibberellin d. cytokinin
- Bakanae disease in paddy is caused by \_\_\_\_\_  
 a. abscissic acid b. phenyl acetic acid c. naphthelene acetic acid (d) gibberellic acid
- In sigmoid curve the rapid growth phase is designated as \_\_\_\_\_  
 a. lag phase (b) log phase c. dormant phase d. steady state phase
- Auxin prevents \_\_\_\_\_  
 a. apical dominance b. ageing process c. parthinocarpny (d) abscission
- "Foolish seedling" disease of rice is caused by \_\_\_\_\_  
 a. auxin (b) gibbrellins c. cytokinin d. abscisic acid
- Closure of stomata is caused by \_\_\_\_\_  
 a. auxin b. gibbrellins c. cytokinin (d) abscisic acid
- The chemical used in the field to eradicate weeds is \_\_\_\_\_  
 (a) 2,4 -D b. IAA c. ABA d. urea
- Abscission is prevented by \_\_\_\_\_  
 (a) Auxin b. Gibberellin c. Cytokinin d. Ethylene
- The response of a plant to the relative lengths of light and dark periods is known as \_\_\_\_\_  
 a. vernalization b. photorespiration c. photosynthesis (d) photoperiodism
- Photoperiodic response in flowering was first observed in \_\_\_\_\_  
 a. wheat (b) Maryland Mammoth c. Oats d. Chrysanthemum
- Which of the following is a short day plant?  
 a. wheat (b) tobacco c. sunflower d. maize
- Which of the following is a long day plant?  
 a. tobacco b. sunflower c. maize (d) wheat

#### 6. BIOLOGY IN HUMAN WELFARE

- Which pathogen causes the blast disease of rice?  
 a. *Cercospora personata* (b) *Pyricularia oryzae* c. *Xanthomonas citri* d. Tungro virus
- What is the collateral host plant of *Pyricularia oryzae*?  
 a. *Oryza sativa* (b) *Digitaria marginata* c. *Arachis hypogea* d. Citrus plant
- Which pathogen causes Tikka disease of groundnut?  
 (a) *Cercospora personata* b. *Pyricularia oryzae* c. *Xanthomonas citri* d. Tungro virus
- Acalyphine is extracted from \_\_\_\_\_  
 (a) *Acalypha indica* b. *Aegle marmelos* c. *Cissus quadrangularis* d. *Mimosa pudica*
- Binomial of 'vilvum' is \_\_\_\_\_  
 a. *Acalypha indica* (b) *Aegle marmelos* c. *Cissus quadrangularis* d. *Mimosa pudica*

## BIO-BOTANY

### Chapter – I Taxonomy of Angiosperms

#### Section: B (3 Marks)

1. Write the objectives (aim) of classification of plants. (M-07, J-08, M-11, O-11) (BB) (Pg.1)
2. What is 'Binomial nomenclature'? Give example. (O-07, J-10) (BB) (Pg.4)
3. What is a type specimen? (M-06) (BB) (Pg.4)
4. Explain author citation with example. (J-09, M-10, O-10) (BB) (Pg.5)
5. Define Nomen ambiguous. (S-08) (BB) (Pg.5)
6. Define tautonym. Give example. (J-06, O-06, M-09, J-11) (BB) (Pg.5)
7. Write the three classes of seeded plants or phanerogamous. (J-07, O-09) (BB) (Pg.8)
8. Write any three merits & demerits of Bentham and Hooker's classification. (M-09, J-10) (Pg.10,11)
9. Mention the systematic position of malvaceae. (J-11) (Pg.13)
10. Write any 3 points comparing the androecium of Malvaceae and Solanaceae. (M-10) (Pg.16 & 21)
11. Name any three-fiber plants of Malvaceae. (O-07, M-11) (BB) (Pg.16)
12. Write the systematic position of potato family or Solanaceae. (M-08) (BB) (Pg.18)
13. Mention the binomials of three medicinal plants in Solanaceae and state their useful parts. (J-06, J-08, O-10, O-11) (BB) (Pg.21)
14. What is atropine? (S-08) (Pg.21)
15. What are the different types of inflorescences seen in Euphorbiaceae? Give example for each. (M-07, M-08) (BB) (Pg.24)
16. Draw floral diagram for female flower of Ricinus communis. (M-06) (BB) (Pg.26)
17. Write the binomial of a) Tapioca b) Castor. (O-09) (Pg.27)
18. Write the systematic position of musaceae. (J-09) (BB) (Pg.29)
19. Explain the structure of androecium of Musa paradisiaca. (J-07) (Pg.32)
20. Draw the floral diagram of Musa paradisiaca. (O-06) (BB) (Pg.33)
21. What is Cladode? Give example. (M-12)
22. What are the alkaloids found in Tobacco? (M-12)



**Section: C (5 Marks)**

1. Give an account of phylogenetic system of classification. (O-06) (Pg.2)
2. Write any five features of ICBN (M-09, M-11) (BB) (Pg.4)
3. Write the importance of herbarium. (M-06, J-06, M-07, J-08, O-09, M-10, O-10, M-12) (BB) (Pg.6)
4. Discuss the outline of Bentham and Hooker's classification of plants. (O-07, S-08) (BB) (Pg.9)
5. Bring out the merits of Bentham and Hooker's classification. (J-07) (BB) (Pg.10)
6. Write the economic importance of members of Malvaceae. (M-08, J09) (BB) (Pg.16)
7. Write the economic importance of the family Euphorbiaceae. (J-10, O-11) (BB) (Pg.27)
8. Write the economic importance of Musaceae. (J-11) (Pg.32)

**Section: D (10 Marks)**

1. With the help of flowchart, discuss Bentham & Hooker's classification of plants. (M-08) (BB) (Pg.8)
2. a) Bring out the merits of Bentham and Hooker's classification of plants. (J-11)(Pg.10)  
b) Bring out the significance of herbarium. (J-11)(Pg.6)
3. Describe *Hibiscus rosasinensis* in technical terms. (M-06, O-11) (Pg.14)
4. Describe *Datura metel* in technical terms. (J-06, O-06, S-08, J-09, O-09, M-10, J-10) (BB) (Pg.19)
5. Describe *Ricinus communis* in botanical terms. (O-07, M-11) (BB) (Pg.25)
6. Describe *Musa paradisiaca* in technical terms. Draw its floral diagram and write the floral formula. (J-06, M-07, J-07, M-09, O-10, O-11, M-12)(BB) (Pg.30)

**Chapter – II Plant Anatomy****Section: B (3 Marks)**

1. Bring out any three characteristics of meristematic cell. (J-08) (Pg.34)
2. What are lateral meristems? (O-11) (Pg.35)
3. Draw the structure of parenchyma and label the parts. (O-07, J-11) (Pg.36)
4. Describe any two types of collenchyma. (M-11) (Pg.36)
5. Draw diagram for Lacunate collenchyma and label its parts. (O-06) (Pg.37)
6. Draw diagram for angular collenchyma and label its parts. (M-07) (Pg.37)
7. Differentiate Sclereids from Fibres. (M-07, O-10) (BB) (Pg.37)

8. What are brachy sclereids? Give example. (J-06) (BB) (Pg.38)
9. Draw diagram, for Brachysclereids and label the parts. (M-06, J-09, O-09, J10, M-12) (Pg.37)
10. Draw any three types of secondary wall thickenings in tracheids. (O-07, J-07) (Pg.39)
11. Draw the diagram of bicollateral vascular bundle. (J-06, M-09, O-08) (Pg.43)
12. Draw and label the parts of open vascular bundle. (M-10) (Pg.43)
13. Explain bicollateral vascular bundle with example. (O-06, S-08)(Pg.43)
14. Explain endarch and exarch xylem with examples (M-09) (Pg.43)
15. What are passage cells? (M-06, J-09, M-10) (BB) (Pg.46)
16. Draw the ground plan for T.S. of dicot root and label its parts. (J-08, O-10) (Pg.49)
17. Write any three anatomical differences between monocot root and dicot root. (O-07) (Pg.50)
18. What is Protoxylem lacuna? Give an example. (J10) (BB) (Pg.52)
19. Define eustele. (O-09) (BB) (Pg.54)
20. Draw the ground plan for T.S. of sunflower stem and label the parts. (M-08) (Pg.55)
21. Write any three differences between the vascular bundles of dicot stem and monocot stem. (M-11) (Pg. 56)
22. Explain dorsiventral leaves with example. (O-07, J-07)(BB) (Pg.58)
23. Write in three sentences about the mesophyll of dicot leaf. or Define mesophyll. (M-08, J-11, M-12) (BB) (Pg.58)
24. Write three differences between the palisade and sponge parenchyma, (O-11) (Pg.59)
25. Define bundle sheath. (S-08) (BB) (Pg.59)

Section: C ( 5 Marks )

1. Explain the types of meristems based on their positions with diagram. (J-07, M-09, O-09)(BB) (Pg.34)
2. With examples, explain any two types of collenchyma with diagram. (J-08) (Pg.36)
3. Write short notes on vessels. (M-10) (BB) (Pg.38)
4. Write short notes on tracheids. (M-12)
5. Explain the structure of sieve elements. (O-06, M-07, M-11)(Pg.40)
6. Describe the four types of cells in phloem tissues (M-09) (Pg.40)
7. Describe the vascular tissue system with diagram. (O-09) (Pg. 42)

8. With examples, explain the structure of concentric vascular bundles. (M-08) (Pg.43)
9. Draw and label the parts of T.S of monocot root (a sector enlarged). (J-11)(Pg.47)
10. Describe the structure of vascular bundle in monocot stem. (O-10) (Pg.52)
11. Write short notes on vascular bundles of the dicot stem. (O-11) (Pg.54)
12. Differentiate between monocot & dicot root anatomically giving 5 points. (S-08, J-09,10)(BB)(Pg.50)
13. Draw a neat sketch of anatomy of sunflower leaf and label the parts. (M-06, J-06, O-07). (BB) (Pg.59)

**Section: D (10 Marks)**

- 1.a) Bring out the characters of meristematic cells. (J-11)(Pg.34)
- b) Write the function of epidermal tissue system. (J-11)(Pg.42)
2. Write an account of Sclerenchyma with diagram. (S-08) (BB) (Pg.37)
3. Write an essay on Xylem tissues (O-07) (BB) (Pg.38)
4. Describe the four types of cells in phloem tissues. (M-09)-(BB) (Pg.40)
5. Describe the vascular tissue system with diagrams. (O-09, M-12) (BB) (Pg.42)
6. Discuss the anatomy of monocot root with diagram. (J-08) (BB) (Pg.46)
7. Describe the primary structure of a dicot root. (O-11) (Pg. )
8. Describe the primary structure of a monocot stem. (J-06, J-09) (BB) (Pg.52)
9. With help of diagram, describe the anatomy of dicot stem. (M-08, J-07, J-10) (BB) (Pg.54)
10. Write the anatomical differences between the dicotyledonous stem and monocotyledonous stem. (M-06, M-07, M-10) (BB) (Pg.56)
11. Explain the anatomy of Dicot leaf. (O-06, O10, M-11) (BB) (Pg.58)

**Chapter - III Cell Biology and Genetics**

**Section: B (3 Marks)**

1. Draw the structure of chromosome and label its parts. (J-06, O-06, M-07, O-09, O-10)(Pg.61)
2. Draw different types of chromosomes based on shape and position of centromere. (M-06, J-10) (Pg.62)
3. Draw and label the parts of acrocentric chromosome. (M-10)(Pg.62)
4. Draw the polytene chromosome and label the parts. (J-08, J-09, M-11) (Pg.63)

5. Draw and label the lampbrush chromosome. (S-08, J-11) (Pg.63)
6. Draw t-RNA and label its parts. (J-07, O-07, M-08, M-09, O-11, M-12) (Pg.83)

**Section: C (5 Marks)**

1. Write short notes on structure of chromosome. (M-10)(BB) (Pg.61)
2. Explain the types of chromosomes on the basis of shape and position of centromere with diagram. (J-07)(BB) (Pg.62)
3. Describe the special type of chromosomes. (or) With the help of diagrams, describe the structure of polytene & lampbrush chromosomes. (M-08, M-09, O-10) (BB) (Pg.63)
4. What is gene mutation? Describe the types of gene mutation. (or) Write a short note on gene mutation. (J-06, M-07, M-12)(BB) (Pg.71)
5. Write about the significance of mutation. (O-06, J-09)(BB) (Pg.72)
6. Explain translocation chromosomal aberration with the help of diagram. (O-11)(Pg. )
7. Give an account of mutagenic agents. (O-07) (BB) (Pg.72)
8. Explain allopolyploidy with an example. (J-08) (BB) (Pg.76)
9. Write any five significances of ploidy. (M-06)(BB) (Pg.77)
10. Explain the experiment conducted by Fredrick Griffith in *Diplococcus pneumoniae*. (O-09) (BB) (Pg.79)
11. Write a note on t-RNA with diagram. (S-08, J-10, M-11)(BB) (Pg.83)
12. Write the difference between DNA and RNA. (J-11) (Pg.84)

**Chapter – IV Biotechnology**

**Section: B (3 Marks)**

1. What is the importance of *Escherichia coli* in biotechnology? (M-07, O-11)(P-86)
2. Name the enzymes involved in the making of a DNA hybrid. (J-06)(BB) (Pg.85)
3. What is restriction endonuclease? (M-08, S-08, J-11) (BB) (Pg.85)
4. What is splicing? (M-10) (BB) (Pg.86)
5. How do bacteria protect themselves from the attack of viruses? or What is role of restriction enzyme in bacteria? (M-06) (BB) (Pg.87)
6. List down any three genetically engineered products and their functions. (J-07) (Pg.89)
7. What are transgenic plants? Give any two examples. (J-10) (BB) (Pg.90)

8. Write any three transgenic dicotyledonous plants. (O-07) (BB) (Pg.90)
9. Write any three monocot transgenic plants. (M-09) (Pg.90)
10. Write any three benefits obtained by the release of genetically modified organisms into the environment. (J-08) (Pg.92)
11. What is inoculation? (O-09)(BB) (Pg.95)
12. What is morphogenesis? Describe the types. (O-11) (Pg.96)
13. List the important tissue culture centers or biotechnology centers in India. (O-06, J-09) (Pg.96)
14. What is PEG? Write its role. (M-11) (Pg.100)
15. Define SCP. Give an example. (M-10) (BB) (Pg.100)
16. Mention the names of any three algae used for SCP production. (M-07) (Pg.101)
17. What is meant by bio-remediation? (M-12)

**Section: C (5 Marks)**

1. Write the basic technique involved in genetic engineering. (J-10) (Pg.85)
2. Explain the steps involved in the production of human insulin by a bacterial cell with diagram. (J-08) (Pg.85)
3. How is DNA cut? (O-07, M-09, O-10) (BB) (Pg.87)
4. Describe with diagram the action of restriction endonuclease enzyme. (M-06)(Pg.88)
5. How are foreign genes introduced into plants? (M-07) (BB) (Pg.90)
6. Write about the electroporation and gene gun methods of introducing foreign gene into plants. (J-09) (Pg.90)
7. Briefly mention the basic concepts involved in plant tissue culture. (M-10) (Pg.94)
8. Give an account of origin of tissue culture. (J-07) (BB) (Pg.94)
9. Write any five outcomes of application of plant tissue culture. (J-06, O-11) (Pg.96)
10. Explain the enzymatic method of isolation of protoplasts. (O-06, S-08, J-11) (BB) (Pg.98)
11. Give an on SCP. (O-09, M-11) (BB) (Pg.100)
12. What is single cell protein? State uses of single cell protein. (M-08, O-09, M-11, M-12) (BB)(Pg.100)

**Section: D**

1. Write an essay on DNA recombinant technology. (S-08, M-10, M-12) (BB) (Pg.85)

2. Write an essay on transgenic plants. (O-06) (Pg.90)
3. a) What is role of Bt toxin in crop protection against pest? (O-09) (BB) (Pg.91)
- b) Write any five uses of plant tissue culture. (O-09)(BB) (Pg.96)
4. Explain the basic techniques of plant tissue culture. (M-06, M-07, O-07, M-08, M-09, M-10, O-10, M-11)(BB) (Pg.94)
5. What are the outcomes of application of plant tissue culture? (J-11) (Pg.96)
6. With the help of diagram, describe the process of protoplasmic fusion. or Explain as to how protoplasmic fusion can bring about somatic hybridization in plants. (J-08, O-11) (BB) (Pg.98)
7. Give an account of single cell protein. (J-06) (BB) (Pg.100)
8. a) Write about the use of genetically engineered bacterial strain by Ananda mohan chakraborty.
- b) Write the benefits from release of genetically modified microorganism into the environment. (J-07)

#### Chapter – V Plant Physiology

##### Section: B (3 Marks)

1. List the photosynthetic pigments. (M-09) (Pg.105)
2. What is photolysis of water? (M-06, J-06, O-06, O-09, M-11) (BB) (Pg.106)
3. What is photophosphorylation? (M-08)(Pg.106)
4. Write the chain of electron carriers in electron transport system. (M-09) (Pg.106)
5. Write the overall reaction of photosynthesis. (J-10, O-10) (BB)(Pg.106)
6. State the conditions under which cyclic photophosphorylation occur. (J-07, J-08, J-09, M-10)(BB)(Pg.108)
7. What are dimorphic chloroplasts? (J-08) (BB) (Pg.112)
8. Write three differences between C3 and C4 pathway. (O-11) (Pg.114)
9. Define C2 cycle. (O-09) (BB) (Pg.114)
10. Write any three differences between photorespiration and dark respiration. (M-06, M-07, O-07, S-08, J-10, O-10, M-12) (BB) (Pg.116)
11. What is energy currency of a cell? Why is it called so? (O-11) (Pg.124)
12. What are insectivorous plants? Give an example. (M-08) (Pg.120)
13. Explain total parasite with an example. (J-09)(BB) (Pg.120)

14. Write about the structure of ATP. (J-08)(Pg.124)
15. Explain the role of aconitase in Kreb's cycle. (J-09)(BB) (Pg.128)
16. Write the role of following enzymes in respiration a) aldolase b) succinyl CoA synthetase. (M-11) (Pg.128)
17. Define Chemosynthesis. (J-11) (Pg.120)
18. Write any three significance of pentose phosphate pathway. (M-12) (Pg.133)
19. Explain respiratory quotient. (J-06, O-06)(BB) (Pg.134)
20. The respiratory quotient of a carbohydrate molecule is one. How? (M-07) (Pg.134)
21. Respiratory quotient of glucose in anaerobic respiration is infinity. Give reasons. (M-08)(BB)(Pg.134)
22. Define fermentation. (M-09) (Pg.135)
23. What are the three phases of sigmoid curve? (O-09) (Pg.138)
24. Write any three physiological effects of Abscic acid. (J-11) (Pg.140)
25. What is apical dominance? (O-11) (BB) (Pg.140)
26. Mention any three physiological effects of cytokinin. (J-07)(Pg.141)
27. Write any three physiological effects of Gibberellin. (M-07) (Pg.141)
28. What is Richmond-Long effect? (M-06, O-07, M-10, J-11)(BB) (Pg.141)
29. Define 'bolting'. (J-06, S-08, M-11, M-12)(BB) (Pg.141)
30. Define growth inhibitors. Give an example. (J-10, O-10) (Pg.142)
31. Explain long day plants and short day plants with examples. (O-06)(BB) (Pg.145)
32. What is vernalization? (S-08)(BB) (Pg.145)
33. Write down the advantages of vernalization. (J-07) (BB) (Pg.146)
34. Is it possible to shorten the time of crop maturity? Support your answer. (O-07) (Pg.146)

**Section: C (5 Marks)**

1. Describe the structure of chloroplast. (O-07, J-09)(BB) (Pg.104)
2. Explain cyclic photophosphorylation. (M-06, O-11) (Pg.108)
3. Write the differences between cyclic photophosphorylation and non-cyclic photophosphorylation. (M-07, J-07, O-09, O-10) (Pg.108)
4. Bring out any five significances of photosynthesis. (J-08) (BB) (Pg.103)

5. Draw C4 cycle without explanation. (O-07)(Pg.113)
6. Write a short note on Ganong's light screen experiment. (S-08, J-10)(BB) (Pg.117)
7. What are the differences between C3 and C4 pathways? (O-06, J-11)(BB) (Pg.114)
8. Explain the test tube and funnel experiment to demonstrate that oxygen is evolved during photosynthesis. (J-09) (BB) (Pg.117)
9. Explain Ganong's respiroscope experiment. (J-06, J-07, M-09, M-12) (BB) (Pg.131)
10. Write the significance of pentose phosphate pathway. (M-11) (Pg.133)
11. Explain respiratory quotient. (M-06) (BB) (Pg.134)
12. Explain Kuhne's fermentation experiment with diagram. (J-08, O-09) (Pg.135)
13. Explain the experiment to measure the actual longitudinal growth of plant by lever auxanometer. (or) Explain the experiment to measure growth in length of a plant. (M-07) (M-08)(BB) (Pg.138)
14. Explain the different phases of growth with sigmoid curve. (M-10) (BB) (Pg.138)
15. State or Bring out the physiological effects of Auxin. (J-08, S-08, M-10) (BB) (Pg.140)
16. Write any five physiological effects of gibberellins. (O-10, O-11) (Pg.141)
17. Bring out the physiological effects of cytokinin. (M-09) (BB) (Pg.141)
18. List the physiological effects of ethylene. (O-06, M-11) (BB) (Pg.142)
19. Write a short note on vernalization. (J-06, J-11) (BB) (Pg.145)

**Section: D (10 Marks)**

1. Describe the light reaction of photosynthesis. or Explain cyclic and noncyclic photophosphorylation.  
(J-06) (BB) (Pg.106)
2. Draw (or) Explain Calvin cycle or Write an account on dark reaction of photosynthesis. (Explanation or Flow chart) (M-11, O-09) (BB) (Pg.109)
3. Describe Hatch and slack pathway of carbon dioxide fixation in plants with flowchart. (or) Write an essay on C4 pathway. (J-08) (BB) (Pg.112)
4. Draw C4 Cycle without explanation. (M-09) (BB) (Pg.112)
5. Write an essay on photorespiration or C2 cycle. (M-07) (BB) (Pg. 114)
6. a) Write the significance of pentose phosphate pathway. (J-09) (Pg.133)
- b) Write short notes on insectivorous plants. (J-09) (Pg.120)



7. What is glycolysis? Explain the steps involved in it. (Explanation or Flowchart) (O-07, J09, M-10, J-11, M-12)(BB) (Pg.126)

8. Draw Kreb's cycle without explanation. (or) Explain Kreb's cycle.(Explanation or Flowchart) (O-06, J-07, M-08, J-10, M-10, O-10, O-11) (BB) (Pg.128)

9. Explain pentose phosphate pathway. (S-08) (BB) (Pg.132)

10. a) Write any five physiological effects of Auxin. (M-06) (BB) (Pg.140)

b) Describe with examples any two types of heterotrophic nutrition in angiosperms. (M-06)(BB)(pg.118)

#### Chapter – VI Biology in human welfare

##### Section: B (3 Marks)

1. Write about pureline selection. (J-07)(Pg.149)

2. Define clonal selection. (S-08) (Pg.149)

3. What is heterosis? (M-06, J-10, O-11) (Pg.150)

4. What is soil reclamation? (M-08)(Pg.153)

5. What are bio-pesticides? (J-11) (Pg. 156)

6. What are edible interferons? (M-07) (Pg.158)

7. What is bio-piracy? (J-08, M-11, M-12) (Pg.159)

8. Mention any two unique facets of Bio-patency. (J-06) (Pg.160)

9. What are biomedicines? Give an example. (O-06, O-09, J-09) (BB) (Pg.164)

10. What is humulin? (O-07, M-09, O10) (BB)(Pg.166)

11. What is rice bran oil? Write any two uses of it. (M-10) (Pg.167)

##### Section: C (5 Marks)

1. Write any five aims of plant breeding. (J-06, O-06, O-07, O-09, J-11) (BB) (Pg.148)

2. Write a note on plant introduction. (M-07) (BB) (Pg.149)

3. Write any five benefits of biofertilizers. (J-09, J-10, O-11) (Pg.153)

4. Give an account of Tikka disease of groundnut. (J-07, M-08) (Pg.155)

5. Write a short note on Bio-patent. (J-08) (Pg.160)

6. Write short notes on microbes in medicine. (S-08, M-12) (BB) (Pg.166)

7. What is antibiotic? Write any two names of antibiotics. State their uses. (M-06) (Pg.166)

8. Write any five economic importance of rice. (O-10) (Pg.167)
9. Bring out the economic importance of groundnut. (M-10) (Pg.167)
10. Write any five economic importance of cotton. (M-09) (Pg.168)
11. Bring out the economic importance of teak. (M11) (Pg. 168)

**BIO-ZOOLOGY****Chapter – I Human Physiology****Section: B (3 Marks)**

1. Classify monosaccharides. (M-10) (Pg.2)
2. List out the essential amino acids. (M-07, M-11) (BB) (Pg.3)
3. What is kwashiorkor? Mention its symptoms. (J-06, S-08) (BB) (Pg.4)
4. What is PUFA? Give an example. (O-07) (BB) (Pg.4)
5. Mention the symptoms of "Marasmus" (M-09, J-11) (Pg.4)
6. Mention the symptoms of pellagra. (M-06) (Pg.6)
7. What is obesity? (M-08) (BB) (Pg.8)
8. Define Basal Metabolic Rate (BMR) (M-11) (Pg.54)
9. What are the enzymes present in the pancreatic juice? (J-10) (Pg.11)
10. Mention the different types of Hernia. (J-09) (Pg.14)
11. What is Rheumatic arthritis? (O-09) (Pg.18)
12. Write the characteristics of Osteomalacia. (O-06) (Pg.19)
13. Name the muscles involved in respiration. (J-11) (Pg.27)
14. What is Herring-Breuer Reflex? (O-06, M-09) (BB) (Pg.29)
15. What is called Bronchitis? Mention its types. (J-07) (Pg.30)
16. What are the symptoms and signs of pneumonia? (O-11) (Pg.30)
17. What is silent infraction? (J-10) (Pg.33)
18. What is Agglogram? (J-08) (Pg.34)
19. What is called coronary angioplasty? (J-07) (BB) (Pg.34)
20. What is called cardio-pulmonary resuscitation? (O-10, M-12) (Pg.38)
21. Write any three functions of cerebrospinal fluid. (O-09) (Pg.49)
22. Enumerate the character of myxedema. (O-10) (Pg.55)
23. What is optometry? (M-06) (Pg.65)
24. What is Cataract? Mention its types. (J-06, M-07) (Pg.65)

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25. Identify two reasons for cataract. (O-07) (BB) (Pg.66)
26. Suggest any three methods for eye care. (O-11) (Pg.67)
27. Draw the diagram of Urea Biosynthesis (Ornithine cycle) (S-08) (Pg.77)
28. What is corpus luteum? (M-08) (Pg.88)
29. Write three phases of menstrual cycle. (J-09) (Pg.88)
30. Mention the function of corpus luteum. (M-10) (Pg.88)
31. What is tubectomy? (M-12)
32. What is vasectomy? (J-08) (Pg.92)

**Section: C (5 Marks)**

1. Describe the process of absorption and assimilation of digested food. (M-10) (Pg.12)
2. Give an account of root-canal treatment. (M-07, S-08, M-11) (BB) (Pg.13)
3. Explain the different types of bone fracture. (O-07, J-08) (BB) (Pg.15)
4. Explain the mechanism of healing of fractured bone. (O-10) (Pg.17)
5. Give an account of origin and conduction of heat. (J-06, J-07, O-11) (Pg.31)
6. Describe the mechanism of blood clotting. (J-09) (Pg.40)
7. Write down the various types of memory. (M-06, J-11) (BB) (Pg.45)
8. "State is asleep of unconsciousness." substantiate the statement. (M-12)
9. Explain briefly right and left brain concept. (O-06) (BB) (Pg.48)
10. Write the brief account of cerebrospinal fluid and its function. (J-10) (BB) (Page No.-49)
11. Draw the V.S of human eye and label the parts. (M-08) (Pg.62)
12. Write notes on human eye defects like myopia and hypermetropia. (O-09) (Pg.64)
13. Enumerate the functions of skin. (M-09) (Pg.73)

**Section: D (10 Marks)**

1. Write an essay on Vitamins. (O-09) (Pg.4)
2. Explain the digestive process taking place in small intestine. (J-07, J-08, J-10, J-11, O-11, M-12) (BB) (Pg.10)
3. What is meant by dental carries? Write its cause, symptoms and root canal treatment. (O-10) (BB) (Pg.12)

4. Define bone fracture and explain the different types of bone fracture. (M-08) (Pg.15)
5. Describe the structure of a skeletal muscle with simple diagram. (M-09, M-11) (Pg.20)
6. Explain the process of pulmonary respiration with the help of diagram. (J-09) (Pg.25)
7. Explain the process of inspiration and expiration. (or) Describe the mechanism of breathing with proper illustration. (O-06, M-07, O-07, S-08) (BB) (Pg.27)
8. Describe the origin and conduction of heart beat and cardiac cycle. (M-10) (Pg.30)
9. Write an essay on myocardial infarction. (M-06) (Pg.33)
10. Enumerate the events involved in the function of the human heart. (M-08) (BB) (Pg.39)
11. Explain the structure and functions of thyroid gland with diagram. (J-09) (Pg.53)
12. Give an account of parathyroid gland. (J-10, J-11) (Pg.55)
13. Explain the importance of Pancreas as an endocrine gland. (J-08) (Pg.56)
14. Explain the physiological effects of insulin and glucagons. (O-07) (Pg.57)
15. Explain how adrenal medulla functions as an endocrine gland. (M-09) (Pg.59)
16. Write an essay on the functions of adrenal secretions. (J-07) (Pg.59)
17. Enumerate the various eye defects. Comment on corrective measures. (J-06, M-11) (BB) (Pg.64)
18. Explain the type of hearing loss and the correcting measures adopted. (M-10) (Pg.70)
19. Explain the mechanism of urine formation. (M-06, M-07) (Pg.77)
20. What is Diabetes mellitus? Explain its symptoms, types and causes. (O-09) (Pg.82)
21. Write an essay on menstrual cycle. (O-06, O-08, O-10, O-11, M-12) (BB) (Pg.88)
22. Comment on various schemes suggested by the National Family Welfare Programmes & their importance. (J-06) (BB) (Pg.90)

Chapter 01 Microbiology

Section B (3 Marks)

1. Write the crowning achievements of Louis Pasteur. (M-11) (Pg.93)
2. What are viruses? Why are they referred to as obligate- intracellular parasites? (J-07) (Pg.94)
3. What is meant by Diploid cell strain? (M-06, O-11) (BB) (Pg.96)
4. Comment on continuous cell line culture of virus. (O-09, O-10) (Pg.96)
4. What is meant by Chicken Embryo Technique? (M-08) (Pg.96)

5. List out the names of any three oncogenic viruses. (M-09) (Pg.97)
6. Mention the various Morphological features of bacteria. (J-08) (Pg.98)
7. What is transduction? (M-12) (Pg.99)
8. Write the symptoms of cholera. (M-08) (Pg.100)
8. Write notes on Gastroenteritis. (J-09) (Pg.100)
9. What is amoebiasis? (O-06) (BB) (Pg.101)
10. Write the names of any three protozoan parasites and their disease. or Mention any three pathogenic protozoans. (J-06, J-10) (Pg.102)
11. Define Zoonoses. (O-07) (BB) (Pg.102)
12. Write any three characteristics of a good chemotherapeutic agent. (S-08) (Pg.103)
13. Enumerate the methods of diagnosis of AIDS. (M-07, J-11) (BB) (Pg.106)

**Section: C (5 Marks)**

1. Write the pathogen, symptoms and mode of transmission of Rabies and Cholera (M-10) (Pg.97, 100)
2. Write short notes on any two viral diseases in man. (J-09) (BB) (Pg.97)
3. Write short notes on viral diseases in man. (M-07) (BB) (Pg.97)
4. Mention the steps involved in the preparation of bacteriological media. (O-09, J-10) (Pg.98)
5. Write notes on 'Bacterial Genetics'. (O-10) (Pg.99)
6. Describe any two bacterial sexually transmitted diseases in man. (J-07, M-11) (Pg.100)
7. Write notes on two bacterial diseases in man. (J-08) (Pg.100)
8. Enumerate the adaptations of pathogenic microbes. (M-06, O-07, J-11, O-11) (BB) (Pg.102)
9. Describe the structure of HIV virus. (M-09) (Pg.105)
10. Explain the control and management (preventive measures) of AIDS. (J-06, S-08, M-12) (BB) (Pg.106)
11. Write the symptoms of AIDS, defined by WHO. (O-06, M-08) (BB) (Pg.106)

**Chapter – III Immunology**

**Section: B (3 Marks)**

1. How do interferon acts as physiological barriers in our body? (M-11) (Pg. 109)
2. What is phagocytosis? Mention the important phagocytes. (S-08, O-09) (BB) (Pg.109)

3. How are macrophages acts as phagocytic barriers? (M-10) (Pg.109)
4. Define Cell Mediated Immunity (CMI). (J-06) (BB) (Pg.110)
5. Write any three unique features of specific immunity. (J-09) (Pg.110)
6. What are the main functions of free antibodies? (O-06, J-09, O-10, M-11, M-12) (BB) (Pg.111)
7. Define opsonisation. (O-11) (Pg.111)
8. Differentiate active adaptive immunity from passive adaptive immunity. (M-06) (BB) (Pg.111)
9. What is the primary function of the "Thymus"? (M-09) (Pg.113)
10. Name the secondary lymphoid organs. (M-07) (Pg.114)
11. Distinguish between paratope and epitope. (M-07) (BB) (Pg.115)
10. State the functions of spleen. (J-10, J-11, O-11) (BB) (Pg.115)
11. Define the term 'antigen'. (O-06, J-11) (BB) (Pg.115)
12. What are haptens? (O-07, J-08, O-10) (BB) (Pg.115)
13. Name the five classes of immunoglobulins. (M-08) (BB) (Pg.116)
14. Comment on 'L' chain of immunoglobulin. (M-06) (Pg.116)
15. Draw the diagram of immunoglobulin and mark the parts. (J-07) (BB) (Pg.116)
16. Write any three effects of graft rejection in a host. (O-08) (Pg.117)
17. Define Xenograft. (O-07) (BB) (Pg.117)
18. Write any three preventive measures for graft rejection. (M-10) (Pg.118)
19. What are immunosuppressant drugs? (J-07) (BB) (Pg.118)
20. What is anaphylaxis? (O-09, M-12) (Pg.119)
21. When do autoimmune diseases occur? Give an example. (J-08) (Pg.119)
22. How is the multiple sclerosis formed? (M-09) (Pg.119)

**Section: C (5 Marks)**

1. What are the anatomical and inflammatory barriers in first line defence? (J-07) (Pg.109)
2. Explain the unique features of the adaptive immunity. (S-08) (BB) (Pg.110)
3. Write a short note on antibody mediated immunity. (M-06) (Pg.111)
4. Write short notes on activation of adaptive immunity. (M-10) (Pg.111)

5. Describe the structure of lymph node with the help of diagram. (O-10) (Pg.113)
6. Describe the structure of immunoglobulin with a diagram. (J-09, J-10) (Pg.116)
7. Draw a labeled diagram of Immunoglobulin (IgG) (J-06, J-10) (BB) (Pg.116)
8. What is organ transplantation? Classify the types of graft. (J-08) (Pg.117)
9. Describe the types of grafts. (M-09) (Pg.117)
10. Write short notes on genetic basis of organ transplants. (M-11) (pg. 117)
11. What are the symptoms of graft rejection? or What are the symptoms of allograft rejection? How it is prevented in clinical field? (O-06, M-07, O-07, O-09, J-11, O-11, M-12)(BB) (Pg.118)
12. Give an account of immunodeficiency diseases. (M-08) (BB) (Pg.119)

#### Chapter – IV Modern Genetics

##### Section: B (3 Marks)

1. What is Karyogram? (O-07) (Pg.120)
2. Write any two uses of Karyotyping of Human Chromosomes (J-06, M-7, M-08, O-11) (BB) (Pg.122)
3. Define recombinant DNA. (M-09) (Pg.124)
4. Write any three uses of recombinant DNA technology. (O-09) (Page NO.-124)
5. What is called pedigree analysis? (O-06, M-10, O-10) (Pg.125)
6. What is meant by pedigree chart? (M-11) (Pg.125)
7. Mention the names of genetic diseases. (M-07) (Pg.125)
8. What are the symptoms of sickle cell anaemia? (O-09) (Pg.125)
9. What are the clinical manifestations of Thalassemia? (J-07, J-08, S-08, J-10, M-11, J-11) (BB) (Pg.125)
10. What is human genome project (HGP)? (M-12) (Pg.128)
11. What is proteomics? (O-07, O-09, J-10) (Pg.128)
12. Define cloning. (M-08) (Pg.129)
13. What is differentiation? (M-10, M-12) (BB) (Pg.129)
14. What are superbugs? Mention any one use of them. (M-06, J-11)(Pg.129)
15. Write the significance of superbugs. (M-09) (BB) (Page NO.-129)
16. What are the merits of Cloning? (J-09) (Pg.130)



17. Mention any two demerits of cloning. (J-08)(Pg.130)
18. What are the uses of transfected cell? (M-06, J-09) (Pg.131)
19. What is gene therapy? Mention its types. (J-07, O-07, J-08, S-08, O-10, J-11) (BB) (Pg.132)
20. Differentiate somatic cell gene therapy from germ line gene therapy. (J-09) (Pg.132)
21. Define bioinformatics. (M-09) (Pg.133)
22. Write any three scopes of genetic engineering. (O-11) (Pg.133)
23. What are the scientific inventions that helped in paving way for origin of bioinformatics? (M-12)
24. Mention any three scopes of 'Bio-informatics'. (J-07) (Pg.134)
25. What is a database in bio-informatics? (M-08, O-10) (BB) (Pg.134)
26. What are the premier institutes considered as the authorities in the nucleotide sequence database? (O-11) (Pg.134)
27. What is DNA library? (O-06, M-07, M-11)(BB)(Pg.136)
28. What is cDNA? (M-10) (Pg.136)
29. Mention the language that helps in bio-informatics. (J-10) (Pg.137)
30. Write any three uses of bio-informatics. (S-08) (Pg.137)
31. What is Protein Data Bank? (J-06)(Pg.138)

Section: C ( 5-Marks)

1. Describe the karyotyping of human chromosomes. (M-10) (Pg.121)
2. Mention the uses of recombinant DNA technology. (M-07, M-08) (BB) (Pg.124)
3. Give the symbolic representation of pedigree chart. (O-07) (Pg.126)
4. Write a short note on Huntington's Chorea. (M-06) (Pg.127)
5. What are the significance and benefits of Human Genome Project? (J-07, J-08, S-08, J-10, J-11) (Pg.128)
6. Explain Dr. Ian Wilmut's cloning mechanism. (O-10) (Pg.129)
7. What are the uses of transgenic animals? (M-12)
8. Write a note on scope of Bio-informatics. (J-06, M-09) (Pg.134)

9. What is database? Briefly explain its types. (O-09) (Pg.134)

10. What are the ethical issues, merits and demerits of cloning? (O-06, M-11, O-11) (BB) (Pg.130)

11. What is a 'Glowing coal'? What are the uses of it? (J-09) (Pg.138)

#### Chapter – V Environmental Science

##### Section: B (3-Marks)

1. What is known as global warming? (O-07)(BB) (Pg.144)

2. Mention any three causes of factors of global warming. (J-08, S-08) (Pg.144)

3. What are ozone-depleting substances? (O-09) (Pg.144)

4. What is greenhouse effect? (O-06) (Pg.144)

5. What are the effects of ozone depletion? (J-09, J-11, O-11) (Pg.147)

6. What is meant by ozone hole? (J-10) (Pg.147)

7. What is non-biodegradable waste? Give an example. (J-06) (Pg.149)

8. What are biomedical wastes? How are they disposed of? (M-06, J-07) (Pg.150)

9. Define Biodiversity. (J-06) (BB) (Pg.152)

10. Define 'Biosphere reserve' (O-10) (Pg.153)

11. Write any two characteristics of a biosphere. (M-12)

12. Mention two Biosphere reserves in Tamil Nadu. (M-06, M-08) (BB) (Pg.154)

13. List out the names of any three bio-reserves in India. (M-09) (BB) (Pg.154)

14. What are the advantages of solar energy? (M-07) (BB) (Pg.157)

15. The future source of power is hydrogen. Why? (M-10) (Pg.158)

16. What is meant by seeding of clouds? (O-06) (BB) (Pg.162)

17. What is meant by bio-remediation? (M-11)

##### Section: D (10-Marks)

1. Give an account of greenhouse gases and their impacts on the environment. (or) 'Global warming is the direct result of Greenhouse effect'. Discuss the statement. What related problems do we foresee? (or) List out the effects of global warming & efforts to control global warming. (S-08, J-09, M-12) (BB) (Pg.144)

2. "Ozone as a natural sun block" – Discuss and also list out the ways of preventing ozone depletion. (M-06, M-07) (BB) (Pg.146)

3. Write an essay on non-hazardous solid waste management. (M-10) (Pg.151)
4. Write an essay on importance of bio diversity, consequences of losing Bio diversity and various strategies adopted to conserve biodiversity. (O-09) (Pg.152)
5. How will you manage hazardous wastes? Discuss it with current knowledge. (J-07, M-08, J-11, O-11) (BB) (Pg.150)
6. What is known as energy crisis? What are the steps taken to solve energy crisis? (O-06, J-08, S-08) (BB) (Pg.156)
7. Give an account on poverty. (O-07, J-10) (BB) (Pg.159)
8. Write about the fresh water resources and the reason for fresh water shortage. (O-10) (BB) (Pg.162)
9. How are reuse and recycling techniques useful in management of solid wastes? Add a note on waste water treatment and management. (M-11) (Pg.151)
10. Write an essay about Freshwater Management. (J-06, M-09) (Pg.162)

#### Chapter – VI Applied Biology

##### Section: B (3-Marks)

1. Write any three characteristics of jersey breed. (M-11) (Pg.169)
2. Write the name of any three exotic breeds of cattle. (M-12)
3. How will you identify healthy cattle? (M-08) (BB) (Pg.169)
4. List out the different types of diseases of cattle. (O-07) (BB) (Pg.169)
5. What are the control and preventive measures of cow-pox diseases? (M-06, O-06) (BB) (Pg.170)
6. Mention any two symptoms of Milk fever. (J-06, J-10) (Pg.170)
7. What is milk fever? Mention its symptoms. (O-09) (Pg.170)
8. What are the precautions and first aid for milk fever? (M-07) (Pg.170)
9. What is meant by outbreeding? (O-11) (Pg.171)
10. What is artificial insemination? (J-08, M-12) (BB) (Pg.171)
11. What are the advantages of artificial insemination? (O-06, J-07, J-09, M-08, S-08, J-11) (BB) (Pg.171)
12. Mention any three breeds of indigenous fowls in India. (J-07) (Pg.173)
13. What are the characteristic features of Aseel breed of fowl? (M-10) (Pg.172)
14. Mention the important points to be considered during selection of eggs. (O-07, M-09) (Pg.174)

15. How are the fish ponds categorized? (O-10) (Pg.179)
16. What are the characteristic features of Tilapia? (J-11) (Pg.182)
17. Mention the uses of stethoscope. (J-08)(Pg.183)
18. Mention the uses of sphygmomanometer. (M-09) (PageNo.-184)
19. What is Haemocytometer? (J-10) (Pg.185)
20. State the clinical significance of Haemocytometer. (O-10) (Pg.186)
21. What is known as Glycosuria?(S-08) (Pg.186)
22. What is Computed Tomography Scan? (J-06)(Pg.189)
23. Mention any three uses of C.T. (M-06, O-11) (Pg.189)
24. What is artificial pace maker? (O-09, M-10) (Pg.190)
25. Mention the advantages of autoanalyser. (M-07, M-11)(Pg.191)
26. Write the disadvantages of an autoanalyser. (J-09) (Pg.191)

**Section: D (10-Marks)**

1. Give account of origin, distribution, characters and milk production of dairy breeds. (O-06) (BB)(Pg.166)
2. Explain any two contagious diseases and two non-contagious diseases found in cattle. Mention about their prevention. (or) Write an essay on common diseases of cattle. (or) Give a detailed account on the contagious diseases of cattle. (J-07, M-08, J-08) (BB) (Pg.169)
3. How will you classify cattle based on their purpose? Give two examples for each. What are the various techniques adopted in cattle breeding? (M-06) (BB) (Pg.166 & 171)
4. What are the techniques adopted in cattle breeding? Write a short note on the exotic breeds of cattle. (M-10) (Pg. 171 & 169)
5. Explain the important-stages or steps in rearing of chickens. (or) Explain the stages involved in the rearing of poultry. (or) Describe poultry farming methods. (M-07, O-07, O-10)(Pg.174)
6. What are the categories of fish farming? Explain the characters of cultivable fish. (O-11) (Pg.177)
7. Write a detailed account on the preparation of fish pond and its maintenance. (M-09, J-11) (Pg.179)
8. Write the management of fish farm and explain any two edible fishes of Tamil Nadu. (J-06) (Pg.180)
9. Write about the instruments used to detect the heart beat and to measure the blood pressure.(J-10) (Pg. 183)

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10. Describe the working method and uses of sphygmomanometer. (M-12) (Pg.183)
11. Briefly describe the P, Q, R, S, T waves of ECG. (O-09, M-11) (Pg.187)
12. What is CT scanner? Write the advantages and uses of CT scanner. (J09) (Pg.189)

#### Chapter – VII Theories of Evolution

##### Section: B (3 Marks)

1. State the theory of inheritance of acquired characters. (J-07) (BB) (Pg.192)
2. Define first law of Lamarck. Write one example. (J-09) (Pg.192)
3. State Germplasm theory. (J-06, O-06, S-07) (BB) (Pg.194)
4. What is meant by survival of the fittest? (M-07, O-11) (BB) (Pg.196)
5. Define Pangenesis theory. (M-09, M-11) (Pg.197)
6. Write the reasons for the formation of polysomics. (M-12)
7. Define "Gene pool". (M-08, O-10) (BB) (Pg.198, 199)
8. State or Define Hardy-Weinberg Law. (M-06, S-08, M-10) (Pg.200)
9. Define bottleneck effect. (J-08) (Pg.201)
10. Define Polymorphism. (J-10) (Pg.201)
11. What is species? Mention its types. (J-11) (Pg.202)
12. Differentiate allopatric species from sympatric species. (O-09) (Pg.203)

##### Section: C (5 Marks)

1. Write a short note on Neo-Lamarckism. (O-06) (BB) (Pg.194)
2. What are the objections to Darwinism? (O-07) (BB) (Pg.197)
3. Describe the modern concept of natural selection. (J-09) (BB) (Pg.198)
4. Explain chromosomal aberration (O-11) (Pg.199)
5. Write a detailed account on population genetics. or What are the condition under which Hardy-Weinberg law operates? (M-08, M-11) (BB) (Pg.199)
6. Describe the 'genetic drift' concept. or Describe Sewall-Wright effect. (O-08, M-12) (Pg.200)
7. What are the three processes in natural selection? Explain. (J-06) (Pg.201)
8. Write down the mechanism that prevents inter-specific crosses? or Explain pre-mating isolation. (J-08, J-07, J-10, J-11) (Pg. 202)

9. Give an account of different types of species. (O-10) (Pg. 203)

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## Unit - 1. Human physiology

## Part - I

Choose the correct answer :

1. Intake of less amount of protein leads to the deficiency disease called  
a) Beri Beri b) Rickets c) Anaemia **(d) Kwashiorkar**
2. Each gram of lipid is capable of yielding.  
**(a) 9.3 calories** b) 8.2 calories c) 7.1 calories d) 6 calories
3. Deficiency of vitamin D causes  
a) Nyctalopia b) Xerophthalmia **(c) Osteomalacia** d) Pellagra
4. The calorie requirement for IRM at heavy work during occupational activities is  
a) 1100 calories b) 750 calories **(c) 2200 calories** d) 460 calories
5. The normal BMI (Body mass index) range for adults is  
a) 10 - 15 b) 12 - 24 c) 15 - 20 **(d) 19 - 25**
6. The normal blood glucose level during fasting is  
**(a) 70 to 110 mg/dl** b) 80 to 200 mg/dl c) 100 to 150 mg/dl d) 200 to 250 mg/dl
7. During emulsification, the bile salts convert bigger fat particles into smaller globules called  
a) granules b) oil **(c) chylomicrons** d) millimicrons
8. During root canal treatment, the cavity of the tooth is filled with a sealing paste made of  
a) chitin b) calcium carbonate c) iodised salt **(d) gutta-percha resin**
9. The gall stones are formed of  
a) calcium b) growing infected tissue **(c) cholesterol** d) sodium crystals
10. A fracture can be caused by  
a) shock b) loss of blood supply **(c) impact of force** d) malnutrition
11. The granulation of tissues around the site of fracture is called  
**(d) callus**

- a) nodule b) papilla c) rudiment **(d) callus**
12. An inflammation of synovial membrane is called as  
 a) infective arthritis b) osteoarthritis  
**(c) rheumatic arthritis** d) mechanical arthritis
13. During the contraction of muscle the ATP molecules bind with the active site of  
 a) myosin filament b) myofibrils c) nerve endings **(d) actin filaments**
14. Ca ions necessary for the contraction of muscles are released from  
 a) blood b) protoplasm c) synovial membrane **(d) sarcoplasmic reticulum**
15. What is the substance that destroys the muscle protein during rigor mortis  
 a) proteolytic enzymes b) mitochondrial enzymes  
**(c) lysosome enzymes** d) esterases
16. The surface area of skin in our body is  
**(a) 1.1-2.2m<sup>2</sup>** b) 2.2-3.3m<sup>2</sup> c) 1-2m<sup>2</sup> d) 0.5-1.5m<sup>2</sup>
17. An oily substance called sebum is secreted by  
 a) sweat gland **(b) sebaceous gland** c) thyroid gland d) tear gland
18. Albinism is an extreme degree of generalized  
 a) hyperpigmentation **(b) hypopigmentation**  
 c) failure of pigmentation d) perioral pigmentation
19. Partial albinism causes  
**(a) leucoderma** b) vitiligo c) melanoma d) dermatitis.
20. Excessive exposure to U V-rays can cause  
 a) vomiting b) redness of eyes c) colour change **(d) skin cancer**
21. Rag weed plant causes allergic responses and results in  
 a) photo dermatitis **(b) herpetiformis dermatitis** M.A.  
 c) dermatitis artefacta d) all the above
22. The amount of urea present in blood  
**(a) 0.02gms/100ml** b) 0.06gms/100ml



c) 0.08gms/100ml d) 0.01gms/100ml

23. Urea biosynthesis takes place in

a) blood **(b) liver** c) cerebro-spinal fluid d) kidney

24. Number of ATP molecules spent to convert ammonia to urea is

a) four b) two **(c) three** d) one

25. During glomerular filtration the malpighian body acts like a

a) structural unit **(b) biological filter**

c) biological buffer d) acid-base balancer

26. The amount of blood supplied to the kidneys is about

**(a) 20-25% of cardiac output** b) 25-30% of cardiac output

c) 30-35% of cardiac output d) 35-40% of cardiac output

27. Net filtration force which is responsible for the filtration in glomerulus is

**(a) 25mm Hg** b) 50mm Hg c) 75mmHg d) 80 mm Hg

28. The amount of urea reabsorbed in the urinary tubules is

a) 5gm b) 17gm c) 21gm d) 20gm      Answer  $53 - 25 = 28 \text{ gm}$ .

29. Area responsible for reabsorption of water, glucose, sodium phosphate and

bicarbonates is

a) glomerulus **(b) proximal convoluted tubules**

c) collecting duct d) descending limb of Henle's loop

30. The volume of water found in the glomerular filtrate is

**(a) 170 lit** b) 168.5 lit c) 165 lit d) 162.8 lit       $170 - 180 \text{ lit}$

31. In recent days insulin resistant diabetes is commonly noticed in the age group

of      <sup>Ans</sup> younger persons.

**(a) 10-15 years** b) 40-50 years c) 35 - 40 years **(d) 20-25 years**

32. The type of diabetes that develops due to heavy viral infection belongs to the

category called

- (a) Insulin dependent diabetes b) non-insulin dependent diabetes  
c) inflammator diabetes d) harmful diabetes

33. Which of the following is called artificial kidney?

- a) donar kidney (b) dializer  
c) tissue-matched kidney d) preserved kidney

### Unit 2. Micro Biology

#### Part I

Choose the correct answer.

- Who first developed vaccine for rabies in man ?  
a) Robert Koch b) Joseph Lister (c) Louis Pasteur d) Stanley
- Which one of the following fields paved the way for modern microbiology  
a) development of vaccines b) technique of new viral strains  
c) discovery of new viral strains (d) development of pure culture technique
- Which one of the following statements is incorrect regarding the structure of viruses ?  
a) Nucleic materials are covered by a protein coat, called capsid.  
b) The capsid is made up of capsomeres  
c) Some animal viruses have an additional envelope  
(d) The additional envelope is made up of glycoprotein
- Virions contain only a single copy of nucleic acid, hence they are called  
a) incomplete viruses (b) haploid viruses c) ploidy viruses d) complete viruses
- Tumour inducing viruses are called  
a) Pathogenic viruses (b) oncogenic viruses c) Para viruses d) variola viruses
- Which one of the following is a protozoan disease ?  
(a) African sleeping sickness b) Measles c) Cholera d) Taeniasis
- Sexual reproduction of plasmodium takes place in  
a) liver cells of man b) RBCs of man c) Plasma of man (d) body of mosquito
- The pathogenic form of *Entamoeba histolytica* is  
(b) vegetative trophozoite

a) encysted spores **(b) vegetative trophozoite** c) merozoite d) schizont

9. Which one of the following is a trematode worm ?

**(a) Schistosomes** b) Wuchereria c) Taenia d) Ascaris

10. The more promising chemotherapeutic agent for treating viral diseases is

a) Tetracycline b) Ampicillin **(c) Interferon** d) Anthramycin

### Unit 3. Immunology

#### Part I

Choose the correct answer

1. Which of the following can induce immunity

a) bacteria b) viruses

c) parasites **(d) all the above**

2. Skin is a/an

**(a) anatomical barrier** b) physiological barrier

c) phagocytic barrier d) inflammatory barrier

3. Which among the following is anti-bacterial ?

a) interferon **(b) lysozyme**

c) hormone d) protein

4. Which of the following is anti-viral

a) lysozyme **(b) interferon**

c) protein d) hormone

5. Identity the phagocytic cells from the following combinations

**(a) Macrophage and neutrophil** b) Lymphocyte and eosinophil

c) Macrophage and eosinophil d) Eosinophil and neutrophil

6. Histamine is secreted by

a) Epithelial cell **(b) Mast cells**

c) Red blood cells d) white blood cells

7. Humoral immunity consists of

a) normal cells b) pathological cells

- c) cytotoxic cells  d) immunoglobulin molecules
8. Which type of graft is used in plastic surgery ?  
a) xenograft b) allograft  
 c) autograft d) isograft
9. MHC genes in mouse is located in  
a) Chromosome 1 b) Chromosome 2  
c) Chromosome 4  d) Chromosome 6
10. Which of the following is an auto immune disease ?  
a) AIDS  b) Multiple sclerosis  
c) Cancer d) Asthma
11. Which antibody characterizes the allergic reaction  
a) IGG b) IGA  
c) IGM  d) IGE
12. SCID is due to  
 a) Adenosine deaminase deficiency b) Glucose oxidase deficiency  
c) Phosphatase deficiency d) Lactate dehydrogenase deficiency
13. Which of the following causes AIDS ?  
a) Bacteria b) Fungus  
c) Retro virus d) TMV
14. Thymus growth occurs up to  
a) 17 years  b) 12 years  
c) 5 years d) 30 years
15. Which of the following secretes immunoglobulin  
a) T-lymphocyte  b) B-lymphocyte  
c) Macrophage d) Mast cells
16. The H-chain of immunoglobulin has a molecular weight  
a) equivalent to that of light chain  
 b) Twice that of light chain

c) Triple the amount of light chain

d) Twice as that of dark chain

17. Immunoglobulins are chemically

a) glycogens  b) glyco-proteins

c) glycolipids d) Lipo-proteins

18. Hyper variability regions are present in

a) heavy chain only b) light chain only

c) heavy and light d) dark chain

19. Organ transplantation from pig to human is an example for

a) Autograft b) Allo-graft

c) ISO-graft  d) Xeno-graft

20. Graft between identical twins is called

a) Xeno-graft b) Allograft

c) Auto graft  d) Iso graft

#### Unit 4. Modern Genetics

##### Part I

Choose the correct answer.

1. In which prokaryote has voluminous genetical works been made

a) TMV virus b) Phage

c) Escherichia coli d) coliform bacteria

2. Who discovered the double helix DNA model ?

a) G.H. Khorana b) Mendel

c) T.H.Morgan  d) Watson and Crick

3. About how many hereditary diseases in human beings had been identified ?

a) more than 300 b) less than 300

c) about 400 d) about 100

4. To obtain information about genetic characters in man which of the following

helps?

a) Biochemical test b) Hybridization

c) Pedigree analysis d) Inbreeding

5. Sickle cell anaemia is due to

a) autosomal gene b) sex chromosomal gene

c) vitamin deficiency d) hormone imbalance

6. Albinism is due to

a) absence of melanin b) absence of vitamins

c) presence of melanin d) absence of hormone

7. Name the human disease due autosomal dominant gene

a) sickle cell anaemia b) thalasemia

c) SCID  d) huntington's chorea

8. Idiogram means

a) Diagrammatic representation of genes

b) Diagrammatic representation of chromosome

c) Graph showing heart defect

d) electro cardiogram

9. In human chromosome karyotyping the chromosomes 4 and 5 belong to group

a) A  b) B

c) C d) D

10. What is the name for mobile genetic elements

a) plasmids b) pili

c) barr body  d) transposons

Unit 5. Environmental Science

Part I

Choose the correct answer

1. What is the rate of growth of human population ?

- a) 10 billion per year (b) 90 billion per year  
 c) 1 billion per year d) 80 billion per year
2. The present sudden acceleration of population is called as  
 a) population explosion b) population bomb  
 c) population trap (d) all the above
3. Global warming is caused due to  
 a) lack of rainfall b) presence of a hole in ozone layer  
 (c) human activities against nature d) extinction of animals and plants
4. The most abundant green house gas is  
 a) NO<sub>2</sub> (b) CO<sub>2</sub> c) O<sub>3</sub> d) SO<sub>2</sub>
5. Which of the following gas destroys ozone layer faster?  
 a) chlorofluorocarbons b) hydrochlorofluorocarbons  
 (c) both (a) and (b) d) sulphur dioxide
6. Which is a better method to dispose large amounts of water carrying relatively small amounts of chemical wastes?  
 a) land filling method b) Deep-well injection  
 (c) Surface impoundments d) incineration
7. Which one of the following organisms plays vital role in pollination of trees in tropical forest?  
 a) mimic moths (b) orchid bees  
 c) Rhinoceros beetles d) Humming birds
8. Which is commonly considered as a biologist's paradise?  
 (a) Gulf of Mannar Biosphere Reserve b) Nilgiri Biosphere Reserve  
 c) Nanda Devi d) Great Nicobar
9. The amount of energy the earth receives from the sun, per year is  
 a) 1000 K calories b) 10 X 10<sup>30</sup> K calories  
 (c) 5 X 10<sup>20</sup> K calories d) 15 X 10<sup>25</sup> K calories  
 $5 \times 10^{20} \text{ K calories}$

10. Which is considered as a future source of power, that can meet our unlimited

demand ?

- a) Hydel power  b) Hydrogen  
 c) Thermal power d) Solar power

11. Of the total amount of water, how much is available as fresh water?

- a) 10 % b) 3% c) 15% d) 50%

12. Which of the following countries depend on desalination process for getting

fresh water?

- a) Dubai b) Oman c) Bahrain  d) all the above

### Unit 6. Applied Biology

#### Part I

Choose the correct answer

1. The breeds of cattle now available in India are

- a) 29 b) 30

- c) 26 d) 20

2. Which one of the following is not a draught breed?

- a) Kangayam b) Khillar

- c) Kankrej  d) Hallikar

3. The other name for the cattle sindhi is

- a) Kongu b) Nellore

- c) Red karachi d) Decan

4. Kangayam originated from

- a) Punjab  b) Coimbatore

- c) Karnataka d) Kathiawar

5. Which of the following is not an exotic breed?

- a) Jersey b) Gir

- c) Brown swiss d) Ayreshire



6. Which one of the following is a contagious disease of the cattle?

a) constipation b) milk fever

Ⓒ cow pox d) diabetes

7. Feeding jaggery along with lime water is one of the first aid measure for

a) Diarrhoea b) constipation

Ⓒ milk-fever d) anthrax

8. Mating of closely related animals is called

a) outbreeding b) artificial insemination

c) cross breeding Ⓓ Inbreeding

9. The milk which the following cow is characterised by high carotene content?

Ⓕ Sindhi b) Haryana

c) Gir Ⓓ Jersy

10. For anthrax one of the following symptom can be seen

a) swelling of udder Ⓒ blood discharge from natural openings

c) loss of appetite d) lack of chewing

### Unit 7. Theories of Evolution

#### Part I

Choose the correct answer

1. The book 'Philosophie Zoologique' was published by

a) Charles Darwin b) August Weismann

c) Mc Dougall Ⓓ Jean Baptiste de Lamarck

2. The German scientist who segregated germplasm from somatoplasm for the

first time was

a) Lamarck b) Malthus

Ⓒ Weismann d) Hugo de vries

3. Mc Dougall supported neo-lamarckism and proved the concept of

a) Direct action of environment on organism

- b) Learning is an acquired character  
c) Speed of learning increased from generation to generation  
d) All the above
4. Darwin supported the following concepts for evolution  
a) arrival of the fittest  
b) survival of the fittest  
c) The differentiation of somatoplasm germplasm  
d) genetic recombinations
5. The book "Process of organic evolution" to support modern synthetic theory of evolution was provided by  
a) Dobzhansky b) Stebbins  
c) Hardy-weinberg d) Hugo de vries
6. The factor that enriches the genepool with new modified genes  
a) mutation b) somatic variation  
c) decrease in chromosomes d) increase in cytoplasm