

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	In a nucleotide, a nitrogenous base is attached to carbon number:	5	4 ●	3	1
2.	A set of three nucleotides on mRNA specifying a particular amino acid is called:	Code	Genetic code	Codon ●	Anticodon
3.	Brothers having same parents are not similar due to:	Mitosis	Synopsis	Apoptosis	Crossing over ●
4.	On looking at a pure white cat, a student of genetics said, "Alas, the cat is deaf!". Guess the genotype of cat.	W/W ●	W/w	w/w	Both A & B
5.	Indicate the salt tolerant plant among the given:	Acacia ●	Mango	Arabidopsis	Shisham
6.	In which disease a patient lacks a gene coding for trans-membrane carrier of chloride ions?	SCID	Cystic fibrosis ●	Cancer	Hodgkin's lymphoma
7.	Which protein is similar in all aerobic organisms?	Cytochrome b	Haemoglobin	Cytochrome c ●	Both A & C
8.	The term niche was coined by:	Joseph Grinnell ●	Charles Elton	Tansley	Hult
9.	Select the inappropriate matching.	Khanpur ↔ Cholistan	Yazman ↔ Thar	Mianwali ↔ Thal	Gilgit ↔ Grassland
10.	<i>Homo sapiens</i> have been on the earth for about:	10,000 years	20,000 years	40,000 years ●	60,000 years
11.	Which of the given retards cell elongation in plants?	Red light	Blue light	Ultraviolet rays ●	Both A & C
12.	An individual produced by parthenogenesis is:	Male ●	Female	Male or female	Hermaphrodite
13.	Transient alteration in brain due to excessive rapid electrical discharges in the grey matter are diagnosed as:	Epilepsy ●	Parkinsonism	Alzheimer's disease	Goiter
14.	Hormone that stimulates conversion of glucose into lipids and proteins is:	Cortisol ●	Insulin	Aldosterone	Glucagon
15.	What is not true about sclerenchyma?	Lignin	Branched pits	Protoplast ●	Thick cell wall
16.	Nastic movements are due to balance or ratio between:	Abscisic acid and gibberellin	Abscisic acid and cytokinin	Abscisic acid and auxins ●	Both A & C
17.	Production of heat or high temperature during fever is called:	Pyrogen	Pyrexia ●	Antitoxin	Both A & C

Please visit for more data at: www.pakcity.org

313-424-1A-18000

★★

Sahiwal Board-2024

Biology

Paper : II

H.S.S.C (12th) 1st Annual 2024

Subjective

Roll No. _____ (To be written by the candidate,

Marks : 68

Time : 2:40 Hours

SECTION-B Note:- Section B is compulsory.

2. Write short answers to any EIGHT parts. (8 x 2 = 16)

- How do fresh water organisms maintain osmoregulation?
- Human nephrons have association of three types of capillary beds. Give their names and location in the kidney.
- Why leaves are said to be excretophores?
- What do you know about skeletal deformities because of genetic causes? Discuss any two of them.
- What kind of cells are responsible for bone formation?
- Name unpaired bones of cranium.

3. Write short answers to any EIGHT parts. (8 x 2 = 16)

- Define Biological Rhythms. Write names of its types.
- Write functions of cerebellum.
- How would you define innate behaviour? Give example.
- What do you remember about law of independent assortment?
- Why blood group O is called universal donor?
- What do you understand by sex limited trait? Give example.

4. Write short answers to any SIX parts. (6 x 2 = 12)

- Define lateral meristem. Give example.
- How coelom is formed in chick embryo?
- What is nucleosome?
- Differentiate between leading strand and lagging strand of DNA.
- How does phenylketonuria affect body?

- How would you differentiate between oviparous and viviparous condition?
- What is the importance of pollen tube in spermatophytes?
- What is profundal zone? What is its source of nutrition?
- Give two adaptations in plants and animals for terrestrial ecosystem.
- How chlorine is responsible for ozone depletion?
- What is acid rain? Write its any two effects.

- Write names of things which are required to produce recombinant DNA.
- What is restriction fragment length polymorphism? How is it detected?
- How would you define Transgenic Organisms?
- How does a predator affect prey and vice versa?
- What does happen in denitrification?
- How would you compare autecology and synecology?

vi. Define cell cycle. Give its sketch also.

vii. What is malignant tumour?

viii. Comparative embryology is an evidence of evolution. Justify.

ix. Define Hardy-Weinberg Theorem.

SECTION-C Note:- Attempt any THREE questions. Each question carries EIGHT (4+4=8) marks.

5. (a) How are excretory products made concentrated in the human kidney?

(b) Write down four differences between mitosis and meiosis.

6. (a) How are broken bones repaired? Explain.

(b) What is succession? Explain it with an example of xerosere.

7. (a) Discuss the main events involved in initiation of nerve impulse.

(b) Write down any four factors which may affect gene frequency.

8. (a) Describe the role of phytochrome in photoperiodism.

(b) In monohybrid cross, we get 3:1 phenotype and 1:2:1 genotype ratio. Prove it with one example.

9. (a) Write a note on embryonic induction.

(b) What is polymerase chain reaction? How does it work? Give its applications also.

313-424-1A-18000

Please visit for more data at: www.pakcity.org

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

SECTION-A

Q.1	Questions	A	B	C	D
1.	During pachytene:	Pairing of homologous chromosomes start	Pairing of homologous chromosomes is completed	Paired chromosomes start to separate	Separation of chromosomes is completed
2.	What type of ratio 1:2:1 is?	Genotypic ratio of monohybrid cross	Phenotypic ratio of monohybrid cross	Genotypic ratio of dihybrid cross	Phenotypic ratio of dihybrid cross
3.	Reverse transcription yields:	mRNA	cDNA	rDNA	tRNA
4.	The use of PROBE is:	To study palindromic sequence	To study bacterial plasmids	To study phage DNA	To search genomic library
5.	The change in allele frequency which occurs by chance is:	Genetic drift	Emigration	Immigration	Mutation
6.	The actual location of an organism is called its:	Niche	Habitat	Behavior	Environment
7.	Succulent plants are found in:	Alpine forests	Grassland	Desert	Deciduous forest
8.	Which one is an environmental buffer?	Ocean	River	Desert	Forest
9.	Urine leaves the kidney through:	Urethra	Ureter	Renal pelvis	Ureteral orifice
10.	Which of these move first leading to the exosmosis of water during rapid movements?	Cl ⁻¹ ions	NH ₄ ⁺¹ ions	K ⁺¹ ions	Ca ⁺² ions
11.	To which region of vertebral column, tetrapod's pelvic girdle is attached?	Lumber region	Sacral region	Pelvic region	Cervical region
12.	Which of these commercially produced hormone promotes malting?	GA ₃	GA	2,4 D	N.A.A
13.	Which of these differentiates into mature sperms in human male?	Spermatogonia	Primary spermatocytes	Secondary spermatocytes	Spermatids
14.	Inhibitory effect of lateral shoots is caused by:	Abscisic acid	Gibberellins	Ethene	Auxins
15.	Notochord is seen in the chick embryo of:	24 hrs.	22 hrs.	20 hrs.	18 hrs.
16.	How many codons specify the amino acid leucine?	2	4	6	3
17.	During cytokinesis in animal cells, actin and myosin form contractile ring which is then followed by the formation of:	Equatorial plate	Cleavage furrow	Phragmoplast	Cell plate

Note:- Section B is compulsory. Attempt any 3 questions from Section C. Sahiwal Board-2022**SECTION-B****2. Write short answers to any Eight parts.****(8 x 2 = 16)**

- i. Discuss adaptations of animals in terrestrial ecosystem.
- ii. What are excretophore?
- iii. Draw the sketch of Urea Cycle.
- iv. What is spondylosis?
- v. Explain all or none response of muscle fiber.
- vi. Discuss locomotion in Mammals?
- vii. What are Gonadotrophins? Give their roles in male and female.
- viii. Define afterbirth.
- ix. Differentiate between alpine and boreal forests.
- x. Discuss the soil condition of the grassland ecosystem.
- xi. Give different ways of energy conservation.
- xii. What is acid rain?

3. Write short answers to any Eight parts.**(8 x 2 = 16)**

- i. Differentiate between chemoreceptors and thermoreceptors.
- ii. Which receptors respond to the mechanical conditions of the internal organs? Give examples.
- iii. What happens when an impulse reaches a synaptic knob?
- iv. What is a gene pool?
- v. Write about over dominance.
- vi. Narrate epistasis.
- vii. What are restriction enzymes, who isolated them?
- viii. How transgenic bacteria promote health of plants? Give example.
- ix. Define examine method of Gene Therapy.
- x. Differentiate between population and community.
- xi. Write a note on biotic components.
- xii. How micronutrients differ from macronutrients?

4. Write short answers to any Six parts.**(6 x 2 = 12)**

- i. What is parthenocarpy? How it can be used commercially?
- ii. How fraternal twins are produced?
- iii. What is a nucleosome? Why histones are positively charged?
- iv. Define transformation. Who discovered this phenomenon?
- v. Compare Okazaki fragments of prokaryotes and eukaryotes.
- vi. Draw ultrastructural features of cell death by apoptosis.
- vii. Give chromosomal make up and symptoms of Turner's Syndrome.
- viii. State theory of special creation.
- ix. What is meant by endosymbiont hypothesis? Who proposed this hypothesis?

SECTION-C**(EACH QUESTION CARRIES EIGHT (8) MARKS)**

5. (a) Explain excretion in Cockroach with diagram. **4**
- (b) Discuss important steps of Nitrogen Cycle. **4**
6. (a) How is human skeleton deformed by trauma? Justify your answer using special reference of disc slip. **4**
- (b) What are mutations? How are they classified? **4**
7. (a) How is growth affected by STH, thyroxine and adrenal hormones of human endocrine system? **4**
- (b) Explain the reasons of Ozone layer depletion. **4**
8. (a) Describe the process of birth in human female. **4**
- (b) What is diabetes mellitus? Discuss diabetes type I disease. **4**
9. (a) What is differentiation? Explain its phenomenon in the formation of different structure of the body. **4**
- (b) How Prokaryotes evolved into Eukaryotes? Discuss the different hypothesis in this type of evolution. **4**

Note: - You have four choices for each objective type question as A, B, C and D. The choice which you think is correct; fill that circle in front of that question number in your answer book. Use marker or pen to fill the circles. Cutting or filling up two or more circles will result no mark.

Q.1	Questions	A	B	C	D
1.	The role a species plays in a community including behaviour and influence is:	Habitat	Biome	Niche	Population
2.	The prokaryotes may have arisen more than _____ billion years ago.	3.5	4.5	5.5	6.5
3.	A genome is a full set of genes of:	Community	Population	Individual	Biosphere
4.	Keeping in view the Pod colour in Pea plant, the dominant colour is:	Green	Yellow	White	Red
5.	Crossing over occurs in:	Leptotene	Zygotene	Pachytene	Diplotene
6.	The full cell cycle takes 90 minutes in:	Human	Yeast	Bacteria	Angiosperms
7.	In fertilized egg of an ascidian Yellow cytoplasm gives rise to:	Epidermis	Gut	Notochord	Muscle cells
8.	In E.Coli the true replicating enzyme is:	DNA polymerase-I	DNA polymerase-II	DNA polymerase-III	DNA polymerase-IV
9.	The formation of rounded closely packed mass of blastomeres is called:	Cleavage	Morulla	Blastula	Gastrula
10.	In honey bee the males are:	Haploid	Diploid	Triploid	Polyploid
11.	A selective weed killer is:	NAA	2,4 D	Ethene	Abscic acid
12.	The acid which is a cause of muscle fatigue.	Lactic acid	Sulphuric acid	Nitric acid	Hydrochloric acid
13.	Which one of the given is paired bone in cranium?	Frontal	Occipital	Sphenoid	Temporal
14.	The amount of water needed to excrete 1g of Ammonia nitrogen.	500 ml	1000 ml	1500 ml	2000 ml
15.	The plants which have the adaptations for reduced rate of transpiration.	Hydrophytes	Mesophytes	Xerophytes	Bryophytes
16.	A good example of environmental buffer is:	Lake	River	Forest	Desert
17.	Cactus is found in the ecosystem.	Forest	Desert	Grass land	Tundra

Biology



Inter (Part-II)-A-2021

Time : 2:40 Hours

Paper : II

Subjective

Marks : 68

Note: Section I is compulsory. Attempt any 3 questions from Section II.

(SECTION-I)

2. Write short answers to any Eight parts.

(8 x 2 = 16)

- Write two differences between cortical nephron and juxtamedullary nephron.
- Differentiate between ectotherms and endotherms.
- Define Panting and Pyrogens.
- Define Sclerenchyma. Write the types of Sclerenchyma cells.
- Write four major functions of skeletal system.
- Define Cartilage. What are two types of cartilage?
- What is the significance of evolution of pollen tube in spermatophytes?
- Define Seed Dormancy. What is its significance for plants?
- Define Grassland Ecosystem. Where grasslands are found in Pakistan?
- Write about animal life found in near-shore zone of a fresh water lake.
- Write the effects of acid rain.
- Define reforestation. How it can be achieved in clear-cut areas?

3. Write short answers to any Eight parts.

(8 x 2 = 16)

- Define Reflex Action and Reflex Arc.
- Draw labelled sketch of motor neuron.
- What is Epilepsy? Name the test for proper diagnosis.
- Differentiate between linkage and crossing over.
- What are sex linked recessive traits? Why men are more vulnerable than women?
- What is Erythroblastosis foetalis? How it is treated after birth?
- Give three main steps of dideoxy method of gene sequencing.
- What are plasmids? How they were discovered?
- What is Hypercholesterolemia? How it is treated now a days?
- Define Ecosystem. Enlist its biotic and abiotic components.
- What is assimilation in Nitrogen-cycle and how it is in contrast to nitrification?
- Give two definitions of "Niche".

4. Write short answers to any Six parts.

(6 x 2 = 12)

- What are meristems? Give two examples.
- Differentiate between maturation and differentiation.
- Define Transformation.
- Enlist types of chromosomes.
- Differentiate between chromosomes and nucleosomes.
- Define Mitosis.
- Differentiate between Cytokinesis and Karyokinesis.
- What is biogeography?
- Differentiate between homologous organs and analogous organs.

(SECTION-II)**(Each question carries Eight (8) Marks)**

- (a) Describe thermoregulatory strategies in mammals including human in cold temperature. 4

(b) Write a note on Biosphere in detail. 4
- (a) What are skeletal muscles? Discuss their structure in detail. 4

(b) Write a note on chemical nature of DNA. 4
- (a) What are hormones? How are they classified? 1+3

(b) Write a note on ozone depletion and greenhouse effect. 2+2
- (a) Describe male reproductive system of man. (Diagram not needed) 4

(b) Explain with example Mendel's law of segregation. 4
- (a) What is Regeneration? Explain it with the help of examples in different groups of animals. 4

(b) Write a short note on Neo-Darwinism. 4

Biology (New Scheme)
Paper : II

(INTER PART II CLASS 12th)(IV)
Objective

Time : 20 Minutes
Marks : 17

Code : 8467

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number with marker or pen. Cutting or filling two or more circles will result in zero mark in that question.

1. The cavity formed between somatic and splanchnic mesoderm is
(A) archenteron (B) Hensen's node (C) neurocoel (D) coelom
2. Reproduction is very important for the survival of
(A) individual (B) population (C) species (D) community
3. In honey bee male sperms are produced by
(A) meiosis (B) mitosis (C) apomixis (D) parthenogenesis
4. The hormones which promote bolting of some rosette plants is known as;
(A) auxins (B) gibberellins (C) cytokinin (D) ethene
5. Which of the following is ~~not~~ part of axial skeleton?
(A) humerus (B) ~~sternum~~ (C) rib (D) tibia
6. Which of the following is ~~not~~ a ruminant?
(A) dog (B) ~~goat~~ horse (C) rabbit (D) monkey
7. Excretory system of planaria is called:
(A) protonephridium (B) metanephridium (C) malpighian tubules (D) renal tubules
8. The category of plants that has adaptations of small and thick leaves to limit water loss is
(A) hydrophyte (B) xerophyte (C) mesophyte (D) hygrophyte
9. Antithrombin III is a biotechnological product produced in :
(A) sheep (B) goat (C) mice (D) cow
10. Archaeobacteria tolerate temperature upto
(A) 60°C (B) 90°C (C) 120°C (D) 150°C
11. Actual location of place where an organism lives is called its
(A) ecosystem (B) habitat (C) niche (D) biome
12. Which one is the most fragile ecosystem?
(A) grassland (B) woodland (C) tundra (D) savanna
13. A single _____ atom can react with ultraviolet rays and destroy as many as one million ozone molecules.
(A) oxygen (B) fluorine (C) chlorine (D) iodine
14. Which of the following is a "start" codon?
(A) AUG (B) UAA (C) UAG (D) UGA
15. The particular array of chromosomes that an individual possesses is called:
(A) kinesis (B) kinetosome (C) karyotype (D) kinetochore
16. During this phase the condensation of chromosomes reaches to its maximum:
(A) leptotene (B) zygotene (C) pachytene (D) diakinesis
17. The blood serum containing antibodies is called;
(A) lymph (B) plasma (C) antiserum (D) antigen

Biology (New Scheme)

(INTER PART II – CLASS 12th)

Time : 2.40 Hours

SUBJECTIVE

Marks : 68

Paper : II

Note:- Section I is compulsory. Attempt any 3 questions from Section II.



(SECTION – I)

2. Write short answers to any Eight parts: (8 x 2 = 16)

- i. Define the given terms: (i) Hypertonic environment (ii) hypotonic environment
- ii. Sketch urea cycle.
- iii. Describe physiological adaptations of animals for thermoregulation.
- iv. Discuss the structure and functions of collenchyma cells in plants.
- v. Name the bones of pectoral and pelvic girdle.
- vi. What is CRAMP?
- vii. Describe various steps involved in Ex-vivo gene therapy.
- viii. Discuss any two benefits of transgenic bacteria to promote health of plants.
- ix. How did plants and animals adapt land habitat?
- x. How will you differentiate ALPINE and BOREAL forests?
- xi. Define Wild Life.
- xii. Give reasons for world population explosion.

3. Write short answers to any Eight parts: (8 x 2 = 16)

- i. What is synapse?
- ii. Write two commercial applications of Ethene.
- iii. What is conditioning in learning behaviour?
- iv. Differentiate between phenotype and genotype.
- v. State the law of independent assortment.
- vi. What is diabetes, name its types?
- vii. What are palindromic sequences?
- viii. Write at least two methods to get a gene of interest.
- ix. What is cell suspension culture?
- x. Differentiate between primary and secondary succession.
- xi. Define autecology and synecology.
- xii. What is commensalism? Give example.

4. Write short answers to any Six parts: (6 x 2 = 12)

- i. Write the names of four types of cytoplasm contain in the fertilized egg of ascidian.
- ii. What is growth correlation?
- iii. Differentiate between primary and secondary growth.
- iv. What is phenyleketonuria?
- v. Why mRNA is modified with cap and tail after its formation?
- vi. Define cell cycle. Write its phases.
- vii. Differentiate between benign and malignant tumor.
- viii. What is Genetic drift?
- ix. What is the concept of inheritance of acquired characteristics?

Section-II

Note:- Attempt any three (3) questions: (3 x 8 = 24)

5. (a) Give the structure and function of Nephron in human kidneys. 4
(b) Write a note on xerosere succession. 4
6. (a) Explain the phenomenon of turgor movements in plants. 4
(b) Write down the Beadle and Tatum experiments on neurospora. 4
7. (a) Give an account of innate behaviour. 4
(b) Write a note on Green House Effect. 4
8. (a) Describe menstrual cycle in human female. 4
(b) Describe genetics of colour blindness. 4
9. (a) Define teratology. Discuss various types of abnormalities in development. 4
(b) Define Hardy –Weinberg Theorem. Discuss the various factors affecting gene frequency. 4

313 – 419 – 10500

Biology (New Scheme)
Paper : II

(INTER PART II CLASS 12th)(IV)
Objective

Time : 20 Minutes
Marks : 17

Code : 8467

Note: You have four choices for each objective type question as A, B, C and D. The choice which you think is correct, fill that circle in front of that question number with marker or pen. Cutting or filling two or more circles will result in zero mark in that question.

- i. Every gene starts with initiation codon AUG which normally encodes the amino acid.

(A) arginine	(B) citruline	(C) lysine	(D) methionine
--------------	---------------	------------	----------------
- ii. The discoidal cap of cells above the blastocoel is called

(A) blastoderm	(B) ectoderm	(C) mesoderm	(D) endoderm
----------------	--------------	--------------	--------------
- iii. Oestrus cycle, a reproductive cycle is found in all females except

(A) cat	(B) cow	(C) human being	(D) lion
---------	---------	-----------------	----------
- iv. Gestation period in human female is

(A) 250 days	(B) 280 days	(C) 300 days	(D) 310 days
--------------	--------------	--------------	--------------
- v. Which hormone in male stimulates the production of testosterone

(A) TSH	(B) FSH	(C) LTH	(D) ICSH
---------	---------	---------	----------
- vi. The vertebral column of human consist of vertebrae

(A) 31	(B) 32	(C) 33	(D) 34
--------	--------	--------	--------
- vii. Angular thickening in their primary wall is present in

(A) parenchyma	(B) collenchyma	(C) sclernchyma	(D) tracheids
----------------	-----------------	-----------------	---------------
- viii. A diluted solution compared to cell concentration is termed as

(A) Hypertonic	(B) Hypotonic	(C) Isotonic	(D) Para tonic
----------------	---------------	--------------	----------------
- ix. One gram of ammonia requires how much amount of water for its excretions.

(A) 50 ml	(B) 100 ml	(C) 250 ml	(D) 500 ml
-----------	------------	------------	------------
- x. About 95 % of our daily energy requirement are filled by

(A) Nuclear energy	(B) Hydroelectric power	(C) Geothermal energy	(D) Fossil fuel
--------------------	-------------------------	-----------------------	-----------------
- xi. In temperate grassland, the rate of primary production is

(A) 700 -1500 g/m ²	(B) 4000 g/m ²	(C) 1500-3000 g/m ²	(D) 6000 g/m ²
--------------------------------	---------------------------	--------------------------------	---------------------------
- xii. In 1917, the term Niche was first proposed by American Ornithologist named

(A) Earnest Haeckel	(B) Joseph Grinnell	(C) Lamark	(D) Darwin
---------------------	---------------------	------------	------------
- xiii. Archeobacteria can tolerate temperature upto

(A) 60°C	(B) 90°C	(C) 120°C	(D) 150°C
----------	----------	-----------	-----------
- xiv. Cystic fibrosis patients lack a gene that codes for trans-membrane carrier of

(A) calcium ions	(B) sodium ions	(C) chloride ions	(D) potassium ions
------------------	-----------------	-------------------	--------------------
- xv. Secretors have dominant secretor gene "Se" on chromosome.

(A) 9	(B) 19	(C) 21	(D) 24
-------	--------	--------	--------
- xvi. Phragmoplast is formed by vesicals originate from

(A) endoplasmic reticulum	(B) golgi complex	(C) chloroplast	(D) mitochondria
---------------------------	-------------------	-----------------	------------------
- xvii. The autosomal non-disjunction in man in which 21st pair of chromosome fail to segregate resulting in gametes with 24 chromosome is

(A) Down's syndrome	(B) turner's syndrome	(C) klinfilter syndrome	(D) jacob's syndrome
---------------------	-----------------------	-------------------------	----------------------

Biology (New Scheme)

(INTER PART II – CLASS 12th)

Time : 2.40 Hours

SUBJECTIVE

Marks : 68

Paper : II

Note:- Section I is compulsory. Attempt any 3 questions from Section II.



(SECTION – I)

2. Write short answers to any Eight parts: (8 x 2 = 16)

- i. What is meant by lithotripsy?
- ii. What is ADH and how does it function?
- iii. Differentiate between osmoconformers and osmoregulators.
- iv. What is Ricket? Give its cause and cure.
- v. What is Rigor Mortis?
- vi. How muscle fatigue is resulted?
- vii. Differentiate between viviparous and ovoviviparous.
- viii. What is parthenocary?
- ix. What type of animals are found in littoral zone?
- x. What are alpine and boreal coniferous forests?
- xi. Differentiate between climate and weather.
- xii. Define eutrophication.

3. Write short answers to any Eight parts: (8 x 2 = 16)

- i. Differentiate between diurnal rhythms and circannual rhythms.
- ii. What are neurons? Give examples.
- iii. Differentiate between gastrin and secretin.
- iv. What is codominance?
- v. What is Rh blood group system? Who first discovered its antigen?
- vi. What is Bombay phenotype?
- vii. Differentiate between gene linkage and crossing over.
- viii. What is gene sequencing?
- ix. What is cell suspension culture? Give an example.
- x. Differentiate between ectoparasites and endoparasites.
- xi. Define mutualism. Give an example.
- xii. Differentiate between mycorrhiza and lichens.

4. Write short answers to any Six parts: (6 x 2 = 12)

- i. Differentiate between inhibitory and compensatory effects.
- ii. Give four name of key events in animal development.
- iii. What is Alkaptonuria?
- iv. What is nucleosome?
- v. Define transformation.
- vi. What is mitosis? Give its two significances.
- vii. What is malignant tumor?
- viii. What are vestigial organs? Give example.
- ix. What is natural selection?

Section-II

Note:- Attempt any three (3) questions: (3 x 8 = 24)

5. (a) Describe excretory system of planaria. 4
 (b) Define the terms (i) Habitat (ii) Succession (iii) Pioneers (iv) Biomass 4
6. (a) Describe locomotion in paramecium. 4
 (b) Discuss Meselson and Stahl's experiment regarding replication of DNA. 4
7. (a) Discuss in detail the Neurons. 4
 (b) Describe the importance of forests. 4
8. (a) Elaborate the process of child birth in human. 4
 (b) What is incomplete dominance? Explain it with an example. 4
9. (a) Write a note on abnormal development. 4
 (b) Discuss the Theory of Lamarck with reference to evolution of species. 4

