



BIOLOGY HSSC-II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

Punjab Text Book Board

Version Number 8 1 0 4

Note: Section – A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet which should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Choose the correct answer A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions given there. Each part carries one mark.

- 1) If a heterozygous yellow seeded plant is crossed with a homozygous green seeded plant, what is the probability of progeny having green seeds?
A. 25% B. 50% C. 100% D. Zero
- 2) A gardener wants to regulate fruit drop from apple crop to reduce the time for picking them, he will be spraying:
A. Auxins B. Abscisic acid C. Gibberellins D. Ethane
- 3) If the recombination frequency between A & B is 11%, A & C is 19%, B & C is 30% what would be the arrangement of genes?
A. ACB B. BCA C. BAC D. ABC
- 4) In urea cycle citrulline combines with a precursor molecule called:
A. Arginine B. Ornithine
C. Arginase D. Arginosuccinate
- 5) The joint that fixes teeth in your jaw is:
A. Fibrous B. Synovial C. Pivot D. Cartilaginous
- 6) Select the **mismatched** one in the following:
A. Pectoral girdle – Clavicle B. Metatarsals – Palm of hand
C. Cervical vertebrae – Neck D. Pelvic girdle – Ilium
- 7) In human female secondary oocyte is released from the ovary at the stage of:
A. Metaphase – I B. Anaphase – II C. Metaphase – II D. Anaphase – I
- 8) Increase in the intensity of light increases the number of cell:
A. Elongation B. Division C. Maturation D. Differentiation
- 9) Which of the following syndrome is **NOT** related to the abnormality of sex-chromosomes?
A. Down's B. Klinefelter's C. Turner's D. Jacob's
- 10) Select a start codon for the synthesis of a polypeptide chain:
A. AGA B. AUG C. AAU D. AAG
- 11) During final moments of a football match your heart beat accelerates due to the secretion of:
A. Adrenaline B. Cortisol C. Parathormone D. Thyroxin
- 12) Considering R for red and r for white eye colour, if a heterozygous female Drosophila is crossed with a white eye male, what would be the percentage of white eye colour in male flies in the next generation?
A. 25% B. 100% C. 50% D. Zero
- 13) Taq polymerase is the other name of:
A. Primase B. DNA ligase
C. DNA Polymerase D. RNA polymerase
- 14) Variation in gene frequency just by a chance is called:
A. Non random mating B. Genetic drift
C. Probability D. Random mating
- 15) In the following there is **NO** difference between:
A. Primary consumers & herbivores B. Primary carnivores & trophic level-II
C. Secondary consumer & omnivores D. Trophic level I & herbivores
- 16) A tree-less region is called:
A. Alpine B. Tundra C. Taiga D. Boreal
- 17) All are the consequences of deforestation **EXCEPT**:
A. Silting of lakes B. Interception of heavy rainfall
C. Heavy floods D. Soil erosion

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BIOLOGY HSSC-II

Punjab Text Book Board

31

Time allowed: 2:35 Hours

Total Marks Sections B, C and D: 68

NOTE: Answer any Seven parts each from Section 'B' and 'C' and any two questions from Section 'D' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 21) (Chapter 15 – 20)

- Q. 2** Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)
- Discuss the role of hormones for maintaining the concentration of urine.
 - Describe briefly the characteristics of a bone.
 - Name the synthetic auxins and describe their commercial applications.
 - How do fresh water organisms maintain osmoregulation?
 - Is it true that low temperature treatment is significant for flower formation? If so discuss it briefly.
 - How is a lagging strand synthesized in the replication process?
 - Discuss the contribution of Macleod and McCarty in identifying transforming principle.
 - Define the following terms:
a) Anticodon b) Photoperiodism c) Haptonasty
 - Discuss the role of parathyroid gland.
 - How is a blastula formed in a developing chick embryo?

SECTION – C (Marks 21) (Chapter 21 – 27)

- Q. 3** Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)
- Define metastasis. What are the properties of cancer cells?
 - What is the test cross? Discuss its significance by making a cross.
 - Discuss Ex-vivo gene therapy to replace faulty genes in the body.
 - How is a recombinant DNA formed?
 - Discuss how a eukaryotic cell evolved from prokaryotic cell according to endosymbiont hypothesis.
 - What is meant by "Mycorrhizal association"?
 - What type of organisms are present in limnetic and profundal zone of a lake ecosystem.
 - Briefly describe the causes of ozone depletion. What are its consequences?
 - Differentiate between:
a) G_1 & G_2 Phase
b) Locus & Allele
c) Autecology & Synecology
 - Write an account of Type-I diabetes mellitus.

SECTION – D (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- Q. 4** a. Explain sliding filament model of muscle contraction. Also describe the formation and control of cross bridges with the help of diagram. (4+3+1)
- b. Define epistasis. Explain this with reference to Bombay Phenotype. (2+3)
- Q. 5** a. Define nerve impulse. What are the major factors maintaining RMP on a nerve fibre? Also draw diagram. (2+5+1)
- b. Write an account of Genomic Library. (05)
- Q. 6** a. Explain nitrogen cycle in detail with diagram. (5+2)
- b. What is meant by apical dominance? How is this phenomena related to growth of a plant? (2+4)

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BIOLOGY HSSC-II

SECTION – A (Marks 17)

32

Time allowed: 25 Minutes

National Book Foundation

Version Number 4 1 0 3

Note: Section – A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet which should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Choose the correct answer A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions given there. Each part carries one mark.

- 1) Which of the following is the function of thermocycler?
 - A. It controls the pH of PCR mixture
 - B. It inhibits contamination in PCR mixture
 - C. It regulates the temperature of PCR mixture
 - D. It maintains the composition of PCR mixture
- 2) Which of the following is the precipitate produced by sewage treatment?
 - A. Algal blooms
 - B. Pond scum
 - C. Sludge
 - D. Humus
- 3) Which of the following combination of events is related to the inspiration phase of breathing?

	Diaphragm	External intercostal muscles	Internal intercostal muscles
A.	Relaxation	Relaxation	Contraction
B.	Relaxation	Contraction	Contraction
C.	Contraction	Contraction	Relaxation
D.	Contraction	Relaxation	Contraction

- 4) The type of urinary tract infection in which kidneys are particularly infected is called:
 - A. Encephalitis
 - B. Pyelonephritis
 - C. Urethritis
 - D. Cystitis
- 5) Which of the following pairs of ribs are called floating ribs?
 - A. 8th, 9th and 10th
 - B. 11th and 12th
 - C. 6th, 7th and 8th
 - D. 7th, 8th and 9th
- 6) Which of the following terms can be used for axon fibre of a neuron?
 - A. Pre synaptic fibre or pre ganglionic fibre
 - B. Post ganglionic fibre or post synaptic fibre
 - C. Pre ganglionic or post synaptic fibre
 - D. Pre synaptic fibre or post ganglionic fibre
- 7) Which of the following components of nervous system are **NOT** involved in reflex arc?
 - A. Central nervous system
 - B. Brain
 - C. Receptors and effectors
 - D. Neurons other than sensory and motor neurons

- 8) Infundibulum is the stalk, composed of blood vessels and the fibres of neurosecretory cells, by which:
- Adrenal glands are attached to the kidney
 - Brain sends signals to the spinal cord
 - Two cerebral hemispheres are attached together
 - Pituitary gland is attached to hypothalamus
- 9) Insulin promotes all of the following events **EXCEPT**:
- Use of glucose in cellular respiration
 - Conversion of excess glucose to fats
 - Glycogenesis
 - Gluconeogenesis
- 10) When an animal learns the same response for two different stimuli which are given to the animal simultaneously, it is called?
- Latent learning
 - Habituation
 - Classical conditioning
 - Insight learning
- 11) After ovulation, the ruptured follicle is transformed into a glandular structure called:
- Blastocyst
 - Inner cell mass
 - Graffian follicle
 - Corpus luteum
- 12) During embryonic development, all of the following parts have been developed from neural crest cell **EXCEPT**:
- Skull bones
 - Brain and spinal cord
 - Peripheral nerves
 - Medulla of the adrenal gland
- 13) Mr. James has A+ve blood group while his wife has A-ve, they have one child, who has O-ve blood group. What is probability of O+ve daughter in next pregnancy?
- $\frac{1}{8}$
 - $\frac{1}{16}$
 - Zero
 - $\frac{1}{4}$
- 14) In Morgon's experiment, what was the F_2 ratio of cross between F_1 male and female flies having long wing, broad abdomen phenotypes?
- 9:3:3:1
 - 1:1:1:1
 - 1:1
 - 3:1
- 15) Which of the following is correct about the nucleotide sequence TATAAT?
- It is -35 sequence located in coding strand
 - It is -35 sequence located in template strand
 - It is -10 sequence located in coding strand
 - It is -10 sequence located in template strand
- 16) Which of the following is represented by "1" in the given equation ($p^2 + 2pq + q^2 = 1$)?
- Sum of all genotype frequencies
 - Sum of all gene frequencies
 - Genotype frequency of recessive homozygotes
 - Genotype frequency of dominant homozygotes
- 17) In the absence of oxygen in soil, which of the following bacteria breakdown nitrates releasing nitrogen back into the atmosphere using the oxygen for their own respiration?
- Rhizobium*
 - Pseudomonas*
 - Azotobacter*
 - Clostridium*



BIOLOGY HSSC-II

(National Book Foundation)

Time allowed: 2:35 Hours

Total Marks Sections B, C and D: 68

NOTE: Answer any Seven parts each from Section 'B' and 'C' and any two questions from Section 'D' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 21)

(Chapter 14 – 20)

- Q. 2 Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)**
- (i) a. How do haemoglobin molecules lose oxygen when they reach at tissue bed? (1)
 - b. Write any two differences between haemoglobin and myoglobin? (2)
 - (ii) What is sinusitis? Give its cause and symptoms? (3)
 - (iii) Human nephrons have association of three types of capillary beds. Give their names and location in the kidney. (3)
 - (iv) How and when is concentrated urine formed in human kidneys? (3)
 - (v) Write any three differences between bones and cartilages. (3)
 - (vi) a. What is the difference between true and false ribs. (1)
 - b. What is sprain? How can it be treated? (2)
 - (vii) What is headache or cephalalgia? Differentiate between primary and secondary headache. (3)
 - (viii) What are the effects of abnormal secretions of antidiuretic hormone? (3)
 - (ix) Explain briefly the hostile and helpful intraspecific interaction by giving suitable example. (3)
 - (x) What do you know about the location and function of sertoli cells and leydig cells in male reproductive system. (3)

SECTION – C (Marks 21)

(Chapter 21 – 27)

- Q. 3 Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)**
- (i) Explain briefly the formation of neural crest and its role in development. (3)
 - (ii) a. Workout all possible types of gametes from the individual having genotype "AaBbCc". (1)
 - b. What do you know about the dominance relations among multiple alleles of ABO blood group system? (2)
 - (iii) Explain the mechanism of sex determination in *Drosophila*. (3)
 - (iv) "Genetic code is universal but not quite universal" Justify this statement. (3)
 - (v) a. Write the difference between karyotype of patients of Down syndrome and of Klinefelter's syndrome. (1)
 - b. Give any two differences between positive and negative regulation of gene expression. (2)
 - (vi) Why was the theory of evolution proposed by Lamarck rejected? (3)
 - (vii) What is productivity of an ecosystem? Differentiate the concept of gross primary productivity and net primary productivity. (3)
 - (viii) What are restriction endonucleases? Explain their mode of action by giving a suitable example. (3)
 - (ix) Explain briefly the two major techniques of animal cell culture. (3)
 - (x) What is integrated disease management? How can it be administered? (3)

SECTION – D (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- Q. 4**
- a. Describe the mechanism of contraction of skeletal muscles. Draw labelled diagram. (3 + 2)
 - b. Describe female reproductive cycle and its hormonal regulation. Also draw labelled diagrams showing the changes in ovaries and uterus during the cycle. (5 + 3)
- Q. 5**
- a. Describe range of phenotype and their genetic basis in ABO blood group system. Also discuss the compatibility of different blood type of this system for transfusions. (2 + 2 + 4)
 - b. Describe Griffith's experiment and its conclusion. Also draw its diagram. (3 + 2)
- Q. 6**
- a. Describe different steps of nitrogen cycle and draw its concept map. (6 + 2)
 - b. Describe the procedure of Sanger – Coulson Method of DNA Sequencing. Also draw its diagram. (3 + 2)

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BIOLOGY HSSC-II

SECTION – A (Marks 17)

Time allowed: 25 Minutes

National Book Foundation

Version Number 4 1 0 6

Note: Section – A is compulsory. All parts of this section are to be answered on the separately provided OMR Answer Sheet which should be completed in the first 25 minutes and handed over to the Centre Superintendent. Deleting/overwriting is not allowed. Do not use lead pencil.

Q. 1 Choose the correct answer A / B / C / D by filling the relevant bubble for each question on the OMR Answer Sheet according to the instructions given there. Each part carries one mark.

1) The process of introducing new plants from their growing place to new locality with different climate is termed as:

- A. Plant introduction
- B. Selection
- C. Hybridization
- D. Acclimatization

2) Which of the following combination of events is related to the expiration phase of breathing?

	Diaphragm	External intercostal muscles	Internal intercostal muscles
A.	Relaxation	Contraction	Contraction
B.	Contraction	Contraction	Relaxation
C.	Contraction	Relaxation	Contraction
D.	Relaxation	Relaxation	Contraction

3) The animals which are hypotonic to their outer environment are:

- A. Only terrestrial animals
- B. Freshwater fishes and marine bony fishes
- C. Freshwater fishes and terrestrial animals
- D. Marine bony fishes and terrestrial animals

4) Which of the following type of joints is found between the shaft regions of the long bones in the forearm and in the leg?

- A. Synovial joint
- B. Fibrous joint
- C. Cartilaginous joint
- D. Hinge joint

5) After an action potential, nerve fibre undergoes a period of recovery in which it regains its original ionic distribution and polarity and prepares itself for the next stimulation. This period of recovery of nerve fibre is called:

- A. Active period
- B. Refractory period
- C. Recovery period
- D. Resting period

6) All of the following are excitatory neurotransmitters EXCEPT:

- A. Acetylcholine
- B. Serotonin
- C. Dopamine
- D. Endorphins

7) Which of the following hormones acts as first messenger that binds with its receptor on the plasma membrane of target cell, starting a series of events in the cell which generates second messenger?

- A. Oxytocin
- B. Cortisone
- C. Aldosterone
- D. Testosterone

8) A type of learning behaviour in which an animal temporarily learns to ignore a repeated, irrelevant stimulus, is called:

- A. Habituation
- B. Classical conditioning
- C. Insight learning
- D. Latent learning

- 9) Based upon changes and hormonal regulation the female reproductive cycle can be divided into three phases i.e., menstrual phase, proliferative phase and:
- A. Post menstrual phase B. Follicular phase
C. Secretory phase D. Pre-ovulatory phase
- 10) The blastocyst is a fluid-filled hollow sphere composed of single layer of large, flattened cells called _____ and a small cluster of 20 to 30 rounded cells inside it.
- A. Amniotic cells B. Inner cell mass
C. Ectodermal cells D. Trophoblast cells
- 11) Mr. John has B+ve blood group while his wife has B-ve, they have one child, who has O-ve blood group. What is the probability of daughter with O+ve blood group in next pregnancy?
- A. $\frac{1}{16}$ B. Zero C. $\frac{1}{4}$ D. $\frac{1}{8}$
- 12) If a light red wheat grain plant having genotype (AaBbCc) is self-fertilized, what will be the expected ratio of dark red wheat grain plants (AABBCC) to white grain wheat plants (aabbcc)?
- A. 1:6:15:20:15:6:1 B. 1:1
C. 3:1 D. 9:3:3:1
- 13) In DNA replication process, the replacement of primers by DNA nucleotides is carried out by:
- A. Primase B. DNA helicase
C. DNA polymerase-I D. DNA ligase
- 14) Which of the following causes the RNA polymerase to stop the synthesis of RNA?
- A. 3'-Tail B. Any of the three stop codons
C. GC hairpin D. 5'-Cap
- 15) Which of the following is represented by "1" in the given equations ($p=1-q$), ($q=1-p$)?
- A. Sum of all gene frequencies
B. Genotype frequency of recessive homozygotes
C. Genotype frequency of dominant homozygotes
D. Sum of all genotype frequencies
- 16) Which of the following are important members of crustose lichen stage in ecological succession on rock surface?
- A. *Permelia* and *Dermatocarpom* B. *Azotobacter* and *Clostridium*
C. *Licanora* and *Rhinodina* D. *Rhizobium* and *Dermatocarpom*
- 17) In DNA test, after hybridization, excess probes are washed from the membrane and the pattern of hybridization is visualized on X-ray film by exposing the membrane to an X-ray source. This technique is known as:
- A. RFLP analysis B. Gel electrophoresis
C. Autoradiography D. X-ray diffraction analysis



BIOLOGY HSSC-II

(National Book Foundation)

35

Time allowed: 2:35 Hours

Total Marks Sections B, C and D: 68

NOTE: Answer any Seven parts each from Section 'B' and 'C' and any two questions from Section 'D' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 21)

(Chapter 14 – 20)

- Q. 2** Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)
- (i) Enlist the changes that occur in diaphragm and ribcage while inspiration and expiration. (3)
 - (ii) Why breathing through nose is supposed to be more advantageous? (3)
 - (iii) How do marine osmoconformers become isotonic to their outer environment? (3)
 - (iv) a. Differentiate the terms nephrolithiasis and pyelonephritis. (1)
b. Define urethritis and cystitis. Why are these conditions fifty times more common in women than in men? (2)
 - (v) Name the muscles involved in the movement of tibio-femoral joint. Also give origin and insertion of these muscles. (3)
 - (vi) Define three most common types of bone fractures? (3)
 - (vii) Highlight any three features of neuron that influence the velocity of nerve impulse? (3)
 - (viii) Explain briefly the mode of action of protein and peptide hormones. (3)
 - (ix) The response to a stimulus can be positive, negative, or ignored. Demonstrate them by giving one suitable example of each? (3)
 - (x) a. Differentiate the terms azoospermia and oligospermia. (1)
b. How does ovulation occur in female reproductive cycle? (2)

SECTION – C (Marks 21)

(Chapter 21 – 27)

- Q. 3** Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)
- (i) a. Define meroblastic cleavage. Also give its example. (1)
b. Explain briefly the structure of human blastocyst. (2)
 - (ii) A pink flower four o'clock plant is crossed with a red flower plant. Find: (3)
 - a. Probability of Red flower plant
 - b. Probability of Pink flower plant
 - c. Ratio of pink flower to red flower plant.
 - (iii) How can we determine if the two genes are linked or not? (3)
 - (iv) Enlist the types of chromosomes based upon position of centromere and define each of them. (3)
 - (v) a. What is the role of DNA polymerase-I in DNA replication process? (1)
b. How do promoter regions of prokaryotic and eukaryotic genes differ from each other? (2)
 - (vi) Explain the concept of genetic drift with the help of suitable example. (3)
 - (vii) What is nitrogen fixation and give its types? (3)
 - (viii) Analyse the gel pattern (in Fig. Q3 (viii)) carefully and: (3)
 - a. Suggest method of gene sequencing which is used while obtaining this gel.
 - b. Read the sequence of nucleotides from the gel and highlight its 5' and 3' ends.
 - c. Propose the actual target sequence which is used to obtain this gel pattern
 - (ix) What are the methods to obtain gene of interest in recombinant DNA technology? (3)
 - (x) Suggest what types of vaccines are available for prevention of the polio infection? (3)

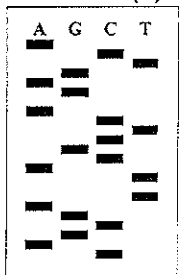


Fig. Q3 (viii)

SECTION – D (Marks 26)

Note: Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)

- Q. 4**
- a. Explain the structure of synapse. Draw its labelled diagram. Also discuss the mechanism of synaptic transmission. (1 + 2 + 3)
 - b. Describe neurulation in human embryo. Also draw its labelled diagram (2 + 2)
 - c. Explain and diagrammatically represent the mechanism of haemodialysis. (1.5 + 1.5)
- Q. 5**
- a. Describe the inheritance of Coat colour in the *Labrador retriever* and highlight the phenomenon of epistasis in this trait. (6 + 2)
 - b. Write a comparative note on different models of DNA replication. Draw the diagrams of models (3 + 2)
- Q. 6**
- a. Define Hardy-Weinberg principle and describe the factors that can change the gene and genotype frequencies of a natural population. (1 + 4)
 - b. Describe the mechanism/procedure of DNA analysis/testing Represent its procedural steps diagrammatically. (6 + 2)

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BIOLOGY HSSC-II

(National Book Foundation)

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Time allowed: 2:35 Hours

Total Marks Sections B, C and D: 68

NOTE: Answer any Seven parts each from Section 'B' and 'C' and any two questions from Section 'D' on the separately provided answer book. Use supplementary answer sheet i.e. Sheet-B if required. Write your answers neatly and legibly.

SECTION – B (Marks 21) (Chapter 14 – 20)

- Q. 2 Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)**
- What is hamburger phenomenon?
 - Write the function of:
 - Ionocytes
 - Rectal glands
 - Osmolytes
 - Write at least one cause of the following:
 - Muscle Fatigue
 - Cramps
 - Tetany
 - Write the names of facial bones and their numbers in human.
 - Briefly write about internal structure of Spinal Cord.
 - Write about any one mode of Hormonal actions.
 - How are Cretinism and myxoedema different?
 - How is Habituation different from Imprinting?
 - How is Human reproductive system Unique?
 - Write about any three causes of female infertility.

SECTION – C (Marks 21) (Chapter 21 – 27)

- Q. 3 Answer any SEVEN parts. The answer to each part should not exceed 5 to 6 lines. (7 x 3 = 21)**
- Why are neural Crest Cells called fourth germinal layer?
 - What are the limitations of Mendelian law of independent Assortment?
 - Write about the transfusion Principal of Rh blood group.
 - Write any three characteristics of Genetic Code.
 - How is regulation of gene Expression Important?
 - What is Sympatric Speciation?
 - What are the causes of Ozone layer depletion?
 - Write the steps involved in the DNA sequencing techniques.
 - Write about the two major techniques of Animal cell culture.
 - What is Acclimatization?

SECTION – D (Marks 26)

- Note: Attempt any TWO questions. All questions carry equal marks. (2 x 13 = 26)**
- Q. 4**
- Explain ultra-structure of skeletal muscle with the help of diagram. (4+2)
 - Write about Repolarization and Hyperpolarization of Neuron fibre. (3.5+3.5)
- Q. 5**
- Explain the Mechanism of translation with the help of diagram. (8+2)
 - What are the kinds of successions? (3)
- Q. 6**
- Write the mechanism of PCR reaction with the help of diagram. (7+2)
 - Describe the Blood circulation to human Nephron. (4)

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