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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

## BIOLOGY HSSC-II

### SECTION – A ( Marks 17)

Time allowed: 25 Minutes

(Revised Syllabus)

**NOTE:** Section-A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It 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** Circle the correct option i.e. A / B / C / D. Each part carries one mark.

- (i) Tidal volume is the air:
- A. Remaining in the lungs after forced expiration
  - B. Exchanged during normal breathing
  - C. Inhaled after normal inspiration
  - D. Forcibly expelled after normal inspiration
- (ii) Fresh water fish excrete:
- A. Ammonia
  - B. Uric acid
  - C. Urea
  - D. All of these
- (iii) Which of the following item gives its correct total number?
- A. Thoracic vertebrae in humans – 11
  - B. Floating ribs in humans – 4
  - C. Metacarpals in humans – 8
  - D. Facial bones in humans – 12
- (iv) Which of the following is a naturally occurring compound which reduces the sensation of pain and generates the feeling of well-being?
- A. Acetylcholine
  - B. Dopamine
  - C. Endorphins
  - D. Epinephrine
- (v) Skeletal muscles are controlled by:
- A. Sympathetic nerve
  - B. Parasympathetic nerve
  - C. Somatic nerve
  - D. Autonomic nerve
- (vi) Deficiency of Adrenal cortex hormone results in:
- A. Cushing's disease
  - B. Graves' disease
  - C. Addison's disease
  - D. Cretinism
- (vii) Ovulation in the human female normally takes place during the female reproductive cycle:
- A. At the end of the proliferative phase
  - B. At the beginning of the proliferative phase
  - C. Just before the end of the secretory phase
  - D. At the mid of the secretory phase
- (viii) The blood vessels of the Allantois become:
- A. Heart
  - B. Umbilical Cord
  - C. Placenta
  - D. Retina

- (ix) Which Mendelian principle will not operate if two genes under study are close together?
- A. Paired unit factors                      B. Dominance  
C. Segregation                              D. Independent Assortment
- (x) Okazaki fragments are used to elongate:
- A. The leading strand towards the replication fork  
B. The lagging strand towards the replication fork  
C. The leading strand away from the replication fork  
D. The lagging strand away from the replication fork
- (xi) Acid rain is produced by:
- A. Excess  $\text{NO}_2$  and  $\text{SO}_2$  from burning fossil fuels  
B. Excess production of  $\text{NH}_3$  by industry and coal gas  
C. Excess release of carbon monoxide by incomplete combustion  
D. Excess formation of  $\text{CO}_2$  by combustion and animal respiration
- (xii) Lamarck theory of organic evolution is usually known as:
- A. Natural selection                      B. Descent with change  
C. Inheritance of acquired characters      D. Differential reproduction
- (xiii) TAQ polymerase is used in PCR because of its:
- A. Low thermal stability                      B. High fidelity  
C. High speed                              D. High thermal stability
- (xiv) \_\_\_\_\_ Chromosomes have arms of equal length with the centromere in the middle.
- A. Submetacentric                      B. Acrocentric  
C. Telocentric                              D. Metacentric
- (xv) When an animal learns a response to a particular stimulus after many unsuccessful tries it is called:
- A. Classical conditioning                      B. Instrumental learning  
C. Insight learning                              D. Latent learning
- (xvi) Transgenic animals are those which are:
- A. Foreign RNA in all its cells                      B. Foreign DNA in some of its cells  
C. Foreign DNA in all its cells                      D. Both A and B
- (xvii) Vinegar is obtained from beer with the help of:
- A. Rhizopus                              B. Acetobacter  
C. Yeast                                      D. Clostridium

For Examiner's use only:

Total Marks:

17

Marks Obtained:



# BIOLOGY HSSC-II

(Revised Syllabus)

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

**NOTE:** Answer any fourteen parts from Section 'B' and any two questions from Section 'C' 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 42)

- Q. 2** Answer any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. ( 14 x 3 = 42 )
- (i) What is oxyhaemoglobin? How is it formed?
  - (ii) How does negative feedback operate to control body temperature?
  - (iii) Define Fracture. Differentiate between its common types.
  - (iv) Draw a diagram of Sarcomere and label its parts.
  - (v) In chemical terms, how the neuronal repolarization is achieved.
  - (vi) Describe the mode of action of Narcotics and their effects on human nervous system. Also give examples.
  - (vii) Write down the functions of the following:
    - a. Chemoreceptors
    - b. Juxtamedullary Nephrons
    - c. Hormone
  - (viii) How is the blood calcium level regulated by calcitonin and Parathormone?
  - (ix) FSH and LH get their names from events of the female reproductive cycle but they also function in males. How are their functions in females and males similar?
  - (x) Define the following terms. Enlist their causes and effects:
    - A. Acromegaly
    - b. Cramp
  - (xi) What is the process of Induction as it relates to vertebrate development? What is the difference between Primary and Secondary Induction?
  - (xii) Differentiate between Dominance and Epistasis.
  - (xiii) How do Endocrine disrupting contaminants affect the reproductive abilities of humans?
  - (xiv)
    - a. What is the function of Acetylcholinesterase?
    - b. Why is it necessary?
    - c. What is the result of interfering with the function of this enzyme?
  - (xv) Write three main steps involved in Polypeptide Elongation in translation process of protein synthesis.
  - (xvi) Enlist the major differences between Divergent evolution and Convergent evolution.
  - (xvii) What is instinct? Also give its examples.
  - (xviii) Highlight the role of Microbes in Biological Nitrogen Fixation.
  - (xix) Outline the steps of DNA sequencing technique.

## SECTION – C (Marks 26)

- Note:** Attempt any TWO questions. All questions carry equal marks. ( 2 x 13 = 26 )
- Q. 3**
- a. Describe various osmoregulatory adaptations of freshwater and marine animals. (06)
  - b. How are synovial joints classified? (07)
- Q. 4**
- a. Discuss neurosecretory role of Hypothalamus. (06)
  - b. Describe the structure and function of Placenta in humans. (05)
  - c. How is blood group distinguished as positive or negative blood group? (02)
- Q. 5**
- a. Describe LAC Operon Model as positive regulation of gene expression. (07)
  - b. How is Gene therapy carried out? (03)
  - c. Write down causes and symptoms of Alzheimers disease. (03)



Roll No.

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Sig. of Candidate. \_\_\_\_\_

Answer Sheet No. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

## BIOLOGY HSSC-II

### SECTION – A ( Marks 17)

**Time allowed: 25 Minutes**

**(Revised Syllabus)**

**NOTE:** Section-A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It 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 Circle the correct option i.e. A / B / C / D. Each part carries one mark.**

(i) The maximum volume of air contained in the lung by a full forced inhalation is called:

- |                        |                         |
|------------------------|-------------------------|
| A. Vital capacity      | B. Tidal volume         |
| C. Total lung capacity | D. Inspiratory capacity |

(ii) The Posterior Pituitary and the Hypothalamus are connected by which of the following:

- |                    |           |
|--------------------|-----------|
| A. Blood vessels   | B. Nerves |
| C. A portal system | D. Ducts  |

(iii) Which of the following is recovered in the collecting duct of the Nephron?

- |            |                   |
|------------|-------------------|
| A. Glucose | B. Water          |
| C. NaCl    | D. Potassium ions |

(iv) Which of the following joints between the ribs and sternum and the pubic symphysis tend to be slightly moveable?

- |                         |                           |
|-------------------------|---------------------------|
| A. Cartilaginous joints | B. Fibrous joints         |
| C. Hinge joints         | D. Ball and socket joints |

(v) Functions of smooth muscles, cardiac muscles, organs and glands are regulated by \_\_\_\_\_ system.

- |                    |                |
|--------------------|----------------|
| A. Parasympathetic | B. Sympathetic |
| C. Central Nervous | D. Autonomic   |

(vi) The tube that carries sperms out of the testes is the:

- |                    |                 |
|--------------------|-----------------|
| A. Vasa efferentia | B. Vas deferens |
| C. Oviduct         | D. Epididymis   |

(vii) Which of the following structures are derivatives of the endoderm?

- |  |
|--|
| A. Skin and nerve cord                         |
| B. Alimentary canal and respiratory structures |
| C. Muscles and blood                           |
| D. Excretory and reproductive structures       |

(viii) Highly condensed and transcriptionally inactive DNA form:

- |                    |                 |
|--------------------|-----------------|
| A. Heterochromatin | B. Euchromatin  |
| C. Autochromatin   | D. Isochromatin |

- (ix) Percentage of pure breeding F<sub>2</sub> individuals of a monohybrid cross would be:
- A. 75% B. 50%  
C. 25% D. 12.5%
- (x) The tRNA anticodon, GAC, is complementary to the mRNA codon with the sequence:
- A. CAG B. CTG  
C. GAC D. CUG
- (xi) The enzyme which seals the foreign DNA into the vector is:
- A. Restriction endonuclease B. DNA polymerase  
C. DNA ligase D. DNA mutase
- (xii) Polygenic inheritance forms the basis of:
- A. Co-dominance B. Continuous variations  
C. Incomplete dominance D. Discontinuous variations
- (xiii) Signals of parturition originate from:
- A. Placenta only  
B. Fully developed foetus only  
C. Both placenta as well as fully developed foetus  
D. Oxytocin released from maternal pituitary
- (xiv) Restriction Fragment Length Polymorphism (RFLP):
- A. Don not identify individuals genetically B. Are not the basis of DNA fingerprinting  
C. Can be subjected to gel electrophoresis D. All of these
- (xv) The process of utilization of nitrogenous compounds in living bodies is termed as:
- A. Nitrogen fixation B. Nitrification  
C. Assimilation D. Ammonification
- (xvi) During exhalation in humans, air moves from the bronchus into the:
- A. Bronchioles B. Alveoli  
C. Pharynx D. Trachea
- (xvii) The control of our natural biorhythms and daily cycle is by:
- A. Insulin B. Dim light  
C. Melatonin D. Thyroxin

For Examiner's use only:

Total Marks:

17

Marks Obtained:



# BIOLOGY HSSC-II

(Revised Syllabus)

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

**NOTE:** Answer any fourteen parts from Section 'B' and any two questions from Section 'C' 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 42)

**Q. 2** Answer any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. ( 14 x 3 = 42 )

- (i) What is Chloride shift? Why does it occur?
- (ii) Name the type of joint between the following:
  - a. Atlas and Axis
  - b. Femur and Acetabulum
  - c. Between Skull bones
- (iii) What is positive feed back mechanism? Give an example.
- (iv) What are four examples of steroid hormones? How do steroid hormones affect changes in their target cells?
- (v) List the human Extra embryonic membranes. Give a function of each.
- (vi) Compare and contrast the functions of the three types of bone cells.
- (vii) Why are the muscles of an animal, that has recently died, likely to be stiff?
- (viii) Describe the basic pathway of information flow through neurons that causes you withdraw your hand when it touches a hot object.
- (ix) Differentiate between Prokaryotic and Eukaryotic protein synthesis.
- (x) Show diagrammatically the steps of oogenesis and follicle development in female reproductive system.
- (xi) Write the functions of the following:
  - a. Hippocampus
  - b. Prostate gland
  - c. Umbilical cord
- (xii) What is Innate behaviour? Write its importance.
- (xiii) Describe the concept of Endosymbiotic theory for the evolution of Eukaryotic cell from Prokaryotic cell.
- (xiv) Describe the methodology for producing recombinant DNA to be used in gene cloning.
- (xv) Define the following:
  - a. Epistasis
  - b. Gene linkage
  - c. Multiple alleles
- (xvi) Give reasons for the pyramid shape of the energy flow data.
- (xvii) How does Acclimatization enhance crop improvement?
- (xviii) What are Monoclonal Antibodies?
- (xix) Write the causes of the following disorders:
  - a. Encephalitis
  - b. Spina bifida occulta
  - c. Chronic renal failure

## SECTION – C (Marks 26)

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

- Q. 3**
  - a. What are the principal hormones produced by the Anterior Pituitary? What function does each perform? (08)
  - b. How is information transmitted across a synapse? (05)
- Q. 4**
  - a. Give a detailed account of the Gastrulation stage of human embryonic development. (07)
  - b. How is the concentration of urine regulated by counter current and hormonal mechanism? (06)
- Q. 5**
  - a. What is the Polymerase Chain Reaction? Describe the components required for carrying out PCR reaction. (06)
  - b. Explain the Termination phase of DNA replication. (04)
  - c. Differentiate between Incomplete dominance and Co-dominance. (03)



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Answer Sheet No. \_\_\_\_\_

Sig. of Candidate. \_\_\_\_\_

Sig. of Invigilator. \_\_\_\_\_

52  
28

## BIOLOGY HSSC-II

### SECTION – A ( Marks 17)

**Time allowed: 25 Minutes**

**(Old Syllabus)**

**NOTE: Section–A is compulsory and comprises pages 1-2. All parts of this section are to be answered on the question paper itself. It 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 Circle the correct option i.e. A / B / C / D. Each part carries one mark.**

- (i) Which of the following is osmoconformer?
- |          |                 |
|----------|-----------------|
| A. Whale | B. Hag fish     |
| C. Man   | D. All of these |
- (ii) In which of the environment do the animals produce large volume of diluted urine?
- |               |                |
|---------------|----------------|
| A. Hypotonic  | B. Isotonic    |
| C. Hypertonic | D. Terrestrial |
- (iii) Which hormone promotes hyponasty in plants?
- |                |                 |
|----------------|-----------------|
| A. Auxin       | B. Cytokinin    |
| C. Gibberellin | D. All of these |
- (iv) In which of the following disease estrogen replacement therapy is required?
- |                    |                         |
|--------------------|-------------------------|
| A. Osteoarthritis  | B. Rheumatoid arthritis |
| C. Gouty arthritis | D. Osteoporosis         |
- (v) Which hormone in human body increases blood calcium level?
- |               |                |
|---------------|----------------|
| A. Thyroxine  | B. Parthormone |
| C. Calcitonin | D. Androgens   |
- (vi) Which of the meristem among the following is **NOT** determinative?
- |                     |                 |
|---------------------|-----------------|
| A. Apical meristem  | B. Intercalary  |
| C. Lateral meristem | D. All of these |
- (vii) During its development Notochord appears in the chick embryo of:
- |             |             |
|-------------|-------------|
| A. 24 hours | B. 22 hours |
| C. 18 hours | D. 26 hours |
- (viii) The direct experimental proof for DNA as hereditary material was provided by:
- |                      |                      |
|----------------------|----------------------|
| A. Fredrick Griffith | B. Avery and Macleod |
| C. Watson and Crick  | D. Hershey and chase |
- (ix) In eukaryotes the length of okazakifragment is:
- |                            |                           |
|----------------------------|---------------------------|
| A. 100 – 200 nucleotides   | B. 500 – 1000 nucleotides |
| C. 1000 – 2000 nucleotides | D. 10 – 100 nucleotides   |
- (x) During gene expression AUG acts as start codon which represents:
- |               |               |
|---------------|---------------|
| A. Arginine   | B. Methionine |
| C. Tryptophan | D. Valine     |

- (xi) During cytokinesis in animal cells, which micro-tubule activates actin and myosin which form constricting ring?
- A. Kinetochare microtubule                      B. Astral microtubule  
C. Polar microtubule                              D. None of these
- (xii) Which among the following is **NOT** a trisomic non-disjunctional syndrome?
- A. Down's syndrome                              B. Edward's Syndrome  
C. Turners syndrome                              D. Kline felters syndrome
- (xiii) Which one is **NOT** a sex-linked disease?
- A. Hypophosphatermic ricket                      B. Haemophilia  
C. Albinism    D. Colour blindness
- (xiv) If mother is O Negative ( $O^-$ ) and developing foetus is Positive ( $A^+$ ) or B Positive ( $B^+$ ) then what is the probable chance of Erthyroblastosis foctalis among the developing baby?
- A. 50%    B. 25%  
C. 75%    D. Zero
- (xv) In P.C.R technology the enzyme used is obtained from a bacterium known as:
- A. E.Coli    B. Compylobactor  
C. Thermus aquaticus                              D. Spirochete
- (xvi) Who first used the term Totipotent for plant cell?
- A. F.C. Steward                                      B. Haber-landt  
C. Sanford    D. Theodore M. Klein
- (xvii) In Pakistan temperate deciduous forests are found in:
- A. Swat valley                                        B. Kaghan valley  
C. Neelam and Shogran valley                      D. Gilgit valley

For Examiner's use only:

Total Marks:

17

Marks Obtained:

----- 2HA 1510 -----





# BIOLOGY HSSC-II

(Old Syllabus)

29

Time allowed: 2:35 Hours

Total Marks Sections B and C: 68

**NOTE:** Answer any fourteen parts from Section 'B' and any two questions from Section 'C' 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 42)

**Q. 2 Attempt any FOURTEEN parts. The answer to each part should not exceed 3 to 4 lines. ( 14 x 3 = 42 )**

- (i) What is Sciatica? Write briefly about its cause and treatment.
- (ii) Write commercial applications of Auxins.
- (iii) Write a brief note on Epilepsy.
- (iv) What is Verbalization? Write a brief note on it.
- (v) What is Pyrexia? Also write its cause.
- (vi) What are meristems? Write the difference between Apical and Lateral meristem.
- (vii) What is Apoptosis? Write briefly about the fate of apoptotic cell.
- (viii) What is the difference between Sex-limited and Sex-influenced traits?
- (ix) Write a brief note on Molecular carriers.
- (x) Define the following:
  - a. Ecological Niche
  - b. Habitat
  - c. Biomass
- (xi) What is Predation? Write its significance in Ecosystem.
- (xii) Name the major Biomes found in Pakistan.
- (xiii) What is Tidal power? How is it harnessed?
- (xiv) Write one function of each of the following hormones:
  - a. Gastrin
  - b. I.C.S.H.
  - c. F.S.H
- (xv) Define the following:
  - a. Photoperiodism
  - b. Follicle atresia
  - c. Teratology
- (xvi) Draw the structural formulae of Adenine and Thymine
- (xvii) Write names of three types of spindle fibers and their functions formed during mitosis.
- (xviii) What are the symptoms of Down's syndrome?
- (xix) Name any three plants found in the temperate deciduous forests.

## SECTION – C (Marks 26)

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

- Q. 3**
- a. Write the roles of hormones secreted from anterior lobe of pituitary gland (08)
  - b. Write role of Phytochromes in flowering. (05)
- Q. 4**
- a. What is Erythroblastosis foetalis? Describe the role of Rh-factor during development of Human embryo. (07)
  - b. Describe Lamarckian theory about inheritance of acquired characters. (06)
- Q. 5**
- a. Write the characteristics of Fresh Water lakes with its various zones. (07)
  - b. What is human impact on aquatic ecosystem? (06)