

2021**Molecular Biology & Biotechnology****[HONOURS]****Paper : I**

Full Marks : 75

Time : 4 Hours

*The figures in the right-hand margin indicate marks.**Candidates are required to give their answers in their own words as far as practicable.**Write the answers to questions of each Unit in separate books.***Answer all the questions.****UNIT-I****(Biology)****(Marks : 50)**

1. Choose the correct answer of the following. Answer any **two** of the following: $1 \times 2 = 2$

- a) Protein synthesis is done by –
- i) Ribosome
 - ii) Mesosome
 - iii) Nucleosome
 - iv) Phagosome

b) Name of a acid fort bacteria is –

- i) E.Coli
- ii) Pseudomonas
- iii) Vibrio
- iv) Mycobacterium

c) According to Miller experiment the first macromolecule is –

- i) DNA
- ii) RNA
- iii) Amino Acid
- iv) Lipid

d) Name of a DNA virus is –

- i) Bacteriophage
- ii) HIV
- iii) Influenza virus
- iv) Ebola virus

2. Answer any **five** of the following: $2 \times 5 = 10$

- a) Mention the layers of cornea.
- b) Give two examples of tailed bacteriophage.
- c) What is the difference between nucleosome and nucleoid?
- d) Mention the functions of ribosome.

- e) What are the differences between skeletal muscle and smooth muscle?
- f) What do you mean by cornified and non-cornified epithelial tissues?
- g) What do you mean by 'blood volume'?
- h) What are integral and peripheral proteins of cell?

3. Answer any **three** of the following questions:

$$6 \times 3 = 18$$

- a) Where is the apical meristem located? What is the function of apical meristem? What is the significance of transpiration in plant?

$$1 + 2 + 3 = 6$$

- b) What is the difference between lytic and lysogenic cycle? What is specialized transduction?

$$3 + 3 = 6$$

- c) What are the methods of horizontal gene transfer in bacteria? Define transformation. What is mesodiploid cell?

$$2 + 2 + 2 = 6$$

- d) Which type of muscle cell is multinucleated? What is the function of syncytium? Mention the function of synapse.

$$1 + 2 + 3 = 6$$

- e) Define the following :

- i) Prototroph

- ii) Auxotroph

- iii) Lithotroph

- iv) Organotroph

$$1 \frac{1}{2} \times 4 = 6$$

4. Answer any **two** of the following: $10 \times 2 = 20$

- a) What are the different components of dermal ground and vascular tissue system of plant? Mention their functions.

$$(2 + 2 + 2) + (1 + 2 + 1)$$

- b) Write short note on: $2 \frac{1}{2} \times 4 = 10$

- i) Mitochondria

- ii) Golgibodies

- iii) Ribosome

- iv) Plastid

- c) What is pellicle? What is the function of nucleolus? What type of genetic material present in the HIV? Give the name of three hallmark genes of HIV. Briefly describe the HIV with suitable diagram.

$$2 + 2 + 1 + 2 + 3$$

- d) Name the two contractile proteins present in muscle tissue and mention their functions. What is the function of haversian system? Name the cells present in the bone. What is pacemaker? Name the pacemaker tissues present in the heart. Give the name of IXth and Xth cranial nerve.

$$(1 + 2) + (2 + 1) + (2 + 1) + 1$$

UNIT-II
(Biochemistry)
(Marks: 25)

5. Answer any **three** of the following: $1 \times 3 = 3$
- a) How K_m is related to V_{max} of an enzymatic reaction?
 - b) What is zwitterionic nature of an amino acid?
 - c) Name two essential fatty acids in human.
 - d) How do coenzymes differ from cofactor?
 - e) What are paracrine glands?
6. Answer any **three** of the following questions: $2 \times 3 = 6$
- a) Write two effects of gibberellin on plant development.
 - b) How adult haemoglobin differs from foetal haemoglobin in human?
 - c) How is α -helix stabilized?
 - d) What is the structural difference between starch and cellulose?
 - e) Write down importance of β -carotene in animal.

7. Answer any **one** of the following questions: $6 \times 1 = 6$
- a) How is the tertiary structure of protein stabilized? What do you mean by quaternary structure of protein and how the same structure is stabilized? $3 + 3 = 6$
 - b) What is the difference between co-enzyme and co-factor? Why does enzyme activity vary with the change of temperature? Discuss the significance of K_m . $2 + 2 + 2 = 6$
8. Answer any **one** of the following questions: $10 \times 1 = 10$
- a) What are phospholipids? Discuss the functional significance of phospholipids in animal body. How does haemoglobin function in human blood? $2 + 3 + 5 = 10$
 - b) Write down the location of thyroxine synthesis in plant cell. What is iodine trapping? How does thyroxine modulate gene expression? What are antithyroid drugs? $1 + 3 + 4 + 2 = 10$