Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058I

(Autonomous College Affiliated to University of Mumbai)

End Semester Examination

May 2021

Maximum marks: 60 | Duration: 120Minutes.

Class: FE | Semester-I

Course Code: AS103. | Branch: Comp Sc. And IT

Name: Biology for Engineers.

Instructions: All questions are compulsory.
Draw neat labelled diagrams wherever necessary.
Solutions without question number will not be evaluated.

Question Number		Maximum Marks	CO	BL
Q1 (a)	Elucidate polymerization of amino acids with respect to: dehydration condensation, name and type of bond linking the monomers in the primary structure and the directionality of the polymer in the C-terminal and N-terminal residues.	8	1	5
Q1 (b)	Compare and contrast systemic and pulmonary circulation in man.	5	4	4
Q1 (c)	State the type of antigens and antibodies found in a person with blood group B. State where the antigens and antibodies are located in the blood.	2	5	1
Q2 (a)	The plasma membrane is a universal feature of all cells. Describe molecular structure of Fluid Mosaic model of plasma membrane. Add a note eukaryotic membrane system.	8	2	3
Q2(b)	Compare and contrast skeletal and cardiac muscle tissues in term of their structure, place of occurrence in the body, their major function, and type of neural control.	5	2	4
Q2(c)	Skin is the largest organ in animals and acts as the mechanical barrier to pathogen entry. State an engineering method to identify the skin diseases and importance of the same.	2	5	2
Q3 (a)	"$\Delta G = \Delta H - T\Delta S$" State what each of the symbols in the above equation stand for. Elucidate cellular energetics in terms of exergonic and endergonic reactions. Add a note on coupled reactions.	8	3	4
Q3 (b)	Define Photophosphorylation. With the help of a diagrammatic representation describe Non-cyclic Photophosphorylation.	7	3	2

Q4 (a)	"Chemistry of life revolves around chemistry of Carbon." Justify the statement	5	1	6
Q4 (b)	Evaluate the role of: cell division, cell migration, differential gene expression, and cell differentiation, during embryonic development in the process of cell-integration into tissues.	5	2	6
	OR			
Q4 (b)	Compare and contrast innate and adaptive immune system in mammals	5	5	4
Q4 (c)	Chemical engineers have designed a bio-tracer micromolecule called, 'Bio-TRCT which has following properties: It is inert and non-toxic to any cells; it cannot be metabolized by the cells, It can easily pass through the capillaries and lymphatics; it is injectable. The Bio-TRCT is injected into the heart of an experimental mammal. Illustrate a schematic course of Bio-TRCT starting from the heart through various biological fluids.	5	4	6
	OR			
Q4 (C)	Compare and contrast Glycolysis and Krebs cycle in terms of starting metabolite, end products, yield of high energy ATP molecules, yield of reductive power, requirement of Oxygen and nature of the metabolic pathway.	5	3	4