Sardar Patel Institute of Technology

Bhavan's Campus, Munshi Nagar, Andheri (West), Mumbai-400058I
(Autonomous College Affiliated to University of Mumbai)

End Semester Examination
August 27, 2021

Maximum marks: 60 | Duration: 120Minutes.
Class: FE | Semester-II
Course Code: AS103. | Branch: ETRX, and EXTC.
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	Question	Marks	CO	BL
Q1 (A)	Carbohydrates, proteins and nucleic acids are biopolymers. i) Present a brief account of their following attributes: monomeric constituents, specific covalent bond, name of dimeric form, name of polymeric form. Information may be presented in a tabular form. ii) Draw a simple molecular sketch of the three monomers. iii) Explain how monomers of nucleic acids differ from those of carbohydrates and proteins	8	1	1
Q1 (B)	Sketch a schematic model of central Dogma of Molecular Biology. Elucidate the transfer of genetic information with reference to : i) Molecular direction of information flow ii) Molecules and processes inherent for Information Transfer. iii) Organelles involved and cellular locations of information transfer.	7	6 1 2	3
Q2 (A)	Present an illustrated account of structure of blood as a unique tissue. Enumerate major functions of blood. Add a note on blood as a diagnostic tool par excellence which reflects on the health of the individual.	8	2 4 6	3
Q2 (B)	Present an account of hierarchical organization of life. In this scheme, where does the skin belong? Enumerate major functions of the skin. Explain how tissue engineering supports treatment of burn victims who have lost part of their skin.	7	2 5	4
Q3 (A) i	"Biological Molecules are information rich but entropy poor." Explain	5	3 1	4
	OR			
Q3 (A) ii	Compare and Contrast catabolic and anabolic pathways.	5	3	4
Q3 (B)	"ATP is molecular currency in cellular energetics." Elucidate	5	3	3
Q3 (C)	Compare and Contrast aerobic and anaerobic respiration.	5	3	3

Question Number	Question	Marks	CO	BL
Q4 (A)	Human circulatory system comprises a pumping heart and network of blood vessels. Elucidate the dynamics of blood circulation in terms of the following factors: i) Compartmentation of Oxygenated and Deoxygenated blood ii) Pulsatile flow and blood pressure iii) Cardiac and Arterial Muscles iv) Parallel Capillary Circuits and Transport of oxygen from blood to tissues	8	4 2	5
Q4 (B)i	Plasma membrane -a universal characteristic of living cells, is a carpet of phospholipid bilayer. Describe molecular structure of phospholipids. Explain how hydrophobic and hydrophilic interactions of phospholipids in the membranes regulate transport of water, solutes and other molecules across the membranes.	7	4 2 1	3
	OR			
Q4 (B)ii	Compare and contrast carrier proteins and channel proteins in protein dependent transport of water, solutes and other molecules across the plasma membrane.	7	4 1	4