

**M.Sc. (Part—I) Semester—I (CBCS Scheme) Examination**  
**1 BTB 1 : BIOTECHNOLOGY**  
**(Cell Biology)**

Time : Three Hours]

[Maximum Marks : 100

**Note :—**(1) All questions are compulsory and carry equal marks.

(2) Draw well labelled diagram wherever necessary.

1. Explain the following :

- (a) Basic properties of cells. 5
- (b) Role of photosynthesis and aerobic metabolism in cell evolution. 5
- (c) Freeze-etch and freeze-fracture method. 5
- (d) Cell fractionation by differential centrifugation. 5

**OR**

- (p) State the cell theory and three corollaries of this theory with exceptions. 5
  - (q) Resolving power of electron microscope. 5
  - (r) Origin of eukaryotic cells. 5
  - (s) Cell lysis methods. 5
2. There are three major classes of filaments that make up the cytoskeleton. Describe in detail their structure and function with respect to their role in motility. 20

**OR**

What are second messengers ? Describe in detail regulation of glycogen metabolism by cAMP. 20

3. Attempt the following :

- (a) How does the activity of anaphase-promoting complex lead to the separation of sister chromatid ? 5
- (b) Describe the factors affecting the membrane fluidity. 5
- (c) Explain co-transporters with an example. 5
- (d) Describe the role of gap junctions in cellular communication. 5

**OR**

- (p) What cellular mechanism ensure that passage through the cell cycle is unidirectional and irreversible ? 5
- (q) Under which circumstances could an ion channel protein catalyze movement of an ionic species ? 5
- (r) What is CAM ? Describe their role in cellular communication. 5
- (s) Explain fluid mosaic model of membrane. 5

4. Describe in detail how body can fulfil its energy needs during the period of starvation. 20

**OR**

Define Cancer. Explain in detail about conventional as well as modern treatments of cancer with their advantages and limitations. 20

5. Attempt the following :

- (a) Double fertilization in plants. 5
- (b) Role of cell surface molecules in sperm egg recognition in animals. 5
- (c) Schematic representation of malarial parasite life cycle. 5
- (d) Explain cell fate and cell lineages. 5

**OR**

- (p) Describe seed formation in plants. 5
- (q) Explain formation of germ layers in animals. 5
- (r) Explain the role of cytoplasmic determinants during developmental stages. 5
- (s) What is AIDS ? Is there any treatment available for AIDS patient ? 5