3 Hours

Total Marks: 100

1. Attempt **all** questions.
2. **All questions** carry **equal** marks.
3. Draw **neat labeled diagrams** wherever necessary.
4. Use of **log tables** and **non-programmable calculator** is **allowed**.

Q.1 a. Do as directed: (Any Six) **06**

1. The time interval between the DNA replication and Mitosis is called _____ phase of cell cycle. (G1,G2,S)
2. *Schizosaccharomyces pombe* is also known as _____yeasts. (Fission, Fusion, Budding)
3. State true or false: Normal animal cells in culture need anchorage in order to pass start.
4. What is size checkpoint?
5. State true or false: Serum Deprivation prevents passage through the cell cycle.
6. Complete the sentence: Xenopus eggs are chosen for experiments in cell cycle because_____
7. _____ enzymes are cysteine proteases involved in apoptosis. .(scramblase, protease, caspase)
8. State true or false: Neurons and skeletal muscle cells, divide once in year to replace old cells.
9. Define Necrosis.

Q.1 b. Explain the following: (Any Two) **14**

1. a. Differences between embryonic cell cycle and the standard cell cycle.
   b. Phases of eukaryotic cell cycle.
2. Growth factors and their role in mammalian cell proliferation.
3. The intrinsic pathway of apoptosis.

Q.2 a. Do as instructed: (Any Six) **06**

1. Explain autocrine signalling.
2. GPCRs are also known as _____ (5-alpha receptors, 7-transmembrane receptors, 2-beta receptors).
3. State true or false: Synaptic signalling involves neurons.
4. Give an example of Ligand activating GPCR.

5. Give an example of any one type of G protein.
6. Give an example of Steroid hormones which can enter the cell for signal transduction.
7. State true or false: Diacylglycerol is a secondary messenger.
8. State true or false: Receptor Methylation is responsible for adaptation in bacterial chemotaxis.
9. Define desensitization.

Q.2 b. Give an account of: (Any Two) **14**

1. RTK pathway of signal transduction.
2. Any two mechanisms of target cell adaptation.
3. Computer based neural networks to understand cell signalling.

Q.3 a. Answer the following objective questions as directed: (Any Six) **06**

1. State true or false: Cell theory changed the conception of studies in developmental biology.
2. State true or false: The development of an embryo from the fertilized egg is known as embryogenesis.
3. State true or false: Cell death is a phenomenon which describes the entire repertoire of cell types a particular cell can give rise in all possible environments.
4. State true or false: Homeotic genes give cells their positional identity.
5. Name any one method of construction of Fate Maps.
6. _____is an early-stage embryo consisting of 16 cells (called blastomeres) in a solid ball contained within the zona pellucida. (Zygote, Cleavage, Morula)
7. _____ is the process by which cells become structurally and functionally specialized, allowing the formation of distinct cell types (cellular differentiation , necrosis , cleavage)
8. Give any one derivative of ectoderm.
9. What is regulative development?

Q.3 b. Discuss the following: (Any Two) **14**

1. With reference to developmental biology:
   a. Zygote and Blastula
   b. Embryonic stem cells.
2. With reference to developmental biology:
   a. Pattern formation.
   b. Cytoplasmic determinants.

3. With reference to developmental biology:
   a. Concept of developmental biology.
   b. Emergence of developmental biology and multidisciplinary approach.

Q.4 a. Attempt the following objective questions as instructed: (Any Six) 06

1. Name any one tumour suppressor genes.
2. Give the significance of Bcl2 protein.
3. State true or false: Oncogenes act in a dominant manner a: gain-of-function mutation in a single copy of the cancer-critical gene can drive a cell towards cancer.
4. Give the significance of Rb protein.
5. Explain the term metastasis.
6. What are proto-oncogenes?
7. What do you mean by replicative senescence?
8. Give the significance of the tumour marker PSA.
9. Define sarcoma.

Q.4 b. Answer the following questions: (Any Two) 14

1. Elaborate on the role of p53 in controlling cancer.
2. Cancer cells are a clone descended from a single abnormal cell. Discuss.
3. Give a detailed account on chemotherapy of cancer.

Q.5 Write Short notes on the following: (Any Four) 20

a. Prokaryotic cell cycle.
b. Apoptosis and its significance.
c. Morphogens.
d. Any one model organism in developmental biology.
e. Angiogenesis.
f. Role of viruses in cancer.
