



Name : .....

Roll No. : .....

Invigilator's Signature : .....

**CS/M.Tech (BT)/SEM-2/MBT-201/2010**

**2010**

**ADVANCED CELL BIOLOGY**

*Time Allotted : 3 Hours*

*Full Marks : 70*

*The figures in the margin indicate full marks.*

*Candidates are required to give their answers in their own words  
as far as practicable.*

**GROUP – A**

**( Multiple Choice Type Questions )**

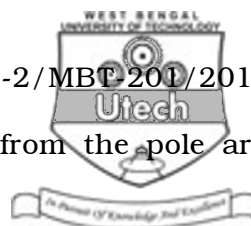
1. Choose the correct alternatives for any *ten* of the following :

10 × 1 = 10

- i) Philadelphia chromosome is observed in
  - a) Chronic myelocytic leukemia
  - b) Burkitt's lymphoma
  - c) Wilm's tumour
  - d) Retinoblastoma.
- ii) Ras oncogene is activated by
  - a) deletion
  - b) translocation
  - c) gene amplification
  - d) point mutation.



- iii) "Guardian of the genome" is the other name for
  - a) p21 gene
  - b) RB gene
  - c) p53 gene
  - d) Abl gene.
- iv) In yeast cells, START is another name for
  - a) G1 checkpoint
  - b) G2 checkpoint
  - c) Cyclin
  - d) M checkpoint.
- v) Which one of the following is *not* a tumour suppressor gene ?
  - a) Rb
  - b) WT1
  - c) p53
  - d) Ras.
- vi) Transfer of glucose across the membrane is an example of
  - a) symport
  - b) antiport
  - c) uniport.
- vii) Release of acetyl choline is associated with
  - a) an increase in cytosolic sodium concentration
  - b) an increase in cytosolic calcium concentration
  - c) a decrease in sodium concentration
  - d) a decrease in cytosolic calcium concentration.
- viii) Cancer of the blood cells is called
  - a) Adenoma
  - b) Carcinoma
  - c) Leukemia
  - d) Sarcoma.
- ix) Embryonic stem cells are
  - a) Pleuripotent
  - b) Totipotent
  - c) Multipotent
  - d) Unipotent.
- x) HAT medium is used for
  - a) screening of myeloma cells
  - b) screening of hybridoma cells
  - c) screening of antibodies
  - d) screening of totipotent cells.



- xi) The spindle microtubules emerging from the pole are connected to
- Centriole
  - Centrosphere
  - Centromere
  - Chromatid.
- xii) Calmodulin is a protein
- present in cytosol and binds with calcium
  - present on the membrane and opens a calcium channel
  - present in nucleus and helps in protein trafficking
  - present in cytosol and controls cell cycle.

### GROUP – B

#### ( Short Answer Type Questions )

Answer any *three* of the following.  $3 \times 5 = 15$

- Differentiate between Apoptosis and Necrosis. 3
  - What do you mean by G0 phase ? 2
- What is monoclonal antibody ? Explain the technology that is used to prepare it. 1 + 4
- What is membrane potential ? 1
  - Give the mathematical expression that is used to measure membrane potential. 1
  - With the help of an example discuss how alteration in membrane potential helps in ion transport. 3
- What are peripheral membrane proteins ? 2
  - Discuss the forces that hold the peripheral membrane proteins to the membrane. 3
- Mention two cellular characteristics of cancer cells. 2
  - Differentiate between proto-oncogenes and oncogenes. 3



**GROUP – C**

**( Long Answer Type Questions )**

Answer any *three* of the following.

3 × 15 = 45

7. a) Discuss how proteins synthesized in cytoplasm are transferred to the endoplasmic reticulum domain. 7  
b) What is stop transfer sequence ? Discuss its role in protein trafficking. 2 + 6
8. a) Briefly discuss the dynamic instability property exhibited by spindle microtubules. 3  
b) Explain the role of Cyclin and Cdk in controlling cell cycle checkpoints. 4  
c) Elucidate the dual role of p53 in cell cycle control and DNA repair pathways. 4  
d) What is the origin of the word "Caspase" ? Discuss the extrinsic apoptotic pathways induced by caspases. 1 + 3
9. a) What is chimera ? 2  
b) Explain the procedure for producing gene targeted knockout mice. 5  
c) Differentiate between embryonic and adult stem cells. 3  
d) Explain the application of stem cells in human therapeutics. 5
10. a) "Cancer is a multi-gene, multi-hit, multi-mutation disease." Justify the statement with a suitable example. 5  
b) Briefly describe the molecular events that give rise to Chronic Myelocytic Leukemia ( CML ). 5  
c) Explain the 'Two-hit model' proposed by Alfred Knudson. 5
11. a) What are receptor-type tyrosine kinase and non-receptor type tyrosine kinase ? 4  
b) How is the receptor type tyrosine kinase activated ? 5  
c) Discuss its role in signal transduction process. 6