

[This question paper contains 4 printed pages.]

1378

Your Roll No.

B.Sc. (Hons.)/III

A

BIOCHEMISTRY – Paper XIV

(Cell Biology)

(Admissions of 2000 and onwards)

Time : 3 Hours

Maximum Marks : 60

*(Write your Roll No. on the top immediately
on receipt of this question paper.)*

*Attempt any Five questions in all,
including Question No. 1 which is compulsory.*

1. (a) Fill in the blanks :

- (i) The inner nuclear membrane contains several integral proteins such as _____ and _____ that interact with nuclear lamins.
- (ii) The sequence which helps in retrieval of molecules to ER is _____.
- (iii) _____ is the signal for lysosomal protein targeting.
- (iv) Inactivation of _____ triggers cytokinesis.
- (v) The translocase of the chloroplast inner membrane is called _____.

(6)

P.T.O.

(b) Give the action of following drugs :

(i) Taxol

(ii) Vincristine

(iii) Herceptin (3)

(c) Give the reason and underlying defects in the following diseases :

(i) Retinoblastoma (2½)

(ii) Zellweger Syndrome (2½)

(iii) Down's Syndrome (2)

2. Give the diagrammatic representations of the following :

(i) Import of mitochondrial matrix protein (3)

(ii) Fibronectin (3)

(iii) Structure of the axoneme of cilia & flagella (3)

(iv) Signal Recognition Particle (SRP) (2)

3. (i) Describe the structure of nucleus. (4)

(ii) How are nuclear proteins like RNA and DNA polymerases transported to the nucleus. (2)

(iii) Compare and contrast contrastational and post translational translocation of polypeptide chains into ER. (5)

4. (i) How do ADF/cofilin, profilin and the Arp2/3 complex regulate actin filament assembly and turnover? (3)
- (ii) Explain the steps involved in glycosylation in the Endoplasmic reticulum. (3)
- (iii) Why don't the transit peptides of chloroplast proteins in contrast to the presequences of mitochondrial proteins need to be +ively charged? (3)
- (iv) Explain the role of complex of aggrecan and hyaluronan in cartilage. (2)
5. (i) Describe adhesion junctions and tight junctions. (7)
- (ii) Explain the role of basal lamina in differentiation of regenerating nerve and muscle at neuromuscular junction. (4)
6. (i) How does the activity of anaphase promoting complex/cyclosome leads to the separation of sister chromatols? (2)
- (ii) What substrates are phosphorylated by CdK1/ cyclin B to initiate mitosis? (2)
- (iii) What are the mechanisms that regulate the activity of cyclin-dependent kinase? (2)

- (iv) How does DNA damage checkpoints ensure that damaged DNA is not replicated and passed onto daughter cells ? (5)
- 7:
- (i) Differentiate between retroviral oncogene and tumor supressor genes. (4)
- (ii) What is the mode of action of Imatinib ? How do some tumor develop resistance to this drug. (2)
- (iii) Explain the intrinsic pathway of apoptosis. (3)
- (iv) How does activation of P1 3-Kinase leads to cell survival. (2)
8. Describe the contributions of following scientists :
- (i) Tim hunt and *et al* (3)
- (ii) Alfred Knudson (3)
- (iii) Elaine Fuchs (3)
- (iv) Huxley and Niedergerke and Hanson (2)