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M.Sc. (Biotechnology) Fourth Semester
MBIO-401: Stem Cell and Regenerative Medicine

Time allowed: 3 Hours

Max. Marks: 80

NOTE: Attempt five questions in all, including Question No. 1 which is compulsory and selecting one question from each Unit.

x-x-x

I. Attempt the following:-

- a) What are Pluripotent stem cells?
- b) What are iPSCs ?
- c) Where are Cap cells and Escort cells found?
- d) Define Embryoid bodies.
- e) What is the significance of Lin markers in stem cell identification?
- f) What are Yamanaka factors?
- g) Name sources of Hematopoietic stem cells.
- h) What is Asymmetric division? (8x2)

UNIT – I

- II. a) What are various types of stem cells on the basis of their origin/source? Discuss.
b) Discuss important properties of embryonic stem cells. (8,8)
- III. Elaborate on molecular mechanisms and factors contributing to pluripotency. (16)

UNIT – II

- IV. a) Explain any mechanism of signalling in stem cells.
b) Discuss the organization and features of GSC niche in Drosophila. (8,8)
- V. Discuss the source, developmental potential characterization and applications of Mesenchymal stem cells. (16)

UNIT – III

- VI. a) What do you know about Transdifferentiation in stem cells? Elaborate.
b) What are the ethical concerns associated with Stem cell use? (10,6)

(2)

- VII. a) Discuss the role of stem cells in Oncogenesis.
b) How are telomerase levels related to Sternness? Discuss. (10,6)

UNIT – IV

- VIII. How is stem cell Gene therapy applied in treatment of Cancer? (16)
- IX. Elaborate on application of stem cell transplantation in tissue engineering. Give examples. (16)

x-x-x