(i) Printed Pages : 3 Roll No. .....

(ii) Questions : 9 Sub. Code : 2 5 9 5 1

Exam. Code : 0 4 3 8

M.Sc. Bio-Technology 4th Semester

(2055)

STEM CELL AND REGENERATIVE MEDICINE

Paper–MBIO-401

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :— Attempt **FIVE** questions in all. Q. No. **1** is compulsory. Attempt **ONE** question from each unit.

1. Attempt the following :

(a) What are Pluripotent stem cells ?

(b) What are iPSCs ?

(c) Where are Cap cells and Escort cells found ?

(d) Define Teratomas and Embryoid bodies.

(e) Where are intestinal stem cells located ?

(f) What are Yamanaka factors ?

(g) Name sources of Hematopoietic stem cells.

(h) List few important cell surface markers on Mesenchymal Stem cells. 2×8=16

UNIT—I

2. (a) What are various types of stem cells on the basis of their origin and potency ? Discuss. 8

   (b) Differentiate between ES, EC and EG cells. 8

3. Elaborate on molecular mechanisms and factors contributing to pluripotency. 16

UNIT—II

4. (a) Explain Hedgehog pathway of signalling in stem cells. 8

   (b) Discuss the organization and mechanisms of GSC niche in Drosophila. 8

5. Discuss the source, developmental potential, characterization and applications of mesenchymal stem cells. 16

UNIT—III

6. (a) What is Transdifferentiation in stem cells ? Elaborate mechanisms, molecular and epigenetic factors involved citing supporting evidences and examples. 10

   (b) What are the ethical considerations associated with different types of Stem Cells ? Discuss. 6

7. (a) Discuss the role of stem cells in Oncogenesis with reference to "Cancer Stem Cell' hypothesis. 8

   (b) How are telomerase levels related to Aging and Stemness ? Discuss. 8

UNIT—IV

8. How is stem cell Gene therapy applied in treatment of Cancer ? 16

9. What are iPSC and how are these obtained ? Elaborate on strategies, properties, therapeutic role, and applications of Human iPSCs. 16