2062
M.Sc. (Biotechnology) Fourth Semester
MBIO-401: Stem Cell and Regenerative Medicine

Time allowed: 3 Hours   Max. Marks: 80

NOTE: *Attempt* <u>*five*</u> *questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

I. Attempt the following:-

   a) What are stem cell types in Umbilical Cord Blood?

   b) Are ES and EC cells same or different? Support your answer.

   c) What is the role of Cap cells and Hub cells in GSC niche?

   d) What are Embryoid bodies and Teratomas?

   e) How are Lin markers applied for stem cell identification?

   f) Differentiate between Reproductive and Therapeutic Cloning.

   g) List sources and Niche locations of HSCs.

   h) Define Autologous and allogenic transplants.   (8x2)

UNIT - I

II. a) Discuss types of Stem cell on the basis of potential to divide and differentiate. Explain.

   b) Discuss source characteristics and Developmental potential of Embryonic stem cells.   (2x8)

III. a) Elaborate on molecular mechanisms and factors contributing to pluripotency.

   b) Differentiate between ES, EC and EG cells.   (10,6)

UNIT - II

IV. a) Explain mechanism of Hedgehog signalling in stem cells.

   b) Discuss organization and Function of adult stem cell niche giving example. (2x8)

V. Discuss source, developmental potential characteristics and applications of Mesenchymal Stem cells.   (16)

UNIT - III

VI. a) Give an account of Trans differentiation of stem cells with specific examples.

b) Elaborate on Ethical concerns with regards to using Different types of stem cells.

(2x8)

VII. a) Discuss relation of Stem cell to Oncogenesis.

b) Discuss role of Telomerase in Stem Cell maintenance. Discuss with reference to Disease development and aging.

(2x8)

UNIT - IV

VIII. How is stem cell Gene therapy applied to treatment of Heart diseases?

(16)

IX. What are different types of adult stem cell transplants? Discuss application advantages and limitations.

(16)

x-x-x