

Exam.Code:0438

Sub. Code: 3486

2071

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. I which is compulsory and selecting one question from each Unit.

x-x-x

I. Attempt the following:-

- a) Which are the markers used for the characterization of murine ES cells?
- b) What is Wnt? Give its function.
- c) Define transdifferentiation?
- d) Give the basis of characterization of hematopoietic stem cells.
- e) What are the characteristic features of cancer stem cells?
- f) Which markers are used to identify the neural stem cells?
- g) Why are embryonic stem cells (ES) called pluripotent? Give reasons.
- h) Give any one application of stem cells in tissue engineering. (8x2)

UNIT - I

- II. a) Give the basic features of stem cells. (4)
- b) Give the characteristic features used to distinguish ES and EC cells. (6)
- c) Which markers are used to identify the stem cells? (6)
- III. a) How are the stem cells classified according to their potential to divide and differentiate? Explain giving some suitable examples.
- b) Explain the molecular basis of totipotency? (2x8)

UNIT - II

- IV. a) Explain the hedgehog signalling pathway.
- b) Write a short note on hematopoietic stem cells and neural stem cells. (2x8)

P.T.O.

(2)

- V. a) Explain the Wnt signalling pathway.
b) Explain the characteristic features of mesenchymal stem cells?
c) Write a short note on adult stem cell niche. (8,4,4)

UNIT - III

- VI. a) Describe trans-differentiation with the help of a suitable example.
b) Explain the relation between telomerase activity and stem cells? (2x8)
- VII. a) What is the role of stem cells in oncogenesis? Explain.
b) Illustrate the ethical concerns in the use of stem cells. (2x8)

UNIT - IV

- VIII. a) Explain the application of stem cells in treatment of Heart diseases.
b) Describe the applications of stem cell transplantation using an auto graft and allogenic method in tissue engineering. (2x8)
- IX. a) Explain the application of stem cells in treatment of Cancer
b) Describe the term Therapeutic cloning of stem cell. (2x8)

x-x-x