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Candidate's Seat No :_____

M.Sc. Sem.-1 Examination

404

Bio-Chemistry

January-2024

Time : 2-30 Hours] **[Max. Marks : 70**

Instructions: Illustrate your answers with neat diagrams wherever necessary.

Q. 1 Write the following

(i) Explain stem cells and classify various types of stem cells (7 Marks)

(ii) Define Embryonic stem cells, its sources & challenges (7 Marks)

OR

(i) Define stem cells and describe various types of stem cells based on potency (7 Marks)

(ii) Define adult stem cells, its sources & compare it with embryonic stem cells (7 Marks)

Q.2 Write the following

(i) Differentiate between embryonic and adult stem cells . Describe various research applications of embryonic stem cells (7 Marks)

(ii) Explain stem cell markers. Provide few stem cell markers for HSC, MSC, Epithelial stem cells. How these stem cell markers are identified (7 Marks)

OR

(i) Explain the process of development of iPSC and its potential merits in therapy (7 Marks)

(ii) Describe various therapeutic applications of adult stem cells (7 Marks)

Q. 3 Write the following

(i) Explain in brief microscopy based methods for characterization of stem cells (7 Marks)

(ii) Describe with workflow diagram the process of isolation of mesenchymal stem cells(MSC) from Adipose tissue derive stem cells (7 Marks)

OR

(i) Describe with diagram the process of isolation of hematopoietic stem cells (HSC) from umbilical cord blood (7 Marks)

(ii) Explain the process for characterization of stem cells using immunological techniques (7 Marks)

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Q. 4 Write the following

(i) Write a note on various therapeutic applications of MSCs (7 Marks)

(ii) Explain step wise the process of cryopreservation of stem cells (7 Marks)

OR

(i) Define the characteristics of cryoprotectant and describe various types of cryoprotectants (7 Marks)

(ii) Describe various therapeutic applications of HSCs (7 Marks)

Q. 5 Attempt any seven out of twelve (14Marks)

(i) What are two typical characteristics of stem cells

(ii) What is iPSCs and who discovered it

(iii) Define ICM & who defined the term Embryonic stem cells

(iv) Name two sources for HSC

(v) Which four transcription factors are required for generation of iPSC

(vi) Name two HSC markers

(vii) Name two surface markers for MSC

(viii) Differentiate Autologous & Allogenic stem cell transplant

(ix) Cite examples of two permeating cryoprotectant

(x) Cite examples of two non-permeating cryoprotectant

(xi) The rate of cooling in control rate freezing is _____°C/min

(xii) Name four transcription factors for generation of iPSC