

SARDAR PATEL UNIVERSITY

M. Sc. (Integrated) Biotechnology – Tenth Semester Examination

Wednesday, 11th April, 2018

10:00a.m. to 1:00p.m.

PS10CIGGB2: REGENERATIVE MEDICINE

Note : (i) Figures to right indicate marks.

(ii) All questions are compulsory.

Total Marks: 70

Q – 1 Choose the most appropriate alternative for the following:

(08)

1. ES cells express _____ transcription factor, which maintains ES cells in a proliferative and non differentiating state.
 - a) Klf4
 - b) LIN28
 - c) OCT4
 - d) cMyc
2. Which of the following stem cells are not located in Bone marrow?
 - a) MSC
 - b) Endothelial progenitor cells
 - c) Bone marrow stromal cells
 - d) Satellite cells
3. One of the following is an angiogenic agent which enhances neovascularization.
 - a) VEGF
 - b) NGF
 - c) EGF
 - d) HGF
4. One of the following is the marker of Hematopoietic stem cells.
 - a) CD34
 - b) CD44
 - c) CD90
 - d) CD105
5. Ductal cells of pancreas typically express a gene known as...
 - a) PDX-1
 - b) interleukin-2
 - c) Cytokeratin-9
 - d) MDX-2
6. Which of the following sets of reprogramming factors are used by Yamanaka for generation of iPSCs?
 - a) OCT4,SOX2,Klf4,cMyc
 - b) OCT4,SOX2,cMyc,Esg1
 - c) OCT4,SOX2,Nanog,Lin28
 - d) OCT4,SOX2,Nanog,cMyc
7. Cells isolated from genetically identical organism such as twins and clones are known as...
 - a) Autologous
 - b) Allogenic
 - c) Xenogenic
 - d) Syngenic
8. One of the following is not an example of porogen particle used in Solvent Casting and Particulate Leaching (SCPL).
 - a) Inorganic salt
 - b) Gelatin spheres
 - c) Saccharose
 - d) Metal beads

Q – 2 Attempt ANY SEVEN from the following: (14)

1. Write the unique properties of stem cells.
2. Narrate about Embryonic germ cells.
3. Prepare the flow chart of Embryogenesis.
4. Enlist the various sources of mesenchymal stem cells.
5. Write working methodology of FACS for stem cell separation in brief.
6. What is a stem cell niche?
7. Narrate about iPSCs.
8. Which type of neurons degenerate in Parkinson's disease?
9. Write about 'tissue engineered bone tissue'.

Q – 3 (a) Write the source and properties of Embryonic stem cells. What is pluripotency? Justify that Embryonic stem cells are truly pluripotent. (06)

(b) Write a note on somatic stem cells and explain the plasticity of somatic stem cells. (06)

OR

(b) (i) Classify the stem cells on the base of potentiality with example. (03)

(ii) Write a note on bone marrow stromal stem cells (03)

Q – 4 (a) Discuss various sources and clinical applications of Hematopoietic stem cells. (06)

(b) Briefly describe the important steps involved in therapeutic cloning and explain how therapeutic cloning differs from reproductive cloning? (06)

OR

(b) Write notes on following: (06)

(i) Very Small Embryonic Like stem cells

(ii) Immunosuppression mechanisms of MSCs

Q – 5 (a) Enlist the different types of diabetes with salient features of each type. Explain how islet cells hold therapeutic potential in curing diabetes. (06)

(b) Write the differentiation of HSCs and Explain its role in therapy for autoimmune disease. (06)

OR

(b) How myocardial infarctions develop in heart? Explain the experimental repair of damaged heart by adult stem cells. (06)

Q – 6 (a) Discuss the basic components of Tissue Engineering and add a note on therapeutic applications of Tissue Engineering. (06)

(b) Describe the various methods for the preparation of Scaffolds. (06)

OR

(b) Write notes on following: (06)

(i) Different types of Cell Sources for Tissue Engineering.

(ii) Biomaterials of Scaffold
