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## SARDAR PATEL UNIVERSITY

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

Thursday, 23<sup>rd</sup> April, 2015.

10:30a.m. to 1:30p.m.

## PS10CIGGB2/PS10CIGMB2: 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. Transcription factor \_\_\_\_\_ is essential for the maintenance of the undifferentiated state of Embryonic stem cells.
 

a) STRO-1	b) c-Myc
c) NANOG	d) SSEA-1
2. Hematopoietic stem cells usually lack \_\_\_\_\_ marker or express it at very low level.
 

a) CD 34	b) FIK-1
c) Lin	d) KLF 4
3. Pluripotent stem cells are not express this factor
 

a) STRO-1	b) OCT-4
c) NANOG	d) SSEA-1
4. The first functional organ in the developing embryo is \_\_\_\_\_.
 

a) Brain	b) Pancreas
c) Heart	d) Liver
5. Beta islet cells express a gene called
 

a) CK-9	b) PDX-1
c) Nestin	d) $\beta$ -MHC
6. One of the following is non-organ specific autoimmune disease.
 

a) type-1 diabetes	b) rheumatoid arthritis
c) lupus	d) multiple sclerosis
7. Which of the following is NOT neurodegenerative disease?
 

a) Huntington's diseases	b) Parkinson's disease
c) Alzheimer's diseases	d) Addison's disease
8. All the following techniques are not required solid porogen except one
 

a) Gas foaming	b) Solvent Casting and particulate leaching
c) Electro spinning	d) Freezdrying

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

1. Write a comparative study of Embryonic stem cells and Embryonic germ cells.
2. What are the unique properties of stem cells?
3. Write the basic steps of embryogenesis in flow chart.
4. Write the difference between therapeutic cloning and reproductive cloning.
5. Which pluripotent stem cells are found in adult tissue? Write their features.
6. How do the immune cells of the body know what to attack and what not to?
7. What is the basic principle of FACS?
8. Write synthesis of scaffold through emulsification.
9. Write the applications of Tissue Engineering.

**Q – 3 (a) What are somatic stem cells? Write the characteristics of somatic stem cells and their transdifferentiation. (06)**

**(b) Explain the culture method of Embryonic stem cells in detailed. (06)**

**OR**

**(b) 1. Classify the stem cells on the base of potentiality with example. (03)**

**2. Embryonic stem cells are truly pluripotent? Justify your answer. (03)**

**Q – 4 (a) Write the differentiation of hematopoietic stem cells and add a note on clinical applications of hematopoietic stem cells. (06)**

**(b) Explain the procedure for reprogramming of somatic cells into pluripotent stem cells. (06)**

**OR**

**(b) Why mesenchymal stem cells are known as immune-privilege cells? Explain different mechanisms of MSC mediate immunosuppression. (06)**

**Q – 5 (a) Explain different types of Diabetes and stem cell based treatment of diabetes. (06)**

**(b) What is Parkinson's disease? Explain the repair mechanism of turning on the brains own stem cells. (06)**

**OR**

**(b) How myocardial infarctions develop in heart? Explain the satellite stem cell repair mechanism for the damaged heart muscle? (06)**

**Q – 6 (a) What is scaffold? Write about the different materials used for scaffold preparation and add a note on CAD/CAM technology for scaffold synthesis. (06)**

**(b) Define Tissue Engineering. What are the basic components of Tissue Engineering? Describe about the different cell sources in Tissue Engineering. (06)**

**OR**

**(b) Write an explanatory note on uses of stem cells in Tissue Engineering. (06)**

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