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Total Number of Pages : 02

B.Tech  
PBT6J001

6<sup>th</sup> Semester Regular Examination 2018-19  
STEM CELL ENGINEERING

BRANCH : BIOTECH

Time : 3 Hours

Max Marks : 100

Q.CODE : F648

Answer Question No.1 (Part-1) which is compulsory, any eight from Part-II and any two from Part-III.

The figures in the right hand margin indicate marks.

Part- I

Q1 Only Short Answer Type Questions (Answer All-10) (2 x 10)

- What stem cell technology requires the transfection of cells with the following four genes - Oct4, Sox2, Klf4, c-Myc?
- Transplant rejection risk is less likely in tissues derived from adult stem cell than those derived from an embryonic stem cell? Why?
- Explain the term plasticity?
- Distinguish between pluripotency and totipotency?
- What do you understand by the term Target identification?
- What is the main source of embryos to provide stem cells for research?
- Which stage of stem cell development is best suited for tissue engineering? Why?
- What is induced pluripotent stem cells (iPSCs)?
- Name the laboratory tests to identify ES cells?
- Write two Unique properties of stem cells?

Part- II

Q2 Only Focused-Short Answer Type Questions- (Answer Any Eight out of Twelve) (6 x 8)

- Explain how stem cells might be used to treat a patient with type 1 diabetes.
- What are stem cells? How do these differ from other somatic stem cell? Mention the types of stem cell on the basis of their potency?
- Write short notes on IVF and its application.
- Write notes on green fluorescent protein tagging.
- Explain the principle of fluorescence activated cell sorting with the help suitable sketch?
- What are umbilical cord stem cells? Write the Collection, Processing, and Banking of Umbilical Cord Blood Stem Cells for Clinical Use?
- Describe different type of adult stem cell with their markers? Write the normal differentiation pathway of adult stem cell? What are the advantages of using adult stem cells?
- Write the therapeutic applications stem cell in Parkinson disease and spinal cord injuries.
- Explain transdifferentiation process of stem cell with suitable example?
- Briefly explain gene therapy with special reference to stem cell.
- Describe and discuss different strategies used for developing genetically engineered stem cells.
- Write a note on adult stem cell differentiation?

**Part-III**

**Only Long Answer Type Questions (Answer Any Two out of Four)**

**Q3** What are embryonic stem cells? Which stages of early embryonic development are important for generating embryonic stem cells? How are embryonic stem cell grown in laboratory? **(16)**

**Q4** Explain the role of stem cell indrug discovery,drug screening and toxicology study? **(16)**

**Q5** Using the bottom up approach and the fundamental principles of tissue engineering, how will you produce skin? **(16)**

**Q6** What do you understand by cloning for embryonic stem cell for therapeutic uses? Discuss the ethical issues associated with cloning for embryonic stem cell? **(16)**