Registration No : | | | | | | | | | | |

Total Number of Pages : 03 **B.Tech.**

PBT6J001

6th Semester Regular Examination 2017-18

STEM CELL ENGINEERING

BRANCH : BIOTECH

Time : 3 Hours

Max Marks : 100

Q.CODE : C327

Answer Part-A which is compulsory and any four from Part-B.

The figures in the right hand margin indicate marks.

Part – A (Answer all the questions)

Q1 **Answer the following questions : *multiple type or dash fill up type :*** **(2 x 10)**

a) What is the unique thing about stem cells that makes them so desirable for therapeutic use?
(a) They develop into nerve cells and can be used by stroke victims.
(b) They develop into organs needed for transplant.
(c) They are found in reproductive tissue.
(d) They can develop into many different tissue types.

b) Differentiation potential of stem cells specifies is .....
(a) Stochastic differentiation
(b) Asymmetric replication
(c) Self-renewal
(d) Potency

c) What stem cell technology requires the transfection of cells with the following four genes - Oct4, Sox2, Klf4, c-Myc?
(a) Induced Pluripotent System (iPS)
(b) Somatic Cell Nuclear Transfer (SCNT)
(c) Cloning
(d) None of the above

d) In the treatment of burns, scientists can use stem cells to help them replace.....
(a) All parts of the patient's skin
(b) Hair follicles and sweat glands
(c) The outermost layer of the skin
(d) All parts of the skin except sweat glands

e) Transplant rejection risk is less likely in tissues derived from adult stem cell than those derived from _____.

f) A blastocyst is……
(a) A very early stage embryo
(b) A type of stem cell
(c) Part of the blood system
(d) A type of brain cell

g) Research on potential uses of human stem cell is very important because –
(a) Information can be obtained about how degenerative diseases arise so that new strategies for therapy can be developed.
(b) Stem cells could be used to test new drugs.
(c) It is important to generate tissues for cell-based therapies
(d) All of the above reasons.

h) Stem cells are present in
(a) Unicellular organisms
(b) Multicellular organisms
(c) Non-living things
(d) Viruses

i) What are the roles of stem cells in our bodies?
(a) We are not sure what roles stem cells play in the body
(b) They produce new specialized cells to replace cells that die or are used uppotency
(c) They fight against infections
(d) They perform specialized roles in the body (e.g. produce insulin, transmit signals in the nervous system)

j) Myeloid dysplastic syndrome is a stem cell disorder in:
(a) Which stem cells reproduce and differentiate into the various types of red blood cells only.
(b) Which stem cells reproduce excessively and differentiate into the various types of blood cells.
(c) Which stem cells fail to reproduce and differentiate into the various types of blood cells.
(d) Which stem cells reproduce excessively and differentiate into the various types of white blood cells only.

Q2 **Answer the following questions : *Short answer type :*** **(2 x 10)**

a) Explain the term trans differentiation and plasticity.
b) What is time lapse video?
c) What do you mean by reproductive and therapeutic cloning?
d) "Cell-based therapies" - what does that mean?
e) What is the most common source of embryos for stem cell harvest?
f) “The process that produces a new individual with a known genetic makeup is called _____.
g) What is best source of stem cells for allogeni-chemopoietic stem cell transplantation in children with hemo-globinopathies?
h) What is a stem cell line?
i) Neural stem cells from the brain can differentiate into which types of cell?
j) What is Process in which one stem cell develops into two differentiated daughter cells, another stem cell undergoes mitosis and produces two identical stem cells is called?

Part – B (Answer any four questions)

Q3 **a)** 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? **(10)**

b) What laboratory tests are used to identify embryonic stem cells? **(5)**

Q4 **a)** Where are adult stem cells foundand what do they normally do? Write a note on adult stem cell differentiation? **(10)**

b) Write notes on induced pluripotent stem cells (iPSCs). **(5)**

Q5 **a)** Describe the role of stem cell in drug discovery. **(10)**

b) Write notes on fluorescence activated cell sorting (FACS). **(5)**

Q6	**a)**	What are umbilical cord stem cells? Write notes on success rate of umbilical stem cell transplant?	**(10)**
	b)	Briefly explain the role of stem cell in treatment of diabetes.	**(5)**
Q7	**a)**	Write the role of stem cell on treatment of Parkinson's disease.	**(10)**
	b)	Give a list of different of type of stem cells on the basis of their potency.	**(5)**
Q8	**a)**	What is tissue engineering? Write notes on production of complete organ, kidney, eyes, heart, and brain using tissue engineering?	**(10)**
	b)	Briefly explain Gene therapy with special reference to stem cell.	**(5)**
Q9	**a)**	What is green fluorescent protein tagging? Explain in detail.	**(10)**
	b)	Write note on regulations, debate, social and ethical concerns pertaining to stem cells use and research.	**(5)**