Reg. No.										

प्रज्ञानं ब्रह्म

INTERNATIONAL CENTRE FOR APPLIED SCIENCES

(Manipal University)

IV SEMESTER B.S. DEGREE EXAMINATION - MAY 2016

SUBJECT: GENETIC ENGINEERING (BT 243)

16TH MAY, 2016

Time: 3 Hours **Max. Marks: 100**

- ✓ **Answer ANY FIVE Questions.**

1A. Results from a single locus probe DNA fingerprint analysis for a female and her five children are given below. Identify the lane contains the DNA of the mother? Explain.
AGE DNA fragment size: Lane 1- 2kb, 3kb Lane 2-2kb, 5kb Lane 3-1kb, 4kb Lane 4-2kb, 4kb Lane 5-4kb Lane 6-2kb, 5kb. ***(6)***
1B. Discuss the viral and physical method of transfection to animal cells. ***(14)***

2A. Parkinson's disease is a degenerative disorder of the central nervous system.Choose an effective gene theraphy method by which you can cure the disease,also list its advantages and disadvantages. ***(14)***
2B. List the results of variants indexed analysis of human genome sequences. ***(4)***
2C. Expand CODIS,D5S818. ***(2)***

3A. You are asked to sequence a DNA fragment by the Maxam-Gilbert Method. Explain diagrammatically. ***(14)***
3B. Three individual samples of the plasmid with gene was taken and digested with *Eco*RI, *Hin*dIII, and both *Eco*RI and *Hin*dIII. The gene size is 1.5kb.The plasmid has *Eco*RI site at both ends to which the gene is ligated. Draw the restriction map of this recombinant plasmid. AGE DNA fragment sizes - *Eco*RI-5.3kb+1.5kb,*Hin*dIII-4.1kb+2.7kb,*Eco*RI+*Hin*dIII-3kb+ 2.3kb+ 1.1kb+ 0.4kb. ***(6)***

4A. What factors affect the polymerase chain reaction? ***(7)***
4B. Explain, how a adaptor is made use of, in genetic engineering? ***(7)***
4B. Set the PCR temperature and time with the given data
Gene size-3.5kb RVPrimer sequence- 5'CTAGCAAAATAGGCTGTCCC ***(6)***

5A. What is the stringency of a hybridization reaction? ***(10)***
5B. Discuss the method by which researchers study vast amount of genomic DNA from the cells of an organism like human. ***(10)***

6A. What do you understand by Neoschizomers and Isoschizomers? ***(5)***
6B. What are reporter molecules and what is their function? ***(10)***
6C. List the essential characteristics of a cloning vector with a neat sketch. ***(5)***

7A. How does DNA *Ligase* work in joining two heterogeneous DNA fragments? ***(10)***
7B. Expand RBS and detail on its two special sequences. ***(6)***
7C. Explain different types of plasmids based on their replication ability. ***(4)***

8A. Why is biochemical purification of one gene away from the other genes in a cell more challenging than biochemical purification of one protein away from the other protein in a cell? ***(4)***

8B. The recognition sites for several restriction enzymes are shown below.

BglI	PstI	BclHI	BamI
5GA/TC3	5A/GATCT3	5G/GATCC3	5T/GATCA3
3CT/AG5	3TCTAG/A5	3CCTAG/G5	3ACTAG/T5

Consider the following small DNA sequence

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5′—CGCACCTGTGTTGATCACCTAGCCGATCCACGGTGGATCCAAGGC—3′
   |||||||||||||||||||||||||||||||||||||||||||||||
3′—GCGTGGACACAACTAGTGGATCGGCTAGGTGCCACCTAGGTTCCG—5′
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For each of the restriction enzymes listed, give the number of times that the enzyme will cut the DNA fragment above. Also give the number of resulting DNA fragments after individual treatment with each enzyme. ***(6)***

8C. Brain tumor (BT) is abnormal growth of cells within the brain. Exposure to vinyl chloride or ionizing radiation will mutate and delete tumor suppressor genes are the lead cause for BT. Temozolomidetype is an effective drug for the treatment of BT. Besides target specificity, toxicity is the major problem with the drug.

i. Suggest an alternate method by which you can solve the above problem. ***(2)***
ii. How different is your method from the conventional cancer therapies? ***(3)***
iii. What do you need to know about the target disease in order to apply your method? ***(2)***
iv. What do you think are some of the challenges facing your method? ***(3)***