

B.Sc. (Honours) Examination, 2018
Semester-VI
Botany
Course: BBC-62 (core)
(Molecular Biology & Genetic Engineering)

Time: Three Hours

Full Marks: 40

Questions are of value as indicated in the margin

1. Answer **any eight** of the following: 1x8=8
- i) What is the degeneracy of the genetic code?
 - ii) What is poly-A tail?
 - iii) State the function of Reverse Transcriptase.
 - iv) Point out two goals of human genome project.
 - v) What is the size of human genome?
 - vi) Name four different enzymes in DNA replication
 - vii) Define cDNA
 - viii) What is a transgene?
 - ix) What is TATA box?
 - x) What is a GenBank
 - xi) Name one peptide hormone produced through recombinant DNA technology.
 - xii) Name one enzyme which removes 5'-phosphate group from DNA.

Group-A (Molecular Biology)

Answer *any two* questions

2. What are the exogenous agents that cause DNA damage? Describe briefly the nucleotide excision repair mechanism in *E. coli*. 2+6=8
3. What is origin of DNA replication? Describe the functions of plasmid-encoded Rep initiator protein on theta mode of plasmid replication. 2+6=8
4. What is catabolite repression of the *lac* operon? What are the structural and regulatory components of the *lac* operon? Describe the role of cAMP in regulation of gene expression of this operon. 2+3+3=8

Group-B

(Genetic Engineering)

Answer *any two* questions

5. What is the purpose of including the alpha-fragment of *lacZ* gene in certain plasmid vectors? Describe the mechanism of the complementary functions of this peptide in Blue-white screening. 4+4=8
 6. What are restriction enzymes? What are the key features that make restriction enzymes suitable for DNA manipulation? What are the recognition sequences for *EcoRI* and *BamHI*. 2+4+2=8
 7. What is the reporter gene? Cite two examples of reporter gene and describe two applications of each. 2+2+4=8
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