

**FACULTY OF SCIENCE**

M. Sc. III – Semester Examination, January 2018

Subject : Biochemistry

Paper – I

Gene Regulation and Genetic Engineering

Time : 3 Hours

Max. Marks: 80

**Note :** Answer all questions from Part–A and Part–B. Each question carries 4 marks in Part–A and 12 marks in Part – B.

**PART – A (8 x 4 = 32 Marks)**  
**(Short Answer Type)**

- ~~1~~ Sporulation in *Bacillus*
- ~~2~~ Control of *lac* operon by catabolite activator protein
- ~~3~~ Alternative splicing
- ~~4~~ Regulation of gene expression by DNA methylation
- ~~5~~ Mechanism of DNA ligase reaction
- ~~6~~ BAC
- ~~7~~ SNP
- ~~8~~ AFLP

**PART-B (4 x 12 = 48 Marks)**  
**(Essay Answer Type)**

- ~~9~~ (a) What is transcription attenuation? Explain in detail by citing an example. Write about the regulatory elements and organization of genes involved in that operon.  
**OR**  
 (b) What are riboswitches? How to identify riboswitches? Describe in detail about regulation of bacterial gene expression by riboswitches.
- ~~10~~ (a) Describe in detail about regulation of gene expression by RNA and its application for crop improvement.  
**OR**  
 (b) Write about the regulatory elements and organization of genes involved in Gal operon of yeast.
- ~~11~~ (a) Narrate the various methods used for screening and selection of recombinants.  
**OR**  
 (b) Define expression vector. Describe different strategies used to optimize the expression of foreign genes in expression vectors. Add a note on types of expression vectors.
- ~~12~~ (a) Write about manipulation of gene expression in mammalian cells.  
**OR**  
 (b) Write in detail about RAPD analysis and their applications in crop improvement. Describe the process of growth hormone production by r-DNA technology.