

Ph.D. IN BIOCHEMISTRY  
(PHDBC)

Term-End Examination

December, 2018

RBC-003 : BIOCHEMICAL AND MOLECULAR  
BIOLOGICAL TECHNIQUES

Time : 3 hours

Maximum Marks : 100

- Note:* (i) The question paper consists of two sections 'A' and 'B'.  
(ii) Section 'A' is compulsory.  
(iii) Attempt any four questions from section 'B'

SECTION - A

1. (a) What is meant by Molarity ? Calculate how many grams of glucose are needed to make 100 ml of a 100 mM solution. (Glucose M.w. = 180) 5
- (b) Explain the following terms in one to two sentences each : 2x5=10
- (i) Homogenization
  - (ii) Microarray
  - (iii) Retention time
  - (iv) Plasmid
  - (v) Gene silencing
- (c) Fill in the blanks in the following : 5
- (i) In exclusion column chromatography, proteins are separated on the basis of their \_\_\_\_\_.

- (ii) A technique in which the proteins separated on the SDS-polyacrylamide gel are transferred on to the nitrocellulose membrane is called \_\_\_\_\_.
- (iii) FACS stands for \_\_\_\_\_.
- (iv) Coomassie R-250 dye is commonly used to detect \_\_\_\_\_ on a gel.
- (v) A plot of the rate of cell proliferation with time gives a \_\_\_\_\_.

### SECTION - B

Answer any four questions :

2. (a) Write the applications of the following : 10  
 (i) HPLC (ii) FACS
- (b) Explain how do buffers work with the help of examples. Write the applications of buffers used in biological research. 10
3. Write the basis of separation and applications of the following : 5x4=20  
 (a) Affinity Chromatography  
 (b) Ion Exchange Chromatography  
 (c) SDS-PAGE  
 (d) Immuno Electrophoresis
4. (a) Write the principle, instrumentation and applications of Gas Liquid Chromatography. 10  
 (b) Illustrate the steps involved in DNA isolation. 5  
 (c) Explain how the molecular weight of DNA can be determined using electrophoretic technique. 5

5. (a) Differentiate between the following : 10  
(i) Reverse transcriptase PCR and Real time PCR  
(ii) Transformation and Transfection
- (b) What is DNA sequencing ? Explain the chemical sequencing method of DNA, its advantages and disadvantages. 10
6. (a) Explain primer designing. 10  
(b) Write in brief any **five** applications of recombinant DNA technology. 10
7. (a) Explain the different phases of Bacterial growth curve and Generation time. 10  
(b) Write short notes on **any two** of the following : 10  
(i) DNA footprinting  
(ii) Subcellular fractionation  
(iii) ELISA
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