

**Ph.D. IN BIOCHEMISTRY (PHDBC)**

00481

**Term-End Examination**

**December, 2017**

**RBC-003 : BIOCHEMICAL AND MOLECULAR  
BIOLOGICAL TECHNIQUES**

*Time : 3 hours*

*Maximum Marks : 100*

*Note : The question paper consists of three sections, A, B  
and C. All sections are compulsory.*

**SECTION A**

1. (a) Define the following terms : 10
- (i) Normality
  - (ii) pH
  - (iii) Primer
  - (iv)  $R_f$  Value
  - (v) Immunodiffusion
- (b) Fill in the blanks : 5
- (i) In ion-exchange chromatography, proteins are separated on the basis of their \_\_\_\_\_ .

- (ii) Transfer of RNA from an agarose gel to a nitrocellulose membrane is done by \_\_\_\_\_ technique.
  - (iii) ELISA technique is based on \_\_\_\_\_ .
  - (iv) Ethidium bromide is commonly used to visualize \_\_\_\_\_ on a gel.
  - (v) FPLC stands for \_\_\_\_\_ .
- (c) What is meant by Molarity ? How will you prepare a 0.2 M NaOH solution with a volume of 100 ml ?

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## SECTION B

*Answer any five questions.*

2. Elaborate the methods employed for tissue homogenization. Explain the method used to separate the sub-cellular organelles from animal tissue. 6
3. What is the principle of Chromatography ? Describe the instrumentation, procedure and applications of HPLC. 6
4. Explain the purpose of each of the chemical reagents given below in PAGE-Electrophoresis : 6
  - (a) Acrylamide
  - (b) Bis-acrylamide
  - (c) TEMED
  - (d) SDS
  - (e) Coomassie blue dye
  - (f) Bromophenol blue
5. Briefly describe the procedure and applications of Thin Layer Chromatography (TLC). 6
6. What is pH meter ? Explain its working, with a suitable diagram. 6
7. Describe three applications of Recombinant Gene Technology. 6
8. Differentiate between DNA Gel Electrophoresis and PAGE. 6

## SECTION C

*Answer any five questions.*

9. What is the principle and applications of SDS-PAGE ? Explain how the molecular weight of an unknown protein can be determined, with a suitable example. 10
10. Explain Blotting techniques. Briefly write the basic steps and three applications of Southern Blotting. 10
11. Why is Gene Cloning important ? Write its basic strategies and give the characteristics of any two cloning vectors for gene cloning. 10
12. Explain the principle, method and applications of the RT-PCR technique. 10
13. Describe the principle, operational procedure and applications of Radio-Immuno-Assay (RIA). 10
14. Write the basic techniques and growth media for cell culture and explain the various sterilization techniques used for cell culture. 10
15. Write short notes on any *two* of the following : 10
  - (a) Flow Cytometry
  - (b) Microarray
  - (c) Gene Silencing
  - (d) Enzyme-Linked Immunosorbent Assay