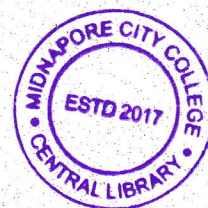


**The West Bengal University of Health Sciences**  
**3rd BMLT September, 2023 Examination**

Subject: Clinical Biochemistry



Time: 3 hrs.

Full Marks: 100

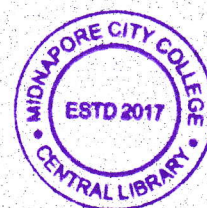
*Attempt all questions*

1. Answer all the questions : 20 x 1
- a) What does QA and QC stand for?  
 i) Quality assurance and quality control                      ii) Quality assurance and quality completion  
 iii) Both of these    iv) None of these
- b) Which technique separates charged particles using electric field?  
 i) Hydrolysis              ii) Centrifugation              iii) Electrophoresis              iv) Both ii) and iii)
- c) The speed of migration of ions in electric field depends upon:  
 i) Shape and size of the molecule                      ii) Magnitude of charge and shape of molecule  
 iii) Magnitude of charge and mass of molecule              iv) Both i) and ii)
- d) Which of the following option involves material and component control?  
 i) Development of standards    ii) Development of specification    iii) Quality control    iv) Feedback
- e) Process control is carried out:  
 i) Before production    ii) During production    iii) After production control    iv) All of these
- f) The mean sampling distribution is:  
 i) Less than mean process distribution                      ii) More than mean process distribution  
 iii) Equal to mean process distribution                      iv) Both ii) and iii)
- g) When is electrophoresis not used?  
 i) Separation of proteins                                      ii) Separation of lipids  
 iii) Separation of nucleic acid                                      iv) Separation of amino acids
- h) Nucleic acids cannot be separated by:  
 i) SDS-PAGE              ii) Native PAGE              iii) Agarose gel electrophoresis              iv) Both i) and ii)
- i) The pH of the stacking gel in SDS-PAGE is:  
 i) 7.0                      ii) 6.8                      iii) 8.0                      iv) None of these
- j) In electrophoresis DNA will migrate towards:  
 i) Cathode or positive electrode                                      ii) Anode or negative electrode  
 iii) Cathode or negative electrode                                      iv) Anode or positive electrode
- k) The most common type of gel used for DNA separation:  
 i) Agar                      ii) Polyacrylamide                      iii) Agarose                      iv) Cellulose
- l) In SDS-PAGE separation is based on:  
 i) Molecular weight                      ii) Shape                      iii) Charge                      iv) All of these
- m) Chromatography is a physical method that is used to separate:  
 i) Simple mixtures                      ii) Complex mixtures                      iii) Viscous mixtures                      iv) Metals
- n) Which force is involved in chromatography:  
 i) Hydrogen bonding                                      ii) Electrostatic interaction  
 iii) Hydrophobic interaction                                      iv) All of these
- o) Ion exchange chromatography is based on:  
 i) Electrostatic interaction                                      ii) Electrical mobility of ionic species  
 iii) Partition chromatography                                      iv) All of these

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- p) Primer used for the process of polymerase chain reaction are \_\_\_\_\_
- i) Single stranded DNA oligonucleotide                      ii) Double stranded DNA oligonucleotide  
 iii) Single stranded RNA oligonucleotide                      iv) Double stranded RNA oligonucleotide
- q) Which of the following is not an application of ELISA?
- i) Detection of hepatitis B markers in serum  
 ii) Percentage of Hb in blood  
 iii) Detection of HIV antibodies in blood sample  
 iv) Detection of mycobacterium antibodies in tuberculosis.
- r) At what temperature does denaturation of DNA double helix takes place?
- i) 60°                      ii) 54°                      iii) 74°                      iv) 94°
- s) The technique used to transfer DNA molecules separated by gel electrophoresis to the nitrocellulose or nylon membrane is called \_\_\_\_\_
- i) Western blotting                      ii) Northern blotting                      iii) Southern blotting                      iv) None of these
- t) Reverse transcription PCR uses \_\_\_\_\_.
- i) RNA as a template to form DNA                      ii) mRNA as a template to form cDNA  
 iii) DNA as a template to form ssDNA                      iv) all of these



2. Answer the following : 5 x 2
- a) What is paper chromatography?  
 b) Write the usefulness of centrifugation.  
 c) What is ion-selective electrodes used for?  
 d) Define quality control protocol.  
 e) What is the clinical significance of cardiac troponin?
3. Answer **any six** of the following : 6 x 5
- a) Distinguish between PCR and real time PCR.  
 b) Write a short note on two-dimension gel electrophoresis  
 c) Explain the relationship between quality control and quality management.  
 d) What is creatine kinase and what is its significance?  
 e) Explain the role of carbonic anhydrase in digestion  
 f) Write a short note on thin layer chromatography.  
 g) Distinguish between HPLC and HPTLC.  
 h) Name two isozymes and state their clinical significance.
4. Answer **any one** of the following: 1 x 10
- a) Write a short note on clinical application of chemiluminescence.  
 b) What is proficiency testing? Define its role in laboratory processes.
5. Answer **any two** of the following : 2 x 15
- a) Write short notes on:  
 i) Gel filtration chromatography                      ii) Sandwich ELISA                      iii) Prostate specific antigen
- b) Enumerate the tests to diagnose HIV-AIDS. Enumerate on the various stages of the disease and for various objectives these tests are being used. 5+10
- c) Distinguish between isoelectric focusing and SDS- PAGE.