

**PARUL UNIVERSITY**  
**FACULTY OF APPLIED SCIENCE**  
**M.Sc./IMSc Winter 2019-20 Examination**

**Semester: 3/9****Subject Code: 11203103****Subject Name: Analytical Tools & Technique****Date: 19-12-2019****Time: 10:30 am to 01:00 pm****Total Marks: 60****Instructions:**

1. All questions are compulsory.
2. Figures to the right indicate full marks.
3. Make suitable assumptions wherever necessary.
4. Start new question on new page.

- Q.1. A) Critically compare the principle of following techniques: (Each of 04 marks) (08)**  
(a) TEM and SEM.  
(b) Native PAGE and SDS-PAGE
- Q.1. B) Answer the following questions (Any two) (04)**  
(a) Short notes (Each of 02 marks) (04)  
1. Principle of NMR  
2. Use of X-ray diffraction in understanding structure of protein crystals  
(b) Write brief note on principle and applications of Sephadex gel filtration chromatography. (04)  
(c) Write a note on: Mass spectrometry. (04)
- Q.2. A) Answer the following questions. (04)**  
(a) Brief note (Each of 02 marks) (04)  
1. Principle of TLC  
2. Lyophilization  
(b) Describe the operation and use of flow cytometry in cell biology. (04)
- Q.2. B) Answer the following questions (Any two) (03)**  
(a) Short questions (Each of 01 marks) (03)  
1. On what basis DNA molecules are separated in agarose gel electrophoresis?  
2. Give the full form of CD spectroscopy.  
3. What is relative centrifugal force?  
(b) Discuss the principle and use of isoelectric focusing in protein science. (03)  
(c) Enlist variables affecting migration of DNA in agarose gel electrophoresis? How the size of a DNA sample can be calculated from agarose gel electrophoresis using suitable ladder/marker? (03)
- Q.3. A) Brief note (Each of 04 marks) (08)**  
(a) Discuss the use of ultracentrifuges in biology.  
(b) Write a brief note on applications of 2-D electrophoresis technique in proteomic studies.
- Q.3. B) Answer the following questions (Any two) (04)**  
(a) Short note/ Schematically label the figures (Each of 02 marks) (04)  
1. Beer-Lambert's Law and its limitations  
2. Give only a labelled schematic diagram for HPLC system.  
(b) Discuss the procedure for Western blotting. (04)  
(c) Explain DNA fingerprinting technique and its applications in forensic science. (04)
- Q.4. A) Answer the following questions. (04)**  
(a) Short note/ Brief note (Each of 02 marks) (04)  
1. Comparison between Southern and Northern blotting techniques  
2. Explain the principle of cation and anion exchange chromatography.  
(b) Giving one example discuss the use of radioisotopes in biology (04)
- Q.4. B) Answer the following questions (Any two) (03)**  
(a) Short questions. (Each of 01 marks) (03)  
1. Name any two radioisotopes used in biological research.  
2. What is mechanism of use of ethidium bromide for detection of nucleic acids on agarose gels?  
3. What is liquid scintillation counting?  
(b) Write a note on: ion selective electrodes (03)  
(c) Explain the measurement of pO<sub>2</sub> using polarographic oxygen electrode. (03)