7. (a) Discuss in details the principle, instrumentation and applications of X-ray spectroscopy. **10**

(b) Write a short note on hardware components and applications of ESR. **5**

Unit IV

8. What are radioisotopes ? Discuss radioactive decay and its types. Describe different methods for the measurement of radioactive decay. **15**

9. Write short notes on the following :

(a) Autoradiography

(b) In-vivo and in-vitro levelling techniques

(c) Internal *vs.* external standards in radio isotopic techniques. **5×3=15**

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M. Sc. EXAMINATION, May 2019

(First Semester)

(C Scheme) (Re-appear)

BIO-TECHNOLOGY

BT509MSC

Bioinstrumentation

Time : 3 *Hours*] [*Maximum Marks :* 75

Before answering the question-paper candidates should ensure that they have been supplied to correct and complete question-paper. No complaint, in this regard, will be entertained after the examination.

Note : Question No. **1** is compulsory. Attempt *four* more questions selecting at least *one* question from each Unit. All questions carry equal marks.

1. (a) Differentiate between scanning and transmission electron microscope. **2**

(b) Why is green light used in phase contrast microscopy ? **2**

(c) What is radioimmunoassay ? **2**

(d) What is reverse phase HPLC ? How does it differ from normal phase HPLC ? **2**

(e) What is quenching in GM counter ? **2**

(f) What does the Beer-Lambert law mean ? **2**

(g) Briefly describe the use of radioisotopes in research. **2**

Unit I

2. Describe the theory, working and applications of transmission electron microscopy. **15**

3. Describe in brief the theory and working mechanism of analytical centrifugation. How best can it be utilized for separating sub-cellular particles ? **15**

Unit II

4. (a) What is gel filtration chromatography ? Explain the various types of gel filtration materials. How the molecular weight of protein can be determined using gel filtration chromatography ? **8**

(b) Write down the theory and application of PAGE. Differentiate between native and denaturing gel electrophoresis. **7**

5. (a) Describe the types of columns, column materials and detectors used in HPLC. **7**

(b) What is the principle of GLC ? Describe various types of columns, detectors and applications of GLC. **8**

Unit III

6. (a) Describe the theory, working and applications of fluorescence microscopy. **10**

(b) Write down the applications of NMR in biological research. **5**