

MANIPAL UNIVERSITY
SECOND YEAR B.Sc. N.M.T. DEGREE EXAMINATION – DECEMBER 2014
SUBJECT: RADIATION CHEMISTRY AND RADIATION PHYSICS

Wednesday, December 17, 2014

Time: 10:00-13:00 Hrs.

Max. Marks: 80

✍ Answer Section – ‘A’ and Section – ‘B’ in two Separate Answer Books.

SECTION – A : RADIATION CHEMISTRY : 30 MARKS

1. Write notes on following:

- 1A. Buffer Solution
- 1B. Limitation of Bronsted theory of Acid and Base
- 1C. Colloid formation and their Properties
- 1D. Coordinated covalent chemical bond

(5 marks × 4 = 20 marks)

2. Describe Bohr’s atomic model. What was their limitation?

(10 marks)

SECTION – B : RADIATION PHYSICS : 50 MARKS

✍ Answer all the questions. Draw neat and labelled diagram as and when required.

3. Write in detail on the following:

- 3A. Working principle of Gamma ray Spectrometer
- 3B. Gamma ray spectrometry with applications
- 3C. Quality check on the performance of gamma ray spectrometer

(3+3+4 = 10 marks)

4. Define detection efficiency. What are the factors affecting detection efficiency?

(8 marks)

5. Compare and contrast between the various modes of radioactive decay.

(12 marks)

6. What is bremsstrahlung radiation? What are the advantages and disadvantages of the same in Nuclear Medicine?

(6 marks)

7A. Derive Lambert's law.

7B. What is the role and why we have to know about the same in Nuclear Medicine?

(4+2 = 6 marks)

8. **Define the following:**

8A. Absorption edges

8B. Bragg's ionization peak

8C. Mass attenuation coefficient

8D. Decay time

(2 marks × 4 = 8 marks)

