Q.P Code : 40401

(3 Hrs) **Total Marks : 80**

N.B

1) **Question No. 1 is compulsory.**
2) **Attempt any three questions out of remaining five questions.**
3) **Figures to the right indicate full marks.**
4) **Assume suitable data if necessary, stating your assumption.**

Q1. Attempt the following:

1. Explain the different steps involved in RIA? (05)
2. Explain the working of radionuclide generator. (05)
3. Explain the difference between PET and SPECT scanning. (05)
4. What is radio labeling? Explain any two methods of radio labeling with examples (05)

Q2. (a) At 11:00 a.m., the 99mTc radioactivity was measured as 9 mCi (333 MBq) on a certain day. What was the activity at 8:00 a.m. and 4:00 p.m. on the same day ($t_{1/2}$ for ^{99m}Tc ¼ 6 h)? (05)

(b) Explain the Liquid scintillation counting system in detail. (10)

(c) Write a short note on radioactive waste management. (05)

Q3. (a) Explain using suitable block diagram, working of PET in detail. (10)

(b) With suitable diagram and graph, explain Gas filled detector used in nuclear medicine (10)

Q4. (a) Explain briefly the biological effects of radiation. (10)

(b) Explain using suitable diagrams, Thyroid uptake monitoring system. (10)

Q5. (a) Explain the interaction of radiation with matter. (10)

(b) Explain using suitable diagram, working of Position circuitry in Gamma camera. (10)

Q6. Write short notes on:

(a) Alpha decay and beta decay. (05)

(b) Treatment of malignant diseases using radionuclides. (05)

(c) Hybrid Imaging modalities. (05)

(d) Applications of radioimmunoassay (05)

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