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CAH 502

**Third Semester M.Sc. Degree Examination, December 2018
(CBCS : 2016-17 Syllabus)**

Analytical Chemistry

BIOANALYTICAL AND RADIOCHEMICAL TECHNIQUES

Time : 3 Hours

Max. Marks : 70

Note : i) Answer Part – A and **any four** questions from Part – B.
ii) Figures to the **right** indicate marks.

PART – A

1. Answer **all** the following sub-divisions : **(9×2=18)**

- a) Give the classification of membrane electrodes.
- b) What are the characteristics of ideal biosensors ?
- c) Outline the applications of glucose biosensors.
- d) Write the characteristic properties of α , β and γ radiations.
- e) Find the radioactivity of 1g sample of ^{226}Ra given that $t_{1/2}$:1620 years and Avogadro's number is 6.023×10^{23} .
- f) Highlight the biological effects of radiations.
- g) Write any two applications of radioactive tracers in analytical chemistry.
- h) Explain the terms; antigens and antibodies.
- i) Give the significance of radio immunoassay.

PART – B

Answer **any four full** questions : **(4×13=52)**

2. a) With a neat sketch, explain the construction and working of an enzyme electrode.
- b) Write a note on botanical biosensor.
- c) Discuss the theory and applications of alcohol biosensors. **(5+4+4)**

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3. a) Explain the working principle and applications of enzyme based calorimeter.
b) Give an account of optical sensors, with respect to their working and applications.
c) Describe the construction and working of gas sensing electrode. **(4+5+4)**
4. a) Describe the method of determining the radioactivity by GM Counter.
b) Explain briefly on radiolysis of gases, liquids and solids.
c) Write a note on hazards in radiochemical work. **(4+5+4)**
5. a) Outline the industrial applications of radiation chemistry.
b) Explain how the pulse radiolysis technique is useful for the study of transient species.
c) Give an account of radioactive waste management. **(4+4+5)**
6. a) Define rate of disintegration and explain disintegration theory.
b) Give an account of instrumentation for radiobioassay.
c) Discuss the basic principle and applications of isotopic dilution analysis. **(5+4+4)**
7. a) Explain the basic principles of radiometric titrations. Outline its applications.
b) Write brief note on enzymatic immunoassay.
c) Outline the principle and applications of radioimmunoassay of insulin. **(5+4+4)**
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