09 DEC 2020

M.Sc. SEM-3 Examination December– 2020
Physical Chemistry
(Nuclear and Radio chemistry)
Paper: 11 Code: 3494

Time: 1:30 Hours **Total Marks: 42**

(1) All questions carry equal marks
(2) Attempt any three questions out of four

Q-1 Discuss the different properties such as nature, velocity, ionizing power, luminescence and penetrating power of the α, β and γ rays. **14**

OR

Q-1 A Explain the nuclear stability. **07**

Q-1 B Define the terms isotopes and isotones with examples. **07**

Q-2 Describe the characteristics features of nuclear reactor in detail. **14**

OR

Q-2 A Give an account of the nuclear fusion reaction. **07**

Q-2 B A sample of radioactive I^{133} gave with a Geiger counter 3150 counts per minute at a certain time and 3055 counts per unit exactly after one hour later. Calculate the half-life period of I^{131}. **07**

Q-3 Discuss the different ways of preparing radioactive isotopes and different techniques of separation of radioactive isotopes. **14**

OR

Q-3 A Write a short note on self-diffusion. **07**

Q-3 B The mass defect for $^{35}_{17}Cl$ is found to be 0.320 amu. Calculate the binding energy per nucleon. **07**

Q-4 Discuss the application of radiotracer in chemical investigations. **14**

OR

Q-4 A Give application of tracers in the field of medicine. **08**

Q-4 B Write the nuclear reactions for the following: **06**

(i) the neutron-induced fission of ^{235}U into ^{144}Ba, ^{90}Kr and two neutrons

(ii) the negatron (negative β-particle) decay of ^{60}Co

(iii) the electron capture decay of ^{208}Bi