CLASS: **IMSC**   **SEMESTER: VI**
BRANCH: **CHEMISTRY**   **SESSION : SP/2019**

SUBJECT : IMC6001 PHYSICAL CHEMISTRY-II

TIME: **1.5 HOURS**   **FULL MARKS: 25**

INSTRUCTIONS:
1. The total marks of the questions are 30.
2. Candidates may attempt for all 30 marks.
3. In those cases where the marks obtained exceed 25 marks, the excess will be ignored.
4. Before attempting the question paper, be sure that you have got the correct question paper.
5. The missing data, if any, may be assumed suitably.

Q1 (a) What is the significance of Plank's quantum theory in quantum mechanics? [2]
   (b) An electron and a proton have the same amount of kinetic energy. Which of the two possesses greater wavelength? [3]

Q2 (a) de-Broglie hypothesis supports the Bohr's model of stationary orbits. Comment on this statement. [2]
   (b) A cricket ball weighing 100 g is to be located within 0.1 Å. What is the uncertainty in its velocity? Comment on your result. [3]

Q3 (a) Why Compton shift is not observed for visible light? [2]
   (b) Calculate the maximum percentage change in the wavelength on Compton scattering of an incident photon of wavelength (i) 1 angstrom and (ii) 10 angstrom. What conclusion can be drawn from comparison of the two results? [3]

Q4 (a) What is the difference between light waves and matter waves? [2]
   (b) What is the threshold frequency for photoelectron emission from a metal having work function 3.8 eV? [$C = 3 \times 10^8$ m s^{-1} & $h = 6.63 \times 10^{-34}$ Js] [3]

Q5 (a) What is the physical significance of wave function? [2]
   (b) Write down the time-independent Schrödinger equation and explain the different terms involved in it. [3]

Q6 (a) A microwave has a wavelength of 0.01m. What is the speed of the wave? [2]
   (b) Draw the electromagnetic wave and explain its characteristics. [3]

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