JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- MARCH-2023

COURSE CODE (CREDITS): 18B11PH212 (4)

COURSE NAME: Bioinstrumentation Techniques

COURSE INSTRUCTORS: Dr. Ragini Raj Singh

MAX. MARKS: 15

MAX. TIME: 1 Hour

Note: All questions are compulsory. Marks are indicated against each question in square brackets.

Q.1.

(a) In view of classical and quantum mechanics discuss the heat capacities of mono-atomic solids.

[CO:1, Marks:1]

(b) Give the Einstein explanation of photoelectric effect. Show with the help of graph.

[CO:1, Marks:1]

Q.2. (a) For certain waves phases are adjusted so all the peaks of the waves match at zero on horizontal axis. What will be the result for 5 waves and for 250 waves show with the help of diagrams?

[CO:1, Marks:2]

Q.3. What are the goals of spectroscopy? Differentiate between atomic and continuous spectra?

[CO:2, Marks:2]

Q.4.

(a) Discuss the factors influencing intensity of spectral lines?

[CO:2, Marks:1.5]

(b) Which are the important mechanism that determines the peak profile width?

[CO:2, Marks:1.5]

Q.5. Solve the following:

(a) What would be the energy of an electron if its wavelength is 3.2×10^{-4} m.

[CO:1, Marks:1.5]

(b) Calculate the de-Broglie wavelength of a thermal neutron at $30^{\circ}C$. [Boltzman Constant $=8.6173303 \times 10^{-5}$ eV/K].

[CO:1, Marks:1.5]

(c) Electron is confined to a box of dimension 2×10^{-10} m. Obtain the minimum uncertainty in velocity.

[CO:2, Marks:1.5]

(d) A bullet of 75 g mass is shot out with a velocity of 350 m/s with an uncertainty of 0.01% in momentum. What would be the accuracy of its position with which it will be located?

[CO:3, Marks:1.5]