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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST -2 EXAMINATION, APRIL 2019
B.Tech(BI and BT) II Semester

Course Code: 18B11PH212 MAX. MARKS: 25
Course Name: Bioinstrumentation Techniques
Course Credits: 04 MAX. TIME: 1.5 Hrs.

Note: All questions are compulsory. Carrying of mobile phone during examinations will be treated as case of unfair means.

Q.1. Write short notes on: [CO:1-5]**[1 x 5=5]**

(i) Jablonski diagram with labels (ii) Observed electronic transitions
(iii) Singlet and triplet states (iv) Mirror image rule and its deviations
(v) Differentiate between UV-Vis and FTIR spectroscopy

Q.2. What do you understand by selection rules in UV spectroscopy? What are the practical applications of UV-Vis spectroscopy? [CO:2-4]**2.5**

Q.3. What is quantum yield of fluorescence and how to measure quantum yield? [CO:2-4]**2.5**

Q.4. Discuss the necessary conditions for IR absorbance. What are the different vibrational modes, discuss them with the help of diagrams? [CO:3-5]**3**

Q.5. Discuss the mechanical model of stretching vibrations and deduce the following: [CO:3-5]**4**

(i) Frequency (ii) Wavenumber

Q.6. [CO:1-5]**2**

(a) For what kinetic energy of a neutron will the associated de-Broglie wavelength be 2.40 x 10^{-10}m?

(b) Also find the de-Broglie wavelength of a neutron, in thermal equilibrium with matter, having an average kinetic energy of 3/2xKT at 300k.

Q.7. In a sample with an absorbance of 1 at a specific wavelength. What is the relative amount of light that was absorbed by the sample? [CO:3-5]**2**

Q.8. Consider the spectrum below, answer the following with reasons [CO:3-5]**4**

(i) Is the spectrum a line spectrum of band spectrum?

(ii) What is its λ_{max} ?

(iii) If the concentration of the solution was 60 ppm, what is the molar extinction coefficient at λ_{max}? and also at 500 nm?

(iv) How will the spectra look if a higher concentration of the same measured?

(v) How will the spectra look if 1 mm sample cell is used instead of 1 cm cell?

(vi) Is the substance in spectrum "b" is same as the substance in spectrum "a"?