St . JOSEPH’S COLLEGE OF ENGINEERING

St . JOSEPH’S INSTTITUTE OF TECHNOLOGY

ASSIGNMENT QUESTIONS

PART –B

PHOTOCHEMISTRY AND SPECTROSCOPY

1.(i) Derive the mathematical expression for Beer - Lambert’s law. 1

(ii) Explain the determination of Quantum yield.

2.With a Jablonski diagram, explain radiative and nonradiative pathways for an electronic transition. 1

3. (i) Explain about the chemiluminescence and photosenitization.

(ii) Explain the various types of Photo physical process.

4. Explain the principle and instrumentation of IR spectroscopy.

5. Discuss the principle construction and working mechanism of UV and visible spectroscopy. 1

6. (i) Explain the applications of IR spectra with suitable examples. 1

(ii) Explain the applications of UV and visible spectroscopy. 1

7. Explain in detail about the rotational , vibrational and electronic transitions.

8. (i) What are the reasons for low and high quantum yield? Give examples.

(ii) Illustrate the Stark- Einstein law of photochemical equivalence.

Phosphorence /7 quantum efficiency 1

Phase rule 1

PHASE RULE AND ALLOYS

1. Draw and explain the phase diagram of water system.

2.Draw a neat phase diagram and explain lead silver system? Briefly write about Pattinson’s process.

3.(i) With neat Phase diagram , explain the salient features of Zinc Magnesium alloy system.

(ii) Explain the classification two Component system.

4. (i) What are the non ferrous alloy . Give their properties.

(ii) Explain the composition, properties and uses of ferrous alloys.

5. (i)State phase rule and explain the terms involved in it .

(ii) Calculate the number of degrees of freedom , components and number of phases:

a). NH4Cl ↔ NH3 + HCl

b). MgCO3 ↔ MgO + CO2

c). Rhombic Sulphur ↔Monoclinic Sulphur

d) . Emulsion of Oil in Water

6. (i)What is an Alloy? Explain the Significance of Alloying.

(ii) Explain the effects of any six alloying elements on the properties of steel .

7.What is heat treatment of steel? Discuss the different methods of heat treatment of steel.

NANOCHEMISTRY

1 .(i) What are CNTs? Explain their applications.

(ii) Explain Laser ablation method for synthesis of CNTs.

2.(i) Explain CVD method for the synthesis of CNTs.

(ii) What are nanowires? Describe VLS process for the synthesis of nanowires. Mention the applications of nanowires.

3. (i) What are nanoclusters? Explain Thermolysis method for the synthesis of nanoclusters.

(ii) Discuss the synthesis of nanoparticles by (i) Solvothermal method (ii) Hydrothermal method.

4. (i) Explain thermal , electrical and mechanical properties of CNTs.

(ii) Compare the properties of molecules , nanomaterials and bulkmaterials .

5. (i)Explain about size dependent properties of nanomaterials.

(ii) Explain the applications of nanomaterials.