YMCA UNIVERSITY OF SCIENCE & TECHNOLOGY, FARIDABAD

B. TECH. 3rd SEMESTER

ELECTRICAL ENGG.MATERIALS & SEMICONDUCTOR DEVICES (E-203, Scheme-2010)

Time: 3 Hours Max. Marks:60

Note: 1. It is compulsory to answer the questions of Part -1. Limit your answers within 20-40 word in this part.

2. Answer any four questions from Part -2 in detail.

3. Different parts of the same question are to be attempted adjacent to each other

4. Assume suitable standard data wherever required, if not given.

PART -1

Q1 (a) List the factors which affecting conductivity of materials. (2)

(b) What is electrostriction? (2)

(c) Differentiate intrinsic and extrinsic semiconductors in tabular form. (2)

(d) Compare BJT and FET. (2)

(e) Draw two transistor analogy of thyristor. (2)

(f) What do you mean by hysteresis losses? (2)

(g) Define magnetic susceptibility and magnetization. (2)

(h) What is loss tangent? (2)

(i) Draw the drain characteristics of depletion type MOSFET. (2)

(j) What you mean by photo detectors? (2)

PART -2

Q2 (a) Draw the typical CB input characteristic curves for an npn transistor. Label all variables. Explain how you will calculate the input resistance of the transistor from these curves. (5)

(b) Explain the various breakdown mechanisms in junction diode. (5)

Q3 (a) Find out the equation of continuity for the n-type semiconductor. Also explain the physical significance of each term. (5)

(b) With the aid of a diagram, explain the working of UJT as relaxation oscillator. (5)

Q4 (a) Explain a general method of classifying magnetic materials. Draw and explain susceptibility versus temperature curves in each case. (5)

(b) Describe the principle of working of LED. What are the merits of LEDs? (5)

Q5 (a) Draw the cross-sectional view of DIAC and explain how it can conduct in both the directions. (5)

(b) Explain the depletion and enhancement type MOSFET with relevant diagrams. (5)

Q6 (a) With the aid of a diagram, explain in detail the planar technology for device fabrication. (5)

(b) Explain the different modes of operation of a thyristor with the help of its static V-I characteristic. (5)

Q7 (a) The following data is known for copper - Density = **8.92g/cc**, Resistivity = **1.73×10^{-8}** ohm-m, Atomic weight = **63.5**. Calculate the mobility and the average time of collision of the electrons in copper. (5)

(b) Write a short note on Piezo-electricity. (5)