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B.E. Dec.  
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Exam.Code:0905  
Sub. Code: 6629

1129

B.E., First Semester  
EC-103: Introduction to Electronics

Time allowed: 3 Hours

Max. Marks: 50

**NOTE:** Attempt five questions in all, including Question No. 1 which is compulsory and selecting two questions from each Unit.

x-x-x

I. Attempt the following:-

- What is the basis for classifying a material as a conductor, semiconductor, or a dielectric? What is the conductivity of perfect dielectric?
- Describe the difference between donor and acceptor impurities.
- Explain the reason why the base current in a transistor is usually much smaller than  $I_E$  or  $I_C$  in active operation.
- What is the difference between Photoluminescence and Electroluminescence?
- Name the two types of reverse breakdowns which can occur in a PN junction diode. Which occurs at lower voltages? (5x2)

UNIT - I

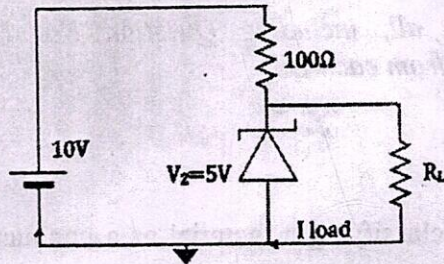
- Explain how we can get p - Type Material, draw Structure Model and Energy Band Representation of such material?
  - What are the main factors affecting the mobility of charge carriers in semiconductors? (10)
- How is the drift and diffusion currents produced in semiconductor sample?
  - What are Photoconductive devices? Explain the principle of operation and working of Photoconductive cell? (10)
- Differentiate between P-type and N-type Semiconductors. Also name the doping materials used for their formation?
  - How are electrons and holes generated in semiconductors? Why electron hole pair is generated only in depletion region? (10)

UNIT - II

- Draw the circuit diagram of half wave rectifier. Explain its working? If the peak value of the ac voltage across the secondary of the transformer is  $20\sqrt{2}V$ , the maximum dc voltage across the load will be.

P.T.O.

- b) In the circuit below, the knee current of ideal zener diode is 10mA. To maintain 5V across the  $R_L$ , the minimum value of  $R_L$  is? (10)



- VI. a) What is a Light emitting diode? Explain its principle of operation. Highlight two applications of Light emitting diode.
- b) Draw a labeled diagram of PNP bipolar transistor and explain its working when biased for active operation. Give expressions of collector and emitter current and its dependence on different parameters. How Alpha dc is related to Beta dc of transistor. (10)
- VII. a) Discuss Ebers-Moll Model in detail. Discuss its limitations.
- b) Discuss working principle of solar cell with labeled diagram and derive expressions of open circuit voltage and short circuit current. Also write condition for maximum power delivered to load. (10)

x-x-x

Time allow

NOTE:

I

II

III

IV. a) E

de

b) F

ai