

# RAMAKRISHNA MISSION VIDYAMANDIRA

(Residential Autonomous College under University of Calcutta)

B.A./B.Sc. FIRST SEMESTER EXAMINATION, JANUARY 2015

FIRST YEAR

ELECTRONICS (General)

Paper : I

Date : 07/01/2015

Time : 11 am – 1 pm

Full Marks : 50

Answer **any five** questions of the following :

[5×10]

1. a) Draw & Explain the working principle of a PN junction diode. [8]  
b) Define Fermi Level Energy. [2]
2. The turn ratio of the transformer used in a bridge rectifier is 12 : 1. The primary is connected to 230 V 50 Hz AC supply. Assuming the diodes as ideal, Find :  
a) DC voltage across the load  
b) PIV of each diode  
c) If the same DC voltage is to be obtained by C.T rectifier, what will the PIV? [10]
3. a) What is the origin of reverse saturation current across p – n junction in reverse bias? [4]  
b) If the base current changes from a 60μA to 40 mA. the collector current changes from 7.3mA to 4.8mA. Calculate the current gain. [3]  
c) Draw the output characteristics of a Transistor in CB mode. Explain it. [3]
4. a) Describe the working principle of a JFET. [2]  
b) What happens if JFET is operated beyond pinch-off case? [1]  
c) Make a comparative study of BJT and FET. [3]  
d) Prove that  $\mu = r_d \times g_m$  for FET devices. [4]
5. a) What do you mean by carrier mobility? How do you define it? [3]  
b) Why is the base region kept narrow in a BJT? [2]  
c) What do you mean by ohmic and non-ohmic contact? Illustrate with examples. [3]  
d) Why cannot we measure the barrier potential with conventional voltmeter? [2]
6. a) What is Zener Break down? [2]  
b) Mention the application of Zener Diode. [3]  
c) Prove that  $\beta = \frac{\alpha}{1-\alpha}$ , where  $\alpha$  &  $\beta$  are the normal gain of the transistor respectively. [3]  
d) What is Doping? How it can affect in increase the conduction capability of a semiconductor. [2]
7. Write short notes on **any two** of the following : [2×5]
  - a) LED
  - b) Avalanche Breakdown
  - c) Effect of doping on Fermi Level Energy in pure semiconductors.
  - d) Enhancement type p-channel MOSFET.

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