

Roll No .....

**EC - 304****B.E. III Semester**

Examination, December 2013

**Electronics devices***Time : Three Hours*

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*Maximum Marks : 70*

**Note:** Attempt any one question from each unit. Assume suitable data if missing.

**Unit - I**

1. Explain Hall Effect and its applications. Discuss Transition and Diffusion capacitance. Differentiate between Diffusion and drift currents. When a reverse bias is applied to a germanium PN Junction diode, the reverse saturation current at room temperature is  $0.3 \mu\text{A}$ . Determine the current flowing in the diode when  $0.15\text{V}$  forward bias is applied at room temperature.

OR

2. Discuss the effect of temperature on PN Junction Diodes. Prove that the conductivity of a semi-conductor is given by  $\sigma = q(p\mu_p + n\mu_n)$ . State and explain Mass-Action law? Write PN Diode applications.

**Unit - II**

3. Discuss PN Junction diode as a rectifier. Differentiate between clipper and clamper circuits. A silicon diode has a saturation current of  $7.5 \mu\text{A}$  at room temperature  $300^\circ\text{K}$ . Calculate the saturation current at  $400^\circ\text{K}$ .

OR

4. Explain piecewise linear approximation model of a diode. Define a load line in a simple diode circuit. Determine the forward resistance of a PN junction diode when the forward current is  $5\text{mA}$  at  $T = 300^\circ\text{K}$ . Assume silicon diode.

**Unit - III**

5. Write short notes on :

a) Zener Diode      b) Varactor Diode

OR

6. Write short notes on :

a) PIN Diode      b) LED

**Unit - IV**

7. Discuss early effect and Ebers-Moll model for a BJT? Calculate the values of  $I_c$  and  $I_b$  for a transistor with  $I_{c,s} = 0.99$  and  $I_{c,BO} = 5\mu\text{A}$ .  $I_B$  is measured as  $20\mu\text{A}$ .

OR

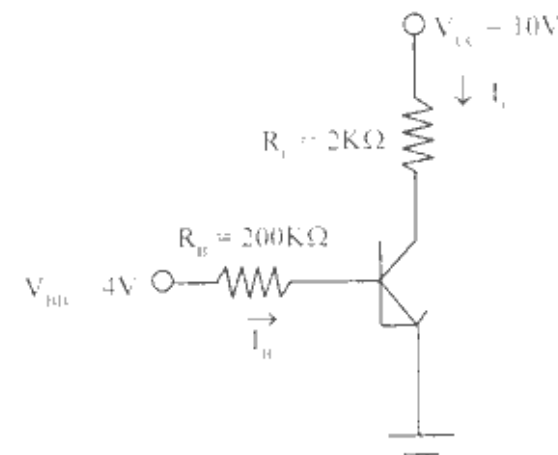
8. Discuss input and output characteristics for CE - configuration BJT.

**Unit - V**

9. Write a short note on Uni-Junction Transistor and FET?

OR

10. Determine the base collector and emitter currents and  $V_{CE}$  for a CE circuit shown in figure (1). For  $V_{CC} = 10\text{V}$ ,  $V_{BE} = 4\text{V}$ ,  $R_B = 200\text{K}\Omega$ ,  $R_C = 2\text{K}\Omega$ ,  $V_{BE}(\text{on}) = 0.7\text{V}$ ,  $\beta = 200$ .



What is meant by Q-point? What is need for biasing a transistor? Explain how a transistor works as an amplifier. Write applications of JFET?

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