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Question Paper Code : 27184

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2015.

Second Semester

Electronics and Communication Engineering

EC 6201 — ELECTRONIC DEVICES

(Regulations 2013)

Time : Three hours Maximum : 100 marks

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. What are the applications of PN diode?

2. Consider a gallium arsenide sample at $T = 300$ K wit doping concentration of $N_a = 0$, $N_d = 10^{16}\,cm^{-3}$ and $\mu_n = 8500$. Calculate the drift current density if the applied electric field is $E = 10$ V/cm.

3. What is multiple emitter transistor? Draw the symbol of that.

4. Define Early effect in BJT.

5. Assume that the p^+n junction of a uniformly doped silicon n – channel JFET at $T = 300$ K has doping concentration of $N_a = 10^{18}\,cm^{-3}$ and $N_d = 10^{16}\,cm^{-3}$. Assume that the metallurgical channel thickness is 0.75 μn. Calculate the pinch off voltage.

6. Draw the symbol of FINFET and Dual gate MOSFET.

7. Mention the applications of Varactor diode.

8. What is the basic principle behind the LDR?

9. What is the name implies VMOS?

10. Draw the circuit diagram of opto coupler.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Briefly explain about depletion region and barrier voltage of a PN junction. (6)

(ii) With necessary diagram, describe the characteristics of a forward and reverse biased PN junction diode. (10)

Or

(b) (i) Draw a diagram to illustrate drift current and diffusion current in a semiconductor material. Briefly explain. (10)

(ii) Write short notes on diode switching characteristics. (6)

12. (a) Draw the circuit diagram of an NPN junction transistor CB configuration and describe the static input and output characteristics. Also define active, saturation and cut-off regions. (16)

Or

(b) (i) Draw the *h* parameter equivalent circuit for NPN transistor CE circuit. Define and derive for all components. (12)

(ii) Compare CB, CE and CC with respect to dc and ac parameters. (4)

13. (a) With neat diagram explains the construction, working principle and V-I characteristics of *p* channel JFET. (16)

Or

(b) With neat diagram explain the operation of Depletion mode MOSFET and sketch the characteristics curves. (16)

14. (a) (i) Sketch the basic construction and characteristics for a Scottky diode. Briefly explain the device operation. (8)

(ii) With neat diagram explain the operation of Zener diode and its characteristics. (8)

Or

(b) (i) What is the difference between the Tunnel diode and ordinary PN diode? (2)

(ii) Explain the operation of Tunnel diode and its characteristics with structural diagram. (14)

15. (a) (i) Explain how a UJT functions as Relaxation Oscillator. (8)

(ii) Explain the operation of SCR with structural diagram and Draw the characteristics for a SCR. (8)

Or

(b) Write short notes on :

(i) Liquid Crystal Display. (8)

(ii) Charge Coupled Device. (8)
