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Question Paper Code: 52408

B.E. / B.Tech. DEGREE EXAMINATION, MAY 2018

Second Semester

Electronics and Communication Engineering

15UEC208 - ELECTRONIC DEVICES

(Regulation 2015)

Duration: Three hours

Maximum: 100 Marks

Answer ALL Questions

PART A - (10 x 1 = 10 Marks)

1. The conventional current flow in a semiconductor coincides with the direction of flow of CO1- R
(a) electrons (b) holes (c) negative ions (d) positive ions
2. The circuits that use the energy storage capability of inductors and capacitors to smooth out the pulsation and to provide steady output current is CO2- R
(a) regulators (b) rectifiers (c) filters (d) battery
3. When the transistor is in saturation, the biasing condition of base emitter and collector base is CO3- R
(a) forward, reverse (b) forward, forward (c) reverse, forward (d) reverse, reverse
4. Beyond pinch-off voltage, the drain to source resistance of a Junction Field Effect Transistor is CO4- R
(a) zero (b) low (c) high (d) unchanged
5. The normal operating condition of photodiode is CO5- R
(a) forward biased (b) reverse biased (c) un biased (d) none

PART – B (5 x 2= 10Marks)

6. Which are the majority carriers, minority carriers and give two examples of the dopant in
 (i) Donor- doped material
 (ii) Acceptor -doped material
7. A silicon diode with a forward voltage drop of 0.7 V is to be operated over a temperature range of 0°C to 65°C. Calculate the maximum and minimum values of forward voltage of the device.
8. Derive the relationship between common base current gain and common emitter current gain
9. Sketch the Junction Field Effect Transistor drain characteristic and label the different regions.
10. Draw the two transistor equivalent circuit of SCR

PART – C (5 x 16= 80Marks)

11. (a) Discuss on the classification of semiconductors. CO1- U (16)
- Or
- (b) Find the conductivity of silicon (i) in intrinsic condition at a room temperature of 300°K (ii) with donor impurity of 1 in 10^8 (iii) with acceptor impurity of 1 in 5×10^7 and (iv) with both the above impurities present simultaneously. Given that the intrinsic concentration for silicon at 300°K is $1.5 \times 10^{10} \text{ cm}^{-3}$, mobility of electron and hole are $1300 \text{ cm}^2/\text{V-s}$ and $500 \text{ cm}^2/\text{V-s}$, number of silicon atoms per $\text{cm}^3 = 5 \times 10^{22}$. CO1- App (16)
12. (a) Sketch the voltage-current characteristics for a pn junction diode
 (a) with forward bias and
 (b) with reverse bias. Show how temperature changes affect the characteristics. CO2- U (16)
- Or
- (b) (i) Show that the efficiency of half wave rectifier is half the efficiency of full wave rectifier. CO2- App (10)
 (ii) Comment on the output waveforms of half wave and full wave Rectifier. CO2- App (16)
13. (a) Draw and explain the common base input, output and current gain characteristics. Also explain how the characteristics are obtained experimentally. CO3- U (16)

Or

- (b) (i) Discuss the principle of obtaining a regulated power supply. CO3- Ana (6)
(ii) Describe the ways by which transistor is used as a regulator. CO3- Ana (10)
14. (a) Draw a typical family of drain characteristic for an n-channel Junction Field Effect Transistor with various levels of gate-source voltage and describe the shape of the characteristics using relevant circuit diagram. CO4- U (16)
- Or
- (b) Explain the operation of n-channel enhancement Metal Oxide Semiconductor Field Effect Transistor. Sketch the device drain and transfer characteristics. CO4- U (16)
15. (a) (i) Describe the construction features of Uni-junction Transistor and draw the equivalent circuit and circuit symbol of Uni-junction Transistor. CO5- U (8)
(ii) Explain the operation of SCR with neat sketch. CO5- U (8)
- Or
- (b) Using illustrations, explain the theory of liquid crystal cell. Show how a liquid crystal cell is constructed and explain the difference between reflective and transmittive type LCDs. CO5- U (16)

