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**Question Paper Code : 40433**

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2021.

Second Semester

Electronics and Communication Engineering

EC 8252 – ELECTRONIC DEVICES

(Common to Electronics and Telecommunication Engineering/Medical Electronics)

(Regulations 2017)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define Knee Voltage of a diode.
2. What is meant by depletion region in a PN junction?
3. Why does thermal runaway affect the transistor?
4. Draw the h-parameter equivalent circuit of a BJT in CE configuration.
5. Mention the advantages of FET over BJT.
6. Define Transconductance of FET.
7. How does the zener breakdown voltage vary with temperature?
8. What is meant by “hot carrier”?
9. Why SCR cannot be used as a bidirectional switch?
10. Mention any four applications of DIAC.

PART B — (5 × 13 = 65 marks)

11. (a) With neat sketches, explain the switching characteristics of a PN junction diode. (13)

Or

- (b) Starting from the basic principles derive the diode current equation for a PN junction diode. (13)

12. (a) Draw the Gummel Poon model for an NPN transistor and explain the model by writing the expressions for various diode current components. (13)

Or

- (b) With neat sketches and relevant expressions, briefly explain the Hybrid- $\pi$  model of BJT. (13)

13. (a) Using the drain curve and transconductance curve, explain the working and characteristics of enhancement mode MOSFET. (13)

Or

- (b) With neat sketches, elucidate the working and characteristics of a JFET. (13)

14. (a) With neat diagrams, describe the construction, working and characteristics of n-channel MESFET. (13)

Or

- (b) With the Volt-ampere characteristics and energy band diagrams, explain the working and tunneling phenomenon of a tunnel diode. (13)

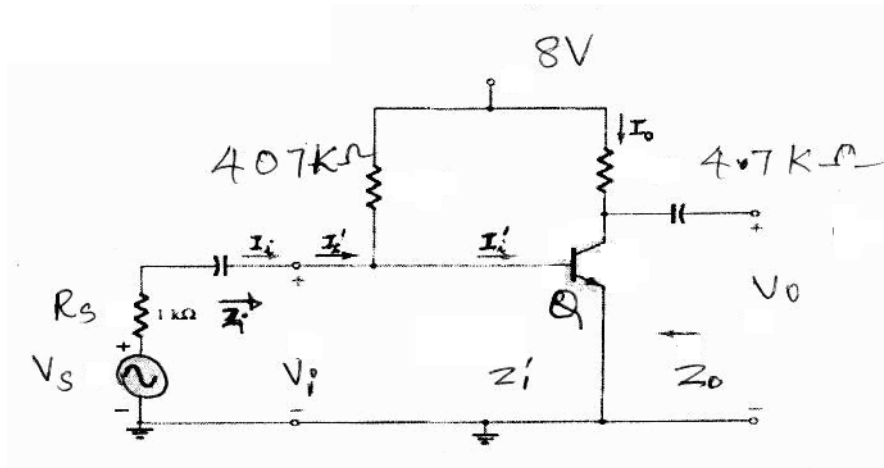
15. (a) With neat equivalent circuit diagram and V-I characteristics, briefly explain the operation of a UJT. Also mention few applications of UJT. (13)

Or

- (b) With neat sketches, explain the construction as well as the effect of the light intensity on the short circuit current and open circuit voltage of a solar cell. Also draw the power curve with respect to light intensity for the solar cell and explain. (13)

PART C — (1 × 15 = 15 marks)

16. (a) For the network shown in Figure 16.a), determine the input impedance ( $Z_i$ ), Voltage Gain ( $A_v$ ), Current gain ( $A_i = I_o/I_i$ ) and output impedance  $Z_o$  (within  $R_c$ ) and  $Z_o$  (including  $R_c$ ) using the complete hybrid equivalent circuit. (15)



$$Q: h_{fe} = 110, h_{ie} = 1.6 K \Omega, h_{re} = 2 \times 10^{-4}, h_{oe} = 20 \frac{\mu A}{V}$$

Figure 16.(a)

Or

- (b) (i) Draw and explain the characteristics of an n-channel depletion type MOSFET. (7)
- (ii) Sketch the transfer characteristics for an n-channel depletion-type MOSFET with  $I_{DSS} = mA$  and  $V_p = -4V$ . (8)