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## Question Paper Code : X 10350

B.E./B.Tech. DEGREE EXAMINATIONS, NOVEMBER/DECEMBER 2020 AND  
APRIL/MAY 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. Mention any two applications of a PN junction diode.
2. What happens when a reverse-bias voltage is applied across the pn-junction ?
3. The common-base current gain of a Bipolar junction transistor is given as  $\alpha = 0.884$ , determine the common emitter current gain  $\beta$ .
4. In a common base transistor circuit the emitter current  $I_E$  is 10 mA and the base current  $I_B = 0.2$  mA. Find the value of the collector current.
5. Justify the name “Field effect transistor”.
6. “FET is less noisy than BJT”. Justify this statement.
7. What is a Schottky diode ?
8. What is meant by an LDR ?
9. Draw the basic structure and circuit symbol of a DIAC.
10. What is the advantage of TRIAC over SCR ?



## PART – B

(5×13=65 Marks)

11. a) Derive the expression for Transition Capacitance  $C_T$  and Diffusion Capacitance  $C_D$  of a PN junction diode. (13)  
(OR)
- b) i) The reverse saturation current  $I_0$  in a germanium diode is  $6 \mu\text{A}$ . Calculate the current flowing through the diode when the applied forward bias voltage is  $0.4 \text{ V}$  at room temperature. (6)  
ii) Describe the action of a PN junction diode under forward and reverse bias conditions. (7)
12. a) The reverse leakage current of the transistor when connected in CB configuration is  $0.2 \mu\text{A}$  and it is  $18 \mu\text{A}$  when the transistor is connected in CE configuration. Calculate  $\alpha_{dc}$  and  $\beta_{dc}$  of the transistor assuming  $I_B = 30 \text{ mA}$ . (13)  
(OR)
- b) With neat sketches, explain the operation and characteristics of a transistor in CE configuration. (13)
13. a) Explain the operation of N-channel JFET with the help of neat sketches and characteristic curves. (13)  
(OR)
- b) i) Compare MOSFET with JFET. (5)  
ii) Discuss the effect of channel length modulation in MOSFET. (8)
14. a) Draw the equivalent circuit of a tunnel diode and explain. Also from the energy band diagram explain the VI characteristic of a tunnel diode. (13)  
(OR)
- b) i) How zener diode can be used as a voltage regulator ? (7)  
ii) Enumerate the difference between MOSFET and MESFET. (6)
15. a) Draw the basic structure, circuit symbol, equivalent circuit and characteristics of a unijunction transistor and explain. (13)  
(OR)
- b) i) Write short notes on optocouplers. (6)  
ii) Explain the basic construction of a PN junction solar cell and its principle of operation. (7)

## PART – C

(1×15=15 Marks)

16. a) A CE amplifier is drawn by a voltage source of internal resistance  $r_s = 1000 \Omega$  and the load impedance of  $R_L = 1200 \Omega$ . The h-parameters are  $h_{ie} = 1.2 \text{ k}\Omega$ ,  $h_{re} = 2 \times 10^{-4}$ ,  $h_{fe} = 60$ ,  $h_{oe} = 25 \mu\text{A/V}$ . Compute Current gain  $A_I$ , Input resistance  $R_i$ , Voltage gain  $A_V$  and Output resistance  $R_o$ . (15)  
(OR)
- b) With neat sketches and relevant expressions, briefly explain the Ebers Moll model of a transistor. (15)