Reg. No. :

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 β.

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 ?

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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_o in a germanium diode is 6 μA. Calculate the current flowing through the diode when the applied forward bias voltage is 0.4 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 μA and it is 18 μA when the transistor is connected in CE configuration. Calculate α_{dc} and β_{dc} of the transistor assuming $I_B = 30$ 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 $r_s = 1000$ Ω and the load impedance of $R_L = 1200$ Ω. The h-parameters are $h_{ie} = 1.2$ kΩ, $h_{re} = 2 \times 10^{-4}$, $h_{fe} = 60$, $h_{oe} = 25$ μA/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)**

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