FACULTY OF ENGINEERING

B. E. (ECE)(AICTE) III – Semester (Main) Examination, December 2019

Subject: Electronic Devices

Time: 3 hours   **Max. Marks: 70**

Note: Answer all questions from Part-A. Answer any FIVE questions from Part-B.

PART – A (20 Marks)

1. What is the effect of temperature on reverse saturation current of diode? A silicon diode has a saturation current of 15nA at a temperature of 100^0C. Calculate the reverse saturation current at 300^0C.   2

2. Distinguish between Zener breakdown and avalanche breakdown.   2

3. Draw the circuit diagram of Half wave rectifier and draw input and output waveforms.   2

4. What is Bleeder resistance? Explain the need for bleeder resistor.   2

5. Define alpha, beta and gamma. Give the relation between them.   2

6. Sketch the input and output characteristics of BJT in common emitter configuration.   2

7. Compare CB, CE and CC in terms of Current gain, Voltage gain, input resistance, output resistance, application and phase shift.   2

8. Draw the h-parameter model of BJT in CB configuration.   2

9. Prove that the transconductance gm of JFET is given by $g_m = \dfrac{2\sqrt{I_D I_{DSS}}}{V_p}$.   2

10. Define Pinch off Voltage. Sketch the depletion region before and after pinch off.   2

PART – B (50 Marks)

11. (a) Explain the formation and working of PN junction diode in forward and reverse bias with neat diagrams. Draw its V-I characteristics.   5

    (b) Derive the expression for transition capacitance.   5

12. (a) Derive the expression of ripple factor for Half wave rectifier with capacitor filter.   6

    (b) Design a Half wave rectifier with capacitor filter to provide dc output with 2% ripple for a 100Ω load.   4

13. (a) Derive the stability factor of a Self bias circuit.   5

    (b) Explain how h-parameters are obtained graphically.   5

14. For the transistor amplifier shown in figure below, calculate A_I, A_V, R_I, R_O using exact and approximate analysis. Use h_{fe}=50, h_{ie}=1.1kΩ, h_{re}=250µ, h_{oe}=25µA / V.   10
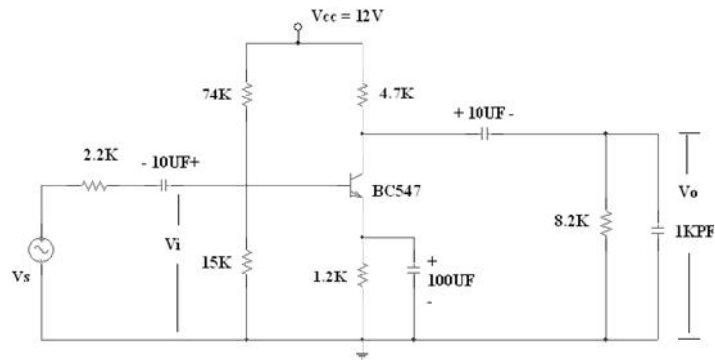
15. (a) Draw the structure of N-channel JFET. Explain the transfer and drain characteristics with neat diagrams. 7

(b) A JFET has drain saturation current I_{DSS} of 12mA and I_D of 6mA with a pinch off voltage of -4Volts. Calculate V_{GS} and gm. 3

16. (a) Draw the circuit of CE amplifier using diode compensation for Ico. Describe how bias compensation in achieved. 5

(b) What is Early Effect? What are its consequences? 5

17. Write short notes on:

(a) Photo diode. 5

(b) Fabrication Process. 5

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