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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B.Tech II Year I Semester Examinations, May/June - 2015
ELECTRONIC DEVICES AND CIRCUITS
(Common to EEE, ECE, CSE, EIE, BME, IT, MCT)

Time: 3 Hours   Max. Marks: 75

Note: This question paper contains two parts A and B.
Part A is compulsory which carries 25 marks. Answer all questions in Part A.
Part B consists of 5 Units. Answer any one full question from each unit.
Each question carries 10 marks and may have a, b, c as sub questions.

PART- A
(25 Marks)

1.a) What is static resistance of a P-N diode? [2M]
   b) Explain principle of operation of tunnel diode. [3M]
   c) What is transformer utilization factor? [2M]
   d) What is PIV? Give its significance. [3M]
   e) List the BJT specifications. [2M]
   f) What is h-parameters? Give its importance. [3M]
   g) Distinguish fixed bias and self bias. [2M]
   h) What is thermal stability? Mention its significance. [3M]
   i) What is pinch-off voltage? [2M]
   j) Describe JFET small signal model. [3M]

PART-B
(50 Marks)

2.a) Compare the characteristics of PN junction diode, Zener Diode and Tunnel diode.
   b) For a Ge diode, the $I_0=2\mu A$ and the voltage of 0.26V is applied. Calculate the forward and reverse dynamic resistance values at room temperature. [6+4]

OR

3.a) Derive an expression for transition capacitance.
   b) Explain Avalanche and Zener Breakdowns. [5+5]

4.a) Explain the operation of full wave rectifier with induction filter with necessary diagrams.
   b) A diode whose internal resistance is 20Ω is to supply power to a 100Ω load from 110V (R.M.S) source of supply. Calculate
   i) Peak load current
   ii) DC load current
   iii) AC load current
   iv) % regulation from no load to given load. [6+4]

OR

5.a) Explain the operation of full wave rectifier with necessary graphs.
   b) A 3 KΩ resistive load is to be supplied with a D.C. voltage of 300 V from A.C. voltage of adequate magnitude and 50 Hz frequency by wave rectification. The LC filter is used along the rectifier. Design the bleeder resistance, turns ratio of transformer, VA rating of transformer and PIV rating of diodes. [6+4]

6.a) Derive emitter efficiency, transport factor and large signal current gain and derive the relation between them.

b) Explain how transistor works as an amplifier. [6+4]

OR

7.a) Explain the operation of CC configuration of BJT and its input and output characteristics briefly.

b) Explain about punch through and base width modulation. [6+4]

8.a) What is biasing? Explain the need of it. List out different types of biasing methods.

b) In a Silicon transistor circuit with a fixed bias, V_{CC}=9 V, R_C=3 KΩ, R_B=8 KΩ, β=50, V_{BE}=0.7 V. Find the operating point and stability factor. [6+4]

OR

9.a) Derive the expression for stability factor of self bias circuit.

b) Explain in detail about thermal runaway and thermal resistance. [6+4]

10.a) Why we call FET as a Voltage Controlled Device.

b) For the Common Source Amplifier, calculate the value of the voltage gain, given
i) r_d=100 KΩ, R_L=10 KΩ, g_m=300μ and R_o=9.09 KΩ.
ii) If C_{DS}=3pF, determine the output impedance at a signal frequency of 1MHz. [5+5]

OR

11.a) Define DC Drain resistance, AC Drain Resistance, Amplification Factor and derive them.

b) What are the values of I_D and g_m for V_{GS} = -0.8V if I_{DSS} and V_P are given as 12.4mA and -6V respectively. [6+4]

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