Code No: 113AU **R13**

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.Tech II Year I Semester Examinations, February/March - 2016

ELECTRONIC DEVICES AND CIRCUITS

(Common to EEE, ECE, CSE, EIE, 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) Write the applications of photo diode. [2]
b) What is meant by depletion region? [3]
c) Define ripple factor and PIV. [2]
d) Explain the necessity of filter circuit after the rectifier circuit. [3]
e) Why we call BJT as a current Controlled Device? [2]
f) Which of the BJT configurations are suitable for impedance matching applications. Why? [3]
g) Define operating point. [2]
h) Explain thermal stability. [3]
i) Compare FET and BJT. [2]
j) Draw small signal model of JFET. [3]

PART-B **(50 Marks)**

2.a) Define tunneling phenomenon. Explain how tunnel diode operates under different operating conditions. In what way it is different from conventional diodes? Give the necessary energy level diagrams.
b) Zener diode can be used as a voltage regulator. Justify it. [6+4]

OR

3.a) With the help of V-I characteristics, explain SCR operation.
b) Derive the expression for Diffusion capacitance of a diode. [5+5]

4.a) A sinusoidal voltage whose Vm=12V is applied to half-wave rectifier. The diode may be considered to be ideal and R_L=1.5 KΩ is connected as load. Find out peak value of current, RMS value of Current, DC value of current and Ripple factor.
b) Derive the expression for Ripple factor for Full Wave Rectifier with L-Section filter. [6+4]

OR

5. Draw the circuit diagram and explain the operation of full wave rectifier using center tap transformer and using bridge rectifier without center tap transformer. Obtain the expression for peak inverse voltages of both. [10]

6.a) With neat diagram explain the construction, working characteristics of UJT. Give its equivalent circuit.

b) Explain about Punch through and Base width modulation. [5+5]

OR

7. Write a note on:
a) Transistor construction.
b) Voltage gain and current gain expression for CB configuration using transistor hybrid model. [4+6]

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

b) What is the necessity of biasing circuits? Derive the expression for stability factor of self bias circuit. [5+5]

OR

9.a) The hybrid parameters for a transistor used in CE configuration are h_{ie} = 5kΩ; h_{fe} = 180; h_{re} = 1.25 × 10^{-4}; h_{oe} = 16 × 10^{-6} ohms. The transistor has a load resistance of 20 KΩ in the collector and is supplied from a signal source of resistance 5 KΩ. Compute the value of input impedance, output impedance, current gain and voltage gain.

b) Give the advantages of h-parameter analysis. [7+3]

10.a) Write the construction, operation and characteristic behavior of JFET under various biasing conditions.

b) Draw and explain small-signal model of a MOSFET. [6+4]

OR

11.a) Describe the operation of common drain FET amplifier and derive the equation for voltage gain.

b) Explain the operation of Depletion mode MOSFET in detail. [5+5]

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