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Code No: 153AT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech II Year I Semester Examinations, September/October - 2023

ELECTRONIC DEVICES AND CIRCUITS

(Common to ECE, EIE, MCT)

Time: 3 Hours

Max. Marks: 75

Note: i) Question paper consists of Part A, Part B.

ii) Part A is compulsory, which carries 25 marks. In Part A, answer all questions.

iii) In Part B, Answer any one question from each unit. Each question carries 10 marks and may have a, b as sub questions.

PART – A

(25 Marks)

- 1.a) Compare Zener Breakdown and Avalanche Breakdown. [2]
- b) Define the ripple factor. What is the value of the ripple factor for FWR and HWR? [3]
- c) List out different biasing techniques. [2]
- d) What do you understand by operating point? What is its significance? [3]
- e) Define Pinch off voltage in Junction Field Effect Transistor. [2]
- f) What are the applications of Tunnel Diode? [3]
- g) Draw the hybrid model of BJT in CE configuration. [2]
- h) Write a few points of comparison between CE, CB, and CC amplifiers. [3]
- i) Draw the circuit diagram of N channel Depletion MOSFET. [2]
- j) Plot the transfer characteristics of N channel Enhancement MOSFET. [3]

PART – B

(50 Marks)

- 2.a) Define different Diode Switching times with neat diagrams.
- b) Discuss the working of the Full wave rectifier. Derive the expression for the ripple factor of FWR. [4+6]

OR

- 3.a) Derive the expression for Diffusion Capacitance of a diode.
- b) Design a Clipping circuit that clips at two independent levels. [5+5]

- 4.a) Draw and explain the input and output characteristics of the transistor in CE configuration.
- b) Explain the need for biasing the circuits. What are the factors affecting the stability factor? [6+4]

OR

- 5.a) Derive the operating point using AC and DC load lines.
- b) Derive the equation for the Stability factor of the Fixed Bias circuit. [4+6]

- 6.a) With the help of a neat diagram, explain the operation of an N channel JFET.
- b) Explain the operation of UJT and discuss its applications. [5+5]

OR

- 7.a) Illustrate the operation of FET as a Voltage variable resistor.
- b) Draw the SCR circuit diagram and explain its characteristics with waveform. [4+6]

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8. Analyze CE amplifier with emitter resistance in terms of Gains and impedences. [10]

OR

9.a) Explain how the Transistor acts as an Amplifier.

b) Derive the expression for voltage gain, current gain, input impedance, and output impedance of the CC amplifier using h-parameter model. [3+7]

10.a) Discuss the construction and working of MOSFET in Enhancement mode.

b) With a neat diagram, explain the operation of the Common Source Amplifier. [5+5]

OR

11.a) 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?

b) Derive an expression for voltage gain, input impedance, and output impedance of CG amplifier at low frequencies. [4+6]

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