

Code No: 113AU

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year I Semester Examinations, November/December - 2018****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) Draw the V-I characteristics of varactor diode. [2]
- b) Explain how does the reverse saturation current of a p-n diode vary with temperature. [3]
- c) Define the percentage of regulation. [2]
- d) What is the need of rectifier? List different types of rectifiers. [3]
- e) Illustrate CE cutoff region. [2]
- f) Explain the base spreading resistance. [3]
- g) What is thermal runaway? [2]
- h) List and briefly explain three sources of instability of collector current. [3]
- i) What are the different types of FETs? [2]
- j) What is pinch-off voltage? Give its expression. [3]

**PART-B****(50 Marks)**

- 2.a) Derive the expression for transition capacitance  $C_T$  of a diode.
- b) Draw the small signal model of Tunnel Diode operating in the negative resistance region. [5+5]

**OR**

- 3.a) Draw and explain the graph indicating the variation of minority carrier density with distance in a p-n junction diode under forward biased condition.
- b) Write the equation for Volt-Ampere characteristics of a photo diode. [5+5]

- 4.a) Draw and explain the circuit of a half-wave rectifier with capacitor filter.
- b) Explain the design of Full wave bridge rectifier. [5+5]

**OR**

- 5.a) A half wave rectifier has a load of  $3.5 \text{ K}\Omega$ . If the diode resistance and the secondary coil resistance together have a resistance of  $800\Omega$  and the input voltage has a signal voltage of  $240 \text{ V}$ , calculate i) Peak, average and rms value of current flowing. ii) dc power output. iii) ac power input iv) Efficiency of the rectifier.
- b) Compare inductor and capacitor filters. [6+4]

- 6.a) Explain the input and output characteristics of a transistor in CB configuration.  
b) Draw the circuit diagram of an NPN junction transistor in CE configuration and describe its characteristics. [5+5]

**OR**

- 7.a) Illustrate and explain active region, saturation region and cut-off region in transistor characteristics.  
b) Explain the hybrid small signal model for common collector configuration. [5+5]

- 8.a) Draw a transistor amplifier using self bias (CE configuration) and explain the operation.  
b) Discuss the stabilization against variations in  $V_{BE}$  and  $\beta$ . [6+4]

**OR**

- 9.a) Draw and explain the Collector feedback biasing.  
b) Describe the analysis of Transistor Amplifier circuit using h-parameters. [6+4]

- 10.a) Explain how FET works as voltage variable resistor.  
b) Compare BJT and FET. [6+4]

**OR**

11. Explain the constructional features of a depletion mode P-channel and Enhancement mode MOSFET and explain its basic operation. [10]

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