

**R15****Code No: 123AU****JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD****B.Tech II Year I Semester Examinations, March - 2017****ELECTRONIC DEVICES AND CIRCUITS****(Common to CSE, ECE, EEE, EIE, ETM, 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 Zener Diode Characteristics. [2]
- b) Draw the Diode Equivalent Circuit. Mention the applications of PN-junction diode. [3]
- c) Explain how P-N junction diode acts as a Rectifier. [2]
- d) Explain the necessity of filter circuit after the rectifier circuit. [3]
- e) Explain how transistor work as an amplifier. [2]
- f) Compare CE, CC and CB configurations. [3]
- g) What is the need of biasing? [2]
- h) Explain Bias Compensation using Diodes. [3]
- i) Compare BJT and FET. [2]
- j) How FET acts as Voltage Variable Resistor? [3]

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

- 2.a) Explain the Avalanche and Zener Breakdowns in PN junction diode.
- b) What is tunneling phenomena? Explain the principle of operation of tunnel diode with its characteristics. [5+5]

**OR**

- 3.a) Derive the expression for transition capacitance of a diode.
- b) Define varactor diode? Explain the operation of varactor diode with its equivalent circuit and mention its applications. [5+5]

4. A sinusoidal voltage whose  $V_m=26V$  is applied to half-wave rectifier. The diode may be considered to be ideal and  $R_L=1.2 K\Omega$  is connected as load. Find out peak value of current, RMS value of Current, DC value of current and Ripple factor. [10]

**OR**

- 5.a) Derive the expression for Ripple factor for Full Wave Rectifier with L-section filter.
- b) Compare FWR and Bridge rectifier. [5+5]

6. The reverse leakage current of the transistor when in CB configuration is  $0.3\mu\text{A}$  while it is  $16\mu\text{A}$  when the same transistor is connected in CE configuration. Determine  $\alpha$ ,  $\beta$  and  $\gamma$ . [10]

**OR**

- 7.a) Explain input and output characteristics of transistor in CB configuration with neat diagram.  
b) Discuss the base width modulation. [5+5]
- 8.a) Derive the operating point using AC and DC load lines.  
b) Draw the circuit diagram of a voltage divider bias and derive expression for Stability factor. [4+6]

**OR**

9. Draw the circuit diagram of CC amplifier using hybrid parameters and derive the expression for  $A_i$ ,  $A_v$ ,  $R_i$  and  $R_o$ . [10]
10. Explain the different biasing techniques of JFET. [10]
- OR**
11. Describe the construction and working principle of Enhancement mode and depletion mode MOSFET and draw its characteristics. [10]

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