

**II B. Tech I Semester Regular Examinations, March - 2021**  
**ELECTRONIC DEVICES AND CIRCUITS**  
**(Electronics and Communication Engineering)**

Time : 3 Hours

Max. Marks : 60

**Note : Answer ONE question from each unit (5 × 12 = 60 Marks)**

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**UNIT-I**

1. a) Draw the VI characteristics of the Zener diode and explain its working. [6M]  
b) Explain the effect of temperature of a diode. [6M]

**(OR)**

2. a) Derive the expression for the space charge capacitance  $C_T$  in a diode. [5M]  
b) Draw the emitter characteristics of a UJT. Draw the equivalent circuit of the UJT. Define “intrinsic stand – off ratio”. Explain clearly the working of a UJT. [7M]

**UNIT-II**

3. a) Calculate the value of C that has to be used for the capacitor filter of a full wave rectifier to get a ripple factor of 0.01%. The rectifier supplies a load of 2k $\Omega$  while the supply frequency is 50Hz. [7M]  
b) Compare various filter circuits used in half wave rectifiers. [5M]

**(OR)**

4. a) Draw the circuit diagram of half wave rectifier and explain its operation with neat waveforms. [6M]  
b) Draw the circuit diagram of a full wave rectifier using Centre tapped transformer and derive expressions for ripple factor, transformer utilization factor and rectification efficiency. [6M]

**UNIT-III**

5. a) Explain the construction and operation of Depletion MOSFET. [6M]  
b) Discuss the construction and characteristics of an n channel JFET with neat diagrams. [6M]

**(OR)**

6. a) With the aid of neat diagrams, explain the construction, principle of operation and characteristics of an n channel enhancement MOSFET. [7M]  
b) JFET can be used as an amplifier and switch. Justify your answer. [5M]

**UNIT-IV**

7. a) A fixed bias circuit has  $R_C = 3.3K\Omega$  and  $V_{CC} = 15V$ . The transistor has a typical current gain ( $\beta$ ) of 60. Find the value of  $R_B$  to give  $V_{CE} = 5V$ . [6M]  
b) Explain voltage divider biasing of JFET. [6M]

**(OR)**

8. a) Derive an equation for operating point in BJT - collector to base bias. [6M]  
b) What is the need for biasing? Explain the criteria for fixing operating point. [6M]

**UNIT-V**

9. a) A transistor is connected as a common – base amplifier is driving a load of  $10K\Omega$ . It is supplied by a source of  $1K\Omega$  internal resistance. The hybrid parameters of the transistor used are [7M]

$$h_{ib} = 22\Omega, h_{fb} = -0.98, h_{rb} = 2.6 \times 10^{-4}, h_{ob} = 0.5M\Omega.$$

Find

- (i) Current gain.  
(ii) Current gain with source resistance.  
(iii) Voltage gain.  
(iv) Output impedance
- b) Explain about CC amplifier and derive the expressions for voltage gain, current gain using approximate h-parameter model. [5M]

**(OR)**

10. a) Derive an expression for voltage gain and output impedance of a CE transistor amplifier in terms of h-parameters. [7M]  
b) Derive the expression for voltage gain of common source amplifier. [5M]

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