Code No: **19ECT305**

R19

II B.Tech I Semester Regular Examinations, March - 2021

BASIC ELECTRONIC DEVICES AND CIRCUITS

(Electrical and Electronics 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) Illustrate an open circuited PN- junction. Explain in detail about
   (i) contact potential
   (ii) depletion region and
   (iii) electric field. [6M]

   b) Explain the principle of operation of varactor diode. [6M]

(OR)

2. a) Explain the V-I characteristics of PN junction diode with neat sketches. [6M]

   b) The current through a PN junction diode is 55mA at a forward bias voltage of 3V. If the temperature is $27^{O}C$, find the static and dynamic resistance of the diode? [6M]

UNIT-II

3. a) Explain with neat sketches the working of bridge rectifier. State the advantages of it. [8M]

   b) Determine the ripple factor of an L-type filter comprising a 10H choke and 8µF capacitor used with an FWR. Compare it with a simple 8µF pure capacitor filter. Assume load current is 50mA, dc load voltage of 50V and the diodes are ideal. [4M]

(OR)

4. a) Prove that a Zener diode acts as a voltage regulator. [6M]

   b) A 40-0-40V (rms) transformer is used with a full-wave rectifier connected to a load resistance of 20Ω. Determine
   (i) DC load current
   (ii) current through diode
   (iii) rectifier efficiency
   (iv) DC load power
   (v) PIV of each diode. [6M]

UNIT-III

5. a) Compare the features of CE, CB, CC configurations. [6M]

   b) A FET has a driven current of 4mA. If I_{DSS} =8mA and V_{GS} (off)=-6V. Find the values of V_{GS} and V_P. [6M]
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(OR)

6. a) Illustrate with neat sketches the static input and output characteristics of a transistor in Common Base mode also indicate various regions of operation. [6M]

   b) Compare BJT and FET. [6M]

UNIT-IV

7. a) What is the need for biasing? Explain the criteria for fixing Q-point.. [6M]

   b) Draw the hybrid equivalent circuit of CB transistor circuit and derive the expressions for current gain and voltage gain. [6M]

(OR)

8. a) Discuss various biasing techniques associated with JFETs. Explain any one biasing circuit. [6M]

   b) A silicon transistor in CE configuration using Self Bias method has $\beta = 100$, $V_{CC} = 12V$, $R_1 = 10K\Omega$, $R_2 = 5K\Omega$, $R_C = 1K\Omega$, $R_E = 2K\Omega$. Determine the co-ordinates of Q-point. Find the stability factor S. [6M]

UNIT-V

9. a) Discuss about crystal oscillator. Also mention the applications. [6M]

   b) Explain the operation of current series feedback amplifier. [6M]

(OR)

10. a) Draw the circuit of RC phase shift oscillator and derive the expression for frequency of oscillation. [6M]

    b) Compare the feedback amplifiers in terms of their performance parameters. [6M]

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