322352(28)

B. E. (Third Semester) Examination, Nov.-Dec. 2021

(New Scheme)

(CSE Branch)

BASIC ELECTRONICS

Time Allowed : Three hours

Maximum Marks : 80

Minimum Pass Marks : 28

*Note : Attempt all questions. Part (a) of each question is compulsory. Solve any **two** parts from (b), (c) and (d) of each question.*

Unit-I

1. (a) Define law of junction.   2

   (b) What is diode capacitance? Derive the expression for transition capacitance.   7

   (c) With the help of diagram explain the V-I characteristics of a P-N junction diode.   7

(d) For any step-graded junction, prove that 7

$$V_0 = V_T l_n \left(\frac{N_A N_D}{n_i^2} \right)$$

Unit-II

2. (a) Explain the necessity of filter at the output of the rectifier. 2

(b) Draw and explain bridge-rectifier circuit with waveforms. 7

(c) With the help of neat circuit diagram, explain the working of Zener diode as voltage regulator. 7

(d) Describe the operation of π filters and calculate its ripple factor. 7

Unit-III

3. (a) Define α and β of transistor. 2

(b) With neat circuit diagram explain the various current components in a p-n-p transistor. 7

(c) Explain the input and output characteristics of a transistor in CB configuration. 7

(d) Explain what is the 'Early Effect', and state its consequences. 7

Unit-IV

4. (a) Define three stability factors. 2

(b) For collector to base bias circuit, determine s, s' and s''. 7

(c) For the circuit shown in fig1, $I_c = 2mA$, $\beta = 100$, calculate. R_E, V_{CE} and stability factors. 7
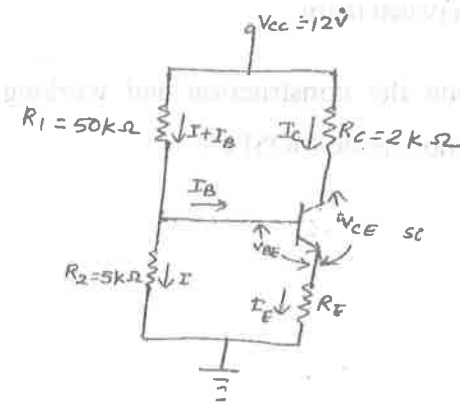
(d) Explain the diode compensation technique.   7

Unit-V

5. (a) Draw and explain small signal model of FET at low frequency.   2

(b) Sketch the drain characteristics of a JFET and explain it before and after pinch off.   7

(c) Define JFET parameters :   7

    (i) Transconductance (g_m)

    (ii) Drain resistance (r_d)

    (iii) Amplification factor (μ) and give relation between them.

(d) Explain the construction and working of the depletion mode MOSFET.   7

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