

VEER SURENDRA SAI UNIVERSITY OF TECHNOLOGY (VSSUT), ODISHA
Mid Semester Examination 2025-26

COURSE NAME: B.Tech

SEMESTER: 3rd

BRANCH NAME: Electrical Engineering
 SUBJECT NAME: Analog and Digital Electronic Circuits

FULL MARKS: 30

TIME: 90 Minutes

Answer All Questions.

The figures in the right hand margin indicate Marks. Symbols carry usual meaning.

Q1. Answer all Questions.

[2 × 3]

- a) Define stability in a biasing circuit. - CO1
- b) Draw the hybrid equivalent circuit of BJT in common base configuration. - CO1
- c) Convert the binary number 110110 into its equivalent Gray code and BCD code. - CO4

Q2.

[4+4]

a) For the network shown in Fig. 1, determine :

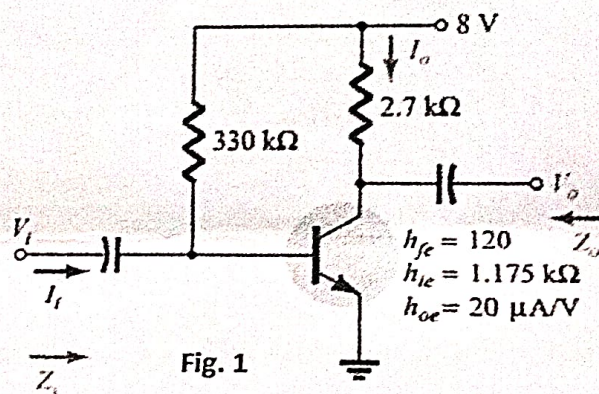
- CO1

(i) Input impedance (Z_i)

(ii) Output impedance (Z_o)

(iii) Voltage gain (A_v)

(iv) Current gain (A_i)

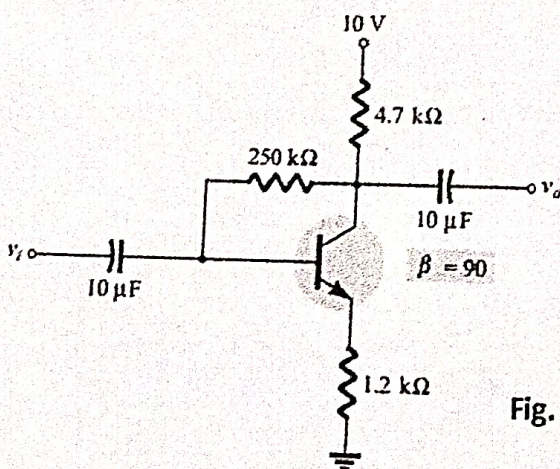


b) For a DC bias with voltage-divider circuit with $V_{CC} = 22V$, $\beta = 140$, $R_1 = 39k\Omega$, $R_2 = 3.9k\Omega$, $R_C = 10k\Omega$, $R_E = 1.5k\Omega$. Draw the circuit and compute I_{CQ} , V_{CE} , V_B , V_E .

OR

a) Determine the I_C , V_{CE} for the network below in Fig. 2.

- CO1



b) Draw an emitter follower circuit and derive the expression for input impedance Z_i of the circuit. - CO1

[4+4]

Q3.

- CO4

- a) Simplify the following Boolean function 'F', together with the don't care conditions 'd'. Given,

$$F(A, B, C, D) = \sum_m(0, 6, 8, 13, 14)$$

$$d(A, B, C, D) = \sum_m(2, 4, 10)$$

- b) Given the Boolean function

$$F = xy'z + x'y + x'yz'$$

- Obtain the truth table.
- Simplify the expression.
- Draw the logic diagram using logic gates.

OR

- a) Explain the rules of BCD addition and perform BCD addition for the decimal numbers 19+74

-CO4

- b) Simplify the boolean function $f = \sum_m(0, 2, 5, 7, 13, 15, 21, 23, 29, 31)$

Q4.

[4+4]

- a) Compare a self bias circuit with a fixed bias transistor circuit.

-CO1

- b) Given $F = x' + x(x + y')(y + z')$.

-CO4

Express the function

- F in Canonical SOP
- F in Canonical POS
- $\bar{F}$ in Canonical SOP
- $\bar{F}$ in Canonical POS

OR

- a) Write a short note on Miller's theorem.

-CO1

- b) Explain the following codes with example.

-CO4

- Weighted Code
- Alphanumeric Code
- Reflex code
- Arithmetic Code

— X —