

Hall Ticket No

23951A6601

Question Paper Code: AEED01



INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal-500043, Hyderabad

B.TECH I SEMESTER END EXAMINATIONS (REGULAR) - FEBRUARY 2024

Regulation: BT23

ELEMENTS OF ELECTRICAL AND ELECTRONICS ENGINEERING
(COMMON TO CSE (AI & ML) | IT | AE | ME | CE)

Time: 3 Hours

Max Marks: 60

Answer ALL questions in Module I and II
Answer ONE out of two questions in Modules III, IV and V
All Questions Carry Equal Marks
All parts of the question must be answered in one place only

MODULE - I

1. (a) State ohm's law. Determine the expression resonant frequency and bandwidth of RLC series circuit [BL: Understand| CO: 1|Marks: 6]
- (b) Find the equivalent resistance between B and C of the circuit shown in the Figure 1 using star delta conversion. [BL: Apply| CO: 1|Marks: 6]

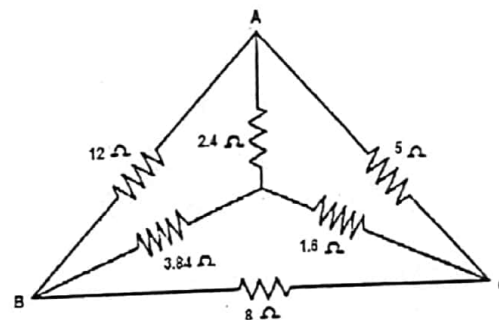


Figure 1

MODULE - II

2. (a) State and prove the maximum power transfer theorem for variable pure resistance load. [BL: Understand| CO: 2|Marks: 6]
- (b) Find the value of R_L for the circuit shown in Figure 2 so that maximum power is delivered to it [BL: Apply| CO: 2|Marks: 6]

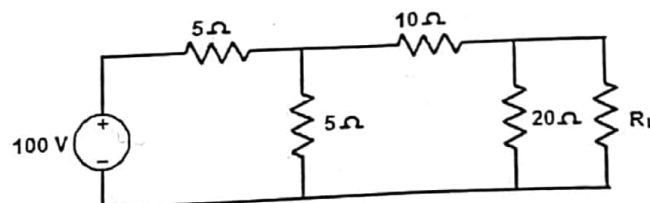


Figure 2

MODULE – III

3. (a) Classify various types of DC generators. Develop the equation of EMF generated by a DC generator. [BL: Understand| CO: 3|Marks: 6]
- (b) A DC series generator has armature resistance of 0.5Ω and series field resistance of 0.03Ω . It drives a load of 50A . If it has 6 turns/coil and total 540 coils on the armature are driven at 1500 RPM, calculate the terminal voltage at the load. Assume 4 poles, lap winding, flux per pole as 2mwb and total brush drop as 2V . [BL: Apply| CO: 3|Marks: 6]
4. (a) With a neat diagram explain the principle of operation and working of full wave rectifier. [BL: Understand| CO: 4|Marks: 6]
- (b) Determine the output waveform V_o of the Figures 3(i) and 3(ii) shown below. [BL: Apply| CO: 4|Marks: 6]

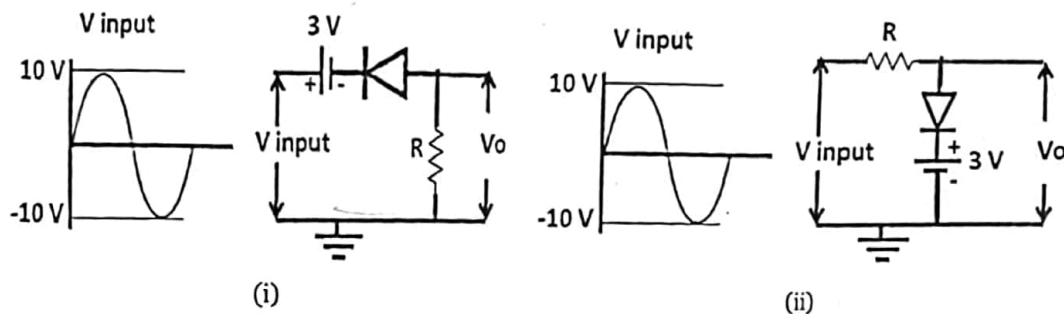


Figure 3

MODULE – IV

5. (a) Compare CC, CB, and CE mode with basic circuit, input & output characteristics, gain and input resistance & output resistance of different BJT configuration. [BL: Understand| CO: 5|Marks: 6]
- (b) A common base transistor amplifier has an input resistance of 20Ω and output resistance of $100\text{k}\Omega$. The collector load is $1\text{k}\Omega$. If a signal of 500mV is applied between emitter and base, find the voltage amplification factor. Assume α to be nearly one. [BL: Apply| CO: 5|Marks: 6]
6. (a) With a circuit diagram, explain the input and output characteristics of BJT in common collector configuration. [BL: Understand| CO: 5|Marks: 6]
- (b) Determine V_o for the circuit shown in the Figure 4. Also find the mode of operation for the given pulse input. [BL: Apply| CO: 5|Marks: 6]

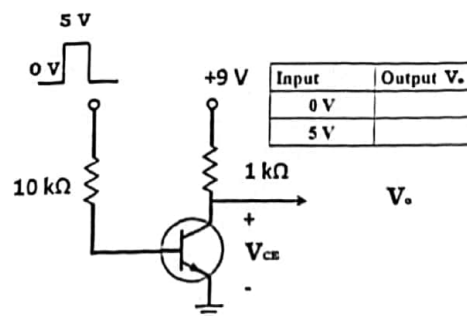


Figure 4

MODULE – V

7. (a) Obtain the expressions for current gain, voltage gain, input impedance and output impedance of CB amplifier using simplified hybrid model. [BL: Understand| CO: 6|Marks: 6]
- (b) A voltage source of internal resistance $R_s=900\Omega$ drives a CC amplifier using a load resistance $R_L=2000\Omega$. The common-emitter h-parameters are given by $h_{ie} = 1200\Omega$, $h_{fe} = 60$, $h_{re} = 2 \times 10^{-4}$ and $h_{oe} = 25 \times 10^{-6} \mu A/V$. Compute the current gain A_i , input resistance R_i , voltage gain A_v , and output resistance R_o using exact and approximate analysis. [BL: Apply| CO: 6|Marks: 6]
8. (a) List the two port devices of amplifier network with suitable diagrams. Write the limitations of h parameters. [BL: Understand| CO: 6|Marks: 6]
- (b) The common emitter amplifier is driven by a voltage source of internal resistance $R_s=800\Omega$ and the load resistance is $R_L = 1000\Omega$. The h-parameters are $h_{ie} = 1K\Omega$, $h_{re} = 2 \times 10^{-4}$, $h_{fe}=50$ and $h_{oe} = 25\mu A/V$, compute the current gain A_i , input resistance R_i , Voltage gain A_v , and output resistance R_o using exact analysis. [BL: Apply| CO: 6|Marks: 6]

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