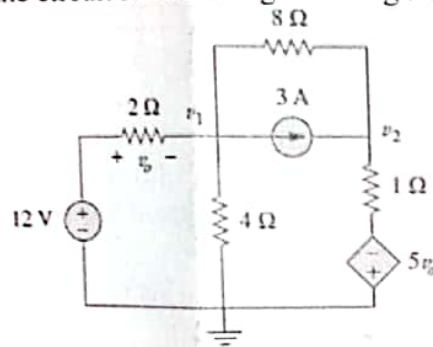# VIT
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MID TERM EXAMINATIONS – October-November 2023

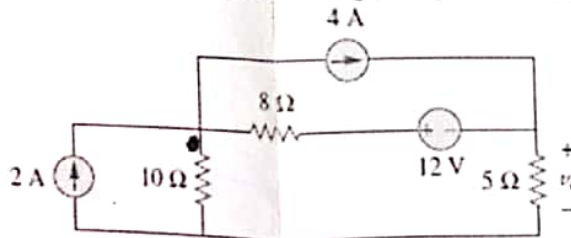| Programme | : B.Tech. | Semester | : Fall 2023-24 |
| Course Title/ Course Code | : Electric Circuits and Systems/ EEE1001 | Slot | : E11+E12+E14 |
| Time | : 1 ½ hours | Max. Marks | : 50 |

Answer all the Questions

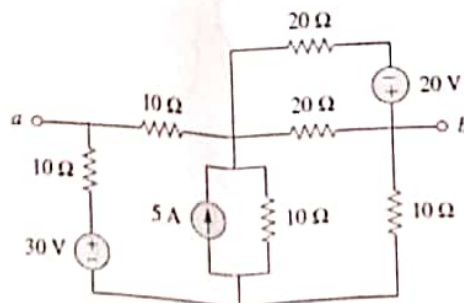| Q.No.	Sub. Sec.	Question Description	Marks
1	a	Determine the v_1 and v_2 in the circuit shown in figure using nodal analysis.	6

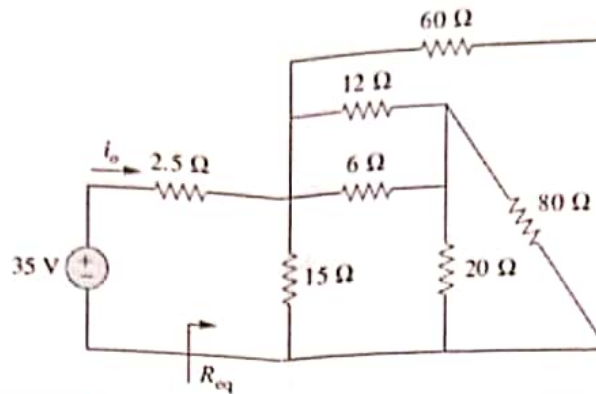| | b | Using superposition theorem, determine the voltage drop v_o across the 5Ω resistor. | 4 |

| 2 | a | For the circuit shown in figure, find the Thevenin's equivalent circuit between the terminals a & b. | 5 |

b   Determine the equivalent resistance for the circuit shown below and find the current i_o flowing through 2.5Ω resistor.

5

3   a   In the circuit shown in figure determine the voltage at 50 Hz to be applied across terminals AB in order that a current of 10A flows in the capacitor(398μF). Draw the phasor diagram for the circuit given.


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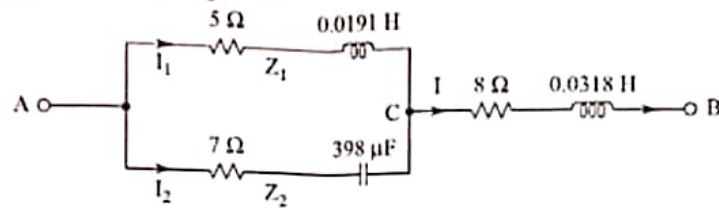
b   A circuit of R=4Ω , L= 0.5H and a variable capacitance C in series is connected across a 100V, 50 Hz supply. Calculate: (a) the value of the capacitance for which resonance will occur; (b) the voltage across the capacitor at resonance and the Q-factor of the circuit.

4

4   (a)   A linear inverse continuous system is specified by $\frac{d^2y(t)}{dt} - 7\frac{dy(t)}{dt} + 10y(t) = \frac{dx(t)}{dt} + 5x(t)$ the input is $x(t) = e^{-5t}u(t)$. Find the (i) natural response for the initial condition, $y(0^+) = 6, \frac{dy(0^+)}{dt} = 0$ (ii) forced response and (iii) total response of the system.
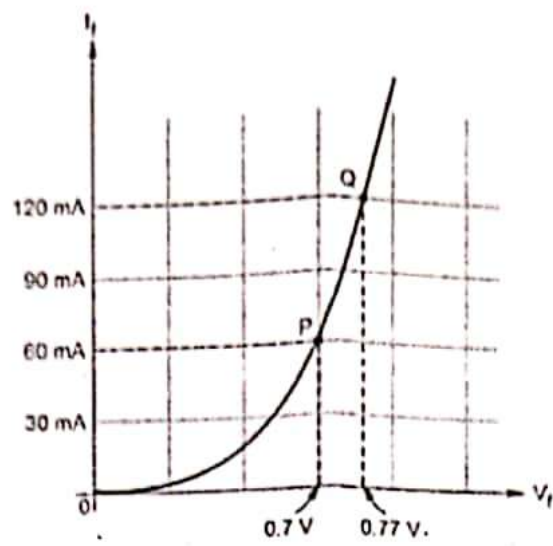
6

(b)   Determine the equivalent inductance for the mutual coupled circuit shown in figure.
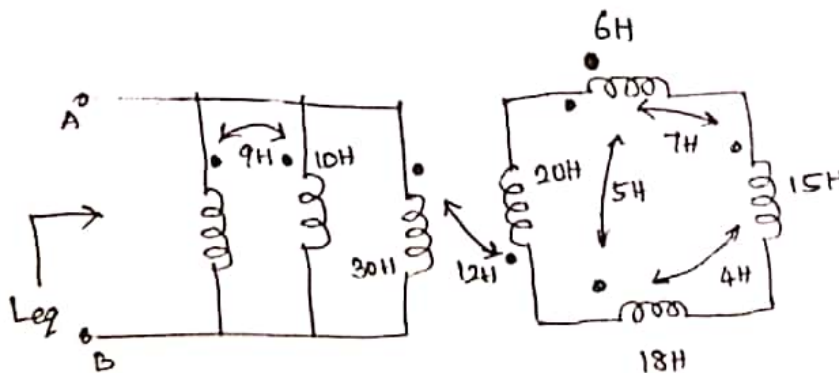
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5   Interpret the working of p-n junction diode at different bias conditions with its V-I characteristics. In regard to the characteristics of the p-n junction diode, its forward characteristics is shown below. Find the dc forward resistance at point P and dynamic forward resistance.

10

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