8.5.17 (M)

K. J. Somaiya College of Engineering, Mumbai-77
(Autonomous College Affiliated to University of Mumbai)

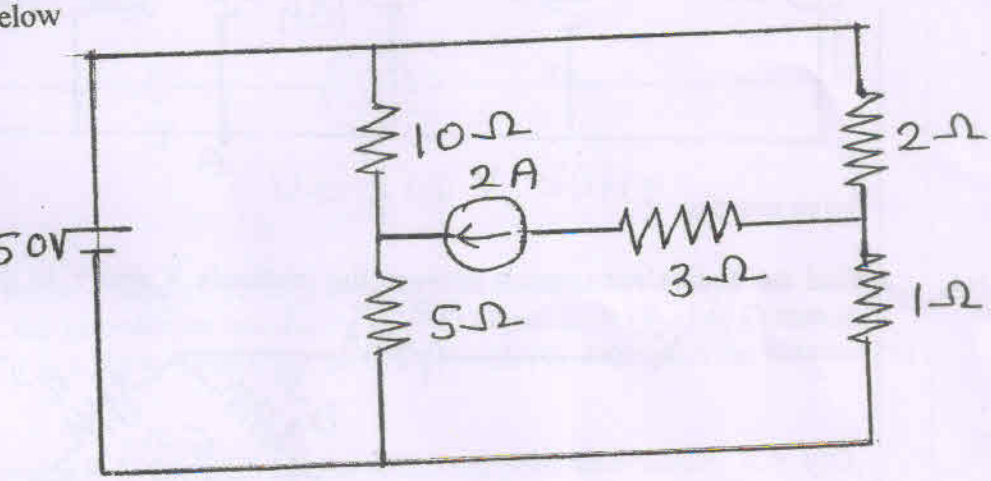
End Semester Exam
April - May 2017

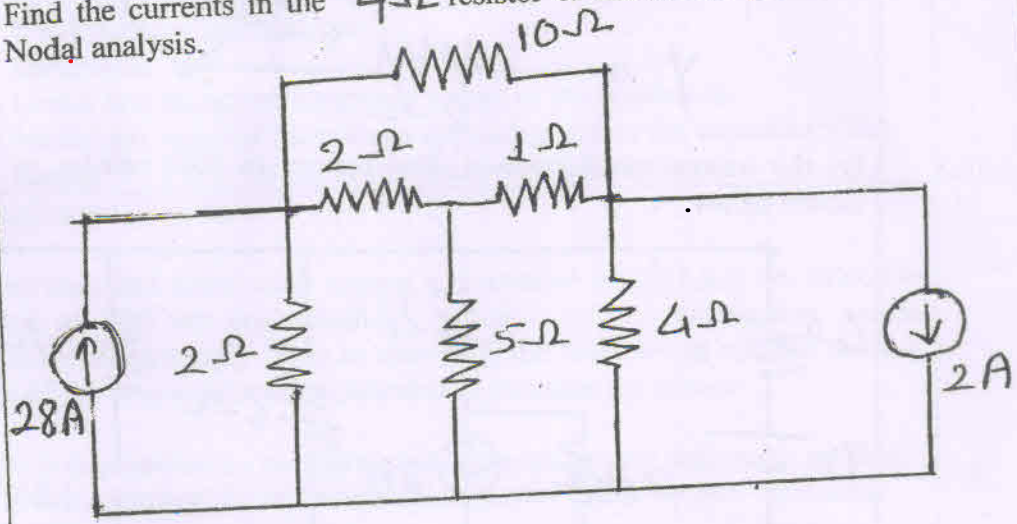
Max. Marks:100
Class: FE
Name of the Course: BEEE
Course Code: USHC105

Duration: 3hrs
Semester: II
Branch: All

Instructions:
(1) All Questions are Compulsory
(2) Draw neat diagrams
(3) Assume suitable data if necessary

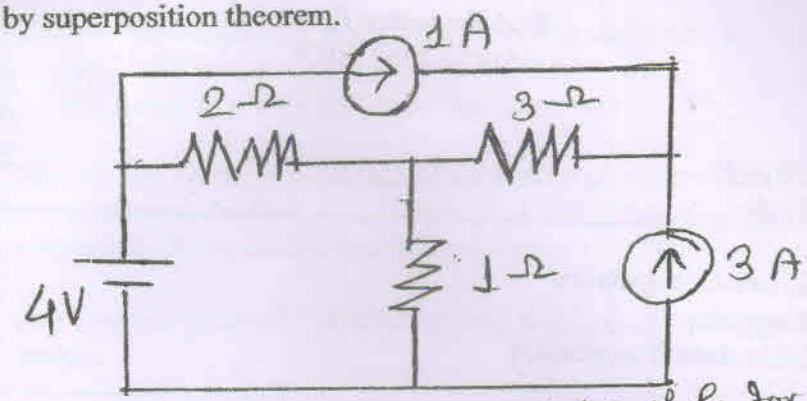
Question No.		Max. Marks
Q 1a	Solve any one By mesh analysis , find the current through 5 Ω resistor in the circuit shown below	10
Q 1a	Find the currents in the 4Ω resistor of the circuit shown below using Nodal analysis.	10





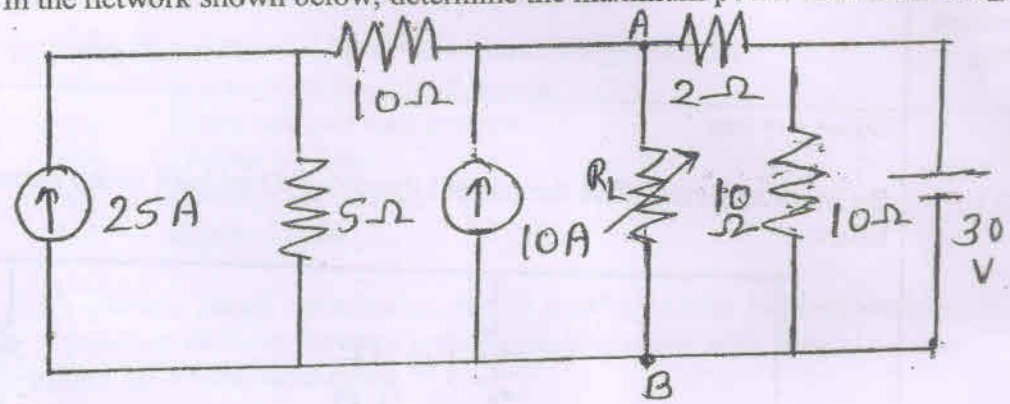
Solve any one

1(b) Determine the current in 1Ω resistor in the network as shown in figure below by superposition theorem. 10



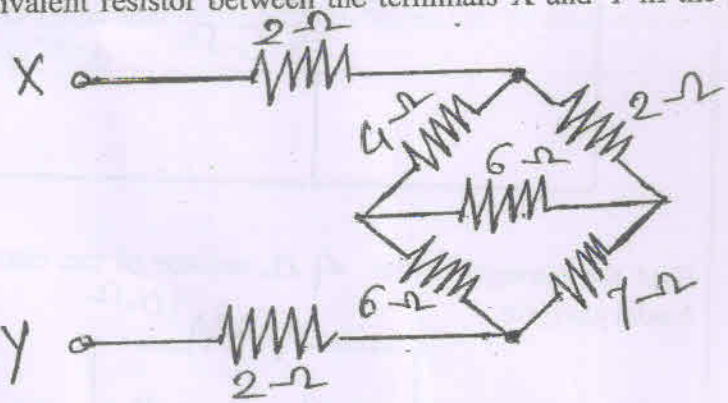
value of R_L for max power

1(b) In the network shown below, determine the maximum power delivered to R_L 10

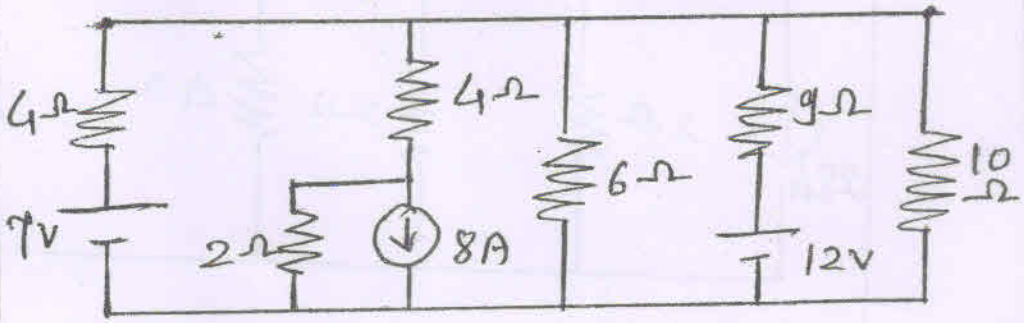


Solve any one

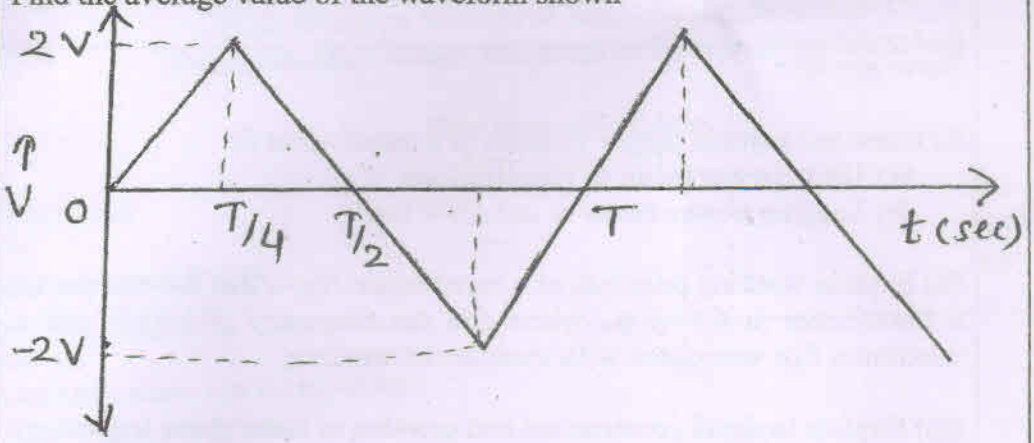
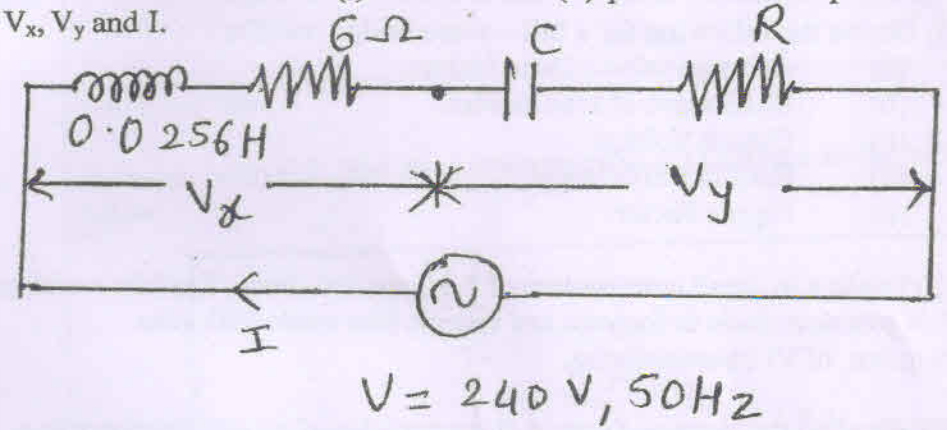
1(c) Find the equivalent resistor between the terminals X and Y in the network shown. 05



1(c) By the source transformation, find current in 10Ω resistor in the circuit shown below 05



8.5.17 (M)

Q2 (a)	Find the average value of the waveform shown 	05
Q2 (b)	Solve any two (i) For the circuit given $V_x = 3V_y$ and V_x and V_y are in quadrature. Determine the values of (i) R and C and (ii) phase relationship between V, V_x, V_y and I. 	10
	(ii) In series - parallel circuit, two parallel branches A and B are in series with C. the impedances are $Z_A = (10+ j\,8)\,\Omega$ and $Z_B = (9 - j\,6)\,\Omega$ and $Z_C = (3 + j2)$. If the voltage across Z_C is $(100\angle 0)$V, determine the values of I_A and I_B	10
	(iii) A series R-L-C circuit has the following parameter values: R = 10Ω, L = 0.014 H, C = 100 μF. compute the following (a) Resonance frequency in rad/sec (b) Quality factor of the circuit (c) Bandwidth (d) Lower and the upper frequency points of the bandwidth (e) Maximum value of the voltage appearing across the capacitor if the voltage $v = 1 \sin (1000t)$ is applied to the R-L-C circuit.	10
Q3	Solve any one	10
	(i) Three identical coils, each having a resistance of 10Ω and an inductive reactance of 10Ω are connected in star connection, across 400V, three phase supply. Find in each case the line current and the reading on each of the two wattmeters connected to measure the power.	
	(ii) Derive Expression for measurement of power by two wattmeter method, also derive expression for measurement of power factor by two wattmeter method.	10

Q4	Solve any two (i) Draw and explain phasor diagram of a transformer for (a) Unity power factor or resistive load (b) Lagging power factor or inductive load (ii) Explain working principle of a transformer. Show that the emf per turn in a transformer is 4.44 $f \varphi_m$ where f is the frequency of supply and φ_m is maximum flux associated with transformer winding. (iii) Explain in detail construction and working of three phase induction motor.	10 10 10
Q5	Solve any two (i) Derive the following for a full – wave bridge rectifier (a) Average value of load current (b) RMS value of load current (c) Output Voltage (d) Rectifier Efficiency (e) Ripple Factor (ii) Explain in detail construction of P-N junction diode. Explain working of P-N junction diode in forward and reverse bias mode with neat diagram of VI characteristics. (iii) Explain the input and output characteristics of an npn transistor in a common emitter configuration. Clearly mark various regions on the characteristics. Show how different parameters can be determined from the above characteristics.	10 10 10