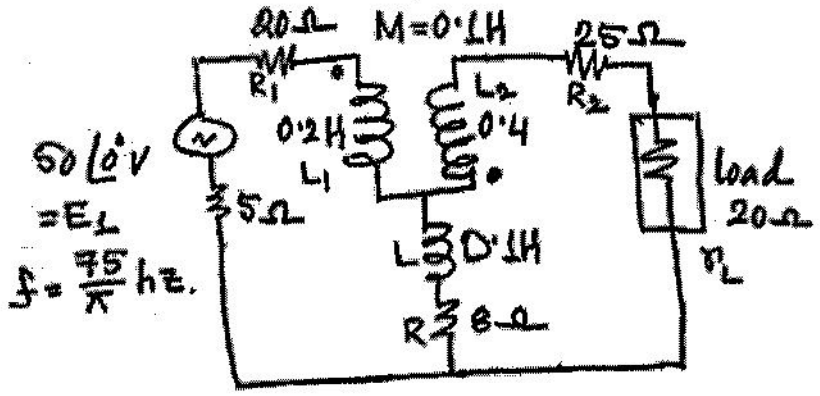
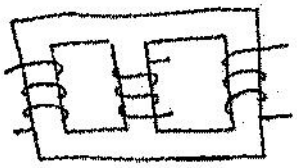
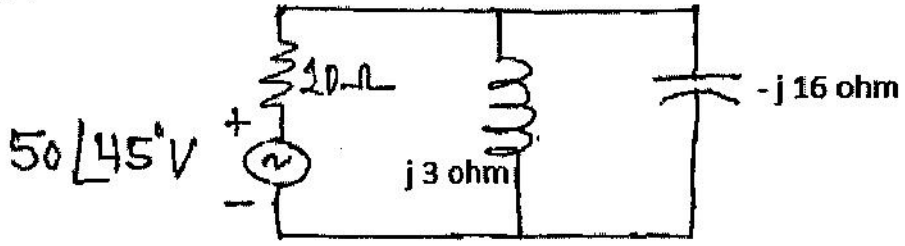
Ref No: Ex/EE/5/T/121/2018

B.E. ELECTRICAL ENGG (PART TIME) 1ST YEAR 2ND SEMESTER EXAM 2018

SUBJECT: - PRINCIPLES OF ELECTRICAL ENGINEERING-II

Time: Three hours **Full Marks 100**
(50 marks for each part)

Use a separate Answer-Script for each part

No. of Questions	PART-I	Marks
	Answer any four, 2 marks for well organized answers (12 x 4 + 2 = 50)	
1.	Find the current through the load of 20 ohm in the circuit shown below. 	12
2. a)	Put dots to indicate polarities of the 3 magnetically coupied coils shown in the figure given below. 	4
b)	Draw and explain the phasor diagram of a single phase transformer with inductive load.	8
3.	In the network shown below, the 10 ohm resistor is changed to 5 ohm. Use Compensation Theorem to find the change in current flowing through the resistor. 	12

[Turn over

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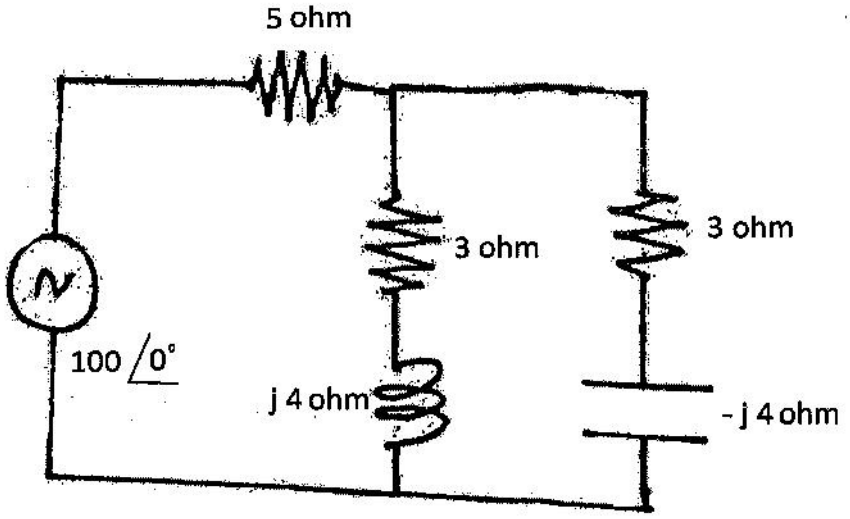
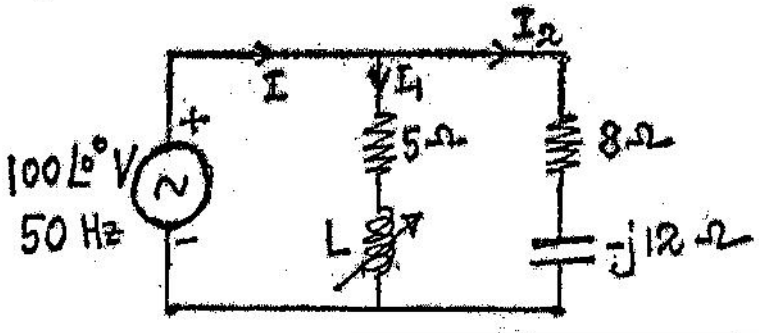
4.	Find the current through (3+j4) ohms branch in the middle and verify Reciprocity theorem for the circuit given below. 	12
5.	A ballast resistor with a nonlinear characterisitc shown in the table is connected with a resistor of 5 ohm and a 24 V DC source having an internal resistance of 2 ohm. Determine graphically the circuit current and the voltage across the ballast. V-I characteristic of the ballast:	12
6.	With the help of locus diagram, drawn to scale, find the value of inductance L in Henry at which the circuit current is minimum. Also find the resonating condition(s) for the same circuit. 	12

V (Volts)	0	0.8	2	3.6	4.2	5.5	8	11	15	20
I (Amp)	0	2	4	6	8	10	12	14	16	18

Ex/EE/5/T/121/2018

B.E ELECTRICAL ENGINEERING (PART TIME) EXAMINATION, 2018

(1st Year, 2nd Semester)

PRINCIPLES OF ELECTRICAL ENGINEERING -II

Time: Three Hours Full Marks: 100

(50 marks for each part)

Use a separate Answer-script for each Part

PART-II

Answer ***any three*** questions

(Two marks are reserved for neatness and well organized answers)

1. a) Calculate the active and reactive current components in each phase of a star-connected 10kV, three-phase alternator supplying 5000kW at a power-factor 0.8(lag). If the total current remains the same when the load power-factor is raised to 0.9(lag), find the new power output. 8

   b) Prove that copper requirement for three phase system is 0.75 times that required in single phase system. 8

2. a) A three-phase, 400V, 4-wire system has the following load impedances $Z_A = 10\angle -60^\circ\ \Omega$, $Z_B = 5\angle 0^\circ\ \Omega$ and $Z_C = 10\angle 60^\circ\ \Omega$. Calculate the line currents and the neutral current and the power drawn by each load when phase sequence is (i) ABC and (ii) ACB. 8

   b) A 3-wire, three-phase system of 400V has the following impedances: $Z_A=(20-j20)\Omega$, $Z_B = (50 + j0)\Omega$ and $Z_C = (30 + j52)\Omega$. Calculate the phase currents Of the load. 8

3. a) Explain when one wattmeter shows zero reading while measuring three-phase power by two wattmeters. Draw the necessary circuit and phasor diagrams. 4+2+2

   b) The power input to a 2000 V, three-phase motor is measured by two wattmeters which read 300 kW and 100 kW respectively. Calculate i) the power input, ii) the power-factor and iii) the line current. 8

4. Write short notes on *any two* of the following: 8×2=16
   (i) Positive sequence system.
   (ii) Millman's Theorem.
   (iii) Phase sequence.