Roll No._____

Total No. of Pages 3

B.Tech.

Second SEMESTER

MAY 2018

END SEM EXAMINATION

EE-102 BASIC ELECTRICAL ENGINEERING

Time: 3 Hours

Max. Marks: 40

Note : Attempt ***FIVE*** questions in All. Q.No. 1 is compulsory.
Attempt any four questions from the remaining questions.
All questions carry equal marks.

Q.1 Indicate whether the following statements are True or False. Justify your answer.

i. Under the condition of resonance in RLC series circuit the p.f. of the circuit is unity.

ii. Power consumed by a resistor of 10 Ω carrying a current of 4+j3 A is 160 W.

iii. In measurement of power on balanced load by two wattmeter method in a 3-phase circuit, the readings of the wattmeters are 3 KW and 1 KW respectively, the latter being obtained by reversing the connections of the current coil. The p.f. of the load is 0.277.

iv. One of the coils of a transformer is shorted while the other is ac excited. The input current drawn is in phase with respect to applied voltage. (2x4)

Q. 2(a) State Norton's theorem. Explain the difference between Norton's and Thevenin's theorem. (4)

(b) Determine the Thevenin equivalent circuit as seen from terminals cd for the circuit shown in Fig.1. (4)

P.T.O

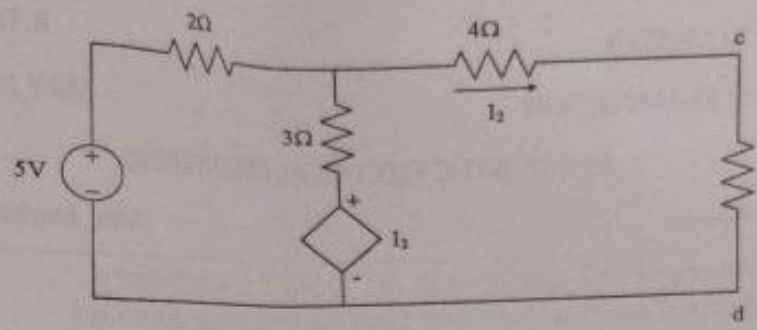

Fig. 1

Q.3 (a) Deduce the expression for instantaneous power when an impedance is excited by a sinusoidal ac voltage source. From this expression explain real, reactive and apparent power. (4)

(b) For the circuit shown in Fig. 2, determine

i. I, V_1, V_2 (4)

ii. *Draw* the phasor diagram.

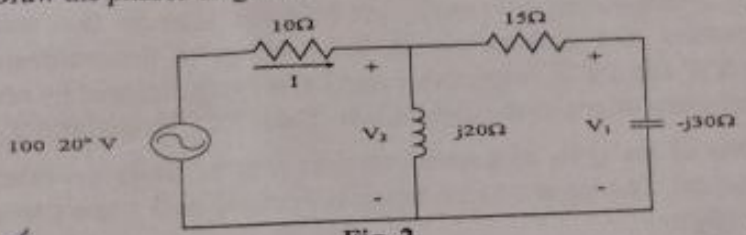

Fig. 2

Q.4(a) What is resonance? Derive the expression for resonant frequency of a circuit consisting of a capacitor in parallel with RL series combination. Draw the phasor diagram showing voltages across each element and current through each element under resonance. (4)

(b) For the waveform shown in Fig. 3 find the average value, the rms value, form factor and peak factor. (4)

P.T.O

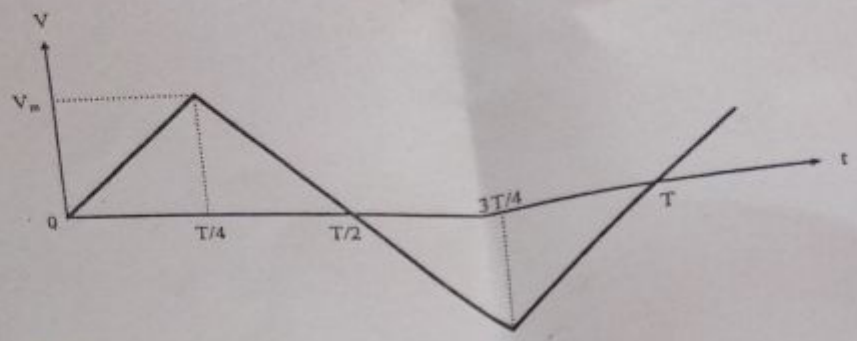

Fig.3

Q.5(a) Explain the principle of generation of three phase voltages. To generate three phase voltages, why is it considered better to rotate the magnetic field instead of the coils? (4)

(b) Three equal star connected inductors take 9 KW at a p.f. of 0.8 when connected to 960 V, 3-phase, 3-wire, 50 Hz supply. Find the per phase load resistance and inductance? (4)

Q.6(a) Explain hysteresis and eddy current loss. How can these losses be minimized? (4)

(b) When connected in series two windings have a total inductance of 0.4 H. With the reversal of connections to one winding, the total inductance is 0.8 H. Find the mutual inductance between the windings. (4)

Q.7 (a) Draw the equivalent circuit of transformer referred to secondary side. Derive the expression of voltage regulation from this circuit. (4)

(b) A 50 KVA, 2400 V / 120 V transformer gives the following test results :

O.C.T.(instruments on LV side) :120 V, 9.65 A, 396 W

S.C.T. (instruments on HV side): 92V, 20.83 A, 810 W (4)

Q. 8 write short notes on ***any two*** of the following : (8)

(i) PMMC instruments

(ii) Star Delta Transformation of resistances

(iii) Electrodynamometer type wattmeter

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