

✓ Q 4 (a) What is Resonance ? Derive the expression for bandwidth of a series RLC circuit. [1+3]

— (b) A coil of inductance 9 H and resistance 50Ω in series with a capacitor is supplied at constant voltage from a variable frequency source. If the maximum current is 1 A at 75 Hz, find the frequency when the current is 0.5 A. [4]

✓ Q 5 (a) Explain with phasor diagram the measurement of the power and pf of a balanced three phase load with the help of two wattmeter method. [4]

(b) Calculate the active and reactive current components in each phase of a star connected 10,000 V, 3-phase alternator supplying 5000 kW at a pf of 0.8. If the total currents remain the same when the load pf is raised to 0.9, find the new output. [4]

✓ Q 6 (a) Describe the analogies that can be made between electric and magnetic circuit. [4]

(b) the combined inductance of two coils connected in the series is 0.6 H or 0.1 H, depending upon the relative directions of the currents in the coils. If one of the coils when isolated has a self inductance of 0.2 H calculate:

- i. the mutual inductance
- ii. the coupling coefficient

[4]

Q 7 (a) Draw the equivalent circuit of the transformer referred to the secondary side. Explain the tests needed to determine these parameters.

[2+1+1]

P.T.O

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Roll No. 99.....

FIRST SEMESTER

B.Tech.

END SEM EXAMINATION

(Nov-2017)

EE-101 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. The phasor current through impedance is $1 \angle 0^\circ$ A and the voltage across it is $2 \angle 60^\circ$ V. The reactive VARs consumed in the impedance is $j\sqrt{3}/2$.
- ii. In a two wattmeter method of the measuring power in a balanced three phase circuit, the readings of the two wattmeters are in the ratio of 1:2. The circuit p.f. is $\sqrt{3}/2$.
- iii. Distribution Transformers are designed to have more core losses.
- iv. The stored energy of a capacitor is dependent on its instantaneous voltage only. (2x4)

Q 2(a) Explain the characteristics of

- i. Ideal and Practical voltage source.
- ii. Ideal and Practical current source.

Also state the conditions to be satisfied to establish the equivalence between voltage source and current source.

[2+2+2=6]

P.T.O.

(b) A 20 kVA, 2500/500 V, single phase transformer has the following parameters:

h.v. winding

$$r_1 = 8 \, \Omega$$

$$x_1 = 17 \, \Omega$$

l.v. winding

$$r_2 = 0.3 \, \Omega$$

$$x_2 = 0.7 \, \Omega$$

Find the voltage regulation and secondary terminal voltage at full load for a pf of

- i. 0.8 lagging
- ii. 0.8 leading

The primary voltage is held constant at 2500 V.

[4]

Q 8 Write short notes on *any two* of the following:

- i. Moving Iron Ammeter
- ii. Digital Voltmeter
- iii. Wattmeter
- iv. Tellegen's Theorem
- v. Autotransformer

[4+4]

-END-

(b) What is the difference of the potential between X and Y in the network shown in Fig. 1.

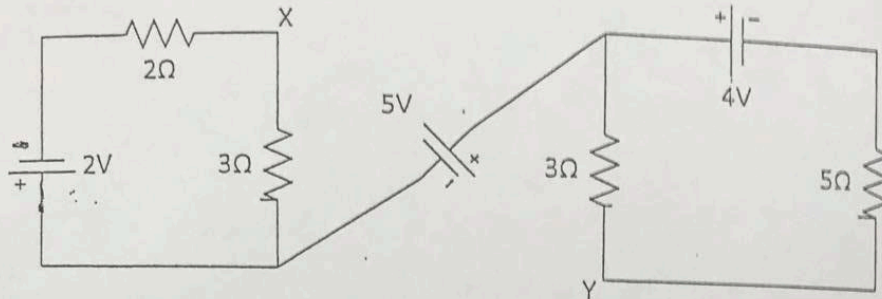


Fig.1

[2]

✓ Q 3 (a) State, explain with the help of an example and give applications of maximum power transfer theorem.

[1+2+1=4]

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

- I_2/I_1
- The power consumed by $5\text{ k}\Omega$ resistor and the power supplied by the 0.5V source.

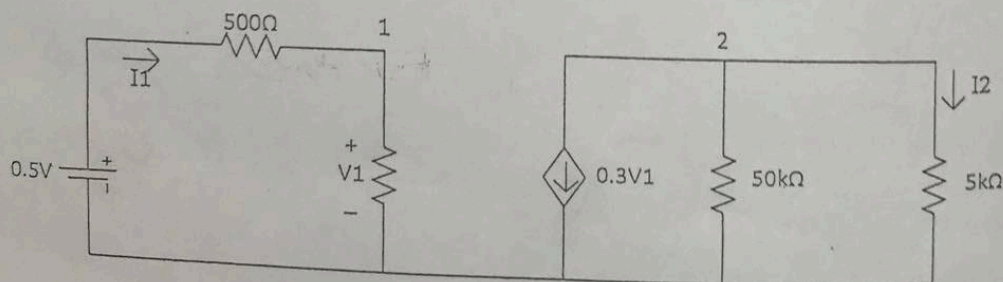


Fig. 2

[4]

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