

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 199215 Roll No.

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B.Tech.

(SEM. II) THEORY EXAMINATION 2013-14

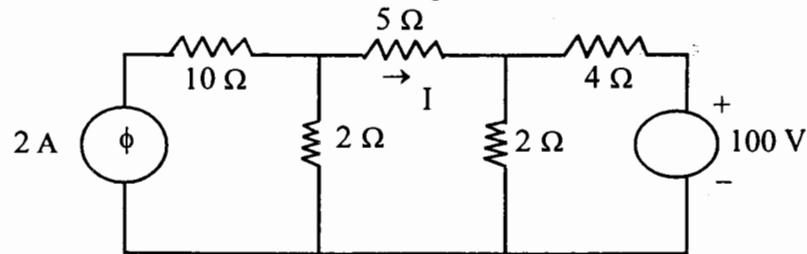
ELECTRICAL ENGINEERING*Time : 3 Hours**Total Marks : 100***Note :-** Attempt **all** questions. Assume any missing data, if any.**SECTION-A**

1. Attempt **all** parts of the following : **(2×10=20)**
- (a) Write the properties of ideal voltage source.
 - (b) Is L a linear element ? Explain the answer.
 - (c) Classify the losses in power transformer.
 - (d) Define the term slip.
 - (e) Why is dc series motor preferred in elevators ?
 - (f) Show the residual magnetism in a B-H curve.
 - (g) Explain the term creep in energy meter.
 - (h) Name two motors used for constant speed operation.
 - (i) Write an expression of resonance frequency for high Q-series R-L-C ckt.
 - (j) What is concept of grid in power system ?

SECTION-B

2. Attempt any **three** parts of the following : **(3×10=30)**
- (a) Describe the construction and principle of operating of attraction type moving iron instrument.

- (b) Apply mesh analysis, obtain the current through 5 ohm resistance in the following ckt :



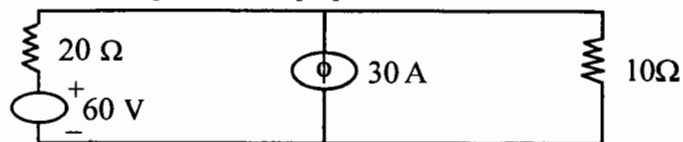
- (c) A three-phase 50 Hz, induction motor has a full-load speed of 1460 rpm. Calculate slip, number of poles and frequency of rotor induced emf.
- (d) Voltages across R,L,C connected in series are 5,8 and 10 volt respectively. Calculate the value of supply voltage at 50 Hz. Also find the frequency at which this ckt would resonate.
- (e) Derive the quality factor Q of the series R-L-C ckt at resonance. Define the bandwidth for the same.

SECTION-C

Note :- Attempt all questions.

3. Attempt any **two** parts of the following : (2×5=10)

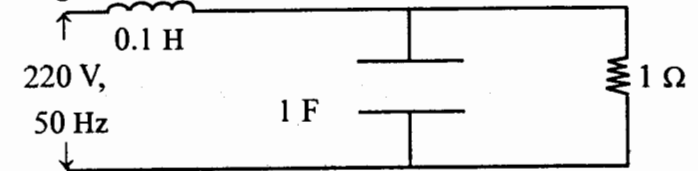
- (a) State and prove maximum power transfer theorem.
- (b) Find the current flowing through 10Ω resistance in the following ckt. Use superposition theorem.



- (c) Explain voltage and current sources of a network with characteristics. Explain source-transformation principle in any ckt.

4. Attempt any **one** part of the following : (1×10=10)

- (a) Calculate the resonance frequency of the ckt shown in figure :



- (b) Derive an emf expression of power transformer. Also draw an equivalent ckt of it.
5. Attempt any **two** parts of the following : (2×5=10)
- (a) Show that in a 3-φ star connected system, the line voltage is $\sqrt{3}$ times of the phase voltage.
- (b) Discuss in brief about autotransformer.
- (c) A balanced delta connected load of $(12+j9) \Omega$ / phase is connected to 3-phase 400 V supply. Calculate line current, power factor and power drawn by it.
6. Attempt **one** part of the following : (1×10=10)
- (a) Discuss the classification of power system in terms of voltage level. Also draw line diagram of typical substation.
- (b) A dc shunt motor develops an open-ckt emf of 250 V at 1500 rpm. Find its developed torque for an armature current of 20 A.

7. Attempt any two parts of the following : $(2 \times 5 = 10)$

- (a) Describe briefly the construction and working of a synchronous generator.
- (b) Explain speed-torque characteristics of dc series motor. Also mention typical applications of it.
- (c) A dc shunt motor develops an open-circuit emf of 250 V at 1500 rpm. Find its developed torque for an armature current of 20 A.