

**Printed Pages : 4**



**EAG-401**

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

**PAPER ID : 180408**

**Roll No.**

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**B. Tech.**

(SEM. IV) THEORY EXAMINATION, 2014-15

**ELECTRICAL CIRCUITS & MACHINE**

Time : 3 Hours]

[Total Marks : 100

**Note :** Attempt all questions.

**1** Attempt any four parts of the following : **5×4=20**

- (a) Explain the double revolving field theory.
- (b) What are the advantages of low power factor? Mention some methods of improving power factor.
- (c) Explain two wattmeter method of measurement of three phase power with the help of circuit and phase diagram?
- (d) Explain the principle of operation of a dc motor.
- (e) What is the need of using starter in :
  - (i) Three-phase induction motor
  - (ii) Single-phase induction motor

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**1**

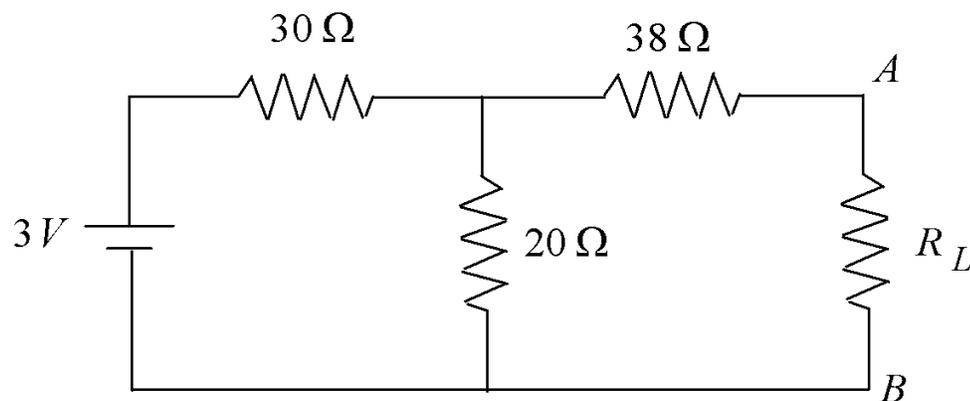
**[ Contd...**

2 Attempt any four parts of following :  $5 \times 4 = 20$

- Mention and explain various electric safety rules.
- Describe with neat sketch, the star delta starting of three phase induction motor.
- A 20 V series motor is developing a torque of 10 N-m when running at 1200 rpm. The total armature and series field resistance is  $0.6 \Omega$ . Calculate the motor current.
- Why improvement of power factor is needed? Explain.
- Explain voltage control in 3-phase induction motor. What type of load is more suitable for this method?

3 Attempt any two parts of the following :  $10 \times 2 = 20$

- Explain the Thevenin's, Norton's superposition power transfer in detail
- Explain maximum power transfer theorem. And find the value of load resistance  $R_L$  in the given diagram and determine the maximum power transferred.



- (c) Write short note on :
- (i) Hysteresis and eddy current loss
  - (ii) Leakage resistance
  - (iii) Voltage regulation
  - (iv) EMF and torque equation

4 Attempt any two parts of the following : **10×2=20**

- (a) Describe the construction, operation, equivalent circuit and phasor diagram for a poly phase induction motor.
- (b) The following results were obtained on 50 kVA, 2400/120 Volt transformer.

Open circuit test, instruments on L.V. side

Wattmeter reading =396W

Ammeter reading =9.65A

Voltmeter reading=120V

Short circuit test, instruments on H.V. Side

Wattmeter reading =810W

Ammeter reading =20.8A

Voltmeter reading=92V

**Find :**

- (i) The equivalent circuit constant
- (ii) The efficiency at full load, 0.8 pf lagging.
- (iii) The approximate voltage regulation

- (c) Why starters are necessary for starting of three-phase induction motors? Describe with the help of diagram, the rotor resistance starter for 3-phase slip-ring induction motor.

5 Attempt any two parts of the following : **10×2=20**

- (a) What do you understand by instantaneous and average power, power factor, reactive and apparent power? Describe in detail.
- (b) Explain procedure for transforming Delta connected network into star connected network and star to Delta transformation. Derive formula in detail.
- (c) A long shunt compound generator supplies a load of 20 kW at 500 V. The armature, series and shunt field resistance are  $0.1 \Omega$ ,  $0.05 \Omega$  and  $100 \Omega$  respectively. Calculate the EMF and also draw the schematic circuit.
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