Printed Pages : 4

EAG-401

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

PAPER ID : 180408

Roll No.

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

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

(a) Mention and explain various electric safety rules.

(b) Describe with neat sketch, the star delta starting of three phase induction motor.

(c) 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 Ω. Calculate the motor current.

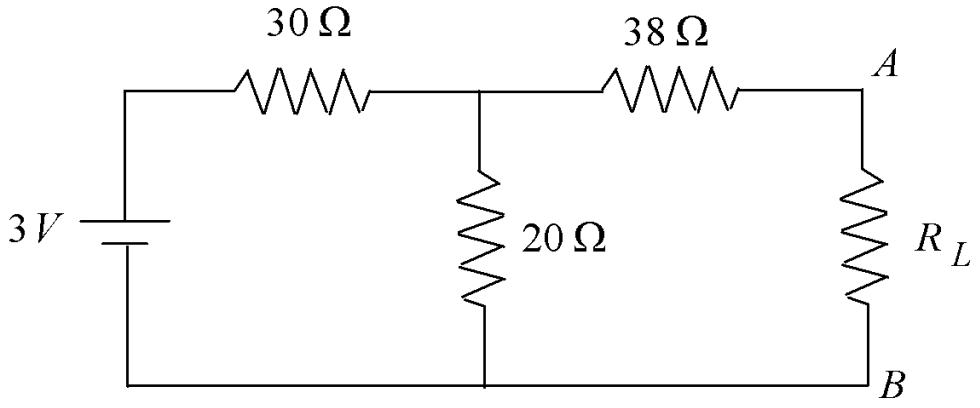
(d) Why improvement of power factor is needed? Explain.

(e) 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 : **10×2=20**

(a) Explain the Thevenin's, Norton's superposition power transfer in detail

(b) 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 Ω, 0.05 Ω and 100 Ω respectively. Calculate the EMF and also draw the schematic circuit.