**Printed Pages : 4**

AG-401

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

**PAPER ID : 180413**

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 all parts of the following :                    2×5=10

    (a)    Explain the Kirchhoff's current and voltage law.

    (b)    Describe the term speed regulation.

    (c)    To find out RMS value of alternating current.

    (d)    Explain low band pass filter.

    (e)    What is the procedure to minimized eddy current and hysteresis losses?

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

    (a)    Explain dependent and independent sources.

    (b)    Briefly discuss on hysteresis and eddy current losses.

    (c)    Explain the function of Starters for DC motor.

(d) What do you mean by double field revolving theory.

(e) How can a electrical circuit be Thevenized by Thevenin's theorem?

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

(a) Derive emf equation of a dc generator.

(b) Explain the slip- torque characteristics of three phase induction motor.

(c) Explain the working operation of single phase induction motor with suitable diagram.

(d) The armature resistance of a 200V dc shunt motor is 0.4 $\Omega$ and no-load current is 2 A. When the loaded and taking an armature current of 50 A, the speed is 1200 r.p.m. Find the no-load speed.

(e) Explain the working principle of three phase induction motor with suitable diagram.

**4** Attempt any five parts of the following: **10×5=50**

(a) Explain maximum power transfer theorem. And find the value of load resistance $R_L$ in the given diagram and determine the maximum power transferred.



**180413]** 2 **[ Contd...**
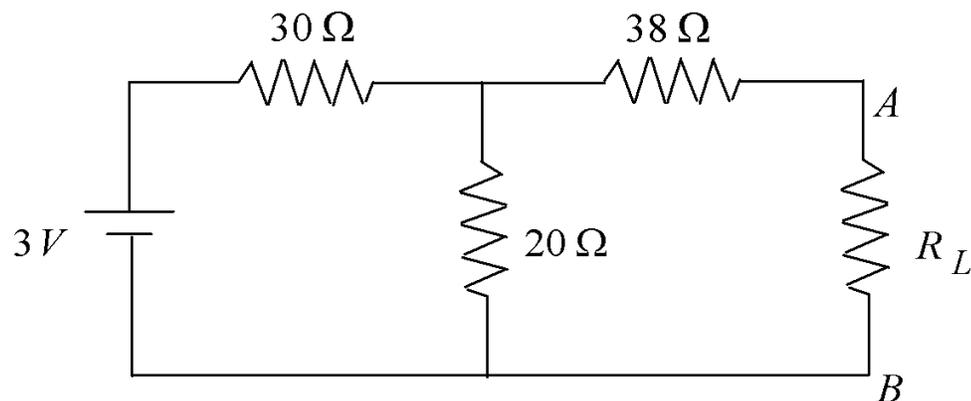
(b)  Name various method of starting the polyphase inductor motor and Describe auto-transfer method of starting in detail.

(c)  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
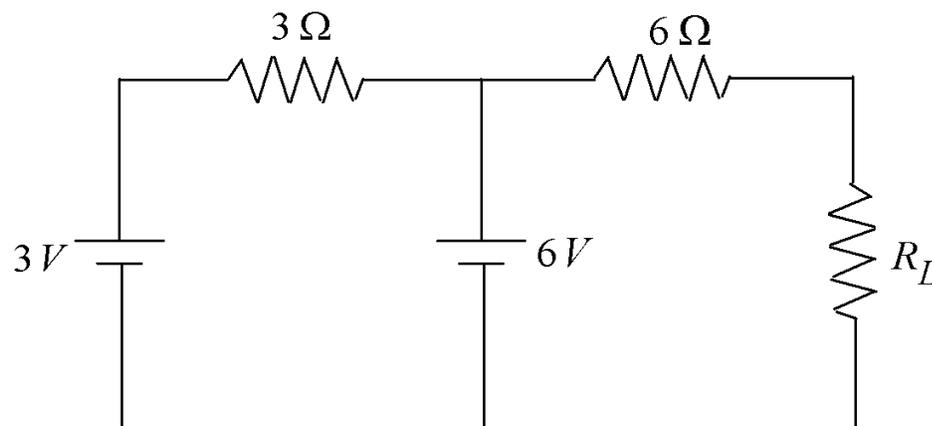
Ammeter reading =20.8A

Voltmeter reading=92V

*Find :*

(i)   The equivalent circuit constant

(ii)  The efficiency at full load,0.8 pf lagging.

(iii) The approximate voltage regulation

(d)  Find Nortan's equivalent circuit for the network shown below also verify it through its Thevenin's equivalent circuit.

(e)   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.

(f)   A voltage wave form is given by expression v=150 sin (520t+50).

*Determine :*

(i)    Maximum Value

(ii)   RMS value

(iii)  Frequency

(iv)   Time period

(v)    Phase angle of voltage

(g)   Explain procedure for transforming Delta connected network into star connected network and star to Delta transformation. Derive formula in detail.

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