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

Paper ID : 199227 Roll No. | | | | | | | | | |

B.TECH.

Theory Examination (Semester-II) 2015-16

BASIC ELECTRICAL ENGINEERING

Time : 3 Hours *Max. Marks : 100*

Section-A

1. Answer all parts in few sentences/words : (10×2=20)

(a) Distinguish between active and passive elements.

(b) A 40 V d.c. source has internal resistance of 2 ohm and supplies a resistive load. What can be maximum power drawn by the load ?

(c) The equation of an alternating current is i = 141.4 sin 314t. What is r.m.s. value of current and frequency ?

(d) What do you mean by apparent power, active power and reactive power ?

(e) In two watt meter method of power measurement in three phase circuit the readings of both watt meters are equal. What is power factor ?

(f) Why is scale of moving iron instruments nonlinear ?

(g) Large ampere turns are needed to create flux in the air gap as compured to steel. why ?

(h) A 400v/200v single phase transformer has primary winding resistance 1.0 ohm and secondary winding resistance 0.2 ohm. What will be total resistance of transformer referred to the primary side ?

(i) Draw torque v/s speed characteristics of a d.c. series motor and explain why the motor should not be started at no load.

(j) Draw slip v/s torque characteristics of a three phase induction motor and indicate

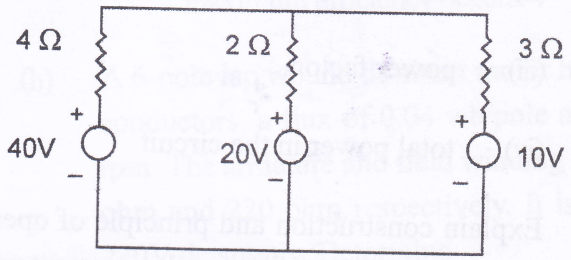
(i) Stable operating zone

(ii) induction generator operating zone.

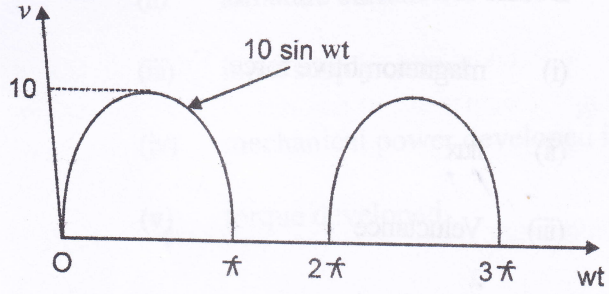
Section-B

2. Answer any five questions : $(10 \times 5 = 50)$

(a) Find current in 2 ohm resistance in the following figure using loop analysis method.



(b) Find average and r.m.s. values of following voltage waveform



(c) Explain resonance in a series RLC circuit with the help of impedance v/s frequency diagram and derive an expression for resonant frequency. Write properties of sereis resonance circuit.

(d) Three similar coils each having a resistunce of 10 ohm and an inductance of 0.0318 H in series are connected in delta. The line voltage is 400V, 50 HZ. Calculate :

(i) phase current

(ii) line current

(iii) power factor

(iv) total power in the circuit

(e) Explain construction and principle of operation of a permanent magnet moving coil instrument with the help of a neat diagrams. Why is scale uniform ?

(f) Define following with respect to a magnetic circuit :

(i) magnetomotive force

(ii) flux

(iii) Veluctance

(iv) Flux density

(v) magnetic field intensity.

Give analogous of each term in corresponding electric circuit.

(g) A 50 KVa transformer has a cove loss of 400 w and a full load copper loss of 800 w. The power factor of the load is 0.9 lossing calculate

(i) full load efficiency

(ii) the maximum efficiency and the load at which maximum efficiency occurs.

(h) A 6-pole lap wound dc shunt motor has 250 armature conductors, a flux of 0.04 wb/pole and runs at 1200 rpm. The armature and field winding resistances are 1 ohm and 220 ohm respectively. It is connected to a 220V dc supply. Determine

(i) induced emf in the motor

(ii) armature current

(iii) input supply current

(iv) mechanical power developed in the motor

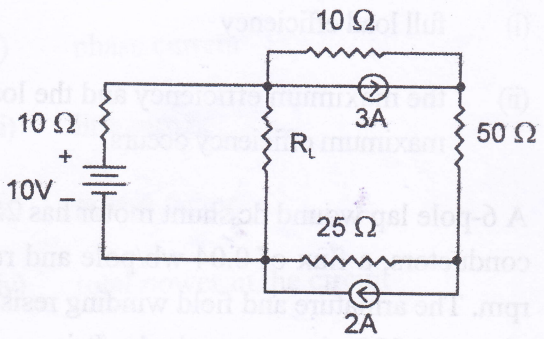
(v) torque developed.

Section - C

Note : Answer any questions of the following : (15×2=30)

3. (a) State and prove maximum power transfer theorm. (7)

(b) In the circuit shown below, determine value of R_L for maximum power transfer condition and also obtain maximum power transferred to the load. (8)



4. Using double revolving field theory explain why single phase induction motor is not self starting. Describe capacitor start - capacitory run method for starting single phase induction motor and give two applications of such motor. (15)

5. (a) Why a three phase synchronous motor is not self starting ? Discuss use of damper winding for starting a synchronous motor. (10)

(b) Explain single phase auot transformer and give its two applications. (5)