Summer Term Carry Over Examination2018-19
B. Tech. (common to all branches), First Year, I/II Semester
Basic Electrical Engineering: BEEG0001/
Electrical Engineering: EEE 1001

Time: 03 Hours **Max. Marks: 80**

Section-A

Note: Attempt all questions **[2x10=20 Marks]**

I The AC supply to a house is 230V, 50Hz. Find maximum and root mean square value (or effective value) of voltage.

II Differentiate between mesh and loop with the help of suitable example.

III An alternating current is given by i (t) =20 Sin 600t A. Find the value of time taken by the current from t=0 to reach a value of 10A.

IV Discuss the power triangle indicating different types of power.

V Define the terms: (a) Magnetic hysteresis (b) Voltage regulation of a transformer.

VI List any two similarities and two dissimilarities between electric & magnetic circuit.

VII Differentiate between an ideal and practical transformer.

VIII Explain why a starter is needed for the starting of DC motor.

IX Define the term 'slip'. What is the value of slip at the instant of starting of 3-phase induction motor?

X A 3-phase, 4-pole synchronous motor is connected to 400V, 50 Hz balanced supply. Calculate the speed of this motor in rpm.

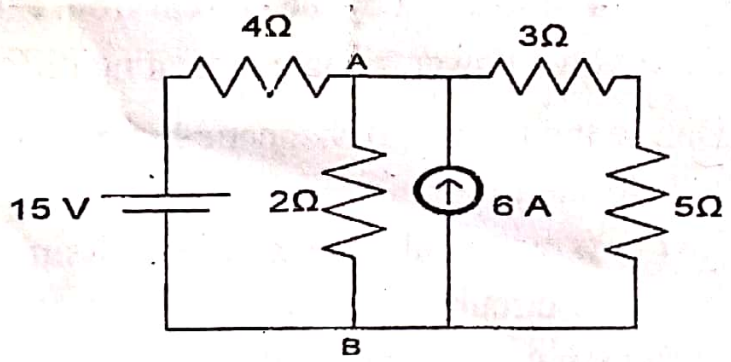
Section-B

Note: Attempt any TWO part from each Question **[5x2x3 = 30 Marks]**

I a) Define the following terms:
(i) Active and Passive Elements with examples
(ii) Linear and Non-linear Elements with examples
(iii) Power factor [5]

b) A resistor of 10 Ω is connected in series with a coil across 200V, 50 Hz AC supply. The current drawn by the series combination is 10A. The resistance of the coil is 2Ω. Calculate: (i) Inductance of the coil (ii)Power factor of the circuit (iii) Voltage across the coil.[5]

c) Calculate the current flowing through a 2 Ω resistor connected between the terminals A and B, in the following circuit by using Thevenin's theorem.[5]



II a) Derive the relationship between line voltage and phase voltage for a 3-phase star connected system with the help of phasor diagram.[5]

b) Discuss the advantages of 3-phase system over 1-phase system.[5]

c) Derive emf equation for a transformer. [5]

III a) Sketch and explain speed-torque characteristics of a 3-phase induction motor. Mark the stable region, unstable region and maximum torque. [5]

b) Derive emf equation for a DC machine.[5]

c) Explain why a 3-phase synchronous motor is not self starting with the help of neat diagram.[5]

Section-C

Note: Attempt all questions **[10x3=30 Marks]**

I State the maximum power transfer theorem and determine the condition for which maximum power is transferred from source to load. Also find efficiency of power transfer under the condition of maximum power transfer.[10]

II a)The efficiency of a 400 kVA, 1-phase transformer is 98.77 % when delivering full load at 0.8 (lagging) pf and 99.13 % when delivering half load at unity pf. Calculate (i) the iron loss (ii) the full load copper loss.[5]

b) A rectangular shaped core is made of mild steel plate 15mm X 20mm cross section. The mean length of the magnetic path is 18 cm. The exciting coil has 300 turns and current 0.7A. Calculate (i) magnetizing force (ii) flux density(iii) reluctance (iv) flux of magnetic circuit. Assume relative permeability of mild steel as 940. [5]

III Explain why a single phase induction motor is not self- starting with the help of double revolving field theory. Describe capacitor start method to make it self-starting with the help of neat circuit diagram. Give the applications of single phase induction motor.[10]

OR

a) Draw neat connection diagram for a fluorescent tube and explain its working. [5]

b) A 3-phase, 4-pole induction motor is supplied from 400 V, 50 Hz balanced AC supply. Calculate (i) Synchronous speed(ii) Rotor speed when slip is 4%(iii) Rotor current frequency when rotor runs at 600 rpm.[5]
