Total No. of Questions : 6] [Total No. of Printed Pages : 8

EH-241

B.E. Ist Semester (CGPA) Inform. Tech.

Examination, 2019

Basic Electrical Engg.

Paper - IT-102

Time : 3 Hours] **[Maximum Marks : 60**

Note :- Attempt all questions. Use of scientific calculateor is required.

1. Choose the correct answer.

1. (i) Which of the following relations is incorrect power factor -

(a) $\frac{Real\ power}{Apparent\ power}$ (b) $\frac{KW}{KVA}$

(c) $\frac{\text{Re}\,sis\,\text{tan}\,ce}{\text{Im}\,pedance}$ (d) $\frac{Conduc\,\text{tan}\,ce}{Suscep\,\text{tan}\,ce}$

(ii) When an alternating current flows through a capacitor, then the current -

(a) leads emf by $\frac{\pi}{2}$

(b) lags emf by $\frac{\pi}{2}$

(c) is in phase with emf

(d) none of the above

(iii) An inductor stores energy in -

(a) electrostatic field

(b) electromagnetic field

(c) core

(d) magnetic field

(iv) Permeance is to reluctance as conductance is to -

(a) inductance

(b) resistance

(c) capacitance

(d) ampere turns

(v) Power for a 3 - phase circuit is -

(a) $3V_L I_L \cos\theta$

(b) $\sqrt{3}\, V_L I_L \cos\theta$

(c) $3V_p I_p$

(d) $\sqrt{3} V_L I_L$

(vi) In lap winding the no. of brushes is equal to -

(a) 2

(b) 4

(c) no. of poles

(d) 2 × no. of poles

(vii) The basic function of a transformer is to change -

(a) level of voltage

(b) power level

(c) power factor

(d) frequency

(viii) A synchronous machine can operate -

(a) Only as a generator

(b) Only as a motor

(c) both generator & motor

(d) none of the above

9. (ix) Which of the following types of instruments cannot be used for dc -

(a) Moving iron - attraction type

(b) Moving coil - permanent magnet type

(c) HOt wiretype

(d) Induction type

(x) In a balanced star connected system, the line voltages are - ahead of their respective phase voltages -

(a) 30^0

(b) 60^0

(c) 120^0

(d) None of the above

2 a. Determine thereninis equivolent circuit aross terminals CD of network shown in fig 1.

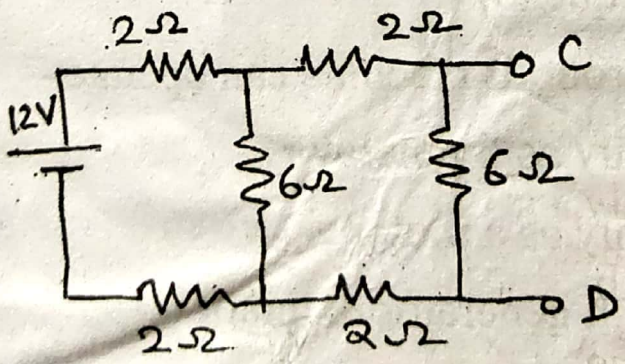

Fig 1

b. State and explain super position theorem.

OR

a. Using nodal voltage analysis, determine the current I in the 15 Ω resistor of the network shown in fig 2.

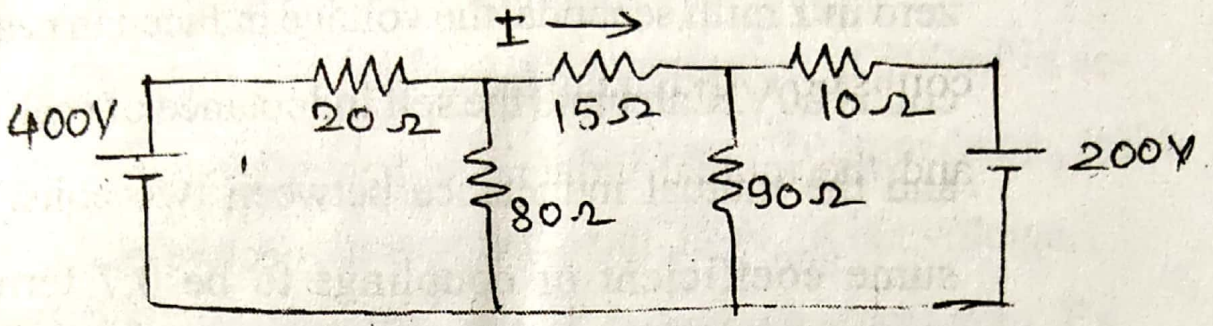

Fig 2

b. State and explain reciprocity theorem.

3. a. What is eddy current loss ? On what factors does it depend and how it can be minimized ?

b. A ring - shaped electromagnet has an air gap 6.5mm in length and 22cm^2 in area. The mean length of the iron core is 52 cm and its cross sectioned area is 11 cm^2 . Assuming the relative permeability of iron to be 1800, calculate the ampere turns required to produce a flux density of 0.55 wb/m^2 in the air gap.

OR

a. Define and explain self and mutually induced emf.

b. A coil of 250 tunns carrying a current of 2A produced a flux of 03 mwb. When the current is reduced to zero in 2 milli seconds, the voltage induced in nearby coil is 60V. Calculate the self inductance of each coil and the mutual inductance between two coils. Assume coefficient of couplings to be 0.7 termine induclance of the coil.

4. a. An RLC series circuit consists of a resistance of 1000 Ω, an inductance of 100mH, and a capacitance of 10 Pf. Determine (a) the resonant frequency, (b) the quality factor of the circuit at resonanace, (c) half power frequencies.

b. Three similar coils, each of resistance 20Ω and inductance 0.5H, are connected in (a) star, and then (b) delta, to a three phase , 440V, 50 Hz supply calculate the line current, and total power absorbed in both cases.

OR

a. Explain the admittance method of solving parallel Ac circuit, in steps giving all the formulas used.

b. An ac circuit consists of a resistance of 5Ω, and inductance of 0.1 H and a capacitance of 100mf in series. Determine (a) total reactance (b) impedance, (c) current, when supplied with 200V, 60Hz voltage.

5. a. Give the classification of measuring instrument. Explain indicating type of instrument in detail.

b. Describe the constructional details and operation of electrodynamo type meter.

OR

a. Explain the working principle of moving iron instruments give its advantages and disadvantages are moving coil ones.

b. How many types of damping is provided in measuring instruments, discuss any one in detail.

6. a. What are the different types of dc generators ? Explain with the help of diagram and voltage equation.

b. Explain the principle of working of an induction motors.

OR

a. The primary winding of a 50 Hz transformes has 480 turns and is fed from 6400v supply determine (i) maximum flux in core, (ii) secondary voltage, if secondary winding has 20 turns

b. Derive the emf equation of a dc generator.

✦✦✦