Printed Pages : 4

NEE101/NEE201

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

PAPER ID : 199227

Roll No.

B. Tech.

(SEM. II) THEORY EXAMINATION, 2014-15

BASIC ELECTRICAL ENGINEERING

Time : **3** Hours] [Total Marks : **100**

SECTION – A

Attempt all parts of this question. Each part carries equal marks. 10×2=20

1 (a) Define ideal voltage and current source.

(b) State maximum power transfer theorem.

(c) Define Form Factor and Peak Factor.

(d) A series circuit has R = 10 ohm, L = 0.02 H and C = 3 μF. Calculate Q-factor of the circuit.

(e) What is the major difference between PMMC type and dynamometer type of instruments ?

(f) Draw connection diagram for power measurement in three phase delta circuit using two wattmeter methods.

(g) Define MMF and write its unit.

(h) Draw equivalent circuit diagram of single phase transformer.

(i) Draw speed – torque characteristic of DC series motor.

(j) Write applications of single phase induction motor.

SECTION - B

Attempt any three questions from 2, 3, 4, 5 & 6. 3×10=30

2 (a) Use superposition theorem to compute the current through 1 Ω resistor of Fig. 1 5

(b) Derive the delta to star transformation. 5

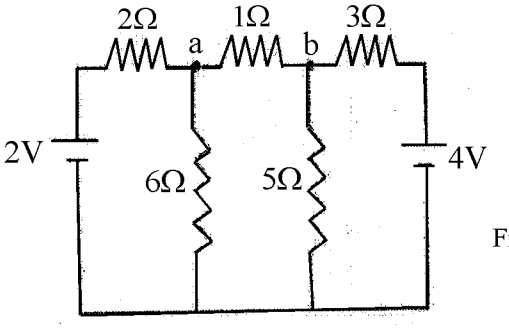

Fig.1

3 (a) Derive resonance conditions in series circuit. Also derive the expression for Bandwidth. 5

(b) A coil having a resistance of 30 Ω and inductance of 0.05 H is connected in series with a capacitor of 100 μF. The whole circuit has been connected to a single phase 230 V, 50 Hz supply. Calculate impedance, current, power factor, power and apparent power of the circuit. 5

4 (a) In the two wattmeter method of power measurement in a three phase circuit, the readings of the wattmeter's are 2000 W and 500 W. What is the total power and power factor of the load ? 5

(b) Explain with neat diagram, working principle of PMMC type electrical measuring instruments. 5

5 (a) Derive and explain the equivalent circuit of a transformer. 5

(b) Define efficiency of transformer. Find condition for maximum efficiency of transformer. 5

6 (a) Why single phase induction motor is not self-starting machine ? Explain it. 5

(b) Classify DC motors and write current and voltage equation for each type. 5

SECTION - C

Attempt any one part from each question of this section. Each part carries equal marks. 5×10=50

7 (a) Use source transformation method to compute the current through 6 Ω resistor of Fig. 2. 10

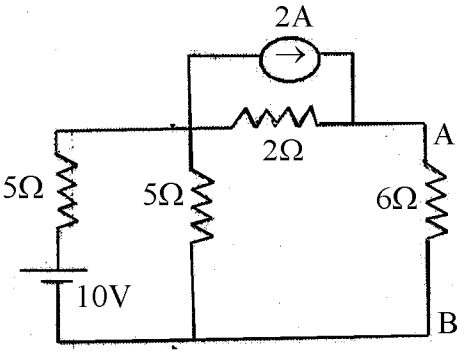

Fig.2

(b) Determine the effective resistance between terminals A-B in the network of Fig. 3. 10

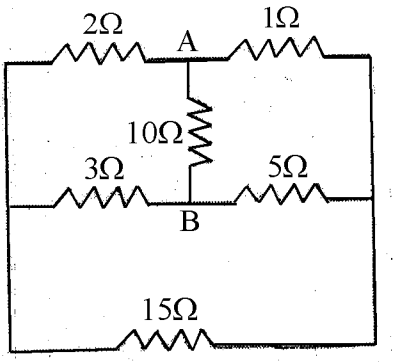

Fig.3

8 (a) Explain Parallel Resonance. A circuit of a resistance of 20 Ω, and inductance of 0.3 H and a variable capacitance in series across a 220 V, 50 Hz supply. Calculate: 10

(i) The value of capacitance to produce resonance
(ii) The voltage across the capacitance and inductance
(iii) The Q-factor of the circuit.

(b) Find form factor and peak factor for given waveform. 10

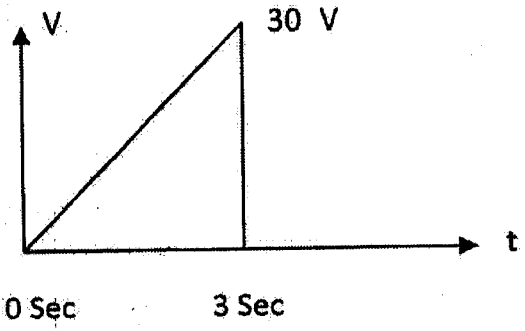

Fig.4

9 (a) Explain the principle of operation of attraction type of moving iron instruments. 10

A moving coil instrument gives a full scale deflection of 30 mA when a potential difference of 70 mV is applied. Calculate the series resistance to measure 750 V on full scale.

(b) Derive the relation between line and phase voltage and current for a delta connected 3 phase balanced system. A balanced delta-connected load of impedance, $Z=30 \angle 60^{\circ} \Omega$ is connected to line voltage of 440 V. Obtain the current and power supplied to load. 10

10 (a) A coil of 200 turns is wound uniformly on an iron ring of mean circumference 10 cm and across sectional area 5 cm^2. Current 10 Amp is flowing through coil. Relative permeability of the material is 3000. Find 10

(i) MMF (ii) Magnetizing force

(iii) Total flux (iv) Reluctance.

(b) Derive the emf equation of a single phase transformer. 10

A single phase 100 kVA, 6.6 kV/230 V, 50 Hz transformer has 90% efficiency at .8 lagging power factor both at full load and also at half load. Determine iron and copper loss at full load for transformer.

11 (a) (i) Draw and explain the torque-slip characteristics of a three phase induction motor. 10

(ii) Explain working principle of synchronous motor and two applications.

(b) (i) Find Torque equation of a dc Motor. 10

(ii) Explain the principle of operation of an Alternator.