Total No. of Questions : 8] SEAT No. :

P547 [Total No. of Pages : 3

[4456] - 104
F.E. (Semester - I & II)
BASIC ELECTRICAL ENGINEERING
(2012 Course)

Time : 2 Hours] *[Max. Marks : 50*

Instructions to the candidates:

1) *Attempt Q.No. 1 or 2, Q.No. 3 or 4, Q.No. 5 or 6, Q.No. 7 or 8.*
2) *Figures to the right indicate full marks.*
3) *Use of non-programmable pocket size scientific calculator is permitted.*
4) *Neat diagram must be drawn wherever necessary.*
5) *Assume suitable data, if necessary.*

Q1) a) Define Insulation Resistance and derive expression for it of a Cable. [6]

b) A single core cable has its conductor diameter as 2 cm and outer diameter as 5 cm. The resistivity of conductor and insulator are $1.73 \times 10^{-8}\ \Omega - m$ and $8 \times 10^{12}\ \Omega - m$ respectively. Calculate resistance of conductor and insulation for a cable of 100 meter. [6]

OR

Q2) a) Derive an expression for Energy stored in a magnetic field. [6]

b) An iron ring of mean circumference of 50 cm has an airgap of 2mm cut in it. It has circular cross section with area of $5cm^2$. It carries a coil wound with 600 turns wound uniformly. The relative permeability of iron is 580. If the coil carries a current of 2 amp. Find the Flux in air gap. [6]

Q3) a) Derive an expression of Average value of an alternating sinusoidal current. [6]

b) An inductive coil, having negligible resistance and 0.1 H inductance, is connected across a 200V, 50Hz supply. Find [6]

i) Inductive reactance.

ii) RMS value of current drawn. State equations for voltage & current.

P.T.O.

OR

Q4) a) Compare core type and shell type transformer construction. [6]

b) A 25kVA, 2200/220V 50Hz single phase transformer has a primary resistance of 1.8 Ω and a secondary resistance of 0.02 Ω. Calculate the transformer efficiency at half load 0.8 lagging p.f. The Iron Losses are 1000 watt. [6]

Q5) a) A circuit, consisting of resistance of 20 Ω and inductance of 0.1H in series, is connected across single phase 220V, 50Hz supply.

Calculate: i) Current drawn

ii) p.f. and

iii) Power consumed by ckt.

[7]

b) Define: [6]

i) Impedance and

ii) Admittance of circuit. Sketch the impedance & admittance triangles.

OR

Q6) a) Three coils each of 5Ω resistance and 6Ω inductive reactance are connected in Delta across 3 phase, 440V, 50Hz, A.C. Supply. Calculate current drawn, p.f. of system and power consumed by circuit. [7]

b) A coil of 2Ω resistance and 0.01H inductance is connected in series with a capacitor across 200V supply. What must be capacitance in order that maximum current is drawn at frequency of 50Hz. Find also voltage across capacitance. [6]

Q7) a) State and Explain Kirchhoff's laws. [8]

b) Calculate the equivalent resistance between terminals (X) and (Y) for the circuit shown in Fig. 1. [5]

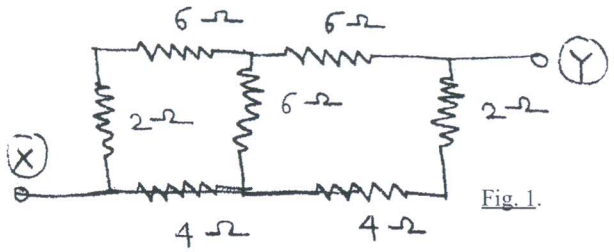
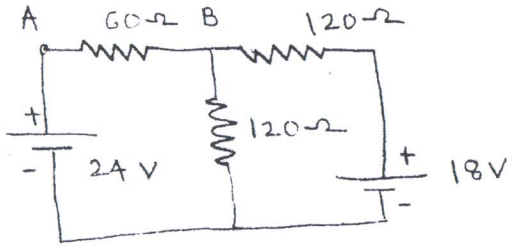


Fig. 1.

OR

Q8) a) Apply Thevenin's theorem to calculate current flowing in branch A-B as shown in Fig. 2. [8]



b) State and explain Superposition Theorem. [5]