Total No. of Questions : 4]

SEAT No. :

PE-524

[Total No. of Pages : 2

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F.E. (All Branches) (Insem.)
BASIC ELECTRICAL ENGINEERING
(2019 Pattern) (Semester - I) (103004)

Time : 1 Hour] *[Max. Marks : 30*

Instructions to the candidates :

1) ***Solve Q1 or Q2; Q3 or Q4.***
2) ***Figures to the right indicate full marks.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Assume suitable additional data, if necessary,***
5) ***Use of non-programmable calculator is allowed.***

Q1) a) Derive an expression for Energy stored per unit volume in the magnetic field. **[7]**

b) Two coils having turns 1000 and 1500 are placed on common magnetic circuit. A current of 5A in coil-1 produces a flux of 0.2mWb and 80% of this flux links to coil-2 . Find (i) Self Inductance of coil-1 (ii) Mutual Inductance between them.(iii) If this current in first coil is interrupted in o.olsec find self induced emf in coil-1 and mutually induced emf coil-2. **[8]**

OR

Q2) a) Obtain an expression for coefficient of coupling between two magnetically coupled coils in terms of self inductances and mutual inductance. **[7]**

b) A coil of N turns is wound on a cast iron ring which has a mean length of 50 cm and its cross section is of 4 cm diameter. The current flowing through the coil is 2A. which produces flux of 6 mWb in the air gap of 2mm length. The relative Permeability of the iron is 1000. Calculate (i)Reluctance of Iron path (ii) Reluctance of Air gap (iii) Total Reluctance (iv) the number of turns N. **[8]**

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Q3) a) Define the Average value and obtain the expression for Average value of sinusoidally varying alternating current in terms of its peak value. **[7]**

b) Three capacitors of 3 μF, 6 μF and 12 μF respectively are connected in series across a 350 V d.c. supply. Calculate: (i) Equivalent Capacitance (ii) the charge on each capacitor iii) the p.d. across each capacitor and (iv) the energy stored in the 6,μF capacitor. **[8]**

OR

Q4) a) Derive an expressian for Energy stored in Capacitor. **[7]**

b) A sinusoidally varying alternating voltage of 1 00V,50Hz is applied to a circuit find **[8]**

i) the mathematical equation of the voltage

ii) Time Period

iii) The instantaneous voltage when t =0.3 ms

iv) The time taken by voltage to reach 85V first time after passing through zero.

v) Average value of the voltage

vi) Maximum value of the voltage.

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