Total No. of Questions : 4]

SEAT No. :

PC377

[Total No. of Pages : 2

[6358]-108
F.E. (All Branches) (Insem)
BASIC ELECTRICAL ENGINEERING
(2019 Pattern) (Semester - I) (103004)

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

Instructions to the candidates:

1) ***Attempt Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Assume suitable data if necessary.***

Q1) a) What is electromagnetic induction? State Faraday's Laws of Electromagnetic induction. **[3]**

b) Obtain the expression for coefficient of coupling of two magnetically coupled coils. **[6]**

c) A coil of 500 turns is wound on an iron ring of circular cross sectional area 3 cm^2 and mean diameter 20 cm. The magnetic flux produced in the ring is 0.5 mWb when the coil carries 2 A current. Determine the relative permeability of the material. **[6]**

OR

Q2) a) Define magnetic field strength and state it's unit. Write an expression for magnetic field strength at any point in case of the field produced in a solenoid. **[3]**

b) Derive an expression for energy stored in an inductor and hence obtain energy stored per unit volume of it. **[6]**

c) Two perfectly coupled coils have 800 and 600 number of turns respectively. A current of 2A flowing through first coil produces magnetic flux is 5 mWb in it. **[6]**

Calculate:

i) self inductance of first coil and

ii) emf induced in both the coils if the current is turned off in 2 mS.

P.T.O.

Q3) a) Define **[3]**

i) instantaneous value

ii) maximum value and

iii) average value in case of sinusoidal alternating quantity.

b) Explain the concept of **[6]**

i) in-phase

ii) lagging phase and

iii) leading phase quantities with the help of suitable wave forms.

c) Obtain the expression for rms value of sinusoidal alternating current in terms of it's maximum value. **[6]**

OR

Q4) a) Define time constant during charging of a capacitor and state it's unit. **[3]**

b) A certain voltage waveform has form factor of 1.15 and peak factor of 1.5. If the maximum value of the voltage is 4500 V, calculate the average and rms values of the voltage. **[6]**

c) Three capacitors and connected in series across 200 V DC supply. The voltage across each capacitor is 50 V, 80 V and 70 V respectively. The charge on each plate of capacitors is 5000 μC. Determine the value of each capacitance and equivalent capacitance value of their series combination. **[6]**