Total No. of Questions :4]

SEAT No. : ____

P4

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FE/Insem./APR-4
F.E (Semester - II)
103004 : BASIC ELECTRICAL ENGINEERING
(2019 Pattern)

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

Instructions to the candidates:

1) ***Answer Q1 or Q2, Q3 or Q4.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figure to right indicate full marks.***
4) ***Use of Non-Programmable Scientific Calculators is allowed.***
5) ***Assume Suitable Data if necessary.***

Q1) a) Define the terms:

i) Reluctance ii) Magnetic Flux Density and iii) Mutual inductance **[3]**

b) Compare Electric circuit and Magnetic circuit, clearing stating similar and dissimilar points. **[6]**

c) Iron ring of mean diameter 25 cm & relative permeability of 1000 is uniformly wound with 500 turns. Find current required to produce a flux density of 1 Tesla in the ring. If an air gap of 1 mm is cut in the ring, calculate new value of current to maintain the same flux density in the ring. **[6]**

OR

Q2) a) Compare series & parallel magnetic circuits. **[3]**

b) Derive the expression for energy stored in an inductor. **[6]**

c) Two coils A & B have self inductances of 120 μH and 300 μH respectively. A current of 2 Amp in coil A, produces flux linkage of 200 μ Wb - turns in coil B. Calculate -

i) Mutual inductance ii) Coefficient of coupling k &

iii) Average emf induced in coil B, when the current in coil A is switched off in 0.05 sec. **[6]**

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Q3) a) Obtain the expression for capacitance of parallel plate capacitor. **[3]**

b) Derive the expression for rms value of a sinusoidal alternating current in terms of its peak value. **[6]**

c) Three capacitors 2 μF, 4 μF, and 6 μF, are connected in series across 200 V DC supply. Find equivalent capacitance and voltage across each capacitor. **[6]**

OR

Q4) a) An alternating voltage is given is by v=141.4 sin 377 t. Find its

i) RMS value ii) average value iii) frequency **[3]**

b) Derive the expression for average value of a sinusoidal alternating current in terms of its peak value. Also write the formula for

i) Form Factor and ii) Amplitude Factor **[6]**

c) The rms value of 50 Hz sinusoidal alternating current is 20A. At t=0, its value becomes 10A. Write down the equation for current. Also find the magnitude of current at t=6 ms. **[6]**

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