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Total No. of Questions : 4]

SEAT No. : ____

P1272

[Total No. of Pages : 2

OCT/FE/INSEM-5
F.E. (Semester - I)
BASIC ELECTRICAL ENGINEERING (All Branches)
(2019 Pattern)

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

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4.***
2) ***Neat Diagrams must be drawn wherever necessary.***
3) ***Figures to right indicate full marks.***
4) ***Use of Non-Programmable Scientific Calculators is allowed.***
5) ***Assume Suitable Data if necessary.***

Q1) a) Define reluctance. State its unit. Also state the factors on which it depends. **[3]**

b) Compare Electric and magnetic circuit stating clearly similar and dissimilar points. **[6]**

c) A coil of 500 turns is uniformly wound on iron ring of mean circumference 25 cm having area of cross section 15 cm^2 . When coil carry current of 1A, produces flux density of 0.8 T. Calculate – (i) magnetizing force H (ii) flux (iii) inductance (iv) relative permeability of iron. **[6]**

OR

Q2) a) State Faradays first and second laws of electromagnetic induction. **[3]**

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

c) An iron ring of mean diameter 20 cm has square area of cross section of 2 cm x 2 cm and is uniformly wound with 600 turns. The relative permeability of iron is 1000. Calculate (i) Self inductance of coil (ii) If permeability of iron is doubled, find new value of inductance. **[6]**

P.T.O.

Q3) a) A sinusoidally varying a.c. voltage is given by $v = 141.4 \sin (100 \pi t)$ volt. Find its (i) RMS value (ii) average value (iii) frequency **[3]**

b) Derive the expression for energy stored in Electric field. **[6]**

c) Obtain the expression for RMS value of sinusoidally varying alternating current in terms of its peak value by analytical method. **[6]**

OR

Q4) a) Covert polar to rectangular Or rectangular to polar form

(i) 5 +j10 (ii) 6-j8 (iii) $5 \angle -36.87^0$ **[3]**

b) The RMS value of 50 Hz sinusoidally varying alternating current is 20A. When t = 0, its value is 10A. Obtain the equation of current. Find the value of current when t = 0.002 second. Also sketch the waveform. **[6]**

c) Sketch the curves for voltage across the charging capacitor and charging current when charged through resistance R and connected DC voltage. Also write down the expression for (i) voltage across the capacitor (ii) charging current (iii) time constant (iv) initial charging current. **[6]**

Total No. of Questions :4]

SEAT No. : ____

P4

[Total No. of Pages : 2

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]**

P.T.O.

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]**