Total No. of Questions : 4]

SEAT No. : ____

PA-1682

[Total No. of Pages : 2

[5931]-1005

First Year Engineering (All Branches)
BASIC ELECTRICAL ENGINEERING
(2019 Pattern) (Semester - I) (103004)

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

Instructions to the candidates:

1) ***Solve Q.1 or Q.2, Q.3 or Q.4.***
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) What is magnetic effect of an electric current in case of a long straight conductor? Hence state right hand thumb rule. **[3]**

b) Distinguish between an electric circuit and a magnetic circuit; stating similarities (04 points) and dissimilarities (02 points) **[6]**

c) Two coils A and B have self-inductances of 10 μH and 40 μH respectively. A current of 2 A in coil A produces a flux a linkage of 5μWb-turns in coil B. Calculate: **[6]**

i) Mutual inductance between the coils

ii) Coefficient of coupling

iii) Average emf induced in coil B if the current of 1 A in coil A is reversed at uniform rate in 0.1 second.

OR

Q2) a) Define Self Inductance by three ways. **[3]**

b) Obtain the expression for energy stored in magnetic field produced by an inductor. **[6]**

c) An iron ring of mean circumference of 150cm and cross sectional area 12 cm^2 is wound with 600 turns of coil. The coil produces flux of 1.25 mWb while carrying a current of 2 A. Find the relative permeability of iron. **[6]**

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

i) cycle

ii) period and

iii) frequency of an alternating quantity.

P.T.O.

b) Explain the concept of lagging taking two electrical quantities with the help of their waveforms and phasor diagrams. **[6]**

c) Two capacitors of 2 μF and 8 μF are connected in series across 200 V DC supply. **[6]**

Find

i) resultant capacitance value

ii) voltage across each capacitor and

iii) charge on each capacitor.

OR

Q4) a) Obtain an expression for average value of a sinusoidal alternating current. **[3]**

b) Define the following terms in electrostatics and mention their units. **[6]**

i) Electric flux density

ii) Electric field strength

iii) Absolute permitivity

c) An alternating current varying sinusoidally with a frequency of 50 Hz has an rms value of 10 A. Write the expression for instantaneous value of this current quantity and find its value for **[6]**

i) t = 0.0015 sec

ii) t = 0.0075 sec after passing through zero and then increasing negatively.

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