Total No. of Questions : 4]

SEAT No. :

PB4

[Total No. of Pages : 2

[6267]-4
F.E (All Branches)(Insem)
BASIC ELECTRICAL ENGINEERING
(2019 Pattern) (Semester -I/II) (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 indicates full mark***
4) ***Assume suitable data, if necessary.***
5) ***Use of non-programmable electronic calculator is allowed***

Q1) a) Obtain the expression for the mutually induced emf in a coil when the neighboring coil is excited by a current. Draw the circuit diagram and mention all the natations clearly. **[7]**

b) A magnetic circuit consists of an iron ring of mean circumference 80 cm with cross sectional area 12cm^2. A current of 2 A in the magnetizing coil of 200 turns produces a total flux of 1.2mWb in the iron. **[8]**

Calculate:

i) flux density in the iron

ii) absolute and relative permeability of iron

iii) reluctance of the circuit

OR

Q2) a) Derive the expression for the energy. stored in the magnetic field of a coil and hence, the energy stored per unit volume of the circuit. **[7]**

b) Two coils having 50 and 500 turns respectively are wound side by side on a closed iron circuit of cross section 50cm^2 and mean length 120 cm. **[8]**

i) Estimate the mutual inductance between the coils if the permeability of iron is 1000.

ii) Find the self-inductance of each coil.

iii) If the current in one coil increases steadily from zero to 5 A in 0.01 second, find the emf induced in the other coil.

P.T.O.

Q3) a) What is phase? Explain the concepts of phase lag between two alternating quantities by **[7]**

i) Mathematical equations

ii) Drawing waveforms and phasor diagrams.

b) Three sinusoidally alternating currents varying at 50Hz have rms values 5 A, 7.5 A and 10 A with phase angles of 30º, – 60º and 45º respectively. **[8]**

i) Find their average values

ii) Write equations for their instantaneous values

iii) Find the instantaneous values of 10 A current at 100 mSec.

OR

Q4) a) Obtain the rms value of a sinusoidal alternating current in terms of its peak value and hence find the peak factor. **[7]**

b) A potential difference of 10 kV is applied to the terminals of a 300 pF capacitor with two rectangular plates each having an area of 100cm^2 and separated by a dielectric 1 mm thick. **[8]**

Calculate:

i) Total charge

ii) Electric flux density

iii) Relative permittivity of the dielectric

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