

Total No. of Questions : 4]

SEAT No. :

P-5371

[Total No. of Pages : 2

[6185]-54

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

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) *Solve Q1 or Q2 and Q3 or Q4.*
- 2) *Figures to the right indicate full marks.*
- 3) *Neat diagrams must be drawn wherever necessary.*
- 4) *Assume suitable data, if necessary.*
- 5) *Use of non-programmable calculator is allowed.*

- Q1)** a) Derive an expression for Energy stored per unit volume in the magnetic field. [7]
- b) Two coils having turns 1000 and 1500 are placed on common magnetic circuit. A current of 5A in coil-1 produces a flux of 0.2 mWb and 80% of this flux links to coil-2 . Find [8]
- i) Self Inductance of coil-1
 - ii) Mutual Inductance between them
 - iii) If this current in first coil is interrupted in 0.01 sec find emf induced in coil-1 and coil-2

OR

- Q2)** a) Obtain an expression for coefficient of coupling between two magnetically coupled coils. [7]
- b) i) Derive the expression for flux, for iron ring wound with N turns & current is passed through it.
- ii) Define the reluctance & state the factors on which it depends. [8]

P.T.O.

- Q3)** a) Define the RMS value of current and obtain the expression for RMS value of sinusoidally varying alternating current in terms of its peak value. [7]
- b) An air capacitor has two parallel plates of $10\text{ cm} \times 10\text{ cm}$ and plates are separated by 1 cm . Find [8]
- Capacitance
 - Potential difference, when charge of $500\ \mu\text{C}$ is applied.
 - If air is replaced by dielectric material having relative permittivity $\epsilon_r = 4$, find new value of capacitance & potential difference when same charge is applied.

OR

- Q4)** a) Explain the concept of phase lag & phase lead by using : [7]
- mathematical equations
 - waveform and
 - phasor diagram.
- b) A sinusoidally varying alternating voltage of 100 V (rms value) with 50 Hz frequency is applied to a circuit find : [8]
- The mathematical equation of the voltage;
 - Time Period
 - The instantaneous voltage when $t = 1.667\text{ ms}$;
 - The time when instantaneous voltage is 100 V ;
 - Average value of the voltage
 - Maximum value of the voltage.
