

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  $1\text{ cm}$ . Find [8]
- Capacitance
  - Potential difference, when charge of  $500\text{ }\mu\text{C}$  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  $100\text{ V}$  (rms value) with  $50\text{ Hz}$  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  $100\text{ V}$ ;
  - Average value of the voltage
  - Maximum value of the voltage.

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