

Total No. of Questions : 4]

SEAT No. :

PC49

[Total No. of Pages : 1

[63601-50

T.E. (Electronics and Telecommunication) (Insem)

ELECTROMAGNETIC FIELD THEORY

(2019 Pattern) (Semester - I) (304182)

Time : 1 Hour]

[Max. Marks : 30

Instructions to the candidates:

- 1) Answer Q.1 or Q.2, Q.3 or Q.4.
- 2) Neat diagram must be drawn wherever necessary.
- 3) Figures to the right indicate full marks.
- 4) Use of electronic pocket calculator and smith chart is allowed.
- 5) Assume suitable data if necessary.

- Q1)** a) Derive an expression for electric field intensity  $\mathbf{E}$  at any point P due to infinite long line charge with density  $\rho_L$  C/m. [7]
- b) Determine total electric field intensity  $\mathbf{E}$  at origin due to following charge distributions present in free space. [8]
- i) Point charge of 12 nC at  $(-2, 0, 6)$
  - ii) Uniform surface charge density  $0.3$  nC/m<sup>2</sup> at  $Z = 2$ .

OR

- Q2)** a) State and prove the Gauss law. [7]
- b) A Point charge of 5 nC is located at origin. If  $V = 2$  V at  $(0, 6, -8)$ , find: [8]
- i) Potential at A  $(3, 2, 6)$
  - ii) Potential at B  $(1, 5, 7)$
  - iii) Potential difference  $V_{AB}$

- Q3)** a) Find the expression for  $\mathbf{H}$  due to an infinite long straight filament carrying direct current. [7]
- b) State and explain : [8]
- i) Biot's Savart Law
  - ii) Ampere's circuit law.

OR

- Q4)** a) Obtain the expression for  $\mathbf{H}$  along the axis of a circular conductor carrying current  $\mathbf{I}$ . [7]
- b) Find magnetic field intensity  $\mathbf{H}$  at  $P(0, 0.2, 0)$  due to three current sheets of current density  $2.7$  a<sub>x</sub> A/m at  $y = 0.1$ ;  $-1.4$  a<sub>x</sub> A/m at  $y = 0.15$  and  $-1.3$  a<sub>x</sub> A/m at  $y = 0.25$ . [5]
- c) State the Maxwell's equation for static magnetic field in point form and integral form. [3]

