

Day &amp; Date: Thursday 18/09/2025

Time: 2:30 P.M- 3:30 P.M

Max Marks- 25

- Instructions:**
- 1) All questions are compulsory.
  - 2) Figures in rounded ( ) brackets within the question, indicate the scheme of marking for respective part of the question, whereas, figures in the first right column indicate total marks for that whole question.
  - 3) CO is the index number of the Course Outcome statement.
  - 4) The Bloom's taxonomy level (BL) for 1,2,3,4,5 and 6 is remember, understand, apply, analyze, evaluate and create respectively.
  - 5) Assume suitable data if necessary.
  - 6) Use of non-programmable calculators is allowed

**Answer the Following**

		Marks	BT Level	COs
Q.1	A			
	If we take the zero reference for potential at infinity, find the potential at P(0, 0, 4) caused by this charge configuration in free space:	6	BL3	CO2
	(i) 50 nC/m on the line $\rho = 6\text{ m}$ , $z = 0$			
	(ii) point charge of 60 nC at A(4, 5, -7)			
	B			
	Derive the expression of potential difference due to uniformly distributed line charge along infinite line segment.	6	BL4	CO2
	<b>OR</b>			
	B			
	Derive the expressions of potential and electric field intensity for dipole.	6	BL4	CO2

**Answer the Following**

Q.2	A			
	Derive the expression of magnetic field intensity due to a finite length current filament lying along the z-axis from $Z=Z_1$ to $Z=Z_2$	7	BL4	CO2
	B			
	Find the magnetic field intensity at point P(4, 7, 12) caused by a differential current filament $I\vec{dl} = 10a_x$ in free space located at (6, 8, 9).	6	BL3	CO2
	<b>OR</b>			
	B i)			
	A circular loop of radius $a = 6\text{ cm}$ carrying current of 4 Amp is located at $z = 0$ . Calculate magnetic field intensity at point P(0, 0, 4) cm.	3	BL3	CO2
	ii)			
	Calculate the value of the vector current density at P(12, 5, 7) if $\vec{H} = 2x^2ya_x + 5xy^2za_y - 8x^3yza_z$ A/m.	3		

