(Please write your Enrolment No. immediately) Enrolment No. 00320807822

MID TERM EXAMINATION 2023

B.TECH PROGRAMME {LE}

IIIrd Semester, 2022-2023

Paper Code: ETEC-210 **Subject: EMFT**

Time: 1½Hrs. **Max. Marks: 30**

Note: Attempt Q.No.1 which is compulsory and any two more questions from remaining.

Q.No.	Question	Max. Marks	CO(s)
1 (a)	Transform the given vector $\vec{P}$ into spherical coordinates $\vec{P} = (y+z)\vec{i}_x$.	3	1,2
1 (b)	Give mathematical statements of Coulomb's law for electric field intensity for various charge distributions.	3	1
1 (c)	Write and explain Maxwell's equations in their general integral and differential forms.	4	2
2 (a)	State and explain (i) Stoke's Theorem (ii) Divergence Theorem Give their applications in electromagnetic problems.	5	1,2
2 (b)	Verify Stoke's Theorem for the curve: $r=2$ $z=0$ $0 < \phi < \pi$ and the vector field $\vec{A}(r, \phi, z) = r^2 \sin\phi\, \vec{l}_r + r.\cos^2\phi\, \vec{l}_\phi + z.\tan\phi \vec{l}_z$	5	1,2
3 (a)	State and explain Gauss's Law in its point and integral form.	5	1
3 (b)	A spherical charge distribution is given by $\rho_0(r, \theta, \phi) = \rho_0(r)$; $r \leq a$ $= 0$; $r > a$ Find the electric field E in both regions ($r < a$ and $r > a$ using Gauss' Law in Integral form.	5	1
4 (a)	State and explain Ampere's Circuital Law in magnetostatics. What was the contribution of Maxwell in it's modified form ?	5	2
4 (b)	Consider volume current density distribution in cylindrical coordinates as $J(r, \phi, z) = 0$; $0 < r < a$ $= J_0(\frac{r}{a})\vec{l}_z$; $a < r < b$ $= 0$; $b < r < \infty$ Find the magnetic field intensity in the region $a < r < b$ using Ampere's Circuital Law.	5	2