[Total No. of Printed Pages:2] **CODE NO:- U-295**

FACULTY OF ENGINEERING

TE(EEP/EE/EEE) Examination - *DEC - 2014*

ELECTROMAGNETIC FIELD(Rev)

[Time: THREE *Hours*] **[Max. Marks: 80]**

"Please check whether you have got the right question paper."

i. Question no1 & question No.6 are compulsory

ii. Attempt any other two questions from the remaining questions of each section.

iii. Assume suitable data. Wherever necessary.

SECTION A

Q 1 Attempt any five (10)

i) Find |F| at P(-4,3,5) if vector field F= 0.4(y-2x)a$\bar{x}$- $\frac{200}{x+^2y^2+z^2}$ $\overline{az}$

ii) Given p(6,1^0,125^0,-3) and Q(3,-1,4) find. Distance P to Q.

iii) Write the expressions for differential surface areas in cylindrical co-ordinate system.

iv) State guass law.

v) What do you mean by del operator.

vi) Define the term electric potential

vii) What do you mean by electric dipole and dipole moment.

Viii) Give the physical significance of divergence.

Q2 a) Define the expression for electric field intensity due to infinite sheet of charge located in x=0 plane (07)

b) Give the cartesion components of the vector H=20 a ϱ-10aØ+392 at P(5,2,-1) (08)

Q3 a) rf. $\varrho_v = \frac{\varrho^{-2r}}{r^2}$ calculate the charge enclosed in the universe (07)

b) State and explain divergence theorem. (08)

Q4 a) Derive the expression for potential and electric field due to electric dipole. (07)

b) Given the potential field. (08)

$V=x^2yz+20y^2$ volts in free space. find

i) V at P(1,2,3)

ii) E at P

iii) $\frac{dV}{dN}$ at P

iv) a_N at P

Q5 a) Show that at the boundary between two perfect dielectric normal components of flux densities are continuous. (07)

b) The vector current density is given as (08)

$J=\left(\frac{4}{r^2}\right)$ cos ⦸ ar + 20$\boldsymbol{\varrho}^{-2r}$ sin⦸ a⦸

- r sin⦸ cos Ø a Ø A/m^2

i) find J at r=3, ⦸=0,Ø=π

ii) find the total current passing through the spherical cap r=3, 0≥⦸ ≥20^0 O≤ Ø ≤ 2π

SECTION-B

Q6 a) Attempt any five. (10)

i) State Amperes circuital law

ii) What do you mean by magnetic field intensity. write its unit.

iii) Explain why ∇.B=σ

iv) Define displacement current density

v) State the faraday's law

vi) Give the unit of μr and $\bar{M}$

vii) Define magnetic dipole moment

viii) What do you mean by solar magnetic potential.

Q7 a) Derive the integral and differential form of continuity equation. (07)

b) If H=$\frac{2}{\varrho}$ cos (0.2Ø) a$\boldsymbol{\varrho}$ calculate valve of vector current density. At print$(1.5,90^0,0.5)$ (08)

Q8 a) Define the expression for magnetic field intensity in free space due to infinite long straight filament (07)

b) A circular loop of wire of radius a lying in x-y plane with its centre at origin carries a current in +aØ direction. Using Biot savart law find if at (o,o,2) and at origin (08)

Q9 a) Derive the boundary condition's for normal and tangential components of B and H at the interface between two different magnetic materials (07)

b) Let μ_1 =4 μH/M in region 1 Z>0 and μ_2 =7μH/m in region 2 Z< 0 let K=80 ax amp/mtr. on surface Z=O if B1=2ax-3ay+az MT in region-1 find B2 (08)

Q10 Attempt any three (15)

i) explain Maxwell's equation in integral form

ii) state and explain stokes theorem

iii) state and explain bio-savarts law

iv) magnetization in magnetic material.