ID.No./Seat No. 09EL118

MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO.

SECOND TERM SECOND YEAR (4TH TERM) B.E.(ELECTRICAL)
REGULAR EXAMINATION 2010 OF 09-BATCH.

THEORY OF ELECTROMAGNETIC FIELDS

Dated: 28-11-2010. Time Allowed: 03 Hours. Max.Marks 80

NOTE: ATTEMPT ANY FIVE QUESTIONS.

Q. No.		Marks
01	(a) Discuss the theory of typical electromagnetic fields.	[8]
	(b) Find the force on charge Q_1, due to charge Q_2, where Q_1 is located at (2,1,3) and Q_2 at (1,-2,4). Q_1 =20μF and Q_2 = -30 μF	[8]
02	(a) Explain the co-ordinate system.	[08]
	(b) Convert (x,y,z) (-1,2,3) into circular cylindrical and spherical co-ordinate System.	[04]
	(c) Convert (r,θ,z) (5,π/4,6) into cartesian and spherical co-ordinate system.	[04]
03	(a) What is equi-potential surface and calculate potential at point charge.	[08]
	(b) A squire ABCD has each side of 1 meter. Four point charges of 0.01μC, -0.02 μC, 0.03μC and 0.02μC are placed at A,B,C and D respectively. Find the potential at the center of the squire.	[08]
04	(a) Discuss in detail the skin effect.	[10]
	(b) Explain magnetic shielding.	[06]
05	(a) Differentiate between conduction current and displacement current.	[06]
	(b) Determine the displacement current within a parallel plate capacitor Where $\varepsilon = 100\varepsilon_0$, S= $0.02m^2$, d=0.06mm and the capacitor voltage is 100 sin 2000 πt volts.	[10]
06	(a) Explain in detail Biot Sawart law.	[08]
	(b) Two parallel wires A and B are 20cm apart and each carries a current of 5A in the same direction. Find the magnetic flux density between the wires 5cm from wire A.	[08]
07.	Describe in detail di-electric material along with properties and uses.	[16]
08.	Write down the short notes on the following.	
	1. Ampere's Circuital Law	[05]
	2. Faraday's Law	[06]
	3. Lorentz Force equation	[05]

----------THE END----------

ID.No./Seat No.

MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO

SECOND TERM SECOND YEAR (4TH TERM) B.E.(ELECTRICAL) REGULAR EXAMINATION 2008 OF 07-BATCH

THEORY OF ELECTROMAGNETIC FIELDS

Dated: 29-11-2008. Time Allowed: 03 Hours. Max.Marks 80

NOTE: ATTEMPT ANY FIVE QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.No.		
01	(a)	What do you understand by Co-ordinate system? Discuss the types of Co-ordinate system with suitable diagrams.
	(b)	Given points A(2,5,-1) , B(3,-2,4) and C(-2,3,1) find; a. $R_{AB} . R_{AC}$; b. The angle between R_{AB} and R_{AC} c. The length of projection of R_{AB} on R_{AC}.
02	(a)	Explain the coulombs law in detail.
	(b)	A 2-mC positive charge is located in vacuum at P_1 (3,-2,-4) and a 5-μC negative charge is at P_2 (1,-4,2) . Find; a. The vector force on the negative charge b. What is the magnitude of the force on charge at P_1.
03	(a)	Explain **Gauss Law**. Describe the application of Gauss Law using symmetrical charge distribution.
	(b)	Describe the relationship between Electric flux density 'D' and Electric field intensity 'E'.
04		Determine the conductance per unit length between the inner and outer conductors of the co-axial cable as shown in fig: Assume that inner and outer conductors are constant potential surfaces of radii a and b respectively and the material between the conductors has a constant conductivity σ.
05	(a)	State and explain Biot-Savart's law.
	(b)	A filamentary current of 10A is directed in from infinity to the origin on the positive x axis, and then back out to infinity along the positive y axis. Use the Biot-Savart law to find $\vec{H}$ at P (0,0,1)
06		How the magnetic materials can be classified. Describe the industrial application of magnetic materials.

Cont'd onP/-2....

07 Draw a simple network that demonstrates **Faradays law of electromagnetic induction** and therefore explain self and mutual inductance.

08 (a) Develop an expression for Lorentz force equation.

(b) A point charge Q=30nC, is moving with a velocity of $6x10^6$ m/s in a direction specified by the unit vector $\hat{a}_v$=0.48 $\hat{a}_n$ -0.6 $\hat{a}_y$+0.64 $\hat{a}_z$.

Find the magnitude of the vector force exerted on the moving particle by the field:

(i) $\vec{B} = 2\hat{a} - 3\hat{a}y + 4\hat{a}zmT$;

(ii) $\bar{E} = 2\hat{a}x - 3\hat{a}y + 4\hat{a}zKV/m$

----------THE END----------

ID.No./Seat No. 08 EL 42

MEHRAN UNIVERSITY OF ENGINEERING AND TECHNOLOGY, JAMSHORO

SECOND TERM SECOND YEAR (4TH TERM) B.E.(ELECTRICAL) REGULAR EXAMINATION 2009 OF 08-BATCH.

THEORY OF ELECTROMAGNETIC FIELDS

Dated: 04-12-2009. Time Allowed: 03 Hours. Max.Marks 80

NOTE: ATTEMPT ANY FIVE QUESTIONS. ALL QUESTIONS CARRY EQUAL MARKS.

Q.No.

01 (a) What do you understand by vector analysis and discuss different types of coordinate system.

(b) Convert (x,y,z) = (1,2,3) into spherical and circular cylindrical coordinate system and also locate the following points (2,3,4) and (1,-2,3) in the rectangular coordinate system.

02 (a) What do you understand by electric dipole and dipole moment.

(b) Discuss electric potential and gradient of electric potential.

03. Define conduction current. Show that the displacement current in the dielectric of a parallel plate capacitor is equal to the conduction current in the leads.

04 (a) Describe in detail Gauss's law for the electrostatic field.

(b) Given the electric flux density, $\bar{D} = 0.2r^2 \hat{a}r$ nC/m^2 in free space, Determine

(i) $\bar{E}$ at point p(r=3, 0=25, ϕ=90°),

(ii) The total charge within the sphere, r=2.

(iii) The total electric flux leaving the sphere r=8.

05 (a) Discuss ampere's work law or ampere's circuital law and also calculate magnetomotive force around the long straight conductor by using ampere's circuital law.

(b) What do you mean by flux, also write down the general, physical and mathematical meaning of electric flux and discuss the condition for max: and min: flux

06 (a) What are magnetic materials which factor you will consider while selecting any magnetic material and also write down their uses.

(b) Discuss classification of the magnetic material and which material is practically used in electrical machine design and why?. Also discuss the classification of that material along with uses.

07 (a) Find the force on charge Q_1 20 μc due to charge Q_2 -300μc where Q_1 is at (0,1,2) and q2 at (2,0,0) m

(b) Discuss electric flux intensity also find e at (0,3,4) m in cartesian coordinates due to point charge Q = 0.5 μc at the origion

08. Write down short notes on four of the following

1. Magnetic shielding
2. Ferrites
3. Coefficient of coupling
4. Mutual induced emf along with three methods for calculating coefficient of mutual induced emf
5. Theory of emf
6. Force between current carrying conductor when placed in a magnetic field

----------THE END----------