INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)

Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

ASSIGNMENT

Course Name	:	**ELECTROMAGNETIC FIELDS**
Course Code	:	A30403
Class	:	II B. Tech I Semester
Branch	:	Electrical and Electronics Engineering
Year	:	2016 – 2017
Course Faculty	:	Ms.S.Ranjitha, Assistant Professor, Department of ECE

OBJECTIVES

To meet the challenge of ensuring excellence in engineering education, the issue of quality needs to be addressed, debated and taken forward in a systematic manner. Accreditation is the principal means of quality assurance in higher education. The major emphasis of accreditation process is to measure the outcomes of the program that is being accredited.

In line with this, Faculty of Institute of Aeronautical Engineering, Hyderabad has taken a lead in incorporating philosophy of outcome based education in the process of problem solving and career development. So, all students of the institute should understand the depth and approach of course to be taught through this question bank, which will enhance learner's learning process.

I. ASSIGNMENT - I

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
	ASSIGNMENT-I UNIT-I **ELECTROSTATIC FIELDS**		
1	Discuss about electric scalar potential	Remember	1
2	Calculate the field intensity at a point on a sphere of radius 3m, of a +ve charge of $2\mu C$ placed at the origin of the sphere.	Evaluate	2
3	Sketch a differential volume element in spherical coordinates (r,θ,φ) resulting from differential charges in the orthogonal coordinate systems.	Analyze	1
4	Compute the gradient of scalar system $t=x^2y+e^Z$ at point P (1, 5,- 2).	Remember	1
5	Find out the integral and differential form of Gauss law.	Analyze	2
6	Point out the potential due to an electric dipole.	Understand	1
7	Discuss about electric scalar potential	Remember	1
8	Convert the point P (5, 1, 3) from Cartesian to spherical coordinates.	Remember	1
9	Determine the potential difference between points A and B for a point charge Q.	Understand	2

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
10	Justify that electric field is conservative.	Analyze	2
11	Obtain the gradient of $V=10\ r\ \sin^2\theta\ \cos\varphi$.	Remember	1
12	A point charge +2 nC is located at origin. Determine the value of potential at P(1,0,0)m.	Remember	1
	ASSIGNMENT – II **CONDUCTORS AND DIELECTRICS**		
1	Define current density. Write the relation between current and current density.	Understand	3
2	What is polarization? Write mathematical equation for polarization.	Remember	4
3	Describe dielectric strength. Write its value for the air with unit.	Evaluate	4
4	Why the electrostatic potential is continuous at boundary?	Remember	3
5	Tell about capacitance? Write the capacitance equation of a coaxial cable.	Remember	3
6	State Uniqueness theorem.	Remember	3
7	Show continuity equation in integral and differential form. What do you understand from current continuity equation?	Remember	3
8	Identify equation of Ohm's law in point form.	Understand	4
9	Describe the boundary conditions for the conductor - free space boundary in electrostatic and interface between two dielectrics.	Understand	4
10	Summarize properties of conductor and dielectric materials.	Understand	4
11	Calculate the values of $\boldsymbol{D}$ and $\boldsymbol{P}$ for a certain linear, homogeneous, isotropic dielectric material having relative permittivity of 1.8 and electric field intensity of $4000a_y$V/m	Understand	3
12	Solve the energy stored in a 10 μF capacitor which has been charged to a voltage of 400v.	Understand	3
	UNIT-III **MAGNETO STATIC FIELDS**		
1	Define magnetic field intensity and state its unit.	Understand	5
2	State Biot-Savart's law.	Remember	6
3	Describe Ampere's circuital law.	Understand	5
4	What is scalar magnetic potential & vector magnetic potential?	Understand	5
5	Write the relation between magnetic flux and flux density.	Understand	5
6	List the applications of Ampere's circuital law.	Understand	5
7	Describe the relation between magnetic flux density and magnetic field intensity.	Understand	6
8	Discuss the term 'relative permeability'.	Understand	5
9	Interpret the point form of Ampere's circuital law.	Remember	6
10	Express magnetic field intensity H in all the regions if cylindrical conductor carriers a direct current I and its radius is 'R' m.	Remember	6
11	Draw the magnetic field pattern in and around a solenoid.	Remember	5

S. No	Questions	Blooms Taxonomy Level	Course Outcomes
12	A long straight wire carries a current I = 1 amp. At what distance is the magnetic field ***H***= 1 A/m.	Understand	5
13	A ferrite material has μr = 50 operating with sufficiently low flux densities and ***B***=0.05 Tesla. Find magnetic field intensity.	Understand	6
	ASSIGNMENT – III UNIT-IV **FORCE IN MAGNETIC FIELDS**		
1	What is Lorentz force equation for a moving charge? Give its applications.	Remember	7
2	Give an integral expression for the force on a closed circuit of a current I in the magnetic field ***H***.	Evaluate	9
3	Define magnetic dipole moment.	Remember	7
4	Describe self-inductance.	Understand	10
5	Tell about mutual inductance.	Remember	8
6	Recall is relative permeability of material?	Apply	9
7	Summarize the expression for energy stored in an inductor.	Evaluate	8
8	Discuss the importance of Lorentz force equation.	Evaluate	7
9	Classify the different types of magnetic materials.	Understand	7
	UNIT-V **TIME VARYING FIELDS**		
1	Write Maxwell's equation in point form or differential form and in integral form.	Remember	11
2	Give the situations, when the rate of change of flux results in a non- zero value.	Understand	12
3	Discuss the condition under which conduction current is equal to the displacement current.	Understand	11
4	Summarize point form of Maxwell's equation in phasor form.	Apply	12
5	Distinguish between conduction current and displacement current.	Understand	11
6	Express the Poynting theorem in point form.	Understand	13
7	Identify Maxwell's equation as derived from Ampere's law.	Understand	14
8	Find the poynting vector on the surface of a long straight conducting wire of radius 'b' and conductivity σ that carries a direct current I.	Analyze	11
9	Calculate the intrinsic impedance of free space.	Understand	12

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