INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

ELECTRICAL AND ELECTRONICS ENGINEERING

DEFINITIONS AND TERMINOLOGY QUESTION BANK

Course Name	:	**ELECTROMAGNETIC FIELDS**
Course Code	:	**AEEB10**
Program	:	**B.Tech**
Semester	:	**III**
Branch	:	**Electrical And Electronics Engineering**
Section	:	**A&B**
Academic Year	:	**2019 - 2020**
Course Faculty	:	**Dr. B. Muralidhar Nayak, Assisstant Professor, EEE** **Mr.T. Anil Kumar, Assisstant Professor, EEE**

COURSE OBJECTIVES:

The course should enable the students to:	
I	Demonstrate the concept of electrostatic field intensity and electric potential.
II	Illustrate polarization of dielectrics and the behavior of conductors and dielectrics in an electric field.
III	Understand the concept of field intensity and flux density in magnetic fields.
IV	Discuss forces in magnetic fields and laws of electromagnetic induction
V	Summarize the concept of time varying field and analyze propagation of electro-magnetic waves.

DEFINITIONS AND TERMINOLOGY QUESTION BANK

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
MODULE-I						
1	Define dot product in vector analysis.	The dot product, also called the scalar product, of two vectors is a number obtained by performing a specific operation on the vector components. The dot product has meaning only for pairs of vectors having the same number of dimensions. The symbol for dot product is a heavy dot (•).	Remember	CO 1	CLO 1	AEEB10.1
2	Define cross product in vector analysis.	The cross product a × b is defined as a vector c that is perpendicular (orthogonal) to both a and b, with a direction given by the right-hand rule and a magnitude equal to the area	Remember	CO 1	CLO 1	AEEB10.1

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		of the parallelogram that the vectors span.				
3	Write the mass of electron and proton.	Mass of , electron M_e= 9.109390×10^{-31} kg Proton M_p= 1.672623×10^{-27} kg	Remember	CO 1	CLO 1	AEEB10.1
4	Define point charge.	A charge with smallest dimensions on the body compare to other charges is called as point charge.	Remember	CO 1	CLO 1	AEEB10.1
5	Discuss about permittivity of medium.	The ability of a substance or medium to store electrical energy in an electric field.	Understand	CO 1	CLO 2	AEEB10.2
6	Define electric field.	It is the region around the point and group charges in which another charge experiences force is called as electric field.	Remember	CO 1	CLO1	AEEB10.1
7	Define electric field intensity mathematically.	Electric field intensity is defined as force experienced by point charge. E = F/q	Remember	CO 1	CLO 1	AEEB10.1
8	Name types of charge distributions .	The types of charge distribution are : Line charge, Surface charge and Volume charge.	Remember	CO 1	CLO 1	AEEB10.1
9	Write the expression for work done in electric fields.	Work done to move point charge through the existing electric field $w = -q\int \vec{E}\, dl$	Remember	CO 1	CLO 2	AEEB10. 2
10	State STOKE's theorem.	The strokes theorem says that surface integral of any function is equal to volume integral of divergence of same function. $Q = \int_s D\, ds = \int_v (\nabla . D)\, dv$	Remember	CO 1	CLO 1	AEEB10. 1
11	Resolve unit vector (direction vector) in terms of distance vector.	Unit vector in terms of distance vector is, $\hat{a}_1 = \vec{R} / R$	Remember	CO 1	CLO 1	AEEB10.1
12	Write mathematical expression of dot product.	Dot product, $A.B = \|A\|.\|B\|.\cos\Theta$. Where, A and B = vectors.	Remember	CO1	CLO 1	AEEB10.1
13	Convert	Cylindrical co-ordinates	Understand	CO 1	CLO 1	AEEB10.1

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	Cartesian co-ordinates to cylindrical co-ordinates.	,(r, Θ, z) r= √x^2+y^2 , Θ = tan^{-1}(y/x) , z = z				
14	Convert Cartesian co-ordinates to spherical co-ordinates.	Spherical co-ordinates ,(ρ, Θ, ϕ) ρ = √x^2+y^2+z^2 , Θ = tan^{-1}(y/x) , ϕ = tan^{-1}(√x^2+y^2 /z)	Understand	CO 1	CLO 1	AEEB10.1
15	Convert cylindrical co-ordinates to spherical co-ordinates.	Spherical co-ordinates , (ρ, Θ, ϕ) ρ = √r^2+z^2 , Θ = tan^{-1}(y/x) , ϕ = tan-1(r /z)	Understand	CO 1	CLO 1	AEEB10.1
16	Define unit vector. How to find unit vector along a particular vector?	A unit vector has a function to indicate the direction. Its magnitude is always unity.	Remember	CO 1	CLO 1	AEEB10.03
17	State coulombs law	Coulombs law states that force between the two point charges Q1 and Q2 Acts along the line joining the two point charges Is directly proportional to the product of the two charges. Is inversely proportional to the square of the distance between them.	Remember	CO 1	CLO 1	AEEB10.01
18	Find the force of interaction between 60 stat coulomb and 37.5 stat coulomb spaced 7.5cm apart in transformer oil(εr=2.2) in 10-4 N	We Know that 1 stat coulomb = 1/(3 X 109) C Then F = (1.998 X 1.2488 X 10-16)/(4∏ X 8.854 X 10-12 X 2.2 X (7.5 X 10-2)2) = 1.815 X 10-4 N. Therefore Force = 1.815 X 10-4 N.	Understand	CO 1	CLO 1	AEEB10.01
19	Define the effect of charge Q2 on Q1.	The force of two charges with respect with each other is given by F1 and F2. Thus F1 + F2 = 0 and F1 = -F2.	Remember	CO 1	CLO 1	AEEB10.01
20	Define scalar field.	A field is a system in which a particular physical function has a value at each and every point in that region. The distribution of a scalar quantity with a defined position in a space is called scalar field.	Remember	CO 1	CLO 2	AEEB10.01

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21	Define scaling of a vector.	This is nothing but, multiplication of a scalar with a vector. Such a multiplication changes the magnitude of a vector but not the direction.	Remember	CO 1	CLO 1	AEEB10.03
22	What are co-planar vector.	The vectors which lie in the same plane are called co-planar vectors.	Understand	CO 1	CLO 1	AEEB10.01
23	Name three coordinate systems used in electromagnetic engineering?	1) Cartesian or rectangular coordinate system. 2) Cylindrical coordinate system. 3) Spherical coordinate system.	Remember	CO 1	CLO 1	AEEB10.01
24	What are the differential elements in cylindrical system	dr-differential length in r direction rdθ -differential length in θ direction dz-differential length in z direction	Remember	CO 1	CLO 2	AEEB10.01
25	Give the types of charge distribution	1. Line charge 2. Point charge 3. Surface charge 4. Volume charge	Remember	CO 1	CLO 1	AEEB10.01
26	Define point charge.	A point charge means that electric charge which is separated on a surface or space whose geometrical dimensions are very small compared to other dimensions, in which the effect of electric field to be studied.	Remember	CO 1	CLO 1	AEEB10.03
27	What is an electric flux.	The total number of lines of force in any particular electric field is called electric flux. It is represented by the symbol (ψ) . Similar to the charge, unit of electric flux is also Coulomb.	Remember	CO 1	CLO 1	AEEB10.01
28	State the application of Gauss's law	1) The Gauss's law can be used to find E and D for symmetrical charge distributions. 2) It is used to find the charge enclosed or the flux passing through the closed surface.	Remember	CO 1	CLO 1	AEEB10.01
29	Define potential difference.	Potential difference is defined as the work done in moving a unit positive charge from one point to another point in an electric field.	Remember	CO 1	CLO 1	AEEB10.02

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
30	State the Divergence theorem.	The integral of the normal component of any vector field over a closed surface is equal to the integral of the divergence of this vector field throughout the volume enclosed by that closed surface	Remember	CO 1	CLO 1	AEEB10.03
MODULE-II						
1	Define electric dipole.	Two opposite charges +q and –q separated by some distance d forms the electric dipole.	Remember	CO 2	CLO 5	AEEB10.5
2	Explain electric dipole moment.	The distance travelled by the point charge is defined as dipole moment (or) the product of charge and distance travelled by it is called as electric dipole.	Understand	CO 2	CLO 5	AEEB10.5
3	Write expression for potential due to electric dipole.	The potential due to electric dipole, $= Kqd.\cos \Theta / (r^2 - d^2/4 \cos^2 \Theta)$	Remember	CO 2	CLO 5	AEEB10.5
4	Give the relation between electric field intensity and electric potential.	The relation between electric field intensity and electric potential, $E = - \nabla V$	Understand	CO 2	CLO 5	AEEB10.5
5	Write expression for torque due to electric dipole.	The torque due to electric dipole, $T = PE.\sin\Theta$.	Remember	CO 2	CLO 5	AEEB10.5
6	Define polarization.	If an piece if dielectric or insulator placed between the charges plates of condenser, then center of gravity of negative charges is concentrated towards positive plate and center of gravity of positives charges concentrated towards negative plate, this process of separation opposite charges is called a polarization.	Remember	CO 2	CLO 4	AEEB10.4

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
7	Define dielectric constant.	Dielectric constant is defined as ratio capacitance of capacitor with dielectric to the capacitance of capacitor without dielectric .	Remember	CO 2	CLO 6	AEEB10.6
8	Define electric susceptibit .	Electric susceptibility is the ratio of polarization and electric field intensity.	Remember	CO 2	CLO 6	AEEB10.6
9	Define capacitanc e of capacitor.	Capacitance of capacitor is defined as charge Q developed between the plates when voltage V is applied.	Remember	CO 2	CLO 6	AEEB10.6
10	Capacitan ce between parallel plates is -- --------.	Capacitance between parallel plates is $C = \varepsilon A/d$.	Remember	CO 2	CLO 6	AEEB10.6
11	Write expression for capacitance of co-axial cable.	The expression for capacitance of co-axial cable, $C = 2\pi\varepsilon / \ln(b/a)$	Remember	CO 2	CLO 6	AEEB10.6
12	Write the expression for energy stored in capacitor.	The expression for energy stored in capacitor, $= CV^2 / 2$	Remember	CO 2	CLO 5	AEEB10.5
13	Define energy density in electro-static field.	Energy density of capacitor is defined energy stored per unit volume, $W_d = DE/ 2$	Remember	CO 2	CLO 6	AEEB10.6
14	Write the relation between electric flux density and intensity.	The relation between electric flux density and intensity is, $D = \varepsilon E$	Remember	CO 2	CLO 6	AEEB10.6
15	Define current density.	If charge is distributed in the given area, then current density is defined as current constituted In given area. $J = i / A \quad (A/mt^2)$	Remember	CO 2	CLO 4	AEEB10.4
16	Define current density	Current density is defined as the current per unit area. J= I/A Amp/m2	Remember	CO 2	CLO 5	AEEB10.05
17	State point form of ohms law.	Point form of ohms law states that the field strength within a conductor is proportional to the current density.	Remember	CO 2	CLO 5	AEEB10.05

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		J=σE				
18	Write the boundary conditions at the interface between two perfect dielectrics.	i)The tangential component of electric field is continuous Et1=Et2 ii)The normal component of electric flux density is continuous Dn1=Dn2	Understand	CO 2	CLO 7	AEEB10.07
19	What are Dielectrics?	Dielectrics are materials that may not conduct electricity through it but on applying electric field induced charges are produced on its faces .The valence electron in atoms of a dielectric are tightly bound to their nucleus.	Understand	CO 2	CLO 9	AEEB10.09
20	What is a capacitor?	A capacitor is an electrical device composed of two conductors which are separated through a dielectric medium and which can store equal and opposite charges independent of whether other conductors in the system are charged or not.	Understand	CO 2	CLO 9	AEEB10.09
21	What are the factors does the capacitance depends on?	1. The permittivity of the dielectric used. 2. The area of cross section of the plates. 3. The distance of separation of the plates.	Understand	CO 2	CLO 5	AEEB10.05
22	What is meant by multiple dielectric capacitors?	The multiple dielectric capacitor is one in which the space between the plates is filled with more than one dielectrics.	Understand	CO 2	CLO 5	AEEB10.05
23	Define dielectric strength of a dielectric.	The minimum value of the applied electric field at which the dielectric breaks down is called dielectric strength of that dielectric.	Remember	CO 2	CLO7	AEEB10.07
24	State the applications of Poisson's equation and Laplace's equation.	1) To obtain potential distribution over the region. 2) To obtain E in the region. 3) To check whether given region is free of charge or not. 4) To obtain the charge induced on the surface of the region	Remember	CO 2	CLO 5	AEEB10.05
25	Define a current and its unit	The current is defined as the rate of flow of charge and is measured as Ampere's (A)	Remember	CO 2	CLO 7	AEEB10.07

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	Ampere.	current of 1 Ampere is said to be flowing across the surface when the charge of 1 coulomb is passing across the surface in 1 second.				
26	What is drift velocity?	Under the effect of applied electric field, the available free electrons start moving. The moving electrons strike the adjacent atoms and rebound in the random directions. This is called drifting of the electrons. After sometime, the electrons attain the constant average velocity called drift velocity.	Understand	CO 2	CLO 9	AEEB10.09
27	What is Polarization?	The applied field E shifts the charges inside the dielectric to induce the electric dipoles. This process is called Polarization	Understand	CO 2	CLO 7	AEEB10.07
28	What is Polarization of Dielectrics?	Polarization of dielectric means, when an electron cloud has a centre separated from the nucleus. This forms an electric dipole. The dipole gets aligned with the applied field.	Understand	CO 2	CLO 9	AEEB10.09
29	Write the expression for dielectric boundary normal to plates.	$C= \varepsilon 1A1/d + \varepsilon 2A2/d$ F	Remember	CO 2	CLO 9	AEEB10.09
30	What is the energy stored in a capacitor?	$W= ½ cv2$ J	Remember	CO 2	CLO 9	AEEB10.09
MODULE-III						
1	Define magneto-statics.	Magneto-statics is the study of magnetic field developed by the constant current through the coil Or due to permanent magnets.	Remember	CO 3	CLO 7	AEEB10. 7
2	Name the laws used in magneto-statics.	The behavior of constant magnetic field is studied by using two basic laws, they are, ➔ Bi-Savart's law ➔ Ampere's circutal law.	Understand	CO 3	CLO 7	AEEB10.7
3	Define magnetic field.	This formation magnetic from North pole to south pole ia called as magnetic	Remember	CO 3	CLO 7	AEEB10.7

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		field. The direction of magnetic flux in an coil is Given by right hand thumb rule.				
4	Define magnetic flux density.	Magnetic flux density is defined as magnetic flux per unit area. $B=\phi/A$	Remember	CO 3	CLO 7	AEEB10.7
5	Explain magnetic field intensity.	The force experienced by coil when some current passes through it is magnetic field Intensity. $H = NI / l$ (AT/mt)	Understand	CO 3	CLO 7	AEEB10.7
6	Explain permeability of core.	Permeability is the inherent property of core which helps in sustaining flux in the core. $\mu = B / H$	Understand	CO 3	CLO 7	AEEB10.7
7	Write the relation between magnetic flux density and intensity.	The relation between magnetic flux density and intensity, $B = \mu H$	Remember	CO 3	CLO 7	AEEB10.7
8	Explain intensity of magnetization.	When a magnetic substance is placed in a magnetic field it experiences magnetic momentum. The magnetic momentum per unit volume of substance is intensity of magnetization.	Understand	CO 3	CLO 7	AEEB10.7
9	Define magnetic susceptibility.	The ratio intensity of magnetization to the magnetic field intensity is called as Magnetic Susceptibility. $K = I / H$.	Remember	CO 3	CLO 7	AEEB10.7
10	Give the range of relative permeability for different magnetic material.	The range relative of permeability for different magnetic material $\mu_r > 1$, paramagnetic materials $\mu_r < 1$, diamagnetic materials $\mu_r = 0$, non-magnetic materials	Remember	CO 3	CLO 7	AEEB10.7
11	State Bio-Savart's law.	According Bio-Savart's law, dH α Idl (current element) dH α sinΘ (angle between current element and length joining point)	Remember	CO 3	CLO 8	AEEB10.8

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		dH α 1 / r^2 (square of distance between current element and point)				
12	Write the expression for magnetic field intensity due to infinite straight conductor.	The expression for magnetic field intensity due to infinite straight conductor, H = I/(2πd)	Remember	CO 3	CLO 8	AEEB10.8
13	Write the analogous of Gauss law in magneto-statics.	From the guass law we can write magnetic flux in the given Surface is surface integral of Magnetic flux density.	Understand	CO 3	CLO 8	AEEB10.8
14	State Ampere circuital law.	The ampere circuital law states line integral magnetic filed intensity around any closed path Is equal to total current enclosed in that path. ∫ H dl = I	Remember	CO 3	CLO 9	AEEB10.9
15	Write the applications of Ampere circuital law.	Applications of Ampere's law : ➔ The magnetic field intensity in the surrounding closed path is always at tangential at Each and every point on it. ➔ At each every point on the closed path magnetic field intensity has the same value.	Understand	CO 3	CLO 9	AEEB10.9
16	State Amperes Circuital Law.	Magnetic field intensity around a closed path is equal to the current enclosed by the path. H·dl=I	Remember	CO 3	CLO 7	AEEB10.013
17	State Biot – Savarts law.	It states that the magnetic flux density at any point due to current element is proportional to the current element and sine of the angle between the elemental length and inversely proportional to the square of the distance between them. dB=μ0Idl sinθ / 4πr 2	Understand	CO 3	CLO 7	AEEB10.013
18	Define Magnetic Vector Potential.	It is defined as that quantity whose curl gives the magnetic flux density. B =Ñ x A =μ / 4π J/r dv web/m2	Remember	CO 3	CLO 7	AEEB10.011
19	Define magnetic field strength.	The magnetic field strength (H) is a vector having the same	Remember	CO 3	CLO 7	AEEB10.013

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		direction as magnetic flux density. H=B/μ				
20	Write down the magnetic boundary conditions.	i) The normal components of flux density B is continuous across the boundary. ii) The tangential component of field intensity is continuous across the boundary.	Understand	CO 3	CLO 7	AEEB10.011
21	Define Magnetic flux density.	The total magnetic lines of force i.e. magnetic flux crossing a unit area in a plane at right angles to the direction of flux is called magnetic flux density. It is denoted as B .Unit Wb/m2	Remember	CO 3	CLO 7	AEEB10.013
22	Define Magnetic field Intensity.	Magnetic Field intensity at any point in the magnetic field is defined as the force experienced by a unit north pole of one Weber strength, when placed at that point. Unit: N/Wb (or) AT /m.It is denoted as H.	Remember	CO 3	CLO 7	AEEB10.015
23	What is Magnetic Field?	The region around a magnet within which influence of the magnet can be experienced is called Magnetic Field.	Understand	CO 3	CLO 7	AEEB10.013
24	Define scalar magnetic Potential.	The scalar magnetic potential Vm can be defined for source free region where J i.e. current density is zero.	Remember	CO 3	CLO 7	AEEB10.015
25	Give Gauss's law in differential form for magnetic fields	The divergence of magnetic flux density is always zero. ∇.B=0.	Remember	CO 3	CLO 7	AEEB10.013
26	State Law of conservation of Magnetic Flux.	It states that, the integral B. ds over a closed surface is always zero. $\int B.ds = 0$ This is also called Gauss's law in integral form for magnetic fields.	Remember	CO 3	CLO 8	AEEB10.013
27	State Stoke's Theorem of magnetic field.	The line integral of a vector A around a closed path L is equal to the integral of curl of A vector over the open surface S enclosed by the closed path L.	Remember	CO 3	CLO 8	AEEB10.015
28	Give the application of Stoke's theorem.	The Stoke's theorem is applicable for the open surface enclosed by the given closed path.Any volume is a closed surface and hence application of Stoke's theorem to a closed surface which enclosed certain volume produces zero answer.	Understand	CO 3	CLO 8	AEEB10.015
29	What is permeability?	In magnetostatics, the B and H are related to each other	Understand	CO 3	CLO 9	AEEB10.015

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
		through the property of the region in which current carrying conductor is placed. It is called permeability denoted as μ . It is the ability with which the current carrying conductor forces the magnetic flux through the region around it. B H= μ				
30	Give any two dissimilarities between electric and magnetic circuits	1) In electric circuit the current actually flows i.e. there is a movement of electrons whereas in magnetic circuit, due to m.m.f, flux gets established and doesn't flow in the sense in which current flows. 2) The electric lines of flux are not closed. They start from positive charge and end on negative charge and the magnetic lines of flux are closed lines.	Understand	CO 3	CLO 9	AEEB10.011
MODULE-IV						
1	Explain force on moving charge.	When an charge Q is with velocity $\vec{V}$ is placed in the magnetic field of density $\vec{B}$ then it Experiences force called as magnetic force. =QVB sinΘ	Understand	CO 4	CLO 10	AEEB10.10
2	Write neuman's formula.	Neuman's formula, $M = \int\int \mu dl_1 \, dl_2 / 4\pi r$	Remember	CO 4	CLO 12	AEEB10.12
3	Write limitations of moving charge in magnetic field.	The limitations of moving charge in the existing magnetic field, ➔ If the velocity of charge in the magnetic field is zero then force experienced also zero. ➔ If the velocity direction and magnetic field direction are parallel to each other then force Experienced is zero. ➔ To say that moving charge in the magnetic field experiences force velocity and field must be normal to each other.	Understand	CO 4	CLO 10	AEEB10.10
4	Write the expression for torque due to	The expression for torque due to moving charge,	Understand	CO 4	CLO 10	AEEB10.10

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	moving charge.					
5	Write the Lorentz force equation.	The Lorentz force is, $= Q(\vec{E} + (\vec{V}X\vec{B}))$	Remember	CO 4	CLO 10	AEEB10.10
6	Write the expression for force due to parallel straight conductors.	The expression for force due to parallel straight conductors, $(F / l) = \mu_0 I_1 I_2 / 2\Pi d$	Remember	CO 4	CLO 10	AEEB10.10
7	Define magnetic dipole.	Magnetic dipole is formed when two opposite magnetic charges are separated by distance l.Q_m.	Remember	CO 4	CLO 11	AEEB10.11
8	Write the expression for magnetic dipole moment.	The expression for magnetic dipole moment, $m = Q_m l$.	Remember	CO 4	CLO 11	AEEB10.11
9	Define magnetizatio n.	Moment per unit volume is called as magnetization.	Remember	CO 4	CLO 10	AEEB10.10
10	Write the expression for torque due to magnetic dipole.	The expression for torque due to magnetic dipole, $\vec{T} = \vec{m} \times \vec{B}$	Remember	CO 4	CLO 10	AEEB10.10
11	Give the units of scalar magnetic potential.	The units of scalar magnetic potential is Ampere.	Remember	CO 4	CLO 10	AEEB10.10
12	Write the relation between magnetic field intensity and current density.	The relation between magnetic field intensity and current density, $\nabla \times H = J$	Remember	CO 4	CLO 10	AEEB10.10
13	What is divergence of curl of vector?	The divergence of curl of any vector is zero.	Remember	CO 4	CLO 10	AEEB10.10
14	Give the expression for self inductance of solenoid.	The expression for self inductance of solenoid, $L = \mu_0 N^2 A / l$	Remember	CO 4	CLO 12	AEEB10.12
15	Give the expression for magnetic flux in N	The expression for magnetic flux in N turns if B and A are known,	Remember	CO 4	CLO 12	AEEB10.12

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	turns if B and A are known.	$\phi = NBA$				
16	What is Magnetization?	The field produced due to the movement of bound charges is called Magnetization represented by M .	Understand	CO 4	CLO 10	AEEB10.10
17	Define Reluctance.	Reluctance R is defined as the ratio of the magneto motive force to the total flux. R=em/Φ And it is measured as Ampere-turn/Weber.	Remember	CO 4	CLO 12	AEEB10.12
18	Define Magnetic dipole moment.	The Magnetic dipole moment of a current loop is defined as the product of current through the loop and the area of the loop, directed normal to the current loop.	Remember	CO 4	CLO 10	AEEB10.10
19	What are Magnetic Lines of Force?	The existence of Magnetic Field can be experienced with the help of compass field. Such a field is represented by imaginary lines around the magnet which are called Magnetic Lines of Force	Understand	CO 4	CLO 10	AEEB10.10
20	Distinguish between solenoid and toroid.	Solenoid is a cylindrically shaped coil consisting of a large number of closely spaced turns of insulated wire wound usually on a non magnetic frame. If a long slender solenoid is bent into the form of a ring and there by closed on itself it becomes a toroid.	Remember	CO 4	CLO 10	AEEB10.10
21	Write the expression for inductance of a toroid.	$L = \mu N2A/(2\pi R)$ H	Remember	CO 4	CLO 10	AEEB10.10
22	What is Lorentz force equation?	Lorentz force equation relates mechanical force to the electrical force. It is given as the total force on a moving charge in the presence of both electric and magnetic fields. F = Fe+ Fm	Remember	CO 4	CLO 10	AEEB10.10
23	What is permeability?	In magnetostatics, the B andH are related to each other through the property of the region in which current carrying conductor is placed. It is called permeability denoted as μ . It is the ability with which the current carrying conductor forces the magnetic flux through the region around it $B = \mu H$	Understand	CO 4	CLO 10	AEEB10.10
24	What are boundary	The conditions of the magnetic field existing at the	Understand	CO 4	CLO 10	AEEB10.10

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	conditions?	magnetic field existing at the boundary of the two media when the magnetic field passes from one medium to other are called boundary conditions.				
25	Give the relation between μ and H in normal component.	The tangential component of H are not continuous at the boundary. The field strengths in two media are inversely proportional to their relative permeabilities $H_{N1}/H_{N2} = \mu 2/ \mu 1$	Remember	CO 4	CLO 10	AEEB10.10
26	Give the relation between μ and H in tangential component.	The tangential component of H are continuous, while tangential component of B are discontinuous at the boundary, with the condition that the boundary is current free. $B_{tan1}/B_{tan2} = \mu 1/\mu 2$	Remember	CO 4	CLO 10	AEEB10.017
27	Write the expression for inductance of a coaxial cable.	$L = \mu d/2\pi$ ln (b/a) H	Remember	CO 4	CLO 10	AEEB10.10
28	Define Inductance.	In general, inductance is also referred as self inductance as the flux produced by the current flowing through the coil links with the coil itself.	Remember	CO 4	CLO 10	AEEB10.10
29	What is fringing effect?	If there is an air gap in between the path of the magnetic flux, it spreads and bulges out. This effect is called fringing effect.	Understand	CO 4	CLO 12	AEEB10.12
30	Write the expression for inductance of a toroid.	$L = \mu N2A/(2\pi R)$ H	Remember	CO 4	CLO 12	AEEB10.012
MODULE-V						
1	How time varying fields are developed?	Time varying fields are produced due to accelerated charges or time varying currents.	Understand	CO 5	CLO 14	AEEB10.14
2	State Faraday's law of electro-magnetic induction.	Faraday law of electro-magnetic induction states if an coil experiencies change in magnetic flux then emf is induced in it.	Remember	CO 5	CLO 13	AEEB10.13
3	State Lenz law.	Lenz law states that the cause opposes every cause of producing it.	Remember	CO 5	CLO 13	AEEB10.13
4	Write Mawell's fourth	Maxwell's fourth equation is , $\nabla xE = -dB/dt$	Remember	CO 5	CLO 14	AEEB10.14

S.No	QUESTION	ANSWER	Blooms Level	CO	CLO	CLO Code
	equation					
5	State Gauss law.	Gauss law states that surface integral of electric flux density is equal to charge enclosed in that surface.	Remember	CO 5	CLO 14	AEEB10.14
6	Name types of emf induced in coil.	The types of emf induced in the coil are, Dynamically induced emf and Statically induced emf.	Understand	CO 5	CLO 13	AEEB10.13
7	Define dynamically induced emf.	Dynamically induced emf is the emf induced in the coil when conductor cuts the flux i.e conductors are rotating and flux is constant.	Remember	CO 5	CLO 13	AEEB10.13
8	Define statically induced emf.	Statically induced emf is the emf induced in the coil when flux cuts the conductor i.e conductors are stationary and flux is variable.	Remember	CO 5	CLO 13	AEEB10.13
9	Write the maximum value of dynamically induced emf.	The maximum value of dynamically induced emf, $e = BlV$.	Remember	CO 5	CLO 13	AEEB10.13
10	Give the expression for statically induced emf.	The expression for statically induced emf, $E = N \phi_m w \cos wt$	Remember	CO 5	CLO 13	AEEB10.13
11	In time varying fields write the expression for total current density.	In time varying fields the expression for total current density is equal to sum of displacement current and conducting current, $J = J_r + J_c$	Remember	CO 5	CLO 14	AEEB10.14
12	Define displacement current density.	The displacement current density is defined as rate of change of electric flux density.	Remember	CO 5	CLO 14	AEEB10.14
13	Define conduction current density.	Conduction Current Density refers to the amount of current (charges) flowing on the surface of a conductor in a time t.	Remember	CO 5	CLO 14	AEEB10.14
14	Write the integral form	The integral form of farady's emf equation,	Remember	CO 5	CLO 13	AEEB10.13

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	of farady's emf equation.	$\int H\, dl = (\sigma + Jw\, \varepsilon) \int E\, ds$				
15	State Faraday's second law of electro-magnetic induction.	Faraday's second law of electro-magnetic induction states that magnitude of emf induced in coil is directly proportional to rate change of flux.	Remember	CO 5	CLO 13	AEEB10.13
16	Mention the properties of uniform plane wave.	At every point in space ,the electric field E and magnetic field H are perpendicular to each other. ii)The fields vary harmonically with time and at the same frequency everywhere in space.	Understand	CO 5	CLO 14	AEEB10.14
17	What is called as intrinsic impedance?	The ratio of amplitudes of E(electric field) and H (magnetic field) of the waves in either direction is called intrinsic impedance of the material in which wave is travelling. It is denoted by η.	Remember	CO 5	CLO 13	AEEB10.13
18	Define propagation constant.	Propagation constant is a complex number $\gamma = \alpha + j\beta$ where γ is propagation constant	Remember	CO 5	CLO 13	AEEB10.13
19	Define Poynting vector.	The pointing vector is defined as rate of flow of energy of a wave as it propagates. P =E X H	Remember	CO 5	CLO 14	AEEB10.14
20	State Poyntings Theorem.	The net power flowing out of a given volume is equal to the time rate of decrease of the the energy stored within the volume- conduction losses.	Remember	CO 5	CLO 14	AEEB10.14
21	Explain the steps in finite element method.	Discrimination of the solution region into elements. Generation of equations for fields at each element iii) Assembly of all elements iv) Solution of the resulting system	Understand	CO 5	CLO 13	AEEB10.13
22	What is Normal Incidence?	When a uniform plane wave incidences normally to the boundary between the media, then it is known as normal incidence.	Remember	CO 5	CLO 13	AEEB10.13
23	What is called attenuation constant?	When a wave propagates in the medium, it gets attenuated. The amplitude of the signal reduces. This is represented by attenuation constantα . It is measured in neper per meter (NP/m). But practically it is expressed in decibel (dB).	Understand	CO 5	CLO 13	AEEB10.13

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24	What is phase constant?	When a wave propagates, phase change also takes place. Such a phase change is expressed by a phase constantβ . It is measured in radian per meter (rad/m).	Remember	CO 5	CLO 13	AEEB10.13
25	How voltage maxima and minima are separated?	In general voltage minima are separated by one half wavelength. Also the voltage maxima are also separated by one half wave length.	Understand	CO 5	CLO 13	AEEB10.13
26	Define power density.	The power density is defined as the ratio of power to unit area. Power density=power/unit area.	Remember	CO 5	CLO 14	AEEB10.14
27	What is the significant feature of wave propagation in an imperfect dielectric ?	The only significant feature of wave propagation in an imperfect dielectric compared to that in a perfect dielectric is the attenuation undergone by the wave.	Remember	CO 5	CLO 14	AEEB10.022
28	Define loss tangent.	Loss tangent is the ratio of the magnitude of conduction current density to displacement current density of the medium.	Remember	CO 5	CLO 14	AEEB10.023
29	Define reflection and transmission coefficients.	Reflection coefficient is defined as the ratio of the magnitude of the reflected field to that of the incident field	Remember	CO 5	CLO 14	AEEB10.021
30	Define transmission coefficients	Transmission coefficient is defined as the ratio of the magnitude of the transmitted field to that of incident field.	Remember	CO 5	CLO 14	AEEB10.023

Signature of the Faculty **HOD, EEE**