

NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch :B.E/EEE	Year / Semester :II/III	Format No.	NAC/TLP-07a.13
Subject Code :EE8391	Subject Name :Electromagnetic Theory	Rev. No.	02
Unit No :5	Unit Name :Electromagnetic waves	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

S. No.	Objective Questions (MCQ /True or False / Fill up with Choices)	BTL
1	Electromagnetic waves are produced by a)A static charge b)An accelerated charge c)A moving charge d)Charged particles	L1
2	In electromagnetic waves the phase difference between electric field vector and magnetic field vector is a)Zero b) $\pi/2$ c) π d) $\pi/3$	L2
3.	In an electromagnetic wave in free space, the root mean square value of the electric field is 6 V/m. The peak value of the magnetic field is a)2.83 x 10⁻⁸ T b)1.51 x 10 ⁻⁸ T c)0.80 x 10 ⁻⁸ T d)4 x 10 ⁻⁸ T	L2
4.	Which of the following can be used to produce a propagating electromagnetic wave? a)Charge moving at a constant speed b)Chargeless particle c)Stationary charge d)An accelerating charge	L1
5.	To which part of the spectrum does EM waves belong if the energy of the wave is of the order of 15 KeV. a)X rays b)Infrared rays c)Ultraviolet rays d)Gamma rays	L1
6.	The ratio of the amplitude of the magnetic field to the amplitude of the electric field for electromagnetic wave propagation in a vacuum is equal to a)Unity b)Speed of light in vacuum c)Reciprocal of the speed of light in vacuum d)The ratio of magnetic permeability to electrical susceptibility in a vacuum.	L2
7.	Which of the following rays are not electromagnetic waves? a)Gamma rays b)Beta rays	L1

NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch :B.E/EEE	Year / Semester :II/III	Format No.	NAC/TLP-07a.13
Subject Code :EE8391	Subject Name :Electromagnetic Theory	Rev. No.	02
Unit No :5	Unit Name :Electromagnetic waves	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

	c)Heat rays d)X rays	
8.	Electromagnetic waves are represented in which of the following format? a) Longitudinal waves b) Transverse waves c) Sinusoidal waves d) Surface waves	L1
9.	What would be the value of length if the distance is given as 30m, $m=3$ and the change in length is 8m. a) 7.43m b) 7.34m c) 6.34m d) 5.43m	L2
10.	In a good conductor the phase relation between the tangential components of electric field E_t and the magnetic field H_t is as follows a) E_t and H_t are in phase b) E_t and H_t are out of phase c) H_t leads E_t by 90 degree d)E_t leads H_t by 45 degree	L1
11.	The skin – depth of copper at a frequency of 3 GHz is 1 micron (10 ⁻⁶ meter). At 12 GHz, for a non – magnetic conductor whose conductivity is 1/9 times that of copper, the skin – depth would be a) $\sqrt{9 \times 4}$ microns b) $\sqrt{9/4}$ microns c) $\sqrt{4/9}$ microns d) $1/\sqrt{9 \times 4}$ microns	L2
12.	A material is described by the following electrical parameters at a frequency of 10 GHz $\sigma = 106 \text{ mho/m}$, $\mu = \mu_0$ and $\epsilon/\epsilon_0 = 10$. The material at this frequency is considered to be ($\epsilon_0 = 1/36\pi \times 10^{-9} \text{ F/m}$) a) Good conductor b) Good dielectric c) Neither a good conductor nor a good dielectric d) Good magnetic material	L2
13.	A uniform plane wave in air is normally incident on an infinitely thick slab. If the refractive index of glass slab is 1.5, then the percentage of the incident power that is reflected from the air – glass interface is (a) 0% (b) 4% (c) 20% (d) 100%	L1

NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch :B.E/EEE	Year / Semester :II/III	Format No.	NAC/TLP-07a.13
Subject Code :EE8391	Subject Name :Electromagnetic Theory	Rev. No.	02
Unit No :5	Unit Name :Electromagnetic waves	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

14.	<p>Some unknown material has a conductivity of 106 mho/m and a permeability of $4\pi \times 10^{-7} \text{ H/m}$. The skin depth for the material at 1 GHz is</p> <p>a) $15.9 \mu\text{m}$ b) $20.9 \mu\text{m}$ c) $25.9 \mu\text{m}$ d) $30.9 \mu\text{m}$</p>	L2
15.	<p>A uniform plane wave in air impinges at 45° angle on a lossless dielectric material with dielectric constant ϵ_r. The transmitted wave propagates in a 30° direction with respect to the normal. The value of ϵ_r is</p> <p>a) 1.5 b) $\sqrt{1.5}$ c) 2 d) $\sqrt{2}$</p>	L2
16.	<p>A uniform plane electromagnetic wave incident normally on a plane surface of a dielectric material is reflected with a VSWR of 3. What is the percentage of incident power that is reflected?</p> <p>a) 10% b) 25% c) 50% d) 75%</p>	L2
17.	<p>A plane wave is characterized by $E^{\rightarrow} = (0.5\hat{x} + \hat{y}e^{j\pi/2})e^{j\omega t - jkz}$. This wave is</p> <p>a) Linearly polarized b) Circularly polarized c) Elliptically polarized d) Un polarized</p>	L1
18.	<p>A uniform plane wave traveling in air is incident on the plane boundary between air and another dielectric medium with $\epsilon_r = 4$. The reflection coefficient for the normal incidence is</p> <p>a) Zero b) $0.5 \angle 180^\circ$ c) $0.333 \angle 0^\circ$ d) $0.333 \angle 180^\circ$</p>	L2
19.	<p>A plane electromagnetic wave propagating in free space is incident normally on a large slab of loss – less, non – magnetic, dielectric material with $\epsilon > \epsilon_0$. Maxima and minima are observed when the electric field is measured in front of the slab. The maximum electric field is found to be 5 times the minimum field. The intrinsic impedance of the medium should be</p> <p>a) $120 \pi \Omega$ b) $60 \pi \Omega$ c) $600 \pi \Omega$ d) $24 \pi \Omega$</p>	L3

NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch :B.E/EEE	Year / Semester :II/III	Format No.	NAC/TLP-07a.13
Subject Code :EE8391	Subject Name :Electromagnetic Theory	Rev. No.	02
Unit No :5	Unit Name :Electromagnetic waves	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

20.	The law of reflection says that a)the angle of reflection from a mirror equals the angle of incidence. b)waves incident on a mirror are partially reflected. c)all waves incident on a mirror are reflected. d)the angle a ray is reflected from a mirror is random	L1	
21.	Calculate the conduction current density when the resistivity of a material with an electric field of 5 units is 4.5 units. a) 22.5 b) 4.5/5 c) 5/4.5 d) 9.5	L2	
22.	At high frequencies, which parameter is significant? a) Conduction current b) Displacement current c) Attenuation constant d) Phase constant	L1	
23.	The loss tangent of a wave propagation with an intrinsic angle of 20 degree is a) Tan 20 b) Tan 40 c) Tan 60 d) Tan 80	L2	
24.	The modes in a waveguide having a V number of 20 is a) 400 b) 200 c) 100 d) 40	L2	
25.	The distance between two terminated plates is given by the a) Guided wavelength b) 2(guided wavelength) c) Guided wavelength/2 d) (Guided wavelength)/4	L2	
26.	The total power of a wave with average power 15 units in a surface density of 0.5 units is a) 15 b) 30 c) 7.5 d) 0.75	L3	
27.	Find the power of an EM wave, given that the cross product of the E and H component is $2 + 3j$. a) 2 b) 1 c) 4	L3	

NADAR SARSWATHI COLLEGE OF ENGINEERING AND TECHNOLOGY, THENI.

Course/Branch :B.E/EEE	Year / Semester :II/III	Format No.	NAC/TLP-07a.13
Subject Code :EE8391	Subject Name :Electromagnetic Theory	Rev. No.	02
Unit No :5	Unit Name :Electromagnetic waves	Date	30.09.2020

OBJECTIVE TYPE QUESTION BANK

	d) 8	
28.	The power per unit velocity of a wave with electric field as 8 units and density 10 units is a) 40 b) 20 c) 80 d) 160	L2
29.	The Poynting vector is the power component that is calculated by the a) Product of E and H b) Ratio of E and H c) Dot product of E and H d) Cross product of E and H	L1
30.	The maximum power transceived by the antenna is in the region of a) Aperture b) Effective aperture c) Maxima lobe d) Minima lobe	L1
31.	The work done in the power transmission with E and H given by 50 and 65 respectively. The velocity of propagation is 20m/s. a) 162.5 b) 621.5 c) 562.1 d) 261.5	L3

Nadar Saraswathi College of
Engineering & Technology