Program: BE Electronics & Telecommunication Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: ECC503 and Course Name: Electromagnetic Engineering

Time: 2hours Max. Marks: 80

Q1. All the MCQs are compulsory and carry equal marks. Marks: 40

1.	Choose and justify what will be the new force, if the charges are moved to a medium having εr = 6 without changing the distance between them.
Option A:	will increase by 6 times
Option B:	will decrease by 0.166 times
Option C:	will decrease by √6 times
Option D:	will increase by 36 times
2	Determine the flux density if sheet of charge density is 25C/m^2.
Option A:	3.125
Option B:	6.25
Option C:	12.5
Option D:	25
3	Three charged cylindrical sheets ρl1 = 5 c/m at R = 6m, ρl2 = -6 C/m at R = 7m and ρl3 = -7 C/m at R = 8m. Find the flux density at R = 1m.
Option A:	3
Option B:	2
Option C:	1
Option D:	0
4	Calculate is the electric field intensity at a distance of 2m from a charge 4nC in vacuum?
Option A:	8982V/m
Option B:	7982V/m
Option C:	8992V/m
Option D:	7992V/m
5	Find the potential at origin if Six equal point charges Q = 5nC are located at 1,2,3,4,5,6, m.
Option A:	120 volts
Option B:	110 volts
Option C:	100 volts
Option D:	90 volts
6	The work done by a charge of 100μC with a potential 2.78 volts is_____ μ joule
Option A:	178

Option B:	278
Option C:	378
Option D:	478
7.	Find the field intensity after reflection. The reflected wave is at an angle of 60 degree. A wave incident on a surface at an angle 30 degree is having field intensity of 3 units
Option A:	5.46
Option B:	4.46
Option C:	6.46
Option D:	3
	46
8.	Calculate the attenuation constant of a conductor of conductivity 100 units, frequency 1000 radian/s in air.
Option A:	0.25
Option B:	0.5
Option C:	0.75
Option D:	1
9.	For a low loss line when both conductor and di-electric loss is small, the assumption that could be made is:
Option A:	$R << \omega L$ and $G << \omega C$
Option B:	$R >> \omega L$ and $G >> \omega C$
Option C:	$R << \omega C$ and $G << \omega L$
Option D:	$R >> \omega C$ and $G >> \omega L$
10.	Calculate the velocity of a wave with frequency 4×10^9 rad/s and phase constant of 2×10^8 units.
Option A:	50
Option B:	5
Option C:	20
Option D:	2
11.	Electric field and magnetic field intensities in electromagnetic wave are 10 and 6 respectively calculate the power
Option A:	120
Option B:	30
Option C:	60
Option D:	90
12.	In a two-port network, the load impedance was measured to be 75 Ω and the characteristic impedance of the transmission line was measured to be 100 Ω. Then the reflection coefficient at the load end is:
Option A:	-0.142
Option B:	0.678
Option C:	-7
Option D:	0.2345

13.	The characteristic impedance of transmission line is 2309.6 Ω at a frequency of 800MHz. At this frequency the propagation constant is 0.054(0.0366 + j0.99). Determine R.
Option A:	5.56 Ω
Option B:	6.56 Ω
Option C:	8.56 Ω
Option D:	7.56 Ω
14.	A 100 Ω microstrip line is connected to 75 Ω line. Determine SWR.
Option A:	1.33
Option B:	2.5
Option C:	0.36
Option D:	0.75
15.	An open wire telephone line has R =10Ω/km, L =0.0038 H/km, C= 0.0088 * 10^-6 F/km and G= 0.45* 10^-6. Determine characteristic impedance (Z_0).
Option A:	674 ∠ 35.37
Option B:	674 ∠ -35.37
Option C:	74 ∠ 35.37
Option D:	574 ∠ 35.37
16.	Find the Maxwell equation derived from Faraday's law.
Option A:	Div(H) = J
Option B:	Div(D) = I
Option C:	Curl(E) = -dB/dt
Option D:	Curl(B) = -dH/dt
Q17.	Find the charge density when the electric flux density is given by 2x i + 3y j + 4z k.
Option A:	10
Option B:	9
Option C:	24
Option D:	0
18.	What is the type of quantizer, if a Zero is assigned a quantization level?
Option A:	Midrise type
Option B:	Mid tread type
Option C:	Mistreat type
Option D:	None of the mentioned
19	Graphene consists...
Option A:	entirely of carbon
Option B:	of 80% carbon and 20% silicon
Option C:	of 80% carbon, 10% silicon and 10% unidentified yet
Option D:	of 80% carbon, 20% unidentified yet

20	Typically, all ESD sensitive (ESDS) items should be handled:
Option A:	Only when room ionization is utilized
Option B:	Only at an ESD control workstation
Option C:	ESDS items should never be handled
Option D:	ESDS items should be handled
Q25.	The principle of dynamically induced emf is utilized in a
Option A:	choke.
Option B:	generator.
Option C:	Transformer.
Option D:	Thermocouple.

Q. 2 Answer any two of the following **Marks [20]**

1. Find the volume charge density ρv at (1,2,3) if in free space $V=50x^2yz+20y^2$ V.

2. Show that same work is done in moving a 5μC charge from origin to P(2,-1,4) through field **E=**2xyz **ax +** x^2z **ay+** x^2y **az V/m** through the path

i) Straight line segment origin to (2,0,0) to (2,-1,0) to (2,-1,4).

ii) straight line x=-2y, z=2x.

3. Explain any two applications of electromagnetics.

Q. 3 Answer any two of the following **Marks [20]**

1) Magnetic field component of an EM wave propagating through a non- magnetic medium ($\mu = \mu_0$) is:
   $H = 25\sin(2 \quad 10^8 + 6x)\, a_y$ mwb/m
   Determine i) The direction of propagation
   i) The permittivity
   ii) Electric Field
2) State and explain any two of the Maxwell's Identities
3) Derive wave equation in free space.