Program: BE Electronics Engineering

Curriculum Scheme: Revised 2016

Examination: Third Year Semester V

Course Code: ELX503 and Course Name: Engineering Electromagnetics

Time: 1 hour Max. Marks: 50

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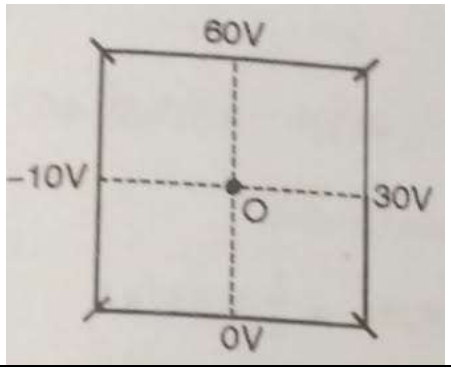
Note to the students:- All the Questions are compulsory and carry equal marks .

Q1.	Given the potential V=2*x^2y-5*x*z, find V at P(-4,3,6)
Option A:	216 V
Option B:	-216 V
Option C:	216 A
Option D:	-216 A
Q2.	Which of the following is a co-ordinate system?
Option A:	Cartesian
Option B:	Cylindrical
Option C:	Spherical
Option D:	All of the above
Q3.	A metallic sphere has a uniform surface charge density of 1 C/m^2. Determine the Electric field inside the sphere.
Option A:	1 V/m
Option B:	2 V/m
Option C:	3 V/m
Option D:	0 V/m
Q4.	In charge free space, the Poisson's equation results in which one of the following
Option A:	Continuity equation
Option B:	Maxwell equation
Option C:	Laplace's equation
Option D:	None of the above
Q5.	If the volume charge density is $8.85 \times 10^{-12}\ C/m^3$, the right-hand side of Poisson's equation will be (Assume permittivity of free space as 1)
Option A:	1
Option B:	-1
Option C:	2
Option D:	-2
Q6.	Which of the following is not a correct statement regarding boundary condition for a dielectric-dielectric interface?
Option A:	Tangential component of electric field is always continuous at the boundary

Option B:	Normal component of magnetic flux density is always continuous at the boundary
Option C:	Tangential component of magnetic field is continuous at the boundary in the absence of current density
Option D:	Normal component of electric flux density is always continuous at the boundary
Q7.	In a non-magnetic medium, the electric field intensity is given by $E = 8\cos(4 * 10^8 t - 2x)a_y \ \ V/m$. The relative permittivity of the medium will be
Option A:	1.5
Option B:	2.25
Option C:	0.44
Option D:	225
Q8.	If a plane electromagnetic wave satisfies the equation $\frac{\partial^2 E_z}{\partial z^2} = c^2 \frac{\partial^2 E_z}{\partial t^2}$, the wave propagates in the
Option A:	x direction
Option B:	z direction
Option C:	y direction
Option D:	xy plane at an angle of 45 degrees between z and x direction
Q9.	A uniform plane wave in air impinges at a 45 degrees angle on a lossless dielectric non -magnetic media. The transmitted wave propagates in a 30 degrees direction with respect to the normal. The value of the relative dielectric constant is
Option A:	1.5
Option B:	$\sqrt{1.5}$
Option C:	2
Option D:	$\sqrt{2}$
Q10.	The unit of magnetic field intensity H is
Option A:	Wb/m^2
Option B:	A/m
Option C:	V/m
Option D:	N/C
Q11.	Which of the following can be concluded from Maxwell's equations?
Option A:	Electric and magnetic fields are interdependent
Option B:	Magnetic poles cannot be separated
Option C:	Existence of displacement current density along with conduction current density
Option D:	All of the above
Q12.	Which of the following are the boundary conditions for solving partial differential equations?
Option A:	Dirichlet boundary conditions
Option B:	Neumann boundary conditions
Option C:	Mixed boundary conditions
Option D:	All of the above

Q13.	A square conducting trough has its four sides held at potentials as shown in figure. Find the potential at the centre 
Option A:	20 V
Option B:	40 V
Option C:	60 V
Option D:	80 V
Q14.	Maximum usable frequency of an ionospheric layer at 60 degrees incidence and 8 MHz critical frequency is
Option A:	9.24 MHz
Option B:	16 MHz
Option C:	8 MHz
Option D:	6.93 MHz
Q15.	The F_1 layer of the atmosphere has a height of 400 km and electron density 10^{11} /m^3. What will be the skip distance for a 10 MHz radiated wave?
Option A:	2659 km
Option B:	2695 km
Option C:	9625 km
Option D:	9265 km
Q16.	The upper part of the atmosphere where the ionisation is appreciable is known as
Option A:	Stratosphere
Option B:	Ionosphere
Option C:	Troposphere
Option D:	Mesosphere
Q17.	For any given time, each ionospheric layer has a maximum frequency at which radio waves can be transmitted vertically and reflected back to earth. This frequency is known as
Option A:	Maximum usable frequency
Option B:	Critical frequency
Option C:	Cut-off frequency
Option D:	Minimum usable frequency
Q18.	A high frequency communication link is to be established between two points on

	the earth 2000 km away. If the reflection region of the ionosphere is at a height of 200 km and has a critical frequency of 5 MHz, calculate MUF for the given path.
Option A:	25.495 MHz
Option B:	25.495 Hz
Option C:	25.495 kHz
Option D:	25.495 GHz
Q19.	The voltages and currents on a transmission line are in the form of
Option A:	Differential equations
Option B:	Difference equations
Option C:	Quadratic equations
Option D:	Cubic equations
Q20.	Transit time effect is dominant
Option A:	When the frequency is low
Option B:	When the frequency is high
Option C:	When the length of the transmission line is high enough
Option D:	Both b and c
Q21.	Which of the following are the primary constants of a transmission line?
Option A:	R, L, G, C
Option B:	γ, Z_0
Option C:	$\gamma, VSWR$
Option D:	R and L
Q22.	When the transmission line is distortionless,
Option A:	$\frac{R}{L} = \frac{G}{C}$
Option B:	$\frac{R}{C} = \frac{G}{L}$
Option C:	$\frac{L}{R} = \frac{G}{C}$
Option D:	$\frac{C}{R} = \frac{G}{L}$
Q23.	A transmission line has R = 0.1 ohms/m, G = 0.01 mho/m, L = 0.01 $\mu H/m$, C = 100 pF/m. Find the characteristic impedance of the line at 2 GHz
Option A:	100+j0.716 ohms
Option B:	100+j0.716 ohms/m
Option C:	10+j0.0358 ohms
Option D:	10+j0.0358 ohms/m
Q24.	The reactance in the upper half portion of the Smith chart is
Option A:	Zero
Option B:	Positive
Option C:	Negative
Option D:	None of the above

Q25.	Two charges of 1 C are placed in air such that the distance between them is $\sqrt{\{9 * 10^9\}}$. Determine the magnitude of force exerted on each of them
Option A:	2 N
Option B:	1 N
Option C:	0.5 N
Option D:	4 N