University of Mumbai
Examination 2020 under cluster 4 (PCE)

Program: BE Electronics & Telecommunication Engineering
Curriculum Scheme: Rev2016
Examination: Third Year Semester V
Course Code: ECC503 and Course Name: Electromagnetic Engineering

Time: 1 hour   Max. Marks: 50
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Note to the students: - All the Questions are compulsory and carry equal marks .

Q1.	The phase shift in electric & magnetic fields in an electromagnetic wave is given by
Option A:	Phase Constant
Option B:	Attenuation constant
Option C:	Propagation Constant
Option D:	Intrinsic Impedance
Q2.	When the electric field becomes zero E = 0, then which of the following relations hold true?
Option A:	E = P
Option B:	D= P
Option C:	B = P
Option D:	H = P
Q3.	The phenomenon of skin effect is deliberately used in
Option A:	Electrostatic shielding
Option B:	Polywells
Option C:	Ink jet printer
Option D:	RF MEMS
Q4.	Two identical circular coaxial coils carry the same current I but in opposite directions. The magnitude of magnetic field B at a midpoint of the axis is
Option A:	Twice that produced by one coil
Option B:	Same as that produced by one coil
Option C:	Zero
Option D:	Half that produced by one coil
Q5.	The work done by a charge of 10μC with a potential of 4.386V is
Option A:	43.86μJ
Option B:	32.6μJ
Option C:	54.68 μJ
Option D:	65.684 μJ

Q6.	A non-magnetic medium has an intrinsic impedance of $250/\_35°$. The loss tangent of the medium is
Option A:	0.5
Option B:	1.732
Option C:	2.74
Option D:	0.7
Q7.	Find the power reflected in a transmission line, when the reflection coefficient and input power are 0.45 and 18V respectively.
Option A:	3.645
Option B:	6.453
Option C:	4.563
Option D:	5.463
Q8.	The intrinsic impedance for a lossless nonmagnetic medium with relative dielectric constant of 2.53 is
Option A:	300Ω
Option B:	237Ω
Option C:	377Ω
Option D:	474Ω
Q9.	Which of the following theorem convert volume integral to surface integral?
Option A:	Divergence theorem
Option B:	Stoke's theorem only
Option C:	Green' s theorem only
Option D:	Stoke's and Green's theorem
Q10.	The skin depth of conductor with attenuation constant of 6 Nepers/m is
Option A:	12
Option B:	36
Option C:	6
Option D:	1/6
Q11.	For a lossless transmission line
Option A:	$R = 0; G \neq 0$
Option B:	$L = C = 0$
Option C:	$R = G = 0$
Option D:	$R \neq 0; G \neq 0$
Q12.	Calculate the emf when a coil of 100 turns is subjected to a flux rate of 0.3

	tesla/sec.
Option A:	3
Option B:	-30
Option C:	-300
Option D:	-400
Q13.	Memristor behaves as
Option A:	Charge controlled capacitor
Option B:	Nonlinear resistor
Option C:	Inductor
Option D:	Diode
Q14.	Calculate the Electric dipole moment of a dipole with equal charges 4C and -4C separated by a distance of 2cm.
Option A:	0.04 C-m.
Option B:	0.08 C-m.
Option C:	0.06 C-m.
Option D:	0.02 C-m.
Q15.	Inside a good conductor, the magnetic field lags electric field by
Option A:	0°
Option B:	30°
Option C:	45°
Option D:	60°
Q16.	The correct Laplace's equation is
Option A:	$\nabla^2 V = -\dfrac{\rho_v}{\varepsilon}$
Option B:	$\nabla^2 V = 0$
Option C:	$\nabla^2 V = \dfrac{\rho_v}{\varepsilon}$
Option D:	$\nabla^2 V = E$
Q17.	The Poynting vector P is a power flow vector whose
Option A:	direction is randomly oriented with the direction of wave propagation.
Option B:	direction is same as the direction of wave propagation
Option C:	direction is opposite to the direction of wave propagation
Option D:	direction is perpendicular to the direction of wave propagation
Q18.	Find the characteristic impedance of a quarter wave with input and load impedances given by 50 and 25 respectively

Option A:	50
Option B:	25
Option C:	75
Option D:	35.5
Q19.	Find the electric potential for an electric field 10 V/m at a distance of 2m.
Option A:	20 V
Option B:	10 V
Option C:	15 V
Option D:	18 V
Q20.	The time domain expression for the magnetic field of a plane wave travelling in a non-magnetic medium is given by $\mathbf{H}(\mathbf{y}, \mathbf{t}) = 2\cos(6\pi \times 10^8 \, t - 10.2\mathbf{y})\, \mathbf{z}$ A/m. Find the direction of propagation of the wave.
Option A:	y-direction
Option B:	x-direction
Option C:	z-direction
Option D:	cannot be specified
Q21.	Ampere law states that,
Option A:	Divergence of $\mathbf{H}$ is same as the flux
Option B:	Curl of $\mathbf{D}$ is same as the current
Option C:	Divergence of $\mathbf{E}$ is zero
Option D:	Curl of $\mathbf{H}$ is same as the current density
Q22.	When the length of the transmission line is same as that of the wavelength, then which condition holds good?
Option A:	$Z_{in} = Z_0$
Option B:	$Z_{in} = Z_0 Z_L$
Option C:	$Z_L = Z_0$
Option D:	$Z_{in} = Z_L$
Q23.	Find the magnetic field of a finite current element with 2A current and height $1/2\pi$ is
Option A:	1
Option B:	2
Option C:	3
Option D:	4
Q24.	The electric field intensity in polystyrene ($\varepsilon r = 2.55$) filling the space between the plates of parallel plate capacitor is 10 kV/m. The distance between plates is 1.5mm. Calculate D.

Option A:	137 nC/m^2
Option B:	225.4 nC/m^2
Option C:	300nC/m^2
Option D:	325 nC/m^2
Q25.	Transmission line characteristics repeats after every----- distance and inverts after ---- distance.
Option A:	λ, $\lambda/4$
Option B:	$\lambda/2$, $\lambda/4$
Option C:	2λ, λ
Option D:	$3\lambda/2$, $\lambda/2$

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Question	Correct Option (Enter either 'A' or 'B' or 'C' or 'D')
Q1.	D
Q2.	B
Q3.	A
Q4	C
Q5	A
Q6	C
Q7	A
Q8.	B
Q9.	A
Q10.	D
Q11.	C
Q12.	B
Q13.	B
Q14.	B
Q15.	C
Q16.	B
Q17.	B
Q18.	D
Q19.	A
Q20.	A
Q21.	D
Q22.	D
Q23.	A
Q24.	B
Q25.	B