

University of Mumbai
Examination 2022 under Cluster
(Lead College:)

Examinations Commencing from 17th May 2022

Program: **Electronics Engineering**

Curriculum Scheme: Rev-2019

Examination: **T.E. Semester VI**

Course Code: **ELC602**

Course Name: **Electromagnetic Engineering**

Time: 2:30-hour

Max. Marks: 80

N.B. Use Smith Chart to solve transmission line Problem

Q1	Choose the correct option for following questions. All the Questions are compulsory and carry equal marks (20 Marks)
1.	Find the force in N between $Q1 = 2C$ and $Q2 = -1C$ separated by a distance 1m in air.
Option A:	$18 \times 10^6 \text{ N}$
Option B:	$-18 \times 10^6 \text{ N}$
Option C:	$18 \times 10^{-6} \text{ N}$
Option D:	$-18 \times 10^{-6} \text{ N}$
2.	Gauss's law is true only if force due to a charge varies as
Option A:	r^{-1}
Option B:	r^{-3}
Option C:	r^{-2}
Option D:	r^{-4}
3.	Find the displacement current when the flux density is given by t^3 at 2 seconds
Option A:	12
Option B:	6
Option C:	3
Option D:	27
4.	The magnetic vector potential for a line current will be inversely proportional to
Option A:	dl
Option B:	I
Option C:	J
Option D:	R
5.	Displacement current depends on
Option A:	Moving Charges
Option B:	Change in time
Option C:	Moving Charges and Change in time
Option D:	Differential Moving Charges and cumulative time period
6.	The inductance of single-phase, two-wire transmission line per kilometer gets doubled when the
Option A:	Distance between the wires is increased as square of original distance

Option B:	Distance between the wires is doubled
Option C:	Distance between the wires is increased four fold
Option D:	Radius of the wire is doubled
7.	The characteristic impedance of a transmission line with impedance and admittance of 16Ω and 9 S respectively is
Option A:	0.75
Option B:	1.33
Option C:	7
Option D:	25
8.	The ratio of radiation intensity in a given direction from antenna to the radiation intensity over all directions is called as
Option A:	Gain of antenna
Option B:	Radiation power density
Option C:	Array Factor
Option D:	Directivity
9.	In which of the following the power is radiated through a complete spherical surface
Option A:	Half-wave dipole
Option B:	Quarter-wave Monopole
Option C:	Both Half-wave dipole & Quarter-wave Monopole
Option D:	Full wave dipole
10.	The effects of EMI can be reduced by
Option A:	Suppressing emissions
Option B:	Reducing the efficiency of the coupling path
Option C:	Suppressing emissions, Reducing the efficiency of the coupling path and Reducing the susceptibility of the receptor
Option D:	Increasing the efficiency of the coupling path and emissions

Q2.	Solve any Two of the Following	20 Marks
A	Derive an expression of Electric Field Intensity due to infinite line charge at any point P on z-axis.	
B	A lossless transmission line with $Z_0 = 50 \Omega$ is 30 m long and operates at 2 MHz. The line is terminated with a load $Z_L = 60 + j40 \Omega$. If $u = 0.6c$ on the line, where c is velocity of light. Use Smith Chart to find (a) The reflection coefficient Γ (b) The standing wave ratio s (c) The input impedance Z_i	
C	Write Maxwell's equations in time harmonic field form	

Q3.	Solve any Two of the Following	20 Marks
A	State and explain Maxwell's equations for differential and integral form for static field.	
B	State Poynting theorem and derive an expression for the Poynting vector. Explain the power terms mentioned in the derivation	

C	Derive an expression for transmission line equation for two wire line problem.
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Q4.	Solve any Two of the Following	20 Marks
A	Explain the terms radiation pattern, directivity, Beam-width and directive gain of the antenna.	
B	Explain in detail the sources and the characteristics of EMI. EMI control techniques.	
C	Write Short Notes on: (1) Horn Antenna (2) Microstrip Antenna	