Paper id: 250874

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM VI) THEORY EXAMINATION 2024-25
ANTENNA AND WAVE PROPAGATION

TIME: 3 HRS **M.MARKS: 100**

Note: Attempt all Sections. In case of any missing data; choose suitably.

SECTION A

1. Attempt *all* questions in brief. **2 x 10 = 20**

Q No.	Question	CO	Level
a.	Why magnetic monopole does not exist	1	K2
b.	Find out the radiation resistance of a λ/16 wire dipole in free space	2	K2
c.	Calculate the length of a half wave dipole antenna meant to have correct half wave length at 60 MHz	2	K2
d.	Calculate the power being radiate by an antenna having a radiation resistance of 50 Ohms and is drawing a current of 8A	2	K2
e.	How much current does an antenna draw when radiating 1000W and is having a radiation resistance of 300 Ohms	3	K2
f.	Calculate the maximum effective aperture area of antenna which is operating at a wavelength of 2 meters and has a directivity of 100	3	K2
g.	Define Virtual Height	5	K2
h.	What is Magneto Ionic Splitting?	5	K2
i.	Write down the features of divergence theorem	1	K2
j.	Define Magnetic Flux Density.	1	K2

SECTION B

2. Attempt any *three* of the following: **10 x 3 = 30**

Q No.	Question	CO	Level
a.	Calculate the effective aperture of a half wave dipole	2	K2
b.	Derive the expression for the E-field of a short dipole	2	K2
c.	Explain the array of N- sources of equal amplitude and spacing- End fire direction of pattern maxima ii. Direction of pattern minima	4	K2
d.	Three parallel line charges, ρ_{L1} = 5nC/m, ρ_{L2} = 4 nC/m and ρ_{L3} = -6 nC/mare located at (0, 0), (3, 0) and (0, 4) m, respectively. FindD and E at (3, 4).	1	K2
e.	Show that the energy of EM wave is equally divided betweenelectric and magnetic fields	1	K2

SECTION C

3. Attempt any *one* part of the following: **10 x 1 = 10**

Q No.	Question	CO	Level
a.	Determine the maximum distance between Tx and Rx for the curvedsurface of the Earth in Space Wave Propagation.	5	K2
b.	Explain the effect of Earth's Magnetic Field on Radio wavePropagation also calculate the minimum frequency	5	K2

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4. Attempt any *one* part of the following: 10 x 1 = 10

Q No.	Question	CO	Level
a.	Derive the expression for the far field pattern of an array of2–isotropic point sources forequal amplitude and phase	3	K2
b.	With a suitable diagram, discuss the construction and operation of aYagi-Uda antenna	4	K2

5. Attempt any *one* part of the following: 10 x 1 = 10

Q No.	Question	CO	Level
a.	Explain the array of N- sources of equal amplitude and spacing- Broad side case	4	K2
b.	Derive an expression for electric field intensity due to an infiniteuniformly charged sheet.	2	K2

6. Attempt any *one* part of the following: 10 x 1 = 10

Q No.	Question	CO	Level
a.	Derive the expression for H on the axis of circular loop carrying asteady current I.	2	K2
b.	Write down the differential form of All Maxwell's Equations and alsoexplain the physical significance of each	2	K2

7. Attempt any *one* part of the following: 10 x 1 = 10

Q No.	Question	CO	Level
a.	Determine the force on a point charge of 5 nC at (0, 0, 5) m due touniformly distributed charge of 5 mC over a circular disc of radius $r \leq 1$ m in $z = 0$ plane.	1	K2
b.	Write Short notes on followings: (i) Skip Distance (ii) Antenna efficiency	5	K2