Paper id: 250869

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

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

TIME: 3 HRS **M.MARKS: 70**

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

SECTION A

1. Attempt *all* questions in brief. **02 x 7 = 14**

Q no.	Question	CO	Level
a.	What is End fire array and draw its radiation pattern?	4	K2
b.	What are the applications of Helical antenna?	4	K2
c.	Distinguish between the conduction current anddisplacement current	2	K2
d.	Why magnetic dipole does not exist?	2	K2
e.	Define VSWR	3	K2
f.	Define beam solid angle and antenna beam efficiency.	3	K2
g.	What are the various modes of Propagation?	5	K2

SECTION B

2. Attempt any *three* of the following: **07 x 3 = 21**

Q no.	Question	CO	Level
a.	State and explain the divergence theorem. Illustrate its application using a suitable example.	2	K2
b.	Explain the array of N- sources of equal amplitude and spacing- End fire case, also calculate thedirection of pattern minima	4	K2
c.	Draw the structure of Log- periodic antenna also explain the why we called it frequencyindependent antenna?	4	K2
d.	If $V = e^{-z} \sin 2x \cosh y$, $P = x^2 yz\, a_x + xz\, a_z$ and $Q = \rho \sin\Phi\, a_\rho + \rho^2 z\, a_\Phi + z \cos\Phi\, a_z$. Determine: (i) Gradient of the V (ii) Divergence of Q (iii) Curl of P	1	K2
e.	Define electric potential. Derive an expression for potential due to point charge	2	K2

SECTION C

3. Attempt any *one* part of the following: **07 x 1 = 07**

Q no.	Question	CO	Level
a.	Draw the structure of 3-elements Yagi-Uda antenna and give the dimensions and spacing between the elements in terms of wavelength?	4	K2
b.	Write short notes [any two] (a) Physical significance of divergence and curl (b) Displacement current. (c) Physical significance of Maxwell IV th equation	1	K2

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4. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Find out the vector magnetic potential due to the followings; i) Line current ii) circular current loop	2	K2
b.	Derive an expression for the power radiated by the current element and calculate the radiationresistance	3	K2

5. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Show that the Effective Earth's Radius in Space Wave Propagation is; $R_{eff} = 4/3R$ Where R=actual radius of earth	5	K2
b.	Derive an expression for the electric field and magnetic field due to a current element at adistance point in free space.	2	K2

6. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	Derive the differential form of all Maxwell's Equations andexplain the physical significance	2	K2
b.	Explain the effect of Earth's Magnetic Field on Radio wavePropagation	5	K2

7. Attempt any *one* part of the following: 07 x 1 = 07

Q no.	Question	CO	Level
a.	With a suitable diagram explain the construction and principle ofoperation of log–periodic antenna	4	K2
b.	Explain briefly the various modes of Propagationalso describe Ground Wave Propagation in detail.	5	K2