PAPER ID-420864

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

BTECH
(SEM VI) THEORY EXAMINATION 2021-22
ANTENNA AND WAVE PROPAGATION

Time: 3 Hours ***Total Marks: 100***

Note: Attempt all Sections. If you require any missing data, then choose suitably.

SECTION A

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

Qno	Questions	CO
(a)	Define irrotational fields.	1
(b)	Define divergence.	1
(c)	Discuss electric field intensity.	2
(d)	Discuss the nature of magnetic flux of lines.	2
(e)	Discuss solid angle and beam area.	3
(f)	List the various parameter of principal radiation pattern	3
(g)	Design a log periodic antenna.	4
(h)	Examine the major advantage of folded dipole antenna.	4
(i)	Determine critical frequency for reflection at vertical incidence if the maximum value of electron density is $1.24*10^{-6}cm^{-3}$?	5
(j)	Illustrate surface wave propagation	5

SECTION B

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

Qno	Questions	CO
(a)	Illustrate Stokes theorem and Divergence Theorem.	1
(b)	Demonstrate the magnetic field due to a finite line conductor having current I.	2
(c)	Derive antenna temperature and its relation with the signal to noise ratio (SNR) of the given antenna.	3
(d)	Analyze Horizontal antennas above a plane ground.	4
(e)	Demonstrate Skip distance and optimum frequency.	5

SECTION C

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

Qno	Questions	CO
(a)	Illustrate line, surface and volume integrals.	1
(b)	Describe the significance of the curl of a vector.	1

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

Qno	Questions	CO
(a)	Demonstrate dielectric –dielectric and dielectric free space boundary conditions for magnetic fields.	2

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(b)	A circular ring of radius a carries a uniform charge ρ_L C/m and is placed on the xy-plane with axis the same as the z-axis. Demonstrate: **(a)** The electric field due to this ring at a height h along its axis. **(b)** What value of h gives the maximum value of electric field? If the total charge on the ring is Q. Find electric as radius of the ring tends to zero.	2

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

Qno	Questions	CO
(a)	Explain Friss transmission formula mathematically.	3
(b)	Explain fields from oscillating dipoles. Describe directivity of an antenna and find the relationship between directivity and gain of antenna.	3

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

Qno	Questions	CO
(a)	Demonstrate the fields of a short dipole.	4
(b)	Demonstrate the radiation pattern of an array of 8 isotropic point sources separated by λ/2 distance and in phase with the help of pattern multiplication.	4

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

Qno	Questions	CO
(a)	Illustrate the skip distance for region between transmitter and receiver using sky wave propagation, when curvature of earth is taken into consideration.	5
(b)	Illustrate the expression for refractive index of ionosphere and critical frequency.	5