

Roll No.

Total No. of Pages : 02

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B.Tech.(ECE) (Sem.-4)
ELECTROMAGNETICS AND ANTENNAS

Subject Code : BTEC-403

M.Code : 57595

Date of Examination : 13-06-2023

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

SECTION-A

1. Answer briefly :

- a) Calculate the critical frequency for a medium at which the wave reflects if the maximum electron density is 1.24×10^6 electrons/cm³.
- b) A radio station radiates a total power of 10KW and a gain of 30. Find the field intensity at a distance of 100km from the antenna. Assume free space propagation.
- c) Write down the Maxwell's equation in differential form.
- d) What is the condition for low loss transmission line?
- e) What is Brewster angle?
- f) Define Scanning array.
- g) Define Virtual height.
- h) Define phase centre of a horn antenna.
- i) Outline the principle of working of a phased array.
- j) Differentiate between conduction current and displacement current.

SECTION-B

2. Discuss the electromagnetic wave propagation in conducting medium and dielectric medium.
3. Describe the working of slot and reflector antenna.
4. Discuss in detail the effects of earth's magnetic field on ionospheric radio waves.
5. Derive the Friss Transmission formula. Discuss its significance.
6. Discuss in detail field equivalence principle.

SECTION-C

7. Derive the field component when the wave is propagating in rectangular waveguide with the TE mode of propagation.
8. Obtain the excitation coefficients of a nine element binomial array.
9. Describe the following with respect to the propagation of radio waves:
 - a) Skip Distance
 - b) Critical Frequency.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.