

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 : 07-07-22

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. a) The VSWR of a lossless transmission line is 5. Find the magnitude of reflection coefficient.
b) What is the highest frequency that will be returned to earth 1000km from the transmitter by the E layer?
c) Consider a lossless antenna with a directive gain of +6dB. If 1 mW of power is fed to it. Find the total power radiated by the antenna.
d) Distinguish between far field and near field.
e) Differentiate between TE and TM wave.
f) What is the significance of duct propagation?
g) Define surface impedance.
h) Outline the properties of a uniform plane wave.
i) State Babinet's principle and specify where it is applied.
j) The critical frequency at a particular time is 11.6 MHz. What is the MUF for a transmitting station if the required angle of incidence for propagation to a desired destination is 70° .

SECTION-B

2. Describe the working of slot and reflector antenna.
3. Show that the directivity of a half wave dipole is 1.644.
4. Write a short note on Smith Charts.
5. Write and explain Maxwell's equation for static and time varying fields in both differential and integral form.
6. Discuss the use of low loss RF and UHF transmission lines.

SECTION C

7. What is an antenna array? Explain the behavior of broad side and end fire antenna array in detail.
8. Derive the relation between Maximum usable frequency and skip distance.
9. State Poynting Theorem and derive the expression for Poynting vector.

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.