

May, 2018,

2011-14 Scheme

No. 12

142 = 3

SHAHEED BHAGAT SINGH STATE TECHNICAL CAMPUS, FEROZEPUR

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Total number of pages: [2]

Total number of questions: 06

B.Tech. Electronics and Communication Engg. (Semester-4th)  
**Electromagnetics and Antennas**

Subject code: BTEC-403

Paper ID: [ ]

Scheme 2011

Time allowed: 3 Hrs.

Max. Marks: 60

**Important Instructions:**

- All questions are compulsory.
- Assume any missing data.

**PART - A (2 x 10)**

Q1) a) What is significance of Poynting vector?

b) How does antenna radiate?

c) Define Polarization.

d) What are time-varying fields?

e) Define gain and directivity.

f) Define characteristic Impedance.

g) Why are antenna array used in practice?

h) What is free space equation?

i) What is Smith Chart?

j) Define duct propagation.

**PART - B (8 x 5)**

Q2) What is Polarization? Describe the three types of Polarization. State and prove modified Ampere's circuital law. CO1

OR

State Maxwell's equation in free space for the time varying fields in integral form. Discuss the physical interpretation of these equations. CO1

Q3) What do you mean by waveguide? Compare rectangular waveguide with circular waveguide. CO2

OR

Write the features of Transmission line and discuss the formation of standing wave in transmission line. CO2

P.T.O.

- Q4) Derive an expression for the radiated fields of a short dipole antenna. Also calculate its radiation resistance. CO3

OR

Distinguish between

- (i) Radiating near field and reactive near field region
  - (ii) Radiation power density and Radiation power intensity
- CO3

- Q5) Explain the principle of field equivalence for aperture antennas. Explain the horn antenna along with its working. CO4

OR

Distinguish between the following:

- (a) Broadside array and End-fire array.
  - (b) Ordinary end-fire array and Hansen Woodyard end-fire array
- CO4

- Q6) Describe the factors that affect radio wave propagation. Derive the expression for critical frequency in terms of ionization density. CO5

OR

Discuss the following terms to differentiate them from each other:

- Maximum Usable Frequency
  - Lowest Usable Frequency
  - Optimum Working Frequency
  - Critical frequency
- CO5

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