

M.Sc.(Electronics) (CBCS Pattern) Sem-IV
PSELT401 Core-II Paper-I : Electromagnetic Fields and Antennas

P. Pages : 2

Time : Three Hours



GUG/W/22/11367

Max. Marks : 80

- Notes :
1. All questions are compulsory and carry equal marks.
 2. Draw neat and labelled diagrams wherever necessary.

Either:

1.
 - a) Describe wave propagation in good dielectrics and good conductors. 8
 - b) State Poynting theorem. Derive the expression for complex Poynting vector. 8

OR

- c) Explain following terms: 8
 - i) Current density
 - ii) Magnetic field density
 - d) Describe uniform plane wave equation for uniform plane waveform, prove $\frac{E}{H} = \sqrt{\frac{\mu}{\epsilon}}$. 8

Either

2.
 - a) What is antenna? Explain the working principle of transmitting and receiving antenna. 8
 - b) Define and explain the importance of following antenna parameters: 8
 - i) Radiation intensity
 - ii) Directivity

OR

- c) Explain the following terms related to antenna 8
 - i) Antenna gain
 - ii) Antenna resistance
 - d) Derive the expression for effective aperture of short dipole antenna. 8

Either

3.
 - a) What is parabolic reflector? Explain its working. 8
 - b) Explain the role of director and reflector in Yagi antenna. 8

OR

- c) Explain the following terms: 8
 - i) Broad side array
 - ii) End fire array
 - d) Describe helical beam antenna. 8

Either:

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| 4. | a) | State and prove reciprocity theorem. | 8 |
| | b) | Describe the structure of antenna on cellular handset. | 8 |

OR

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|-----------|----|--|----------|
| | c) | Describe compact antenna test range (CATR) with suitable diagram. | 8 |
| | d) | Describe antennas for terrestrial mobile communications with suitable diagram. | 8 |
| 5. | a) | State the Maxwell's second equation in differential form. | 4 |
| | b) | Explain elliptical polarization of antennas. | 4 |
| | c) | Explain the structure of horn antenna. | 4 |
| | d) | Describe base station antenna. | 4 |
