

15/12/09

2-30 to 5-30

N.B. : (1) Question No. 1 is compulsory.

(2) Attempt any four questions from the remaining six questions.

(3) Assume suitable data if needed.

(4) Support your answers with neat sketches.

1. Explain the following :-

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- FRIS transmission formula
- Maxwell's equation's for harmonic variations
- Polarization and polarization matching factor
- Ground interference effects.

2. (a) Derive an expression for the near field and far field equation for a short electric dipole.

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(b) State and give the applications of Reciprocity Theorem. Show that the transmitting and receiving radiation patterns of antennas are equal.

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3. (a) State and explain the principle of pattern multiplication use the principle to find the radiation pattern of 4 isotropic elements fed in phase and $\lambda/2$ apart.

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(b) Derive the equation for the total far field pattern of linear array of n isotropic point sources of equal amplitude and spacing. Define array factor.

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(c) Define broadside and end fire arrays. What are the conditions for a linear array of N isotropic elements to radiate in end fire and broadside modes.

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4. (a) Explain important features of loop antenna. Explain how a loop antenna may be used for direction finding.

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(b) Explain with diagrams the working of a log-periodic antenna. Give its applications.

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5. (a) Give the current distribution and radiation pattern of a folded dipole antenna. Explain how its radiation pattern will be modified with addition of reflectors and directors.

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(b) Explain the structure of microstrip antennas. State its limitations and applications.

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6. (a) Explain the following terms :-

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- Critical frequency
- Virtual height
- Maximum usable frequency.

(b) What is line of sight propagation ? Obtain the expression for range of line-of-sight for spacewave propagation in terms of antenna's transmitting and receiving heights.

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7. Write short notes on any two of the following :-

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- Horn antenna – working, antenna feed and applications.
- Construction, working and modes of operation of helical antenna.
- Structure of Ionosphere.