(3 Hours) **(Maximum Marks: 80)**

NB. 1. Que number one is compulsory
2. Attempt any three out of remaining five questions
3. Assume suitable data
4. Figures to the right indicate the maximum marks.

Q.1 **Attempt any 4 questions:** **[20]**
(a) State and explain Biot Savart law. Also express it in vector form.
(b) Define the terms: Critical frequency, MUF, Virtual height, skip distance as measures of ionospheric propagation.
(c)State the Poynting theorem and explain the various terms associated with it.
(d) A 60m diameter parabolic reflector is fed by a nondirectional antenna at 1430 MHz. Calculate Beam width between Half power points and between Nulls.
(e) Derive Laplace's and Poisson's equations.

Q.2 (A) Derive Maxwells equations in integral form and point form. Give the word statements. **[10]**
(B) State and derive FRII'S transmission equation. Explain its significance. **[10]**

Q.3 (A) Describe the construction and radiation pattern of Log periodic antenna. Why is it called Log periodic? **[10]**
(B)Derive the Helmholtz wave equations for free space in terms of electric and magnetic fields. **[10]**

Q.4 (A)State and explain principle of pattern multiplication. Explain the concept of array factor**.** **[10]**
(B)Compare Broadside and End-fire Array. **[10]**

Q.5 (A)Explain skywave propagation with reference to D, E, and F regions and multiple reflections. **[10]**
(B)Describe the structure of Microstrip antenna. Also discuss the feeding techniques for rectangular and Circular patch antenna. **[10]**

Q.6 (A)What is near field and far field radiation for an antenna. Explain its importance in communication and its applications**.** **[10]**
(B)Derive radiation resistance for an infinitesimal dipole. p**[10]**

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