

C 61439

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Name.....

Reg. No.

**SIXTH SEMESTER B.TECH. (ENGINEERING) DEGREE EXAMINATION
APRIL 2014**

(2009 Scheme)

EC/PTEC 09 603—RADIATION AND PROPAGATION

(Regular/Supplementary/Improvement)

Time : Three Hours

Maximum : 70 Marks

Part A

Answer all questions.

1. Define Directivity.
2. What is antenna beam efficiency ?
3. Define Array factor.
4. Give *two* applications of high frequency antenna ?
5. What is meant by virtual height ?

(5 × 2 = 10 marks)

Part B

Answer any four questions.

1. Find the effective aperture of an antenna with radiation intensity $U = \sin \theta$, $0 < \theta < \pi/2$
2. How is antenna bandwidth measured for wide-band antennas and for narrow-band antennas ?
3. Explain in brief the working of rectangular arrays.
4. Explain in brief how loop antennas are used in direction finding ?
5. Explain in brief the working of fractal antenna.
6. Derive the attenuation factor for ionospheric Propagation.

(4 × 5 = 20 marks)

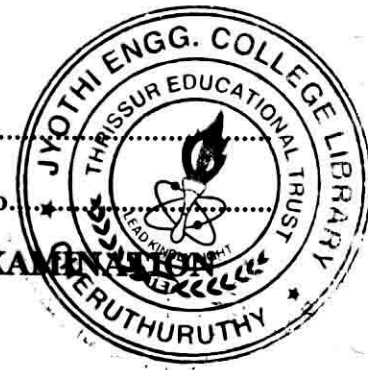
Part C

1. Derive the expression for far-field Components of an infinitesimal dipole.

Or

2. Given that the radiation intensity of an antenna is $U = \sin^2 \theta \sin \phi$, $0 < \phi < \pi/2$, $0 < \theta < \pi/2$. Find the directivity using actual formula and directivity from HPBW.

Turn over



3. Derive the Array factor, Directions of Pattern maxima, Pattern minima and HPBW for broadside array of n -isotropic sources.

Or

4. Design a Dolph-Chebychev array of 10 elements, with spacing between the elements is $\frac{\lambda}{2}$ and the side lobe level down the main lobe is 22 dB.
5. Explain with diagram the operation of Rhombic antenna and its design methods.

Or

6. Explain the operation of turnstile antenna and show that a coaxial cable of 70Ω impedance can be used to feed the turnstile antenna.
7. Derive the expression for refractive index of ionospheric layer.

Or

8. Derive the expressions for the reflection factor for horizontal polarization and vertical polarization in ground wave propagation.

(4 × 10 = 40 marks)