Code No: 09A50405

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY, HYDERABAD
B. Tech III Year I Semester Examinations, June/July-2014
ANTENNAS AND WAVE PROPAGATION
(Common to ECE, ETM)

Time: 3 hours   Max. Marks: 75

Answer any five questions
All questions carry equal marks
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1.a)   Explain the following terms
       i) Figure of merit,   ii) Front- to- back ratio,
       iii) Half power Beam width, iv) Antenna input impedance.
 b)   Show that the Radiation resistance of λ/2 antenna is 73 Ω.

2.a)   What is Array factor? Find the array factor of two element array with neat sketch.
 b)   Show that the radiation electric field intensity of Quarter wave Monopole is

$$\frac{60I_m}{r}\left[\frac{\cos\left(\dfrac{\pi}{2}\cos\theta\right)}{\sin\theta}\right]V/m$$

3.   Design a 4 element broad side array of λ/2 spacing between elements. The pattern
       is to be optimum with a side lobe level 26 dB down the main lobe maximum.

4.a)   Explain the design considerations of Pyramidal Horns.
 b)   A pyramidal Horn antenna has an aperture of 20cm x 15 cm. Assuming the field
       distribution to be uniform over the aperture(phase=constant all over the
       aperture), estimate the maximum directivity and the beam width of the antenna.

5.   Explain about Cassegrain feed, paraboloidal reflectors, Spherical reflectors.

6.a)   Explain about non metallic dielectric lens antenna.
 b)   How the measurement of gain is obtained by direct comparison method.

7.a)   Explain the salient features of tropospheric scatter propagation.
 b)   Find the maximum range of a tropospheric transmission for which the
       transmitting antenna height is 100 ft and receiving antenna height is 50 ft.

8.a)   Obtain the relation between Skip distance and Maximum Usable Frequency.
 b)   Explain the mechanism of Radio wave bending by the Ionosphere.

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