Total number of printed pages – 4    B. Tech

PEEC 5401

## Seventh Semester Examination – 2008

### ANTENNA ENGINEERING

Full Marks – 70

Time – 3 Hours

Answer Question No. **1** which is compulsory
and any **five** from the rest.

The figures in the right-hand margin
indicate marks.

1.  Justify :                                      2 × 10

    (a)  Isotropic radiator radiates equally in all
         directions.

    (b)  Standing waves are present along half wave
         dipole.

    (c)  If the feed point of the antenna is at a
         current maximum, the input impedance is
         only real.

                                             P.T.O.

(d) Substitution method of antenna measurement is better than the bridge method.

(e) Antenna polarization can be easily obtained by received power measurement.

(f) Cassegrain feed mechanism is very popular for low noise applications.

(g) The efficiency of a corrugated horn is more than that of conventional horn.

(h) Horn is a flared out waveguide.

(i) The desired polarization can be obtained by different shapes of the microstrip antenna.

(j) The method of moment is useful for finding field distribution in slots and other wire antennas.

2. (a) Explain the following : 6

   (i) Method of excitation of antennas

   (ii) Impedance matching techniques.

(b) An array of dipoles of $\frac{\lambda}{2}$ length in end-fire mode is to produce a power gain of 24. Find (i) array length, number of elements when spaced $\frac{\lambda}{2}$ and (ii) Null to Null beam width. 4

3. What is a log-periodic antenna ? What are the salient features of such antenna ? Draw a log-periodic array and write the equations involve in designing the same. 10

4. (a) Enumerate the salient features of resonant antennas. How these are different from travelling wave antenna ? 5

(b) A rhombic antenna is to operate at a frequency of 45 MHz with the elevation angle 35° with respect to ground. Find (i) height of the rhombic, (ii) tilt angle, and (iii) length of each wire. 5

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5. Explain the following in relation with a patch antenna : 2.5×4

   (a) Patch parameters

   (b) Methods of bandwidth control

   (c) Shapes of antenna

   (d) Characteristic impedance.

6. (a) Explain the radiation phenomena of a waveguide slot. 4

   (b) The aperture dimensions of a pyramidal horn are 10 × 5 cm. It is operating at 6.6 GHz. Find (i) beam width, (ii) power gain and (iii) directivity. 6

7. (a) Why antenna measurements are necessary ? What are the drawbacks in measurements of antenna parameters? 4

   (b) Explain impedance measurement by Wheatstone bridge method. 6

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