Paper / Subject Code: 30603 / R F MODELING AND ANTENNAS

(3 Hours) [Total Marks 80]

N.B. : (1) Question **No. 1** is **compulsory**.
(2) Solve **any three** questions from the remaining **five**
(3) Figures to the right indicate full marks
(4) Assume suitable data if necessary and mention the same in answer sheet.

Q.1 Attempt **any four** out of the remaining **five** **[20]**
a) Explain Stripline and Microstrip line.
b) Compare Binomial filter with Chebyshev filter
c) Explain near field and far field radiation related to antenna.
d) Explain pattern multiplication for antenna array.
e) What are characteristics of Log periodic antenna ?

Q.2 a) Explain with equivalent circuits the RF behaviour of resistor, capacitor and **[10]**
inductor.
b) Design a composite high pass filter by the Image parameter method with the **[10]**
following specification.
R_0=75 Ω, f_c=50 MHz, f_∞=48MHz

Q.3 a) Design a LPF whose input and output ports are matched to 50 Ω impedance **[10]**
with cutoff frequency of 3 GHz, equi ripple of 0.5 dB and rejection of atleast 40
dB at approx twice the cutoff frequency.

b) Explain the following terms related to basic antenna concepts with relevant **[10]**
equations.
[i] Gain and Directivity
[ii] Radiation Pattern
[iii] Radiation Resistance
[iv] Antenna Efficiency
[v] Effective aperture

Q.4 a) Derive radiation resistance of infinitesimal dipole. **[10]**

b) What is maximum power received at a distance of 0.75 Km over free space **[10]**
for 1 GHz frequency. The system consists of transmitting antenna with 3 dB
gain and receiving antenna with 17dB gain and antenna is fed with 200 W
power.

Q.5 a) Explain working principle of Yagi-Uda antenna and draw its radiation **[10]**
pattern. Mention its applications.
b) Draw the structure of Microstrip antenna. Discuss its characteristics, **[10]**
limitations and applications.

Q.6 Write short notes on the following : **[20]**
a) Hazards of electromagnetic radiation
b) Friss transmission formula
c) Helical antenna
d) Principle of Parabolic reflector antenna

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