

NB: 1. Question No. 1 is compulsory.

2. Solve **any three** questions from the remaining.
3. Assume suitable data wherever necessary and justify the assumption.
4. Draw suitable diagrams wherever required.



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| 1 a | Compare Binomial filter with Chebyshev filter. | 5 |
| b | What is reactive near field. Explain its importance in communication and its applications. | 5 |
| c | Compare Broadside and Endfire array. | 5 |
| d | Find the gain of an antenna when physical aperture is 5 m^2 at 2 GHz with efficiency 70%. | 5 |
| 2 a | Design a composite high pass filter by the Image parameter method with the following specification.
$R_0=75 \Omega$, $f_c=50 \text{ Mhz}$, $f_\infty=48\text{Mhz}$ | 10 |
| 2 b | Design a LPF whose input and output ports are matched to 50Ω impedance with cutoff frequency of 3 GHz, equi ripple of 0.5 dB and rejection of atleast 40 dB at approx twice the cutoff frequency. | 10 |
| 3 a | Derive Friss transmission formula. State its significance in wireless communication.
gain and receiving antenna with 17dB gain and antenna is fed with 200 W power. What is maximum power received at a distance of 0.75 Km over free space for 1 GHz frequency. The system consists of transmitting antenna with 3 dB | 10 |
| 3 b | Derive radiation resistance of small dipole. Explain its significance. | 10 |
| 4 a | Find the radiation pattern for an array of 4 elements fed with same amplitude and opposite phase. Find its HPBW and BWFN. | 10 |
| 4 b | Design a rectangular microstrip antenna with coaxial feed at 2.45 Ghz. | 10 |
| 5 a | Describe parabolic reflector antenna and its different feeding methods. | 10 |
| 5 b | Explain important features of loop antenna. Discuss use of loop antenna in radio direction finding. | 10 |
| 6 | Write short notes on :
a. RF field effect transistor
b. Binomial array
c. RF behavior of resistor and capacitor.
d. Helical antenna | 20 |