



12. (a) (i) What is the function of an isolator? Write down its 'S' parameters. (6)
- (ii) From the first principles derive the scattering matrix of a circulator. (10)

Or

- (b) (i) What are waveguide Tees? Where are they used? (4)
- (ii) Derive the Scattering matrix for E-plane Tee and H-plane Tee. (12)
13. (a) (i) Draw a neat sketch showing the constructional features of cavity Magnetron and explain why the magnetron is referred to as crossed field device. (8)
- (ii) Derive an expression for cut off magnetic field for a cylindrical magnetron. (8)

Or

- (b) With a neat sketch describe the working of a Reflex Klystron. In what ways bunching in this tube differs from bunching in multicavity tubes? Draw an Applegate diagram to illustrate bunching. Draw graphs of output power when used as an oscillator and frequency deviation as a function of repeller voltage and explain the graphs. (16)
14. (a) (i) What is Gunn diode? Explain the working of Gunn diode as an oscillator. (8)
- (ii) Explain the operation of PIN diode and draw its equivalent circuit. (8)

Or

- (b) (i) Explain transferred electron effect. (4)
- (ii) Compare the performance of IMPATT and TRAPATT with suitable output waveforms. (12)
15. (a) With suitable diagrams explain the measurement of antenna gain and phase at microwave frequencies. (16)

Or

- (b) Explain the following :
- (i) Measurement of frequency by Down conversion method. (8)
- (ii) High power measurements by Calorimetric method. (8)