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12. a) Derive the expressions for various types of power gain of RF amplifier. (16)

(OR)

b) i) Explain microstrip line matching networks. (10)

ii) Explain in detail noise figure in an amplifier. (6)

13. a) Derive the S matrix for a directional coupler and also verifying the properties of it. (16)

(OR)

b) i) Derive the S matrix H plane TEE. (8)

ii) Explain the mode of oscillation of gunn diode. (8)

14. a) i) Draw a neat sketch showing the constructional features of a cavity magnetron and explain why magnetron is called as crossed field device. (8)

ii) Derive an expression for cut off magnetic field for a cylindrical magnetron. (8)

(OR)

b) A reflex klystron is operated at 8 GHz with dc beam voltage of 600 V for 1.75 mode, repeller space length of 1 mm, and dc beam current of 9 mA. The beam coupling coefficient is assumed to be 1. Calculate the repeller voltage, electronic efficiency and output power. (16)

$$V_0 = 600 \text{ V}, L = 1 \text{ mm}, I_0 = 9 \text{ mA}$$

$$\beta_0 = 1, f = 8 \text{ GHz}, n = 2 \text{ or } 1 \frac{3}{4} \text{ mode}$$

15. a) i) Draw the block diagram for the slotted line method of VSWR measurement and explain. (8)

ii) Explain a method for high power measurement. (8)

(OR)

b) i) Draw the experimental set-up for the measurement of impedance of a discontinuity and explain. (8)

ii) Draw the experimental set-up for S-parameter measurement of Magic Tee and explain. (8)