Q.2a. **A transmission line has the following parameters:**
   R= 2 ohm/m   **G=0.5 mmho/m   f=1 GHz**
       L=8 nH/m   C=0.23 pF
 Calculate: (i) the characteristics impedance   (ii) the propagation constant.

b. Derive the equation for determining the reflection coefficient at any point along the line.

Q.3a. **An air-filled waveguide with cross section 2 x 1 cm transport energy in the TE$_{10}$ mode at the rate of 0.5 hp. The impressed frequency is 30 GHz. What is the peak value of the electric field occurring?**

finding β (3marks) Eg (3marks)   (6)

Soln: Text1 – pg.no – 133 -134, Example 4.1.2   Topic 4.15

b.   Show that the power transmission derived from the Poynting's theory is same as from

the circuit theory for an ordinary transmission line.

Soln: Text1 – pg.no – 149 -150.

(10) ↑

Topic 4.25

Q.4a.   **Explain the Waveguide Corners, Bends and Twists in waveguide components.**

(4 marks) (2)   (2)

Topic (4.4.4)

Soln: Text1 – pg.no-166-167, Article – 4.4.4.

b.   **Derive the expression for the resonant frequency and the unloaded Q_0 of cavity resonator.**

Soln: Text 1, pg.no-157 -158, Equations 4.3.20, 4.3.21.

Topic 4.3.3

Q.5 a.   **Draw the equivalent circuits of Tunnel Diodes and Calculate gain equations of a tunnel diode amplifier.**

(3 marks)   (7 marks) (10) Topic) (5.3.2)

Soln: Text1 – pg.no – 221-222, Figure 5.3.5, Equations 5.3.9 and 5.3.10.

b.Draw equivalent circuit for a parametric amplifier and explain the working operation of it.

3 marks   5 marks (6) Topic 8.53

Soln: Text1 – pg.no – 345, Article – 8.5.3

Q.6a.   **Show that the gain bandwidth product is independent of frequency.**

Soln: Text1 – pg.no – 358-359, Article – 9.1.3.

Topic 9.13

b.Explain the working operation of Reflex Klystron with neat Schematic.

Topic 9.4.1 (8)

Soln: Text1 – pg.no – 392-393, Figure.9.4.1

2 marks circuit diagram + 2 marks Applegate diagram
4 marks operation

Q.7a.   **Draw the equivalent circuit for resonator of a magnetron and derive the expressions for Power output and efficiency.**

2 marks diag. + 4 marks power + 4 marks
Calculation efficiency

the Topic
10.1.1

Soln: Text1 – pg.no- 450-451.

b.A CFA operates under the following parameters:

Anode dc voltage : V_{ao} = 2 kV

Anode dc current : I_{ao} = 1.5 A
Electron Efficiency: η_e = 20%
RF input power: P_{in} = 80 W

Calculate: The induced RF power, Total RF output power,
Power gain in decibels.

(2 marks)   (2 marks)

Calculate: The induced RF power, The total RF output power,
The power gain in decibels.

2 marks

Soln: Text1 – pg.no-474. Example-10.2.1.

6 marks
Topic
10.2.2

Q.8 a. Derive expression for Quality Factor ˙ Q˙ of Micro-Strip Lines and show that it is

approximately the reciprocal of the dielectric loss tangent θ.

6 marks

Soln: Text1 – pg.no – 502 – 503, Article – 11.1.3.

b.   **Describe about Coplanar Strip Losses.**

8 marks

Soln: Text1 – pg.no – 506 -507. Article – 11.3

Q.9   **Write a detail note on the following:**
        (a) MMIC Fabrication Techniques   **8 marks**

Soln: Text1 – pg.no 520 – 521. Article – 12.2.1

        (b) Hybrid Integrated – Circuit Fabrication   **8 marks**

Soln: Text1 – pg.no – 526 -527. 519 / Article – 12.5

Text Book

1. Microwave Devices and Circuits, Samuel Y. Liao, 3rd Edition, Prentice-Hall of India, New Delhi, 2006