53 (EC 601) MWEN

2014

MICROWAVE ENGINEERING

Paper : EC 601

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

*Answer **any five** questions.*

1. *(a)* Derive the expression for reflection coefficient and transmission coefficient of a transmission line. 10

(b) A transmission line having $R = 2Kohm/m$, $G = 1mmh/m$ $C = 2nF$ $L = 1mH$ is terminated with a load impedance $Z_l = 40 + 20j$. Determine 10

(i) Phase constant

(ii) Attenuation constant

Contd.

(iii) Characteristic impedance

(iv) Transmission coefficient

(v) Reflection coefficient

2. (a) An electromagnetic wave of frequency 9 *GHz* is propagating through an airfilled rectangular waveguide of cross section $2 \times 1 cm^2$ in TE_{10} mode. Determine 10

(i) Cut off frequency

(ii) Phase constant

(iii) Phase velocity

(iv) Wave impedance.

(b) Explain the coupling of a cavity resonator. 10

3. What is a tee junction ? What are the different types of tee junction ? Explain *each* with 5-matrix. 20

4. (a) Make the 5-matrix of a directional coupler. 10

(b) Explain the working of a two-cavity klystron. 10

5. (a) Explain the velocity modulation process of a reflex klystron. 10

(b) Explain the amplification process of a TWT. 10

6. (a) Obtain the Hull-cut off voltage equation for an 8-cavity magnetron. 10

(b) Explain the RWH theory of a Gunn diode. 10

7. Write short notes on – 10×2=20

(a) 4-port circulator

(b) Microwave bench.