Reg. No. : ☐☐☐☐☐☐☐☐☐☐☐

Question Paper Code : 61213

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Electronics and Communication Engineering

EC 1402 A — MICROWAVE ENGINEERING

(Regulation 2008)

Time : Three hours   Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Define a reciprocal network. Give an example.

2. Write the S matrix equation for a 2 port network.

3. Mention the use of matched terminations.

4. Write the S matrix of a isolator.

5. What is the function of the repeller voltage in the reflex Klystron.

6. Mention two differences between Klystron and TWT.

7. What is Gunn effect?

8. What is the principle of a varactor diode?

9. Define VSWR and reflection coefficient.

10. Define insertion loss.

PART B — (5 × 16 = 80 marks)

11. (a) (i)   Draw and explain the scattering port matrix representation for a
              multiport network.   (6)

        (ii) Discuss the properties of the Scattering matrix.   (10)

Or

(b) (i) Compare the [S], [Z] and [Y] matrices. (6)

(ii) Obtain the relationship between ABCD parameters and S parameters. (10)

12. (a) (i) Explain the working of a two hole directional coupler and obtain its scattering matrix. (8)

(ii) Explain the function of waveguide corners, bends and twists. (8)

Or

(b) (i) Explain the functional operation of a magic tee and mention its applications. (8)

(ii) Explain the principle of operation of passive attenuators. (8)

13. (a) Describe with a neat diagram, the principle of operation of a two cavity Klystron amplifiers. Discuss its mode curves, equivalent circuit ,voltage gain and efficiency. (16)

Or

(b) Describe the mechanism of oscillation of a magnetron. Discuss how mode separation and phase focusing are achieved in it. Mention its typical power output and applications. (16)

14. (a) Draw the various structures of a IMPATT diode . Explain its principle of operation, power output and efficiency considerations. (16)

Or

(b) (i) Explain the mechanism of operation of tunnel diode oscillators. (8)

(ii) Explain the principle and types of parametric amplifiers. (8)

15. (a) (i) Explain impedance measurement using slotted line. (8)

(ii) Explain the operation of the bolometer sensor for measuring power. (8)

Or

(b) (i) Explain how direct frequency measurement of microwave source is carried out. (8)

(ii) Describe the steps involved to measure dielectric constant of a solid using waveguide method. (8)

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