P390

B.E./B.TECH. DEGREE EXAMINATIONS, NOV/DEC–2011

REGULATIONS 2008

SEVENTH SEMESTER

EC 73 – RF AND MICROWAVE ENGINEERING

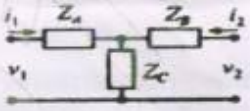
ELECTRONICS AND COMMUNICATION ENGINEERING

Time: Three Hours Maximum: 100 marks

ANSWER ALL QUESTIONS

PART–A (10×2=20 marks)

1. For the T-network shown in figure below, find the impedance matrix



2. Compute the return loss for a 25Ω resistor connected to a 75Ω lossless transmission line.
3. Define noise figure.
4. Draw a simple Pi-network used to match high source impedance to low load impedance.
5. What is an H-plane Tee?
6. Write in brief the operation of an isolator.
7. What is tunneling effect?

8. What are the characteristics of ideal substrate materials?

9. Define bunching parameter of a Klystron.

10. How is VSWR measured from reflection coefficient?

PART–B (5×16=80 marks)

11. (a) (i) Derive the Y-parameters of a two port network in terms of ABCD parameters. (8)

(ii) Compute the ABCD parameters for an RF transformer with turn's ratio (8)

N= N1/N2. where N1 is number of turns in primary winding and N2 is number of turns in secondary winding.

Or

(b) (i) Derive the S-parameters for a two port lossless and reciprocal network. (8)

(ii) Draw the distributed circuit for inductor and capacitor and explain the operation. (8)

12. (a) Derive the expressions for various gains of an amplifier in terms of S-parameters and reflection coefficients. (16)

Or

(b) Explain how impedance matching is performed with T and Pi matching networks with example for each. (16)

13. (a) (i) Derive the S matrix of a two hole directional coupler. (8)

(ii) Explain the operation of magic tee and write the S matrix of magic tee. (8)

Or

(b) Explain the operation of

(i) Microwave circulators (8)

(ii) Cylindrical cavity resonators. (8)

14. (a) Explain the operation of tunnel diode at microwave frequencies with equivalent circuits and parallel and series loading in tunnel diode. (16)

Or

(b) Explain the operation with diagrams for

(i) IMPATT diodes. (8)

(ii) TRAPATT diodes. (8)

15. (a) Explain the working of two-cavity Klystron with velocity modulation and bunching process. (16)

Or

(b) Explain the working of a cylindrical magnetron and derive the Hull cutoff voltage equation. (16)
