Reg. No. : | | | | | | | | | | | | |

Question Paper Code : 60469

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2016.

Seventh Semester

Electronics and Communication Engineering

EC 2403/EC 73/10144 EC 703 — RF AND MICROWAVE ENGINEERING

(Regulations 2008/2010)

(Common to PTEC 2403 – RF and Microwave Engineering for B.E. (Part-Time) Sixth Semester – Electronics and Communication Engineering – Regulations 2009)

Time : Three hours Maximum : 100 marks

Smith chart is to be provided.

Answer ALL questions.

PART A — ($10 \times 2 = 20$ marks)

1. Define reciprocal and symmetrical networks.

2. Express power input and power output under matched conditions for a two-port network in terms of wave components.

3. Draw the VSWR circle for reflection coefficient 1.

4. Draw the contour of Nodal Quality Factor $Q = 3$.

5. What are the applications of Magic Tee?

6. What are the S parameters of the rotary type attenuator with rotation angle of 30°?

7. Define Transconductance and output resistance of a MESFET.

8. Can Inductive elements be fabricated in MMICs? Justify your answer.

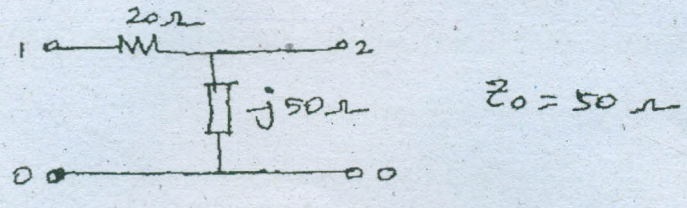
9. Distinguish between TWT and Klystron.

10. Define SWR.

PART B — (5 × 16 = 80 marks)

11. (a) (i) State and verify the symmetry property of the reciprocal networks. (8)

(ii) Find the S parameters for the following circuit. (8)



Or

(b) (i) Draw the high frequency equivalent of wire, resistor, inductor and capacitor and explain. (8)

(ii) Evaluate the S parameters from the Z parameters. (8)

$$[Z]=\begin{bmatrix} 2+3j & 5j \\ 3j & -j \end{bmatrix}, Z_0 = 50\Omega .$$

12. (a) Derive the transducer power gain for a transistor amplifier. Design LC network to match source impendence $Z_S = (50 + j25)\,\Omega$ to the load $Z_L = (25 - j50)\ \Omega$. Assume $Z_O = 50\ \Omega$, f = 2GH3. Use smith chart.

Or

(b) Discuss the smith chart approach to design the L-section and T-section matching networks.

13. (a) (i) Explain the concept of Two hole directional coupler and derive its S-matrix. (8)

(ii) Draw and explain the operation of an Isolator. (8)

Or

(b) (i) Explain the construction of Magic Tee and derive its S-matrix. How can a isolator he designed using 3 port circulator? (8)

(ii) Describe the principle of Microwave transmission through ferrite. Explain how a gyrator is designed based on this effect. (8)

14. (a) Explain the working principle of Gunn diode with two valley model and plot its characteristics.

Or

(b) What are avalanche transit time devices? Explain the operation and construction of IMPATT diode.

15. (a) Explain the working principle of Reflex Klystron and derive the expression of bunching parameter.

Or

(b) (i) Write a detailed note on cylindrical magnetron. (8)

(ii) Explain the procedure for measuring impedance at microwave frequency with the aid of slotted line. (8)

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