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10TE64

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Sixth Semester B.E. Degree Examination, June/July 2018

Microwaves and Radar

Time: 3 hrs.

Max. Marks:100

Note: Answer FIVE full questions, selecting at least TWO full questions from each part.

PART - A

- 1 a. By considering elementary section of a transmission line derive transmission line equations. (08 Marks)
- b. Explain the formation of standing waves and give the equation for the same. (04 Marks)
- c. A load impedance of $Z_L = 60 - j80\Omega$ is required to be matched to a 50Ω coaxial cable by using a short circuited stub of length ' l ' located at distance ' d ' from the load. The wavelength of operation is 1 metre using Smithchart find ' d ' and ' l '. (08 Marks)
- 2 a. Explain the working of a two hole directional coupler with neat diagram and derive its S-matrix. (10 Marks)
- b. With a neat diagram, explain the operation of Faraday rotation isolator. (10 Marks)
- 3 a. Explain the different modes of operation of Gunn diode. (08 Marks)
- b. Discuss RWH theory in detail. (06 Marks)
- c. Write an explanatory note on parametric amplifier. (06 Marks)
- 4 a. Discuss the properties of S-parameters with necessary derivations. (10 Marks)
- b. Two transmission lines of characteristic impedances Z_1 and Z_2 are joined at plane PP'. Express S parameters in terms of impedances. (06 Marks)
- c. Compare [S], [Z] and [Y] matrices. (04 Marks)

PART - B

- 5 a. Explain precision type variable attenuator with neat diagram and field components. (06 Marks)
- b. Explain the operation of magic tee with neat diagram and obtain its S-matrix. (10 Marks)
- c. A lossless H-plane Tee junction with 50mW of power being fed into port (1) and other two ports (2) and (3) are terminated in matched termination. Calculate the power fed into each of the ports by the junction. (04 Marks)
- 6 a. Explain the construction and operation of micro strip line. Obtain the characteristic impedance for the same. (08 Marks)
- b. A parallel strip line has a conducting strip width W. The relative dielectric constant ϵ_{rd} of substrate is 6 and a thickness ' d ' of 4mm. Calculate:
 - i) The required width W of the conducting strip to have a characteristic impedance of 50Ω .
 - ii) The stripline capacitance C.
 - iii) The stripline inductance L.
 - iv) The phase velocity. (08 Marks)
- c. Write a short note on shielded stripline. (04 Marks)
- 7 a. With a neat block diagram, explain the operation of pulse radar. (08 Marks)
- b. Discuss the applications of radar in detail. (07 Marks)
- c. Derive radar range equation. (05 Marks)
- 8 a. Explain the working of MTI radar in detail with neat diagram. (08 Marks)
- b. Explain the compensation for blind phases using I and Q channels. (06 Marks)
- c. What is sweep to sweep subtraction and explain SDLC with neat diagram? (06 Marks)

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Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and/or equations written eg. $42+8=50$, will be treated as malpractice.