

5E5025

Roll No.

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B. Tech V Sem. (Main/Back) Exam. Nov-Dec. 2015
Electronics & Communication Engineering
5EC5A Microwave Engineering - I

Time: 3 Hours

Maximum Marks: 80

Min. Passing Marks Main: 26

Min. Passing Marks Back: 24

Instructions to Candidates:

Attempt any five questions, selecting one question from each unit. All questions carry equal marks. Schematic diagrams must be shown wherever necessary. Any data you feel missing suitably be assumed and stated clearly.

Units of quantities used/calculated must be stated clearly.

Use of following supporting material is permitted during examination.

1. NIL

2. NIL

UNIT-I

- Q.1 (a) Derive the field components of TM waves in rectangular waveguide. [10]
- (b) A rectangular waveguide measures 3×4.5 cm internally & has a 10GHz signal propagated in it. Calculate the cut off wavelength, the guide wavelength & the characteristic impedance for the TE_{10} mode. [6]

OR

- Q.1 (a) Discuss & give the relations of following parameters for microchip lines - [6]
- (i) losses
- (ii) characteristic impedance
- (b) Explain parallel coupled striplines with all its design parameters [6]

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[5040]

(c) A certain microstrip line has following parameters -

[4]

$$\epsilon_r = 2.23$$

$$w = 10\text{mm}$$

$$h = 10\text{mm}$$

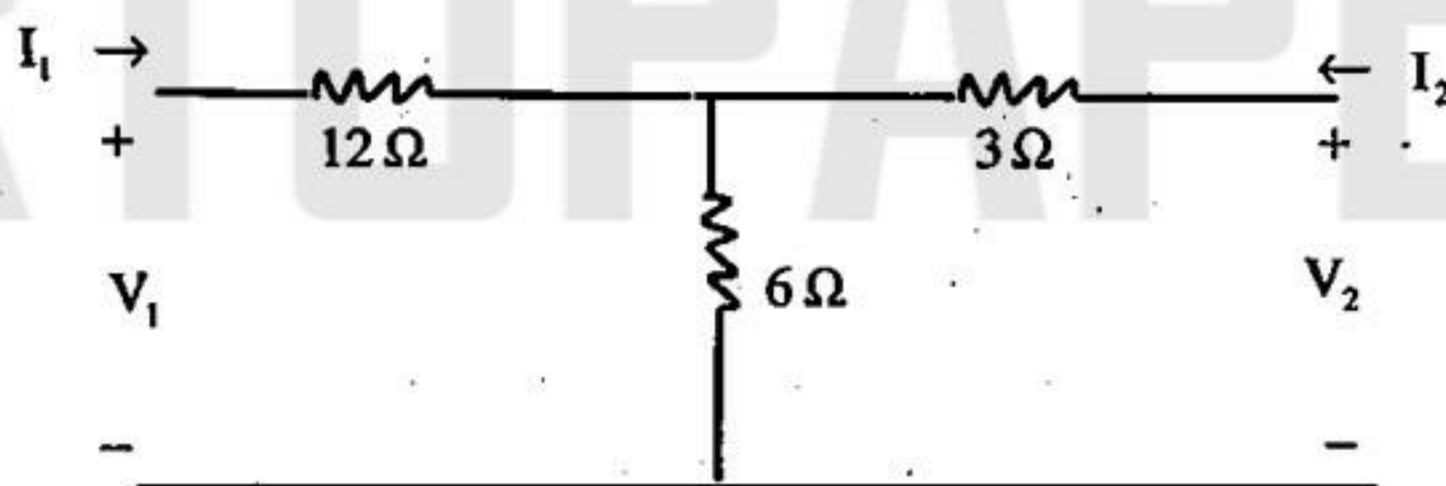
$$t = 2\text{mm}$$

Calculate the characteristic impedance Z_0 of the line.

UNIT-II

Q.2 (a) Find the impedance parameters for the two part network shown in figure-

[8]



(b) Discuss the following-

[8]

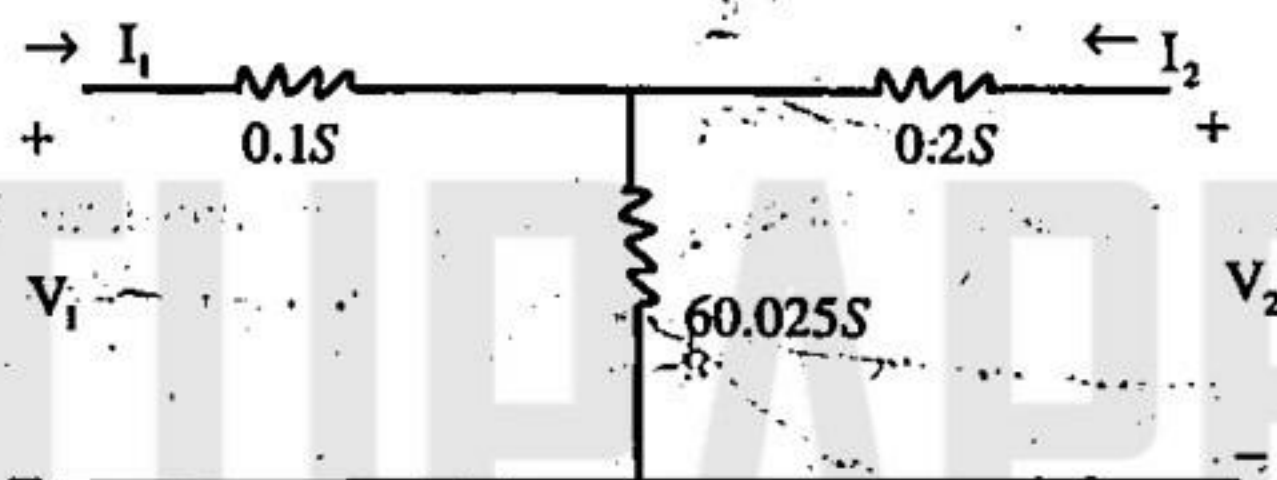
(i) Reciprocal Networks

(ii) Lossless Networks

OR

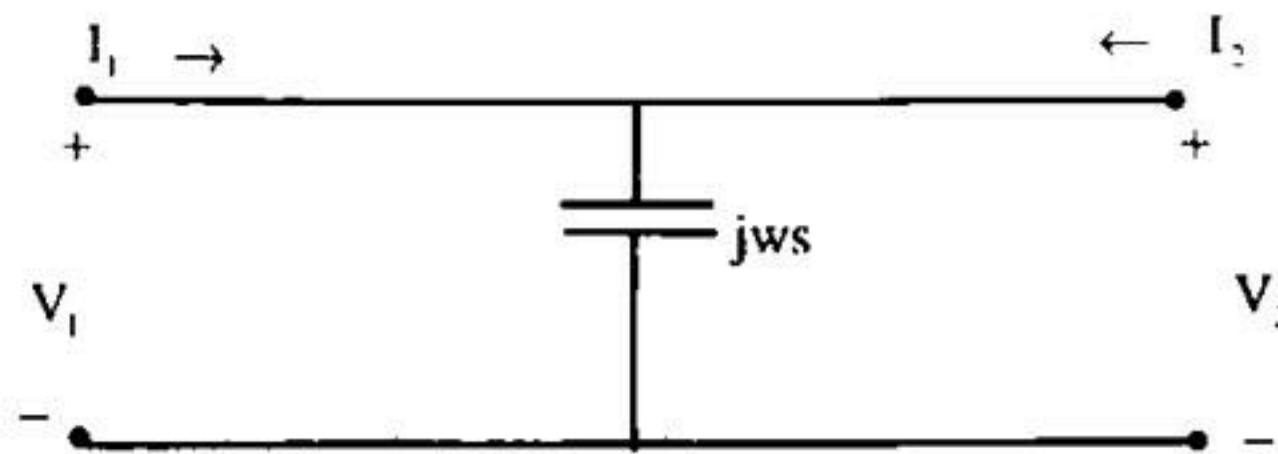
Q.2 (a) Find the admittance parameters for the two part network shown in fig.-

[10]



Is this circuit reciprocal & symmetrical?

- (b) Determine the transmission parameters of the network shown in figure. [6]



UNIT-III

- Q.3 (a) Explain the working of directional coupler & following terms regarding directional coupler - [8]
 (i) Coupling factor
 (ii) Directivity
 (iii) Insertion loss.
- (b) A 10mw signal is applied to a 20dB directional coupler. Determine the power available at the coupled port. [8]

OR

- Q.3 (a) Discuss the turn magic tee? Derive the scattering matrix for magic tee. [12]
 (b) Why it is called as magic tee. Prove that all of its ports are matched. [4]

UNIT-IV

- Q.4 (a) Describe a procedure for VSWR measurement using microwave bench setup. What is "double minima method"? [10]
 (b) In an experiment of measuring frequency using a transfer oscillator the frequencies of null beat condition are obtained to be 238 MHz & 245MHz. What will be the unknown frequency? [6]

OR

Q.4 Write short notes on-

[8×2=16]

- (a) Calorimeter Wattmeter measurement
- (b) Network Analyzer measurement

UNIT-V

Q.5 (a) List down the steps of MOSFET fabrication with suitable diagrams.

[8]

(b) Give advantages & disadvantages of MMIC.

[8]

OR

Q.5 (a) Discuss hybrid technology (photolithographic process & deposited lumped components), with example.

[8]

(b) Write short note on thin film formation.

[8]