M18002010

Registration No: | | | | | | | | | | |

Total Number of Pages : 02 **M.TECH**

M.TECH 2ND SEMESTER REGULAR EXAMINATIONS, MAY 2018
MICROWAVE ENGINEERING & ANTENNA THEORY
Branch: EC, Subject Code:MECPC2010
Time: 3 Hours
Max Marks : 70

PART-A

(10 X 2=20 MARKS)

1. Answer the following questions.

a) Why is s-matrix used in MW analysis? **(CO3)**
b) What are ferrites and give its properties? **(CO1)**
c) Give the applications of directional coupler. **(CO2)**
d) What is Faraday"s rotation law? **(CO1)**
e) What is Gyrator? **(CO2)**
f) What is hybrid ring? What is the other name of hybrid ring ? **(CO4)**
g) Why isolators are called uniline? **(CO2)**
h) What is the condition for oscillation in Reflex klystron? **(CO3)**
i) Write down the formula for the radius of the circular patch. **(CO3)**
j) Why microstrip antenna is preferable over other antennas? **(CO4)**

PART-B

(5 X 10=50 MARKS)

Answer any five questions from the following.

2. a) Define TM , TE and TEM waves and derive the equation of each field component in a rectangular wave guide . **[5](CO3)**
   b) Design a rectangular microstrip antenna using a substrate (FR4 Epoxy) with dielectric constant of 4.4, h = 0.16 cm (0.0625 inches) so as to resonate at 2.4 GHz. **[5] (CO4)**

3. a) Derive the expression for input impedance of a terminated transmission line. Find out the equation short circuited transmission line. **[5] (CO2)**
   b)A lossless transmission line has inductance equals to 100μH and capacitance equals to 50pF. Find out the characteristic impedance, phase constant and phase velocity if the length of the transmission line is 200 m and operating frequency 0.2GHz. **[5](CO3)**

4. a) Differentiate between Gun diode and IMPATT diode. **[5](CO1)**
   b) Explain the terms Radiation pattern, near-and far-field regions, directivity and gain, effective aperture and polarization. **[5] (CO2)**

5. a) Explain the Scotty barrier diode and its features. **[5] (CO4)**

   b) Differentiate between rectangular and circular patch antennas with Proper expressions. **[5] (CO2)**

6. a) Define all the parameters associated with an antenna with proper expression. **[5](CO2)**
   b) Design an optimum gain X-band (3.7–4.2 GHz) pyramidal horn so that its gain(above isotropic) at f = 10 GHz is 25dB. The horn is fed by a WR 90 rectangular waveguide with inner dimensions of a = 5 cm and b = 2 cm. **[5] (CO3)**

7.a)Write the difference between rectangular waveguide and circular waveguide. **[5] (CO2)**
   b) What do you mean by Tee? Explain about the Magic Tee. **[5] (CO1)**

8.Write short notes on

a. Directivity and gain [5]**(CO2)**

b. Stub [5]**(CO1)**

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