Total No. of Questions : 6]

SEAT No. :

**P4911**

[Total No. of Pages : 2

# B.E./Insem - 40
# B.E. (E & Tc) (Semester - I)
# Microwave Engineering
# (2012 Pattern)

*Time :1Hour]* *[Max. Marks :30*

***Instructions to the candidates:-***

1) ***Answer Q1 or Q2, Q3 or Q4, Q5 or Q.6.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right side indicate full marks.***
4) ***Use of Calculator is allowed.***
5) ***Assume Suitable data if necessary.***

***Q1)*** a) An air filled waveguide has dimensions of a = 6 cm and b = 4 cm. The signal frequency is 3 GHz. Compute the following for the $TE_{10}$, $TE_{01}$, $TE_{11}$,$TM_{11}$ modes : **[8]**

i) Cut off frequency

ii) Phase Constant

iii) Group Velocity

b) Distinguish between waveguide with transmission line. **[2]**

OR

***Q2)*** a) Explain the rectangular cavity resonator in detail. **[6]**

b) Distinguish between TE mode and TM mode. **[4]**

***Q3)*** a) Explain the Faraday's rotation principle? Explain in brief the working principle of an isolator. **[6]**

b) Explain the concept of circulator and its construction with the help of Magic Tee and Gyrator. **[4]**

OR

***Q4)*** a) Write a short note on Losses in Microstrip line. **[6]**

b) If the incident power of 10 dB directional coupler is 250 mW, calculate **[4]**

i) The output power in the main arm

ii) The output power in the auxiliary arm

***Q5)*** a) Write a short note on concept as well as different types of impedance. **[6]**

b) Compare circulator and isolator in detail. **[4]**

OR

***Q6)*** a) Discuss the need of network and circuit concepts for microwave analysis. **[6]**

b) Determine the scattering matrix of a 3 port circulator with insertion loss of 0.6 dB, isolation of 30 dB and VSWR of 2. **[4]**

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