Total No. of Questions : 8]

SEAT No. :

P3104

[Total No. of Pages : 2

[5670]-203
B.E. (E & TC)
Microwave Engineering
(2012 Pattern) (End Semester)

Time : 2½ Hours] *[Max. Marks : 70*

Instructions to the candidates:

1) ***Answer Q.1 or Q.2, Q.3 or Q.4, Q.5 or Q.6, Q.7 or Q.8.***
2) ***Neat diagrams must be drawn wherever necessary.***
3) ***Figures to the right indicate full marks.***
4) ***Use of calculator is allowed.***
5) ***Assume suitable data if necessary.***

Q1) a) A rectangular wave guide with dimensions of 3×2*cm* operates in the TM_{11} mode at 10 GHz. Determine the characteristics wave impedance. **[6]**

b) Explain the working of directional coupler and give its application. **[6]**

c) Derive the S-matrix for E plane tee using S-matrix properties. **[8]**

OR

Q2) a) What are ferrites? Why are these useful in microwave. Mention their properties. **[6]**

b) Consider a rectangular waveguide of 8×4*cm* with critical wavelength of TE_{10}=16 cms; TM_{11}=7.16 and TM_{21}=5.6cms. What modes are propagated at a free space wave length of **[6]**

i) 10 cm

ii) 5 cm

c) List the properties of S-matrix and derive the S-matrix of magic tee. **[8]**

Q3) a) What are the limitations of conventional tubes? Explain any one 'O' type microwave tube operation. **[8]**

b) What is slow wave structure device? Explain helix TWT with its application. **[8]**

OR

P.T.O.

Q4) a) Explain the two cavity Klystron tube construction and its advantages. **[8]**

b) Explain the working principle of magnetron with its application as microwave oven. **[8]**

Q5) a) What is Gunn effect? Explain the Gunn diode in detail. **[8]**

b) Write short note on **[8]**

i) Shottky barrier diode

ii) IMPATT diode

OR

Q6) a) Compare the microwave bipolar transistor, FET & MESFET. **[8]**

b) Explain the PIN diode with respect to structure, principle of operation, specifications and applications. **[8]**

Q7) a) Write short note on : **[6]**

i) Tunable detector

ii) Power meter

b) Explain the VSWR measurement procedure using slotted line. **[6]**

c) Explain the procedure to measure the Q of cavity resonator. **[6]**

OR

Q8) a) Explain the Impedance measurement procedure using Magic Tee. **[6]**

b) What is the importance of VSWR? How it can be measure using VSWR meter when VSWR < 10. **[6]**

c) Explain the attenuation measurement at microwave frequencies. **[6]**