Total No. of Questions : 8] **SEAT No. :**

P2266 **[Total No. of Pages : 3**

[5254]-603
B.E. (E & TC)
MICROWAVE ENGINEERING
(2012 Pattern) (End Semester)

Time : 3 Hours] ***[Max. Marks : 70***

Instructions to the candidates:

1) ***Answer any one questions out of 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 side indicate full marks.***
4) ***Assume Suitable data if necessary.***

Q1) a) Explain advantages and applications of microwave. **[8]**

b) Draw and explain the two hole directional coupler. Also represent it in terms of S-matrix. **[6]**

c) Explain the faraday's rotation principle? Draw and explain isolator. **[6]**

OR

Q2) a) For an air filled rectangular waveguide of dimensions a =2cm and b=lcms calculate the cut off wavelength for TE_{10} and TM_{11} modes. Also calculate the guide wavelength at 10GHz. **[6]**

b) Write a short note: The concept of Impedance and different types of impedance. **[4]**

c) What is a cavity resonator? Explain in detail the re-entrant type of cavity resonator. **[6]**

d) Explain with the help of neat diagram proprieties of E-plane Tee. **[4]**

Q3) a) Distinguish between TWTA and Klystron tube. **[8]**

b) Explain in detail the phase focusing effect in cavity magnetron. **[8]**

P.T.O.

OR

Q4) a) Explain the voltage, power and frequency characteristics of reflex klystron tube. **[8]**

b) A travelling tube operates under the following parameters, **[8]**

Beam voltage V_O = 3KV

Beam Current = I_O = 30mA

Characteristics impedance of the helix = Z_O = 10Ω

Circuit length N = 50

Frequency f = 10 GHz

Determine:

i) gain parameter 'c',

ii) the output power gain 'A_p' in decibels and

iii) all the propagation constant.

Q5) a) Explain the working of Schottky barrier diode. **[6]**

b) Write a note on: Varactor Diode. **[4]**

c) Explain the working of Microwave transistor. **[6]**

OR

Q6) a) Explain the working principle of Gunn diode. **[8]**

b) Write a note on: **[8]**

i) PIN diode

ii) Tunnel Diode

Q7) a) TE10 wave is transmitting inside a transmission system operating at 10GHz. Dimensions of waveguide are 4cm × 2.5cm. Distance measured between the twice minimum power point is 1mm o a slotted line. Calculate the standing wave ratio of transmission system. **[6]**

b) Explain Roberts and Von-Hipple method of dielectric constant measurement. **[6]**

c) Write a note on: Measurement of noise factor. **[6]**

OR

Q8) a) Two identical directional coupler are used in waveguide to sample incident and reflected powers. The output of two couplers is 2.5mw and 0.15mw respectively. Find the value of VSWR in waveguide. **[6]**

b) Explain the phase shift measurement using double minimum method at microwave frequency. **[6]**

c) Write a short note on VSWR meter. **[6]**