Total No. of Questions : 8]

SEAT No. : ____

P2020

[Total No. of Pages : 3

[5059] - 623
B.E. (E & TC)
MICROWAVE ENGINEERING
(2012 Pattern) (End Sem.)

Time : $2\frac{1}{2}$ ***Hours]*** ***[Max. Marks : 70***

Instructions to the candidates :-

1) ***Answers any one Questions out of Q1 & Q2, Q3 &Q4, Q5& Q6, Q7& Q8.***
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) What is a waveguide? Distinguish between the rectangular waveguide and circular Waveguide. **[6]**

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

c) Write a short note on : **[8]**

i) Microstrip line

ii) Shielded strip line and

iii) Parallel strip line

OR

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

b) Explain the Impedance and Admittance Matrices for n-port microwave network. **[4]**

c) What is a cavity resonator? Explain in detail the quality factor 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]**

OR

P.T.O.

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 = 30 mA

Characteristics impedance of the helix = $Z_o = 10\Omega$

Circuit length N = 50

Frequency f = l0GHz

Determine:

i) gain parameter 'c'

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

iii) all the propagation

Q5) a) With the help of two valley theorem explain the working of Gunn diode. **[8]**

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

c) Explain the working of Microwave field effect transistor (FET). **[4]**

OR

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

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

i) IMPATT Diode

ii) Schottky barrier 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 on a slotted line. Calculate the standing wave ratio of transmission system. **[6]**

b) Explain reflectometer method for measurement of impedance. **[6]**

c) Write a note on Measurement of quality 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]**