66

BE - Sem - VII - CBGS - EXTC

MRE

10/12/15

Q.P. Code : **6015**

(3 Hours) [**Total Marks : 80**

N.B. : (1) Question No.**1** is **compulsory.**
(2) Solve any **three** questions from the remaining.
(3) Assume suitable **data** if **necessary.**

1. (a) Design circulator using magic tees. 5
   (b) Explain Travelling wave tube as an amplifier. 5
   (c) Explain the operation of 2-hole Directional coupler with s-matrix. 5
   (d) Explain Doppler shift and its role in pulsed and CW radar. 5

2. (a) The terminating impedance Z_L is $100+j100\Omega$ and the characteristics impedance Z_0 of the line and stub is 50Ω. The first stub is placed at 0.40 λ away from the load. The spacing between the two stubs is $3\lambda/8$. Determine the length of the short circuited stubs when the match is achieved. 10
   (b) Explain instrument landing system for aircraft navigation. 10

3. (a) Derive the wave equation for a TE wave and obtain all the field components in a circular waveguide. 10
   (b) What is the importance of beam coupling coefficient ? Derive the equation of velocity modulation in klystron. 10

4. (a) Explain the significane of RWH model and two valley model in Gunn diode. 10
   (b) With a suitable diagram, explain the working on conical scan tracking radar. Explain the various factors that need to be considered in determining the optimum squint angle. 10

5. (a) Draw and explain with block diagram of MTI radar system. What are its limitations. 10
   (b) Discuss the power frequency, current frequency and power gain frequency limitations with refrence to a microwave transistor. 10

6. (a) Design two lumped element L section matching network at 500 MHz to transform $Z_L = 200 - j100\Omega$ to a 100 Ω transmission line. Use Smith Chart. 10
   (b) Write a short note one backward wave oscilator. 5
   (c) A radar operating at 1.5 GHz uses a peak pulse power of 2.5 MW and have a range of 100 nmi for objects whose radar cross section is $1m^2$. If the minimum receivable power of the receiver is $2x10^{-13}$ Watt. What is the smallest diameter of the antenna reflector could have, assuming it to be a full paraboloid with $\eta=0.65$. 5

MD-Con. 11083-15.