19/12/2015 BE sem VII – ET – old – RME

QP Code : **2385**

(3 Hours) [Total Marks :100

N.B. : (1) Question no. 1 is compulsory.
(2) Answer any **four** out of remaining six.
(3) **Illustrate** answers with **sketches**.
(4) Use smith **chart** wherever necessary.

1. (a) State and explain Lorentz Reciprocity Theorem. 5
   (b) Explain microwave propagation in ferrites. 5
   (c) Differentiate between transferred electron devices and avalanche transit time 5
       devices.
   (d) Explain Amplification process in TWT. 5

2. (a) Using the multiple reflection viewpoint explain the principle of working of a 10
       quarter wave transformer
   (b) Describe the mechanism of velocity modulation in a two cavity klystron. 10

3. (a) Describe construction and working of two hole directional coupler along with 10
       its s-matrix.
   (b) Match a load impedance Z_L = 60 - j80 to a 50Ω line using a double - stub 10
       tuner. the stubs are open circuited are spaced $\lambda/8$ apart. The match frequency
       is 2 GHz.

4. (a) An air filled rectangular waveguide of inside dimensions 7 x 3.5cm operates 10
       in TE_{10} mode.
       (i) Find the cutoff frequency
       (ii) Determine the guided wavelength at 3.5 GHz
       (iii) Determine the phase velocity of the wave in the guide at the same
            frequency
   (b) What are the steps to solve a single - stub matching problem? 10

5. (a) With neat diagrams explain the working of a Gunn Diode. 10
   (b) Derive the electromagnetic equations for TE modes in rectangular waveguide. 10

6. (a) Explain the working of a negative resistance parametric amplifier. 10
   (b) Explain the working of Magic Tee. Design a circulator using Magic Tees. 10

7. Write short notes on the following:-
   (a) Faraday Rotation 5
   (b) Power dividers 5
   (c) Hybrid junctions 5
   (d) O-type and M - type devices 5

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