Paper / Subject Code: 42471 / MICROWAVE ENGINEERING

June 4, 2024   10:30 am - 01:30 pm   1T01037 - B.E.(Electronics and Telecommunication)
(SEM-VII)(Choice Base Credit Grading System) (R- 2019-20)(C Scheme) / 42471 -
MICROWAVE ENGINEERING   QP CODE: 10055144

Time: 3 Hour   **Max Marks: 80**

Note: 1.Each question carries 20 marks
   2: Question no 1 is compulsory
   3: Solve any 3 out of remaining

   4: Assume suitable data wherever required

Q1: Solve any four.

 a) A transmission line has the following parameters: **5**
   $R = 2\ \Omega/m$, G= 0.5 mmho/m, $f = 1$ GHz, L = 8nH/m, C = 0.23 pF
   Calculate the characteristics impedance and propagation constant.

 b) Explain characteristics of E plane tee.   **5**

 c) Explain Applegate diagram of two cavity klystron   **5**

 d) Explain characteristics and working principal of tunnel diode   **5**

 e) Explain how to avoid mode jumping in Magnetron.   **5**

Q2: A) Derive equation for field components in Rectangular waveguide.   **10**

 B) State and prove condition for negative resistance in Gunn Diode. **10**

  Explain Two -Valley model theory.

Q3: A) An impedance $Z_L = (450 - j600)\ \Omega$ at 1 GHz is connected to a 300 Ω line. **10**

  Calculate the position and length of a short circuited stub designed to match

  This load to the line.

 B) Explain working and characteristics of IMPATT diode.   **10**

Q4: A) Explain H plane Tee and Magic Tee. State their applications.   **10**

 B) Explain basic construction of rotary attenuator and rotary phase shifter. **10**

Q5: A) Explain Reflex Klystron with neat schematic diagram. Explain process of **10**

  Velocity modulation with the help of Applegate diagram.

 B) A two cavity klystron has the following parameters   **10**

  Vo = 1000V, Ro = 40 KΩ, Io = 25 mA, f = 3 GHz

  Gap spacing in either cavity d = 1 mm, Spacing between the two cavities

  L = 4 cm and effective shunt impedance excluding beam loading Rsh = 30 KΩ.

  Find the input gap voltage to give maximum voltage V_2

Q6 A) Explain any one method to measure power at microwave frequency. **10**

 B) Write short note on

  a) VSWR measurement   **5**

  b) Varactor diode   **5**

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