

**CONTINUOUS INTERNAL EVALUATION- 2**

|   |                     |                             |               |
|---|---------------------|-----------------------------|---------------|
| Dept:EC   | Sem / Div: VI       | Sub:Microwaves and Antennas | S Code:18EC63 |
| Date:25/06/2021   | Time: 9:30-11:00 am | Max Marks: 50               | Elective:N    |
| Note: Answer any 2 full questions, choosing one full question from each part. |                     |                             |               |

| Q N           | Questions  | Marks | RBT | COs |
|---------------|--|-------|-----|-----|
| <b>PART A</b> |  |       |     |     |
| 1             | a A magic T is terminated at collinear ports 1 and 2 and difference port 4 by impedances of reflection coefficients $\Gamma_1= 0.5$ , $\Gamma_2=0.6$ and $\Gamma_4 = 0.8$ respectively. If 1 W power is fed at sum port 3, calculate the power reflected at port 3 and power transmitted to other three ports.   | 9     | L3  | CO2 |
|               | b Obtain an expression for Q-factor of a micro-strip line due to conductor losses.   | 8     | L3  | CO2 |
|               | c Define radiation pattern. Explain field pattern and power pattern of a directional antenna.  | 8     | L2  | CO3 |
| <b>OR</b>     |  |       |     |     |
| 2             | a A lossless parallel strip line has a conducting strip width W. The substrate dielectric separating the two conducting strips has a relative dielectric constant of 6 and a thickness d of 4mm. Calculate: i) The required width 'w' of the conducting strip in order to have a characteristic impedance of 50ohm, ii) The stripline capacitance. iii)The strip line inductance, iv) The phase velocity of the wave in the parallel stripine. | 8     | L3  | CO2 |
|               | b Explain the operation of a microwave dielectric phase shifter.   | 9     | L2  | CO2 |
|               | c Explain the following terms with respect to antennas.<br>i)Beam area, ii)Radiation intensity   | 8     | L2  | CO3 |
| <b>PART B</b> |  |       |     |     |
| 3             | a With a neat schematic diagram explain the working of a ferrite twin-toroid phase shifter.  | 8     | L2  | CO2 |
|               | b A 20mW signal is fed into one of the collinear port 1 of a lossless H-plane T junction. Calculate the power delivered through each port when the other terminals are terminated in matched load.   | 8     | L3  | CO2 |
|               | c What are the various types of losses in a micro-strip line? Derive an expression for the attenuation constant due to dielectric losses in a micro-strip line.  | 9     | L3  | CO2 |
| <b>OR</b>     |  |       |     |     |
| 4             | a Draw a neat diagram of a E-plane T junction and explain its operation. Write its S matrix.   | 10    | L2  | CO2 |
|               | b With a diagram explain the working of a precision type variable attenuator.  | 8     | L2  | CO2 |
|               | c Explain the structure and working of co-planar stripline and shielded stripline.   | 7     | L2  | CO2 |