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**SIDDHARTH INSTITUTE OF ENGINEERING & TECHNOLOGY:: PUTTUR**  
(AUTONOMOUS)

**B.Tech III Year II Semester Supplementary Examinations March-2021**

**MICROWAVE ENGINEERING**

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 60

(Answer all Five Units 5 x 12 = 60 Marks)

**UNIT-I**

- 1 a Discuss about the important considerations when making attenuation measurement. 6M  
b Explain about measurement of attenuation using a microwave bench setup. 6M

OR

- 2 a Derive the equation for Resonant frequency in rectangular cavity resonator. 7M  
b Calculate resonant frequency of rectangular cavity filled with dielectric with  $\epsilon_r=4$  and having dimensions  $a=5\text{cm}$   $b=4\text{cm}$  and  $d=15\text{cm}$ . 5M

**UNIT-II**

- 3 a Explain Precision variable attenuator. 6M  
b Explain Rotary vane attenuator. 6M

OR

- 4 a Derive the S-matrix for Magic Tee junction. 7M  
b A 20 dB coupler has a directivity of 30 dB. Calculate the value of isolation. 5M

**UNIT-III**

- 5 Describe with a neat sketch the constructional details and principle of operation of a reflex klystron tube. 12M

OR

- 6 a Write short notes on wave modes. 6M  
b Mention how a TWT can be converted to an oscillator. Explain the operation of such a device. Why large tuning range, are possible with such a device? 6M

**UNIT-IV**

- 7 a Explain the properties of high field domain for microwave generation and amplification. 6M  
b Explain the rate of growth of space charge layers with the help of necessary expressions. 6M

OR

- 8 a Discuss in detail about Gunn diode modes of operation. 6M  
b What are bulk properties of a GUNN diode that give rise to negative resistance like Characteristics? 6M

**UNIT-V**

- 9 a Discuss about the important considerations when making attenuation measurement. 6M  
b Explain about measurement of attenuation using a microwave bench setup. 6M

OR

- 10 a Draw the experimental setup necessary for the measurement of impedance using slotted line. Explain in detail. 7M  
b What are the characteristics of detectors used in microwave measurement? 5M

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