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Total No. of Pages : 02

Total No. of Questions : 18

**B.Tech. (ECE) (2012 to 2017)**  
**(Sem.-6)**

**MICROWAVE AND RADAR ENGINEERING**

**Subject Code : BTEC-601**

**M.Code : 71121**

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. **SECTION-A** is **COMPULSORY** consisting of **TEN** questions carrying **TWO** marks each.
2. **SECTION-B** contains **FIVE** questions carrying **FIVE** marks each and students have to attempt any **FOUR** questions.
3. **SECTION-C** contains **THREE** questions carrying **TEN** marks each and students have to attempt any **TWO** questions.

**SECTION-A**

**Answer briefly :**

1. What is the need of isolator in microwave bench?
2. Why is PIN diode used in microwave engineering?
3. Which klystron is used as an amplifier only and not as an oscillator?
4. What do you mean by transit time?
5. What is the function of slow wave structure in TWT?
6. What is the use of bends and corners in microwave?
7. Define BWO.
8. What is tunneling effect?
9. Name the various scanning techniques.
10. What is SWR?

**SECTION-B**

11. Explain the slotted line method of VSWR measurement with basic experimental set-up for high VSWR ( $S > 20$ ).
12. What do you understand by moving target detector? Explain.
13. How power can be measured using calorimeters?
14. A two cavity klystron amplifier has the following characteristics  
Voltage gain = 15 dB  
Input power = 5 mW  
 $R_{sh}$  of input cavity = 30 k $\Omega$   
 $R_{sh}$  of output cavity = 40 k $\Omega$   
Load impedance = 40 k $\Omega$   
Determine :
  - a. The input rms voltage
  - b. The output rms voltage
15. Explain the working of phase shifter in detail.

**SECTION-C**

16. Explain working and construction of directional coupler and solve the s-matrix for the same.
17.
  - a. What is Gunn Effect? Explain Gunn domain in detail.
  - b. What is velocity modulation? What are the benefits obtained from velocity modulation?
18. Define the following terms of magnetron :
  - a. favoured electrons
  - b. back heating effect
  - c.  $\pi$ -mode oscillations
  - d. frequency pushing and frequency pulling
  - e. mode jumping

**NOTE : Disclosure of identity by writing mobile number or making passing request on any page of Answer sheet will lead to UMC against the Student.**