

**24326**

**B. Tech 6th Semester (ECE)  
Examination – May, 2018**

**MICROWAVE AND RADAR ENGINEERING**

Paper : EE-302-F

*Time : Three Hours ]*

*[ Maximum Marks : 100*

*Before answering the questions, candidates should ensure that they have been supplied the correct and complete question paper. No complaint in this regard, will be entertained after examination.*

*Note : Attempt five questions in all, selecting one question from each Section. Question No. 1 is compulsory. All questions carry equal marks.*

1. (a) Differentiate between wave guide and transmission line. 5
- (b) What is Duplexer ? Give its applications. 5
- (c) List out the application of varactor diode. 5
- (d) Define Doppler Effect. 3
- (e) Define term 'Scanning' and 'Tracking' in Radar. 2

**SECTION – A**

2. (a) Derive the wave equation for a TM wave and obtain all the field component modes in rectangular wave guide. 10

- (b) An air filled rectangular waveguide of inside  $8 \times 4$  cm operates in dominant  $TE_{10}$  mode. Find 10
- (i) Cut off frequency
  - (ii) Phase velocity of wave in the guide at  $4 \text{ GHz}$
  - (iii) Guided wavelength at the same frequency.

3. (a) Derive an expression for characteristics impedance. 10
- (b) What are cavity resonators ? Derive the equations for resonant frequency in circular cavity resonator. 10

### SECTION - B

4. (a) What is Magic Tee ? Derive expression for scattering matrix. 10
- (b) Explain the operation of a two hole waveguide directional coupler. 10
5. (a) Explain construction, operation and properties of Klystron Amplifier. 15
- (b) What are Ferrites ? Why are these useful in microwaves ? 5

### SECTION - C

6. Explain the operation, construction and applications of following devices. 20
- (a) IMPATT
  - (b) Gun Diode
  - (c) TRAPATT

7. (a) Explain how high value of VSWR can be measured using the Minimum Method. 10
- (b) Describe how can the power of a microwave generator be measured using Bolometer technique. 10

### SECTION - D

8. (a) Explain the block diagram of Basic Radar System. Give the limitations and applications of Radars. 15
- (b) Explain the factor effecting the maximum range of a Radar. 5
9. Write a short note on any *three* : 20
- (a) PDI Displays
  - (b) PRF
  - (c) Pulsed Radar
  - (d) Line pulse Modulator
-