

Roll No.

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

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(b) An air filled rectangular waveguide of inside 8×4 cm operates in dominant TE_{10} mode. Find 10

- (i) Cut off frequency
 - (ii) Phase velocity of wave in the guide at 4 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

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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

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