

Roll No. ....

**24326**

**B. Tech. 6th Semester (ECE)**

**Examination – May, 2019**

**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) How are waveguides different from normal two wire transmission lines ? Explain.
- (b) Explain the performance characteristics and applications of BWO devices.
- (c) Discuss the operation of Varactor Diode.
- (d) Discuss the Radar frequencies briefly.  $5 \times 4 = 20$

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**SECTION – A**

2. Derive the wave equation of TM wave and obtain all the filled component in rectangular waveguide. 20
3. (a) An air filled rectangular waveguide of inside dimensions  $7 \times 3.5$  cm operates in the dominant  $TE_{10}$  mode. Find : 12
  - (i) Cutoff frequency.
  - (ii) Phase velocity of wave in the guide at 3.5 GHz.
  - (iii) Guided wavelength at same frequency.
- (b) Write a short note on polarisation in microstrip antennas. 8

**SECTION – B**

4. (a) Explain the functioning of flap and Vane attenuators. 10
- (b) Explain the function of rat-race function. 10
5. (a) What are the limitations of conventional tubes. 10
- (b) Differentiate between fixed and variable attenuator. 10

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**SECTION - C**

6. (a) Explain the operation and characteristics of GUNN diode. 10
- (b) An IMPATT diode has a drift length of 24 m, determine : 10
- (i) The drift time of carrier.
- (ii) Operating frequency of diode.
7. (a) Explain how high value of VSWR can be measured by twice the minimum method. 10
- (b) Explain the operation of parametric amplifier. How is it different from a normal amplifier. 10

**SECTION - D**

8. (a) What is RADAR ? Explain the operation of a RADAR system with the help of its block diagram. <https://www.haryanapapers.com> 10
- (b) Explain Doppler effect in RADAR system. 10
9. (a) Explain the function of Duplexer in pulsed radar system. 10

- (b) How do you distinguish stationary targets and moving targets ? Explain the principle and working of MTI Radar. 10

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