

7. (a) Explain how high value of VSWR can be measured by twice the minimum method? 10
- (b) A Parametric diode amplifier has $R_s = 4\Omega$ and $R_L = R_1 = R_2 = 0$. The characteristics impedance of the amplifier is 50Ω calculate: 10
- (i) Reflection coefficient.
- (ii) Power gain.

SECTION - D

8. (a) What is RADAR ? Explain the operation of a RADAR system with the help of its block diagram. 10
- (b) Explain various applications of RADAR. 10
9. (a) Derive the radar range equation. Also explain the factors that effects the maximum rangs of RADAR. 15
- (b) Explain Doppler effect in RADAR system. 5

Roll No.

24326

B. Tech 6th Semester (ECE)

Examination – May, 2016

MICROWAVE AND RADAR ENGINEERING

Paper : EE-302-F

Time : Three Hours]

[Maximum Marks : 100

Before answering the question, 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 by taking one question from each Section and Question No. 1 is compulsory.

1. (a) What is characteristics impedance? 4
- (b) Explain the performance characteristics and applications of BWO devices. 4
- (c) Differentiate between fixed and variable attenuator. 4
- (d) What is the role of PIN diode in test setup? 4
- (e) What is range ambiguities in RADAR? 4

SECTION - A

2. (a) Explain the difference between TE and TM modes in rectangular waveguides with the help of suitable field pattern. 10
- (b) An air filled rectangular waveguide of inside dimensions 7×3.5 cm operates in the dominant TE_{10} mode find :
- (i) Cut off frequency
- (ii) Phase velocity of wave in the guide at 3.5 GHz.
- (iii) Guided wavelength at the same frequency. 10
3. (a) Compare waveguide with transmission lines. 10
- (b) A 4GHz signal is propagated in a rectangular waveguide with internal dimension of $5 \text{ cm} \times 2.5 \text{ cm}$. Assuming the dominant mode, calculate cut off frequency (λ_c), guided wavelength (λ_g), phase velocity (V_p) and characteristics impedance of the guide. 10

SECTION - B

4. (a) Explain the operation of a two-hole waveguide directional coupler. 10

24326-6,200-(P-4)(Q-9) (16) (2)

- (b) What are ferrites ? Explain the action of circulator using ferrites. 10

5. (a) What is TWT ? How oscillations are prevented in a TWT ? 10

- (b) A TWT operates under following parameters, beam voltage $V_o = 3KV$, beam current $I_o = 20MA$, characteristics impedance of helix $Z_0 = 10\Omega$, circuit length $N_i = 50$ and frequency $f = 10GHz$ determine : 10

- (i) Gain Parameter
- (ii) Output power gain
- (iii) Four propagation constant

SECTION - C

6. (a) Explain the operation and characteristics of GUNN diode. 10
- (b) An IMPATT diode has a drift length of 24m, determine : 10
- (i) The drift time of carrier.
- (ii) The operating frequency of the diode.

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P. T. O.