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Roll No. ....

**328731(28)**

**B. E. (Seventh Semester) Examination,  
April-May 2021**

**(New Scheme)**

**(ET&T Engg. Branch)**

**MICROWAVE COMMUNICATION and  
ENGINEERING**

***Time Allowed : Three hours***

***Maximum Marks : 80***

***Minimum Pass Marks : 28***

***Note : Part (a) of each unit is compulsory. Attempt any two parts from (b), (c) and (d) from each unit.***

**Unit-I**

1. (a) Define Velocity Modulation. 2
- (b) An applegate diagram by means of and explain the operation of two cavity Klystron amplifier. 7

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- (c) A Reflex Klystron operates at 8 GHz at the peak of  $n = 2$  mode with  $V_0 = 280$  volts,  $I_0 = 22$  milli amp and Signal voltage  $V_1 = 30$  volt. Determine the input power, output power and efficiency. 7
- (d) A helical TWT has diameter of 2 mm with 50 turns per cm, Calculate axial phase velocity and anode voltage at which the TWT can be operated for useful gain? 7

**Unit-II**

2. (a) Difference between Linear beam tube and Crossed field tubes. 2
- (b) What do you mean by Mode Jumping and how can be avoided it in Magnetron? 7
- (c) With help of constructional detail, explain working of Inverted Coaxial Magnetron. 7
- (d) Write short notes on Forward Wave crossed field amplifier. 7

**Unit-III**

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3. (a) Why GaAs is preferred as compared to Si in MESFET? 2
- (b) Describe constructional detail of Microwave Transistor with help of different surface geometry. 7
- (c) Describe the construction, operation and characteristics of PIN Diode under Forward and reverse bias condition. 7
- (d) What are MESFET? Explain the construction, operation, performance characteristics and their applications. 7

**Unit-IV**

4. (a) An IMPATT Diode has a drift length  $2\mu\text{m}$  and Drift velocity for Si is  $10^7$  cm/sec. Determine its Operating Frequency. 2
- (b) State Manley Rowe relations as applied to Parametric amplifiers. What are the conditions for Parametric up and down converter? 7
- (c) A Typical Si BARITT diode has the following specifications. Relative dielectric constant is 12.5, Donor

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Concentration =  $3.2 \times 10^{22}/\text{m}^3$  and length  $8\mu\text{m}$ .

Calculate critical voltage, breakdown voltage and breakdown electric field. 7

(d) Define negative differential resistivity. Explain J-E characteristics of GUNN diode. 7

### Unit-V

5. (a) Define Directivity and Coupling Factor of Directional Coupler. 2

(b) Describe measurement of Power by using Bolometric method. 7

(c) Two identical 30 decibel directional coupler are used to sample incident and reflected power in a waveguide, VSWR = 2 and the output of the coupler sampling incident power = 4.5 mw. What is the value of Reflected Power? 7

(d) Write short notes on : (any two) 7

(i) Isolator

(ii) H Plane TEE

(iii) S parameter