

UNIT-V

5. Explain construction and working principle of magnetron with suitable diagram?

OR

5. An X band pulsed cylindrical magnetron has following operating parameters.
- Anode voltage  $V_0=26\text{KV}$ , beam current  $I_0=27\text{A}$ , magnetic flux density  $B_0=0.336\text{wb/m}^2$ , radius of cathode  $a=5\text{cm}$ , radius of centre= $10\text{cm}$
- a) Find angular frequency
- b) The cut off voltage for fixed  $B_0$
- c) The cut off magnetic flux density for a fixed  $V_0$ .

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B.TECH (ELEC. & COMM. ENGG.)

V-SEM Examination, Dec.-2016

SUB: MICROWAVE ENGG.-1

Time : 3 Hours]

Total Marks 60

Use of following supporting material is permitted during examination.

1. \_\_\_\_\_ Nil \_\_\_\_\_ Nil

Note: 1. Attempt any five questions selecting one question from each unit.

2. Each question carry equal marks.

UNIT-I

1. An air filled resonant cavity with dimensions  $a=5\text{cm}$ ,  $b=4\text{cm}$  and  $c=10\text{cm}$  is made of copper ( $\sigma=5.8 \times 10^7\text{ mhos/m}$ ). It is filled with a lossless material ( $\mu_r=1$ ), ( $\epsilon_r=3$ ). Find the resonant frequency  $F_r$  and the quality factor for  $TE_{101}$  mode.

OR

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1. a) Write applications of microwaves?  
b) A rectangular waveguide has the following characteristics  $b=1.5\text{cm}$ ,  $a=3\text{cm}$  and  $\mu r=1$ ,  $\epsilon r=2.25$ . Calculate cut off wavelength and frequency for  $TE_{10}$  mode.

**UNIT-II**

2. Write short note on (any two)
    - a) Hybrid ring
    - b) Magic tee
    - c) Circulators
- OR**
2. a) Explain measurement of impedance using magic tee?  
b) Explain microwave Isolator with suitable diagrams?

**UNIT-III**

3. Derive an expression of velocity modulation for two cavity klystron? And also draw its Applegate diagram?

**OR**

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3. A reflex klystron operate at the peak mode of  $n=2$  with beam voltage  $V_0=300\text{V}$ , Beam current  $I_0=20\text{MA}$ , signal voltage  $V_1=40\text{V}$ .  
Determine -
  - i) The input power
  - ii) The output power
  - iii) The efficiency.

**UNIT-IV**

4. A helical TWT has diameter of  $2\text{mm}$  with  $50$  turns per cm.
  - a) Calculate axial phase velocity
  - b) The anode voltage at which the TWT can be operates for useful gain.

**OR**

4. a) Derive an expression of convection current for TWT?  
b) Explain slow-wave stuctors of TWT with suitable diagram and also write application of TWT?

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