Code No: 157CM

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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, February/March - 2022
MICROWAVE AND OPTICAL COMMUNICATIONS
(Electronics and Communication Engineering)

Time: 3 Hours **Max. Marks: 75**

Answer any Five Questions
All Questions Carry Equal Marks

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1.a) Explain in detail the operation of Reflex Klystron and derive equation for its efficiency.
b) What is Velocity modulation? How is it different from normal modulation? Explain how velocity modulation is utilized in Klystron amplifier. [8+7]

2.a) Explain the operation of TWT and derive its gain. Give its characteristics and applications.
b) What is a Gunn Diode? Explain how it works as a Oscillator and also discuss about the characteristic curve. [8+7]

3.a) Explain the operation of magnetron and derive its Hull Cutoff Voltage equation.
b) Explain the operation of IMPATT Diode and explain its characteristics curve. [7+8]

4.a) Discuss the design of Waveguide terminations.
b) With a neat diagram explain in detail about H-plane tee and determine its S-matrix. [8+7]

5.a) What are ferrites? How they are useful in microwaves? Explain faradays rotation.
b) Explain the design and working principle of a Gyrator. [8+7]

6.a) Explain the operation of Magic Tee. Describe how it can be used in constructing a Circulator and a Duplexer.
b) Discuss in detail the operation of a 2-hole directional coupler, Calculate the coupling factor if the power in the primary waveguide is 65mw and the power delivered to the directional coupler is 7mw. [8+7]

7.a) With a neat block diagram of typical microwave bench, explain the functionality of each block.
b) Define an optical fiber. Explain in detail different types of optical fibers with neat sketches. [8+7]

8.a) Explain P-I-N photo detector with neat sketch.
b) Briefly explain the types of losses occur in optical fiber. [7+8]

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