# M.Sc. PHYSICS <br> FOURTH SEMESTER <br> ELECTRONICS \& COMMUNICATION TECHNOLOGY <br> MSP-403 B <br> (Use separate answer scripts for Objective \& Descriptive) 

Duration: 3 hrs.
Full Marks: 70

## (PART-A: Objective)

Time: 20 min.
Marks: 20
Choose the correct answer from the following:
$1 \times 20=20$

1. Klystron is a microwave:
a. oscillator
b. amplifier
c. switch
d. none of the above
2. Which one of the following is a crossed field device?
a. Magnetron
b. Klystron
c. TWT
d. TRAPATT
3. $\Pi$-mode is supported in:
a. Magnetron
b. Klystron
c. TWT
d. both a) and b)
4. RADAR uses:
a. antenna
b. duplexer
c. both a) and b)
d. none of the above
5. Electrons in Reflex Klystron are captured at repeller end by:
a. buncher cavity
b. catcher cavity
c. resonant cavity
d. none of the above
6. Signals coming back from RADAR target is known as:
a. echoes
b. reflected signal
c. pulse
d. transmitted signal
7. A graph which shows the distribution of field strength or power strength of EM wave at all points which are equal distance from antenna is called:
a. radiation resistance
b. radiation pattern
c. beamwidth
d. major lobe
8. The process in which electron drops to lower level in an entirely random way is:
a. spontaneous emission
b. stimulated emission
c. both a) and b)
d. none of the above
9. Luminescence where excitation arises from the absorption of photons is called:
a. electroluminescence
b. photoluminescence
c. cathodoluminescence
d. both a) and b)
10. Light source for optical fibre is:
a. LED
b. LASER
c. Both a) and b)
d. None of the above
11. Interface that converts .......waves to...... waves and vice-versa is called antenna
a. $\frac{V}{I}, \frac{E}{H}$
b. $\frac{E}{H}, \frac{V}{I}$
c. $\frac{I}{V}, \frac{H}{E}$
d. none of the above

## PART-B : Descriptive

## [ Answer question no. 1 \& any four (4) from the rest]

1. Explain the operation of reflex klystron with the aid of a suitable schematic diagram. Explain the process of velocity modulation.
2. a. Define different types of microwave tubes. Explain the working principles of each with example.
b. Define different types of antenna. Derive Friss's transmission equation for electromagnetic wave propagation
3. a. Explain the operation of TWT with a suitable schematic diagram. b. What is magnetron? Explain the working principle of magnetron
4. a. Draw the basic block of RADAR system. Derive RADAR range equation indicating significance of each term.
b. Explain pulsed RADAR system with functional block representation.
5. a. Describe two element antenna arrays. Find special cases for radiation plots.
b. Write difference of basic principle of operation of Klystron and Magnetron. Explain $\Pi$ mode oscillation in magnetron.
6. a. Write short notes on: (any two)
i) Antenna array.
ii) Radiation pattern.
iii) Bunching process in TWT.
b. Explain briefly operation principle of Backward wave oscillator.
7. a. Explain MTI with block representation.
b. Explain with diagram the process of emission and absorption.
8. a. Categorize luminescence. Explain one of it.
b. Write down different sources of optoelectronics devices. Explain the process of optical fiber communication system.
a. velocity modulation
c. space modulation
b. speed modulation

To produce LASAR action. $\qquad$ is created.
a. population inversion
c. population absorption
b. population diversion d. radiation
20. Photodiode is used as
a. optical source
b. optical receiver
c. optical medium
d. all of above
a. modulation
b. Doppler effect
d. all of the above

