REV-00 MSP/11/16

M.Sc. PHYSICS FOURTH SEMESTER **ELECTRONICS & COMMUNICATION TECHNOLOGY MSP-403 B**

(Use separate answer scripts for Objective & Descriptive)

Duration: 3 hrs.

PART-	A : Ob	jective	
-------	--------	---------	--

Time: 20 min.

Marks: 20 $1 \times 20 = 20$

Choose t	he correct	answer from	the fol	lowing:
----------	------------	-------------	---------	---------

- 1. Klystron is a microwave: a. oscillator
 - c. switch

b. amplifier d. none of the above

d. TRAPATT

b. Klystron

d. both a) and b)

- 2. Which one of the following is a crossed field device? a. Magnetron b. Klystron
 - c. TWT
- 3. Π -mode is supported in: a. Magnetron c. TWT
- 4. RADAR uses: a. antenna
 - c. both a) and b)

b. duplexer d. none of the above

- 5. Electrons in Reflex Klystron are captured at repeller end by: b. catcher cavity a. buncher 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: b. stimulated emission a. spontaneous 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 c. Both a) and b)

b. LASER d. None of the above

Full Marks: 70

11. Interface that convertswaves to..... waves and vice-versa is called antenna.

a.
$$\frac{V}{I}, \frac{E}{H}$$

c. $\frac{I}{V}, \frac{H}{E}$

b. $\frac{E}{H}, \frac{V}{I}$

d. none of the above

b. power per solid angle d. power per unit length

12. In array antenna $\alpha = 0, d = \frac{\lambda}{2}$ leads half power points at:

a.	θ	= =	± 60 °	and	± 120	•	b.	θ	=	± 90 °	and	±	120	•
c.	θ	= :	±45°	and	± 180	o .	d.	θ	=	± 30 °	and	±	120	

13. Radiation intensity of an antenna is:

1.	power	per	unit	area
		_		the second s

c. power per unit volume

14. In radar range equation $r_{\text{max}=}$ is given by:

a.
$$\left[\frac{P_{r}A_{r}^{2}}{(4\pi)^{3}}P_{\min}\right]^{\frac{1}{4}}$$
b.
$$\left[\frac{P_{r}A_{r}^{2}}{(4\pi)^{3}}P_{\min}\right]^{\frac{1}{2}}$$
c.
$$\left[\frac{P_{r}A_{r}^{2}}{(4\pi)^{3}}P_{\min}\right]^{\frac{1}{3}}$$
d.
$$\left[\frac{P_{r}A_{r}^{2}}{(4\pi)^{2}}P_{\min}\right]^{\frac{1}{2}}$$

15. Performance of RADAR is determined by:

a. range equation	b. echoes
c. pulses	d. antenna

16. Gain of an antenna is:

a. a measure of its directivity.

b. a measure of the bandwidth.

c. a measure of its power handling capability. d. all of the above.

7. MIT in RADAR system em	ploysin its operation.
a. modulation	b. Doppler effect

c. interference	a. all of the above
18 The variation in electron velocity	in drift snace is known as

o. The variation in electron velocity	in unit space is known as.
a. velocity modulation	b. speed modulation
c. space modulation	d. none of the above

- d. none of the above
- 19. To produce LASAR action..... is created.

a. population inversion	b. population diversion
c. population absorption	d. radiation

20. Photodiode is used as:

a. optical source

c. optical medium

b. optical receiver d. all of above

	(<u>PART-B : Descriptive</u>)	
Гin	Marks: 50	
	[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.	10
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. 	5+5=10
3.	a. Explain the operation of TWT with a suitable schematic diagram.b. What is magnetron? Explain the working principle of magnetron.	4+6=10
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.	_6+4=10
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 Π mode oscillation in magnetron. 	4+3+3=10
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. 	3+3+4=10
7.	a. Explain MTI with block representation.b. Explain with diagram the process of emission and absorption.	4+6=10
8.	a. Categorize luminescence. Explain one of it.b. Write down different sources of optoelectronics devices. Explain the process of optical fiber communication system.	3+3+4=10

== *** ==

3