

Roll No.

E-755

M. Sc. (Third Semester)
EXAMINATION, Dec.-Jan., 2020-21

PHYSICS

Paper Fourth (B)

[Electronics—I Communication]

Time : Three Hours]

[Maximum Marks : 80

Note : Attempt all Sections as directed.

Section—A

1 each

(Objective/Multiple Choice Questions)

Note : Attempt all questions.

Choose the correct answer :

1. A high power microwave pulses of the order of megawatt can be generated by :
 - (a) TWT
 - (b) Magnetron
 - (c) Gunn diode
 - (d) Klystron

P. T. O.

2. A TWT amplifier by virtue of :
 - (a) The absorption of energy by the signal from an electrons stream
 - (b) The effect of an external magnetic field
 - (c) The energy contained the cavity resonator
 - (d) None of the above
3. Which of the following is used as an oscillator device in SHF band ?
 - (a) Thyatron tube
 - (b) Tunnel diode
 - (c) Vacuum pentode
 - (d) None of the above
4. What is the purpose of EM field which surrounds a travelling wave tube ?
 - (a) To accelerate the electron
 - (b) To velocity modulate the electron beam
 - (c) To keep electrons from spreading out
 - (d) None of the above
5. Microwave frequencies are normally regarded as those in the range of :
 - (a) 1 to 500 MHz
 - (b) 1,000 to 10,000 GHz
 - (c) 1 to 100 GHz
 - (d) None of the above

6. The mode of propagation supported by a rectangular wave guide is :
- (a) TM TEM, TE mode
 - (b) TM TE mode
 - (c) TM TEM mode
 - (d) None of the above
7. The lowest mode of TM wave propagation is :
- (a) TM 10 mode
 - (b) TM 01 mode
 - (c) TM 11 mode
 - (d) TM 12 mode
8. What ferrite device can be used instead of duplexer is :
- (a) Isolater
 - (b) Magnetron
 - (c) Circulator
 - (d) None of the above
9. If antenna diameter in radar system is increased by a factor 4, the maximum range will increase by a factor of :
- (a) $\sqrt{2}$
 - (b) 2
 - (c) 4
 - (d) 8

10. If target cross-section is changing, the best system of accurate tracking in radar is :
- (a) lobe switching
 - (b) sequential lobing
 - (c) conical scanning
 - (d) monopulse
11. The highest disadvantage of CW doppler radar is that :
- (a) It does not target velocity.
 - (b) It does not give the target range.
 - (c) It does not give target position.
 - (d) A transponder is required at the target.
12. The down link in C-band transponder is :
- (a) 6 GHz
 - (b) 4 GHz
 - (c) 14 GHz
 - (d) 20 GHz
13. Polar orbiting satellite is :
- (a) Orbiting earth in such a way to cover north and south polar region
 - (b) Orbiting earth in such a way to cover east and west region
 - (c) Both (a) and (b)
 - (d) None of the above

14. Device used in radar for transmitting and receiving signal is :

- (a) Duplexer
- (b) Diplexer
- (c) Phase array antenna
- (d) None of the above

15. In the following microwave generator only one cavity is used :

- (a) Magnetron
- (b) Klystron
- (c) TWT
- (d) Reflex Klystron

16. Failure of vacuum tube in microwave range is due to :

- (a) Electron transit time effect
- (b) Modification of impedances
- (c) Feedback
- (d) All of the above

17. In general radar system number of antennae used :

- (a) One antenna
- (b) Two antenna
- (c) Three antenna
- (d) None of the above

18. Millimeter wave is ;

- (a) Radio wave
- (b) Microwave
- (c) Optical wave
- (d) None of the above

19. Position of antenna in phase array antenna is :

- (a) Stable
- (b) Moving
- (c) Both stable and moving
- (d) None of the above

20. Two fields are magnetic and electric are used in :

- (a) Klystron
- (b) Reflex Klystron
- (c) Magnetron
- (d) All of the above

Section—B

2 each

(Very Short Answer Type Questions)

Note : Attempt all questions.

1. What is Klystron ?
2. Write name of *five* microwave generators.
3. Write the merit of microwaves.
4. What is radar range ?

5. Draw equivalent circuit diagram of conductor at microwave range.
6. What are uses of radar ?
7. What is satellite ?
8. What is geostationary orbit ?

Section—C

3 each

(Short Answer Type Questions)

Note : Attempt all questions.

1. Explain in short principle and working of reflex klystron.
2. Explain in short principle and working of TWT.
3. Define TM modes in circular wave guide.
4. Explain in short Q-factor in cavity resonator.
5. Explain in brief the principle and working of GUNN diode.
6. Write the name of various types of RADAR.
7. Explain in brief the working of satellite.
8. Explain the brief about use of escape velocity in satellite launching system.

Section—D

4 each

(Long Answer Type Questions)

Note : Attempt all questions.

1. Write the failure of conventional tubes in UHF range.
Explain principle and working of magnetron with diagram.

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2. Describe the various types of modes of rectangular wave guides. Also explain in short the excitation modes in rectangular wave guide.
3. What do you understand by Transferred electronic devices ? Explain the principle and mode of operation of IMPATT with suitable diagram.
4. What is RADAR ? Explain in detail the working of RADAR and find RADAR range equation. Also write uses of RADAR in civil, military, metrological, medical and scientific field.
5. What is satellite ? Write the difference between natural and artificial satellite. Explain the principle and working of satellite. Also write the utility of geostationary satellite. Write name of any *five* satellites.