ED-605

M.Sc. 3rd Semester
Examination, March-April 2021

PHYSICS

Paper - IV (B)

Electronics-I
Communication

Time : Three Hours] [*Maximum Marks* : 80

Note : Answer **all** questions. The figures in the right-hand margin indicate marks.

Unit-I

1. Explain the working principle of Magnetron and write its performance characteristics and applications. 16

OR

What are the major differences between a klystron amplifier and a TWT amplifier ? Draw the diagram of helix travelling wave tube and explain its operation. 16

Unit-II

2. Derive the field expression for TE and TM modes in rectangular waveguide. 16

OR

Derive the expressions for field equation of TM modes in circular waveguide. Write advantages, disadvantages and applications of circular waveguide. 16

Unit-III

3. Write short notes on the following :

(*a*) Semi circular cavity resonators 4

(*b*) Q-factor of a cavity resonator 4

(*c*) Propagation of microwave 4

(*d*) Advantages of microwave transmission 4

OR

(*a*) What are avalanche transit time devices ? Explain read diode. 8

(*b*) With the help of two valley theory, explain how negative resistance is created in Gunn diodes. Also explain J-E characteristics of a Gunn diode. 8

Unit-IV

4. What do you mean by the term 'RADAR' ? Explain the basic principle of RADAR. Prove that the maximum radar range is directly proportional to one-fourth power of antenna gain. 16

OR

(*a*) Define Radar target. Explain Radar cross-section of the target. 8

(*b*) Explain the following :

(*i*) Integration of Radar pulse 4

(*ii*) Minimum detectable signal in basic Radar 4

Unit-V

5. (*a*) What is meant by look angles ? Explain them with reference to a geostationary satellite. 8

(*b*) What is Satellite ? What are the types of setellite ? Explain general and technical characteristics of satellite communication system. 8

OR

Explain the following :

(*a*) Orbital patterns 8

(*b*) Orbital spacing 8