17656

15116

3 Hours / 100 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. a) Attempt any THREE of the following: **12**

(i) Define the terms w.r.t. waveguide

1) Cutoff frequency of a waveguide

2) Guide wavelength

(ii) Draw labelled sketch of Reflex Klystron. State its applications.

(iii) Write RADAR range equation and state the factors affecting maximum range of RADAR.

(iv) Define geostationary orbit and geostationary satellite.

b) Attempt any ONE of the following: **06**

(i) Sketch the construction of Gunndiode and write its operation.

(ii) What is waveguide? With neat sketch explain its operation.

P.T.O.

Marks

2. Attempt any FOUR of the following: **16**

a) Differentiate between circular and rectangular waveguide.

b) Draw the construction of two cavity Klystron amplifier and describe its working principle.

c) How doppler effect can be used to measure speed?

d) State the reason for difference in uplink and downlink frequency in satellite communication.

e) Describe scattering and dispersion losses in optical fiber.

f) Draw frequency spectrum for optical communication with band name and its range.

3. Attempt any FOUR of the following: **16**

a) State advantages and applications of circular waveguide.

b) Sketch the construction of tunnel diode and write its operation.

c) Describe a scope display method of radar with its diagram.

d) State the advantages and disadvantages of fiber optic communication.

e) Define with respect to satellite communication

(i) Orbit

(ii) Footprint

4. a) Attempt any THREE of the following: **12**

(i) Draw field pattern of circular waveguide. State its applications.

(ii) Draw the construction of PIN diode and describe with its working principle.

(iii) State two advantages and two applications of CW radar.

(iv) Illustrate the block diagram of communication channel subsystem used in satellite communication.

Marks

b) Attempt any ONE of the following: **06**

(i) Explain the working of MTI radar with the help of block diagram and with suitable waveforms.

(ii) Draw the block diagram of fiber optic communication system and list out the detectors and light source for it.

5. Attempt any FOUR of the following: **16**

a) Distinguish microwave circulator and isolator with following parameters:

(i) Function

(ii) Construction

(iii) Application

(iv) Number of ports

b) Show how TWT can be used as an amplifier.

c) A step index fiber has a numerical aperture of 0.16, a core refractive index of 1.45 and core diameter of 90 mm. Calculate:

(i) The acceptance angle θ_a

(ii) The refractive index of cladding

d) Describe the antenna used in satellite.

e) Describe edge emitter LED construction and working principle.

f) Draw and explain the block diagram of OTDR.

Marks

6. Attempt any FOUR of the following: **16**

a) Draw diagram of twists and corners. State its applications.

b) Describe the Intrinsic and Extrinsic absorption losses in optical fiber.

c) Draw the diagram of fusion splicing and rigid alignment tube splice.

d) Illustrate how telemetry tracking and command system in used in satellite.

e) Draw structure of avalanche photodiode and describe its working principle.