11718

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

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

Marks

1. **(A) Attempt any THREE :**   **12**

(a) Draw the microwave spectrum and designate the appropriate band in it.

(b) Sketch the constructional details of TWT and explain its working.

(c) Define Radar beacons and state their uses.

(d) Define and explain the terms :

(i) Uplink frequency

(ii) Downlink frequency

(B) Attempt any ONE :   **6**

(a) Differentiate between TE m, n and TM m, n modes. (6 points)

(b) Draw a constructional diagram of tunnel diode. Describe it's working. State it's applications.

2. **Attempt any FOUR:** 16

   (a) Explain the dominant mode of wave propagation through a rectangular waveguide.

   (b) List the specifications of two cavity klystron amplifier and give its applications.

   (c) Draw block diagram of basic radar system and describe its working.

   (d) List the types of orbits used in satellite system and describe them.

   (e) Define :

   (i) Reflection

   (ii) Refraction

   (iii) Absorption in scattering w.r.t. light theory.

   (f) List any four types of losses in optical fibers.

3. **Attempt any FOUR :** 16

   (a) State the advantages of circular waveguide and list its applications.

   (b) Draw the construction of Gunn diode and describe its working.

   (c) List the antenna tracking methods used in radar system. Explain any one of them.

   (d) Explain the following terms w.r.t. satellite :

   (i) Elevation, (ii) Altitude

   (e) Define : Critical angle. State Snell's law.

4. **(A)** **Attempt any THREE :** 12

    (a) Draw the field patterns of circular waveguide.

    (b) State the two applications of each :

        (i) IMPATT diode

        (ii) PIN diode

    (c) Compare between A-scope and PPI display methods.

    (d) Draw the block diagram of telemetry tracking and command subsystem and state its principle of operation.

  (B) **Attempt any ONE :** 6

    (a) Derive the Radar range equations and describe the factors affecting the maximum range of radar.

    (b) Draw and explain the block diagram of fiber optic communication system. List its advantages and disadvantages.

5. **Attempt any FOUR :** 16

    (a) Describe the function of following w.r.t. waveguide :

        (i) Isolators

        (ii) Circulators.

    (b) Draw the construction of magnetron. Describe its working.

    (c) Compare between edge emitter and surface emitter LED's.

    (d) Draw the block diagram of communication channel subsystem and state its principle of operation.

(e) Classify the optical fibers based on bands and specify their operating frequency range.

(f) List and explain the properties of splicing.

6. **Attempt any FOUR :** 16

(a) Describe the function of following junctions :

(i) E – plane junction

(ii) H-plane junction in microwave transmission.

(b) State and explain the characteristics of optical fibers.

(c) Differentiate between fusion splice and V-groove splice.

(d) Describe the antenna subsystem of satellite.

(e) Draw the construction of avalanche photodiode. State it's working principle.

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