

17656

11819

3 Hours / 100 Marks

Seat No.

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- 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) Define the term cut-off frequency and cut-off wavelength. State their mathematical formulae.
- (b) State significance of two cavities in multicavity Klystron. State its effect on Bandwidth.
- (c) State advantages and disadvantages of continuous wave Radar. (Two each)
- (d) Define the term Geostationary satellite. State its advantages.

(B) Attempt any ONE :

6

- (a) Compare waveguide and transmission line on the basis of definition, operating mode, construction, frequency range, applications and limitations.

- (b) State the name of microwave diode suitable for following each application :
- (i) Microwave oscillator
 - (ii) Replacing TWT Transmitter
 - (iii) Microwave Power Switching
 - (iv) Airborne Radar
 - (v) Logic operations
 - (vi) Pulse modulation

2. Attempt any FOUR :

16

- (a) For a rectangular waveguide with a wall separation of 4 cm and a desired frequency of operation is 8 GHz, determine :
- (i) Cut-off frequency
 - (ii) The Phase Velocity
- (b) With neat cross sectional constructional details, write effect of magnetic and electric field in magnetron.
- (c) State RADAR range equation and write factor influencing maximum range.
- (d) Sketch block diagram of satellite earth station and state functions of each block.
- (e) State any four advantages and four disadvantages of fibre optic communication.
- (f) Define the term multimode fiber, step Index fiber, Graded Index fiber and single mode fiber.

3. Attempt any FOUR :**16**

- (a) Sketch field pattern for TE_{11} mode of Rectangular waveguide. State its any two advantages.
- (b) Sketch constructional diagram of Tunnel diode and state any four feature.
- (c) Explain Pulse Radar with neat block diagram.
- (d) State frequency range for up link and down link for C band and Kv band for satellite.
- (e) Define the term Numerical aperture, Acceptance Angle & Critical Angle for optical fiber cable.

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

- (a) Compare :
 - (i) TE Mode & TM Mode
 - (ii) Circular wave guide & Rectangular wave guide
- (b) Sketch schematic diagram of IMPATT diode and write its working principle.
- (c) State the meaning and sketch antenna scanning pattern for Horizontal scan, Helical scan, Spiral scan and Nodding Scan.
- (d) Why altitude control is essential for satellite ? Hence write the role of altitude control subsystem for satellite.

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

- (a) State the concept of continuous wave RADAR. Sketch its block diagram. State its any two applications.
- (b) A optical fiber with a core diameter large enough, has a core refractive index of 1.70 and a cladding refractive index of 1.65. Calculate critical angle, numerical aperture and acceptance angle.

P.T.O.

5. Attempt any FOUR :**16**

- (a) Explain Hybrid Tee with neat sketch.
- (b) Velocity modulation occurs in two cavity Klystron amplifier. Justify with neat sketch.
- (c) Compare LED with LASER on the basis of principle of operation, spectral width, data rate, compatible fibers.
- (d) Draw the block diagram of satellite sub-system & explain power subsystem.
- (e) A step index fiber has a numerical aperture of 0.14 a core refractive index of 1.50 and core diameter 80 mm. Calculate acceptance angle and refractive index of cladding.
- (f) Explain OTDR with neat diagram & give its advantages.

6. Attempt any FOUR :**16**

- (a) Explain Reflex Klystron with neat sketch & define Transit Time. Give two application of it.
 - (b) Define the term absorption loss. State types of absorption losses. How these losses occurs ?
 - (c) List out any four essential properties of fiber connector.
 - (d) State the functions of telemetry and trucking sub-system of satellite.
 - (e) Compare PIN photo diode with avalanche photo diode. (any four factors)
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