

17670

15162

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 terms with respect to waveguide :

(i) Group velocity

(ii) Cut-off wavelength

(b) Draw well labelled schematic of TWT. Give its any two applications.

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

(d) Define the following terms with respect to satellite :

(i) Look angle

(ii) Foot print

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

- (a) With neat diagram describe the wave propagation through rectangular waveguide. Also, give the condition when propagation in dominant mode.
- (b) Write Radar maximum range equation in noise free atmosphere and state how different parameters affecting the RADAR range.

2. Attempt any FOUR : **16**

- (a) Differentiate between waveguide and two wire transmission line (any four point).
- (b) Describe working of magnetron as an oscillator.
- (c) Write the operation of pulse RADAR to detect the object.
- (d) Justify selecting uplink frequency higher than downlink frequency in satellite communication system.
- (e) Describe transponder with basic block diagram.
- (f) Give frequency bands used for satellite communication with uplink and downlink frequency range.

3. Attempt any FOUR : **16**

- (a) Give advantages of circular waveguide over rectangular waveguide.
- (b) Describe the operation of Gunn diode with well labelled diagram.
- (c) Describe different display methods used in RADAR system.
- (d) List different orbits used for satellite communication. Also specify one application of each.
- (e) Compare satellite communication system with fibre optic communication system (any four points).

4. (A) Attempt any THREE : 12

- (a) Describe the function of bends and corners; taper and twists in microwave system.
- (b) Draw the construction of PIN diode and describe its working.
- (c) Describe the working principle used in CW Radar System.
- (d) Describe the function of Attitude control subsystem in satellite communication system.

(B) Attempt any ONE : 6

- (a) Describe the function of satellite earth station with neat block diagram.
- (b) Describe different antenna tracking methods with neat diagrams.

5. Attempt any FOUR : 16

- (a) Draw schematic of two cavity klystron amplifier and list its specifications.
- (b) Distinguish microwave circulator and isolator on the basics of function, construction, application and number of parts.
- (c) Describe station keeping in satellite communication system.
- (d) List advantages of microwave tubes over vacuum tubes.
- (e) Calculate maximum radar range of a RADAR system which operates at 3 cm with peak pulse power of 500 kW, its minimum receivable power is 10^{-13} W, capture area of antenna is 5 m^2 , radar cross sectional area of target is 20 m^2 .

6. Attempt any FOUR :**16**

- (a) Draw sketches of E plane and H plane TEE. Give function of Hybrid Tee.
 - (b) Compare Reflex Klystron with two cavity Klystron amplifier. (any two points)
 - (c) Draw schematic of IMPATT diode and explain its working.
 - (d) Give applications of TRAPATT and PIN diode. (2 each)
 - (e) List specifications and two applications of TWT.
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