17670

21718

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** of the following : **12**

i) Define terms w.r.t. waveguide :

1) Phase velocity

2) Group velocity.

ii) List advantages of microwave tubes over vacuum tubes.

iii) Describe A-scope display method used in Radar System.

iv) Describe the following terms with respect to satellite :

1) Look angle

2) Station keeping.

b) Attempt **any one** of the following : **6**

i) Describe the construction and working of IMPATT diode with the help of well labelled sketches.

ii) What is dominant mode in waveguide ? Draw field patterns of TE_{10} and TE_{11} mode.

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

a) Draw neat sketch of two cavity Klystron amplifier and list its specifications.

b) Distinguish between microwave circulator and isolator on the basis of :

i) Function

ii) Construction

iii) Application

iv) Number of ports.

Marks

c) Describe the working principle used in CW Radar System.

d) Describe the function of propulsion subsystem and antenna subsystem in satellite.

e) Draw the block diagram of satellite earth station. State function of HPA and LNA.

f) Explain the operation of pulsed Radar System for detection of the object.

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

a) Describe the function of bends and corners; taper and twist in microwave system.

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

c) What are Radar Becons ? State its applications.

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

1) Elevation angle

2) Azimuth angle.

e) Explain the altitude and orbital subsystem of satellite.

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

i) Compare waveguide with two wire transmission line (four points).

ii) Describe the operation of Gunn diode with well labelled diagram.

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

iv) Illustrate how telemetry, tracking and control subsystem used in satellite communication.

b) Attempt **any one** of the following : **6**

i) Describe different antenna scanning methods used in radar with neat sketches of scanning patterns.

ii) Draw well labelled schematic of TWT and describe its working as amplifier. List any two applications of TWT.

5. Attempt **any four o**f the following : **16**

a) How power is generated in satellite ? Describe how it is distributed to other subsystem of satellite.

b) Describe working and state applications of TRAPATT diode.

c) Describe working of cavity resonator with the help of neat diagram.

d) Show how Reflex Klystron can be used as an amplifier.

e) Describe working of magnetron with neat diagrams. List any two applications.

f) Draw the block diagram of communication channel subsystem. State function of each block.

Marks

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

a) Give frequency bands used for satellite communication with uplink and downlink frequency range.

b) List any 4 microwave frequency bands with their frequency range and give two applications of each.

c) Compare Reflex Klystron with two cavity Klystron amplifier (two points).

d) Describe working of magnetron as an oscillator.

e) Describe working of microwave bipolar transistor with characteristics curve.

f) Describe the operation of MTI radar with its block diagram and waveforms.

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