Printed Pages:02 **Sub Code:KEC-062**

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B.TECH
(SEM VI) THEORY EXAMINATION 2022-23
SATELLITE COMMUNICATION

Time: 3 Hours ***Total Marks: 100***

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief. 2 x 10 = 20

(a) What are the main advantages of satellite communication technologies?
(b) What are the various orbital effects?
(c) Define look angle and azimuth angle.
(d) What are Rain and Cloud effects in Satellite Communication?
(e) Define INSAT system? Give the applications of INSAT.
(f) What is an EIRP?
(g) An amplifier has a quoted noise figure of 2.5 dB. What is its equivalent noise temperature?
(h) Define apogee and perigee.
(i) What is timing accuracy?
(j) Explain access control protocol.

SECTION B

2. Attempt any *three* of the following: 10 x 3 = 30

(a) Explain TTCM with the help of block diagram.
(b) Write the advantages and disadvantages of geostationary orbit. A satellite moving in a highly eccentric Molniya orbit having the farthest and the closest points as 35000km and 500km respectively from the surface of the earth. Determine the orbital time period and the velocity at the apogee and perigee points.
(c) Explain the Kepler's laws of Planetary Motion. Explain ascending node and descending node of a satellite.
(d) What are the various antennas used in satellite communication?
(e) Write note on Space qualification and Space debris.

SECTION C

3. Attempt any *one* part of the following: 10 x 1 = 10

(a) What is Orbit perturbations? Explain the significance of G/T ratio of an earth station.
(b) Discuss in detail the factors that affect the uplink design and the downlink design in geostationary satellites? How the uplink design different than the downlink design?

4. Attempt any *one* part of the following: 10 x 1 = 10

(a) Derive the expression for C/N ratio. A satellite TV signal occupies the full 36 MHz transponder bandwidth and is desired to provide a C/N ratio of 22dB at the earth station. If the downlink frequency is 4GHz and the other losses amount to 3.4dB, what must be the G/T of the earth station if GRP is 37dBW. The path length is 40000km. (Boltzman's constant K=1.38×10-23 J/K).

(b) Explain DBS-TV system design. Also discuss about DBS-TV link budget.

5. Attempt any *one* part of the following: 10 x 1 = 10

(a) How satellite signal acquisition is performed?

(b) What is satellite navigation and the GPS system? Also, explain radio and satellite navigation principles.

6. Attempt any *one* part of the following: 10 x 1 = 10

(a) With a neat diagram explain satellite altitude. Explain three axis methods of satellite stabilization?

(b) What is VSAT? Describe the distinguishing feature of VSAT?

7. Attempt any *one* part of the following: 10 x 1 = 10

(a) Explain
(i) The power supply subsystem
(ii) Thermal control subsystem

(b) Write note on
(i) PSLV
(ii) GSLV