Printed pages: 02 **Sub Code: EEC-069B**

Paper Id: 131820 **Roll No:** | | | | | | | | | | |

B.TECH
(SEM-VIII) THEORY EXAMINATION 2017-18
SATELLITE COMMUNICATION

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

Note: 1. Attempt all Sections.
2. Assume any missing data.

SECTION A

1. Attempt *all* questions in brief. 2 x10 = 20

a. What do you understand by the argument of perigee?
b. Explain kepler's law of planetary rotation.
c. Explain why downlink frequency should be lower than uplink frequency?
d. What is meant by system noise temperature?
e. Write short note on ice effect in satellite communication.
f. What is an EIRP?
g. Write the name of codes for error control for digital satellite links.
h. Describe the utilization of pre-emphasis and de-emphasis.
i. What are look angles? Define them.
j. What are the parameters which may affect the orbital position of the satellite?

SECTION B

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

a. Name and explain various orbital parameters to determine a satellite's orbit. How a satellite is placed into a geostationary orbit.
b. Discuss about various satellite subsystems highlighting their important functions and characteristics.
c. With the help of a suitable diagram, explain satellite communication system architecture using VSAT. Also write the Applications of VSAT.
d. Briefly describe the overall working of Direct Broadcast Satellite (DBS) television network. Explain the working of DBS-TV receiver with the help of a neat block diagram.
e. Discuss various types of antenna used for mobile satellite broadcasting. What are their requirements?

SECTION C

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

a. Explain what is mean by geostationary orbit. How do the geostationary orbit and geosynchronous orbit differ?

b. Describe look angle and orbit determination. An earth station is located at 30° W longitude and 60° latitude. Determine the earth station azimuth and elevation angles with respect to geostationary satellite located at 50° W longitudes. (Assume orbital radius = 42164 km and earth's radius 6360 km).

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

a) Explain the significance of G/T of an earth station. Find out the expression for C/N and G/T ratio. Write the values of G/T for standard earth stations.

b) Derive the expression for overall satellite link design. How a complete satellite link becomes downlink limited? How the overall satellite link design is affected by intermodulation noise?

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

a) Explain in detail rain attenuation and rain depolarization in satellite communication with suitable diagrams.

b) Describe low earth orbit and non-geostationary satellite systems.

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

a) State and explain the different segments of GPS. What is meant by satellite signal acquisition in GPS?

b) Explain the GPS receiver operation and timing accuracy in detail.

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

a) Explain briefly the Wire Quadrifilar Helix Antenna (WQHA) for hand held terminals with suitable diagram.

b) Describe Global Mobile Satellite Systems with suitable diagram in detail.