Printed Pages—3 EEC069

(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID :121854 Roll No.

B.Tech.

(SEM. VIII) THEORY EXAMINATION 2013-14

SATELLITE COMMUNICATION

Time : 3 Hours *Total Marks : 100*

Note :– (i) Attempt **all** questions.

(ii) All questions carry equal marks.

1. Attempt any **four** parts : **(4×5=20)**

(a) Draw and explain block diagram of an earth station. What are uplink and downlink in a satellite spectrum. What are uplink and downlink frequencies in "C" band ?

(b) Explain how a satellite is placed into a geostationary orbit from the earth.

(c) List various advantages and disadvantages of satellite communication. Also mention the applications of satellite communication.

(d) Explain different types of antennas used in satellite communication.

(e) A satellite is in an elliptical orbit with a perigee of 1000 km and an apogee of 4000 km. Using mean earth radius of 6378.14 km, find the period of the orbit in hours, minutes and seconds and the eccentricity of the orbit.

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(f) What are the Kepler's law of Planetary Motion ? Explain ascending node and descending node of a satellite orbit.

2. Attempt any **four** parts : **(4×5=20)**

(a) Explain the significance of G/T of an earth station. Write the values of G/T for standard earth stations.

(b) Discuss the antenna requirements for large and small earth stations.

(c) What do you mean by station keeping of satellite ? Explain its significance and methods to achieve it.

(d) Two amplifiers are connected in cascade having gain of 20dB each. If the noise temperature of each is 200 K, determine the overall noise temperature and gain of the system.

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

(f) Explain the factors that affect the uplink and the downlink. How is the uplink design different than the downlink design ?

3. Attempt any **two** parts of the following : **(2×10=20)**

(a) Explain pre-emphasis and de-emphasis in detail with the help of a neat diagram. Why is it required ? Explain FM improvement.

(b) Explain DAMA and demand assignment control methods.

(c) What is SPADE System ? Briefly describe its operation.

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4. Attempt any **two** parts : **(2×10=20)**

(a) Explain Convolutional Coding. Why do Convolutional codes provide better error correction performance ? Explain it.

(b) A code word is received as (1010110). Find whether it is a correct code-word. If not, find the correct code word. The generator matrix C_T is given below :

$$G=\begin{bmatrix} 1 & 0 & 0 & 0 & 1 & 1 & 1 \\ 0 & 1 & 0 & 0 & 1 & 1 & 0 \\ 0 & 0 & 1 & 0 & 1 & 0 & 1 \\ 0 & 0 & 0 & 1 & 0 & 1 & 1 \end{bmatrix}$$

(c) Explain various cocenter measures against propagation impairment.

5. Attempt any **two** parts : **(2×10=20)**

(a) Explain DBS home receiver with the help of neat block diagram.

(b) Explain various segments of GPS system.

(c) Write short notes on any **two** :

(i) VSAT Systems

(ii) LEO Satellites for internet transmission

(iii) Non Geo-stationary satellites.