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Roll No. | | | | | | | | | | | | | Total No. of Pages : 02

Total No. of Questions : 8

M.Tech. (ECE) (2018 Batch) (Sem.–2)

SATELLITE COMMUNICATION

Subject Code : MTEC-PE3A-18

M.Code : 76261

Time : 3 Hrs. Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :
1. Attempt any FIVE questions out of EIGHT questions.
2. Each question carries TWELVE marks.

1. a) What is the frequency bands used for the satellite communication? 4

   b) Explain the principle and architecture of satellite communication. 8

2. A satellite is moving in an elliptical orbit characterized by semi-major axis equal to 16000 km. If the, distance between apogee and perigee is 30000 km. Determine : 12

   a) Eccentricity of elliptical orbit

   b) Apogee and perigee distance

   c) Time-period of elliptical orbit

   d) Satellite velocity at apogee point

   e) Satellite velocity at perigee point.

   f) Also, explain the concept of solar day

3. a) Define all the orbital elements that are required to locate the satellite position at any observational time with respect to any point on the earth surface. 6

   b) Derive the vis-viva equation to define the instantaneous velocity of the satellite in its elliptical orbit. 6

4. a) Explain communication sub-system, power sub-system and antenna sub-system in detail. 7

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b) Explain the role of tracking and monitoring in satellite systems. 5

5. a) Explain attitude and orbit control system in satellite communication system. 8

b) Explain phenomenon of solar eclipse in detail. 4

6. Explain in detail :

a) Remedies of eclipse 3

b) Sun transit outage phenomenon 5

c) Doppler shift 4

7. For given downlink data: transponder saturated output power as 160 W, on-axis transmitting antenna gain as 34.3 dB, on-axis receiving antenna gain as 33.5 dB, downlink frequency as 12.2 GHz, receiver IF bandwidth 20 MHz, receiving system noise temperature 145 K, coupling coefficient of antenna as 0.95, path loss at 12.2 MHz as 205.7 dB, edge of beam loss as 3 dB, clear sky atmospheric loss as 0.4 dB, and rain attenuation as 3 dB and other losses as 3 dB. Calculate C/N ratio for rainy environment. 12

8. a) Explain VSAT system in detail. 6

b) Explain GPS system in detail. 6

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NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.

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