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Question Paper Code : 61214

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2014.

Seventh Semester

Electronics and Communication Engineering

EC 1403 — SATELLITE COMMUNICATION

(Regulation 2008)

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Calculate the radius of a circular orbit for which the period is 1 day.
2. What is prograde orbit?
3. Write down the parameters which are necessary for determining the look angles for the geostationary orbit.
4. Define Sun Transit Outage.
5. Expand TVRO and TT & C.
6. A satellite downlink at 12GHz operates with a transmit power of 60W and an antenna gain of 48, 2 dB. Calculate the ERP in dBW.
7. What is DASS and State the purpose of it?
8. Define CDMA.
9. Name the components of GIS.
10. What is image enhancement?

PART B — (5 × 16 = 80 marks)

11. (a) (i) Explain the three Kepler's law with relevant diagrams. (6)
(ii) For a particular satellite, the eccentricity is 9.5981×10^{-3} and the mean anomaly is 204.9779° . The mean motion is 14.2171404 rev/day The semimajor axis is 7194.9 km Calculate the true anomaly and the magnitude of the radius vector 5s after epoch. (6)
(iii) Write a brief note on Julian dates. (4)

Or

- (b) (i) Explain the orbital perturbations in detail. (8)
- (ii) Explain the geometry for determining the subsatellite point with a diagram. (8)
12. (a) (i) Determine the angle of tilt required for a polar mount used with an earth station at latitude 49° north. Assume a spherical earth of radius 6371 km, and ignore earth station altitude. (6)
- (ii) Explain what is meant by satellite attitude, and briefly describe the attitude control with a relevant diagram. (10)
- Or
- (b) (i) Describe with a diagram, satellite eclipse and satellite sun transit around spring and autumn equinoxes. (10)
- (ii) What is thermal control? Why it is necessary in a satellite? (6)
13. (a) (i) Explain briefly CATV system. (8)
- (ii) Discuss about antenna misalignment losses and feeder losses. (8)
- Or
- (b) (i) Derive the link - power budget equation. (8)
- (ii) An LNA is connected to a receiver which has a noise figure of 12 dB. The gain of the LNA is 40dB, and its noise temperature is 120 K. Calculate the overall noise temperature referred to the LNA input. (4)
- (iii) A satellite is operated at an EIRP of 56 dBW with an output BO of 6 dB. The transmitter feeder losses amount to 2dB, and the antenna gain is 50dB. Calculate the power output of the TWTA required for full saturated EIRP. (4)
14. (a) Explain clearly the preassigned FDMA with suitable diagrams and show how it differs from demand assigned FDMA. (16)
- Or
- (b) Draw the frame and burst format of TDMA and explain the need for a reference burst in a TDMA system. (16)
15. (a) (i) Discuss about the key characteristics of digital satellite image. (8)
- (ii) Write short notes on types of maps. (8)
- Or
- (b) (i) Explain what is meant by remote sensing and also the need of integration of GIS and remote sensing. (12)
- (ii) State the advantages of GPS. (4)