Register Number: …….

M.E DEGREE EXAMINATION NOV/DEC 2010

Second Semester

COMMUNICATION SYSTEMS

COM518: Satellite Communcation

Time: Three Hours **Maximum Marks: 100**

Answer ALL Questions:-

PART A (10 x 2 = 20 Marks)

1. What is the range of frequencies in 'C' and 'K' composite bands?
2. Distinguish between mean anomaly and true anomaly.
3. What are the three axes for a satellite in orbit?
4. What are the functions that are carried out by TT&C sub-systems?
5. State the general equation for C/N ratio for a satellite link.
6. What is meant by output back-off?
7. What is the role of reference burst in TDMA?
8. What is the advantage of CDMA over TDMA?
9. Draw the layered structure of TCP/IP model.
10. What are the features of VSAT?

PART B (5 x 16 = 80 Marks)

11. a) (i) State and explain Keplar's first and second laws. Also, bring out the significance of the laws with respect to the orbital parameters. (8)

(ii) Given eccentricity of a satellite's orbit, e = 0.00115 and length of semi-major axis, a = 7192 Km. Calculate apogee and perigee heights assuming Earth's mean radius of 6371 Km. (8)

(OR)

b) (i) Illustrate how look angles for a Earth station antenna are determined with respect to geo-stationary satellites. (8)

(ii) Compute the geo-stationary height using Keplar's third law. Use $\mu = 3.986 \times 10^{19}$ m^2/sec^2. Assume an equatorial radius of 6375 km. (8)

12 a) (i) Describe how spin stabilization is achieved in cylindrical satellites. (8)

(ii) What are the main elements of the transponder? Describe each element in brief. (8)

(OR)

b) (i) What is the type of antenna system that is employed on board satellites for global coverage of TV and broadcast. Justify your choice with an example system.

13. a) (i) Obtain an expression for received power at uplink of a satellite circuit. (12)

(ii) Calculate the gain of a 3m parabolic antenna operating at a frequency of 10 GHz. Assume an aperture efficiency of 50%. (4)

(OR)

b) (i) Derive an expression for C/N ratio for a satellite link. Assume clear-sky conditions. (8)

(ii) What is the effect of rain upon a satellite link performance? Explain. (8)

14. a) (i) Compare pre-assigned and demand assigned TDMA systems with respect to frame and burst formats. (8)

(ii) Calculate frame efficiency for an INTELSAT frame given the following data: (8)

Total frame length: 1, 20, 832 symbols	Preamble symbols: 180
Reference channel symbols: 8	Guard interval: 103 bytes
Traffic burst per frame: 14	Reference burst per frame: 2

(OR)

b) (i) Describe satellite switched TDMA system. (8)

(ii) Describe the working of a basic CDMA system with a neat block diagram. (8)

15. a) (i) Trace the evolution of satellite based mobile services. (8)

(ii) Describe the role of satellites in Global Positioning systems. (8)

(OR)

b) (i) Using a neat block diagram, describe the operation of a home DBS system. (8)

(ii) Discuss the growth and applications of INTELSAT series system. (8)

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