Register Number: ……………………..

B.E DEGREE EXAMINATIONS: JUNE/JULY 2013

Seventh Semester

AERONAUTICAL ENGINEERING

AER139**:** Satellite Communication

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

Answer all the Questions:-

PART A (10 x 1 = 10 Marks)

1. The shape of the earth is

    a) spherical   b) Oblate

    c) circle   d) ellipse

2. Elevation is measured

    a) Upward from local horizontal.   b) North eastward to the projection of the satellite path

    c) North westward to the projection of the satellite path   d) South eastward to the projection of the satellite path

3. Transponders are

    a) Power systems used in satellites.   b) Used to stabilize the satellite

    c) Launch vehicles for satellites   d) Receiver transmitter units

4. G/T ratio is called as

    a) Gain noise temperature ratio   b) Gain telemetry ratio

    c) Geostationary tracking ratio   d) Gain tracking ratio

5. The alphabets used in colour TV signals are

    a) Y,I and Q   b) Y, T and V

    c) Y, A and M   d) Y, C and R

6. ISI stands for

    a) Ionosphere satellite interference   b) Inter modulation symbol interference

    c) Inter satellite interference   d) Inter symbol interference

7. For binary error detection and correction

    a) Pulse code modulation is used   b) Code division multiple access is used

    c) Linear block codes are used   d) QPSK is used

8. A fundamental difference between analog and digital signals is that we can improve the bit error rate of a digital signal by the use of

    a) Stop and wait ARQ system.   b) Go back ARQ system..

    c) Error correction technique.   d) Select and repeat ARQ system.

9. VSAT means

   a) Very small aperture terminal   b) Very small aperture transponder

   c) Very small aperture tracking   d) Very small aperture transmitter

10. Inmarsat provides satellite communications for

   a) Internet connectivity   b) Satellite telephones

   c) Direct to home television programs   d) Ships and offshore oil platforms

PART B (10 x 2 = 20 Marks)

11. What are the various steps in launching communication satellite?

12. Explain the geocentric equatorial coordinate system.

13. What are the four main types antennas used on space craft?

14. What are the several factors dominate the design of any system using Geostationary satellites?

15. Describe Bit and symbol error rates

16. What is meant by Time division Multiplexing?

17. Give an example of even and odd parity for a 7 bit ASCII word.

18. What is atmospheric absorption of signals in satellite links?

19. Explain Aperture antenna.

20. Describe Low Noise amplifier.

PART C (5 x 14 = 70 Marks)

21. a) (i)   State Kepler's three laws of planetary Motion. Explain their relevance to   (7)
              artificial satellites orbiting the earth.

        (ii) Explain the determination of sub satellite point.   (7)

(OR)

    b) (i)   What are the effects of a non spherical earth on the orbital mechanics of a   (7)
              satellite?

        (ii) Describe the orbital effects in communications systems performance.   (7)

22. a) (i)   Write a brief note on Telemetry , Tracking and Command.   (7)

        (ii) Discuss in detail about uplink design of satellite system .   (7)

(OR)

    b) (i)   From first principles derive an expression for Power received P_r by an antenna   (7)
              in terms of L_a attenuation in atmosphere ,L_{ta} Losses associated with transmitting
              antenna L_{ra} losses associated with receiving antenna and EIRP in communication
              system.

(ii) Discuss in detail about the design of satellite links for specified carrier to Noise (7)
ratio (C/N)

23. a) (i) Explain how Television signals are transmitted using Analog FM transmission (7)
by satellite.

(ii) Explain with a block diagram Quadrature phase shift keying demodulator. (7)

(OR)

b) (i) Draw block diagram of a pulse amplitude modulation communication system (7)
and explain its operation with aid of its of its basic waveforms.

(ii) Describe the important features of Frequency Division multiple access (FDMA) (7)

24. a) (i) Explain the various methods by which data errors are detected and corrected in (7)
satellite channels.

(ii) With the diagram of the various propagation loss mechanism on a typical earth (7)
space path ,explain propagation effects and their impact on Satellite earth links.

(OR)

b) (i) With diagrams of Stop wait ARQ system and go back N-Blocks ARQ system (7)
explain the implementation of Error detection on satellite links.

(ii) What are the various cyclic Block codes explain them briefly with applications. (7)

25. a) (i) Explain in detail equipment for earth stations (7)

(ii) Describe briefly about the configuration of front fed , cassegrain and Gregorian (7)
type of earth station antennas.

(OR)

b) (i) Give a brief account of satellite TV network distribution and direct broadcasting. (7)

(ii) Write short notes on INTELSAT satellite (7)

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