

Q.P. Code :10800

[Time: Three Hours]

[ Marks:80]

Please check whether you have got the right question paper.

- N.B:
1. Question no. 1 is compulsory; attempt any 3 questions out of remaining 5 questions.
  2. Figures to right indicate full marks.
  3. Assume suitable data wherever necessary and state it clearly.

Q.1] Attempt the following questions (Total – 20 Marks)

- A. What kind of orbits is most suitable for coverage of higher latitude regions? Explain disadvantages of geostationary orbit. (05 Marks)
- B. What are the different methods to be considered as solutions on saturation issues of satellite power amplifier during multi carrier operation? Explain. (05 Marks)
- C. How switching techniques is better than transponder hopping method for on-board satellite connectivity issues? Justify. (05 Marks)
- D. Compare IRIDIUM and GLOBALSTAR satellite networks on the basis of basic differences. (05 Marks)

Q.2] Attempt the following questions (Total – 20 Marks)

- A. Explain window organization with three beams in satellite switched TDMA techniques of connectivity. (10 Marks)
- B. The EIRP from a satellite is 49.4 dBW. Calculate the power flux density at ground station for which the range is 40,000 km and the power delivered to the matched load at ground station receiver if the antenna gain is 50 dB in a downlink operated at 4 GHz frequency. Assume room temperature 290 K and aperture efficiency 55% respectively. (10 Marks)

Q.3] Attempt the following questions (Total – 20 Marks)

- A. Explain the effects of Earth's oblateness and gravitational forces of Sun and Moon on the orbital parameters. (10 Marks)
- B. Explain single hop and multi-hop satellite connections in networking issues. (10 Marks)

Q.4] Attempt the following questions (Total – 20 Marks)

- A. Draw and explain in detail reference architecture for satellite networks using different components. (10 Marks)
- B. What is difference between almost synchronous and synchronous digital multiplexing hierarchies? Explain how synchronous digital hierarchy (SDH) is better in this comparison? (05 Marks)
- C. Explain DTH application of satellites. Which orbits are suitable for this applications of satellite and why? (05 Marks)

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**Q.5 Attempt the following questions (Total – 20 Marks)**

- A. Explain satellite laser beam acquisition techniques with diagram. (10 Marks)
- B. How reliability of satellite system can be increased? How redundancy plays important role in the reliability issues? (05 Marks)
- C. Calculate line of sight distance between two geostationary satellites orbiting at a height of 36,000 KM above the earth surface. The first satellite is located at  $15^{\circ}$  West and second satellite is located at  $30^{\circ}$  East in longitudes. Consider radius of earth to be 6370 KM. (05 Marks)

**Q.6 Attempt the following questions (Total – 20 Marks)**

- A. Write a short note on satellite image analysis applications. (05 Marks)
- B. Explain basic rate and primary rate interfaces of ISDN Networks. (05 Marks)
- C. Explain various earth observation applications using satellites. (05 Marks)
- D. Write a short note on navigation applications of satellites. (05 Marks)