

CS/B.Tech/ECE/Even/Sem-8th/EC-801C/2015



WEST BENGAL UNIVERSITY OF TECHNOLOGY

EC-801C

SATELLITE COMMUNICATION &amp; REMOTE SENSING

Time Allotted: 3 Hours

Full Marks: 70

*The questions are of equal value.**The figures in the margin indicate full marks.**Candidates are required to give their answers in their own words as far as practicable.***GROUP A****(Multiple Choice Type Questions)**

- I. Answer any ten questions. 10 × 1 = 10
- First Indian remote sensing satellite named as  
(A) IRS 1A (B) LISS  
(C) PAN (D) Landsat
  - What type of aerial photograph is taken when the camera is placed at an angle?  
(A) photogrammetric (B) rectified  
(C) oblique (D) nadir
  - Which of the following types of sensors uses a highly focused beam of light?  
(A) SONAR (B) LiDAR  
(C) side looking RADAR (D) ground penetrating RADAR
  - An early satellite remote sensing program that used film for taking images was  
(A) Pleiades (B) Spot  
(C) Early bird (D) Corona

8140

1

Turn Over

CS/B.Tech/ECE/Even/Sem-8th/EC-801C/2015

- Off-nadir viewing allows a sensor  
(A) to obtain imagery with a half meter or finer resolution  
(B) to sense beyond the usual 8-bit range of values  
(C) to image locations not directly under the sensor  
(D) to image more than 100 bands simultaneously
- Which one of the following helps to identify the object on the earth surface?  
(A) atmospheric window (B) signature  
(C) radiometric error (D) none of these
- Which of the communication satellite is in a highly eccentric, inclined orbit?  
(A) Molniya (B) Raduga  
(C) Ekran (D) Gorizont
- Clarke orbit is another name of  
(A) sun synchronous orbit (B) MEO  
(C) GEO (D) LEO
- Rapid fluctuations in attenuation are called as  
(A) scintillation (B) depolarization  
(C) fading (D) crosstalk
- Factors that influence the ground track of a satellite are  
(A) altitude of the satellite  
(B) latitude at which the satellite is located  
(C) longitude of the satellite  
(D) both (A) and (B)
- Which indigenously developed launch vehicle is used by India to launch INSAT series of satellites  
(A) Longmarch (B) PSLV  
(C) GSLV (D) ISLV

8140

2

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(xii) Which of the following satellite systems are used both for communication as well as for weather forecasting applications?

- (A) GOES (B) INSAT  
(C) METEOSAT (D) METEOR

**GROUP B**  
(Short Answer Type Questions)

Answer any *three* questions.

3×5 = 15

2. (a) Make a comparative study between LEO, MEO, GEO types of satellites. 3+2  
(b) Mention different frequency bands used for satellite communications?
3. (a) What is the importance of using 6/4 GHz as satellite carrier frequency? 3+2  
(b) Why the uplink frequency is greater than the downlink frequency?
4. Draw the block diagram of satellite transponder and explain function of each block. 5
5. (a) How troposphere and ionosphere affects the satellite communications? 3+2  
(b) Write and explain Friis Transmission equation.
6. (a) What is remote sensing? 1+3+1  
(b) Write down the advantages of Remote Sensing.  
(c) What is spectral signature?

**GROUP C**  
(Long Answer Type Questions)

Answer any *three* questions.

3×15 = 45

7. (a) Explain how antenna gain at high frequency may be enhanced using parabolic reflectors? 5+4+3+3  
(b) What are different multiple access scheme used in satellite communication. Make a comparative study.

CS/B.Tech/ECE/Even/Sem-8th/EC-801C/2015

- (c) A communication satellite is used for voice transmission at 60.8 kbps. If the earth station transmits TDMA at 90% efficiency and if the transmission line capacity is 130 Mbps calculate the number of channels.  
(d) Explain AKM and PAM with regards to launching of a satellite?

8. (a) Discuss the effects of eclipse on a satellite? 3+1+4+7  
(b) What is system noise temperature?  
(c) Briefly discuss C/N and G/T ratio in connection with satellite communications?  
(d) A satellite at a distance of 36,000km from the surface of the earth radiates a power of 5 W from an antenna of gain 16 db. Find the flux density and power received by an antenna of effective area 14 square meter. If the receiving antenna has a gain of 60 db calculate the received power?
9. (a) Define sub satellite point. 2+4+6+3  
(b) A satellite is in an elliptical orbit with a perigee of 1000 Km and apogee 4000 Km. Using mean earth radius of 6378.14 Km, find the orbital period in hours.  
(c) What do you mean by orbital perturbation? Explain briefly.  
(d) What is the power gain of a receiving horn antenna of square aperture and having each dimension equal to  $6\lambda$ .
10. (a) Describe briefly on satellite sensors, detection and the scanning process. 7+5+3  
(b) Briefly mention about different types of resolution.  
(c) What is the importance of atmospheric windows in remote sensing?
11. Write short notes on any *three* of the following: 3×5  
(a) Geostationary and geo synchronous orbits  
(b) Spacecraft antenna  
(c) Megha-Tropiques  
(d) Radio Ocultation  
(e) Radiometer.