Code No. : 5160/M

FACULTY OF ENGINEERING
B.E. 4/4 (ECE) II Sem. (Main) Examination, May/June 2012
RADAR AND SATELLITE COMMUNICATION SYSTEMS

Time : 3 Hours] [Max. Marks : 75

***Note**: Answer **all** questions from Part **A**. Answer **any five** questions from Part **B**.*

PART – A **25 Marks**

1. Define Radar cross section of the target. **2**
2. How do you distinguish the moving targets from stationary targets ? **2**
3. How does track-while-scan radar operate ? **2**
4. What is a delay line canceller ? Classify them. **3**
5. What should be the pulse repetition frequency of a radar in order to achieve a maximum unambiguous range of 60 nmi ? **3**
6. What are the advantages of Geosynchronous satellites ? **3**
7. Define the following with respect to a satellite.
   a) Perigee b) Apogee **2**
8. What are the methods used to achieve stability of a satellite in orbit ? **3**
9. What is meant by multiple access of a satellite ? **2**
10. What is the system noise temperature ? How does it affect the $\frac{C}{N}$ and $\frac{G}{T}$ ratios ? **3**

Code No. : 5160/M

PART – B (50 Marks)

11. Derive the basic radar range equation as governed by the minimum receivable echo power P_{min} and state the Radar Frequency bands. 10

12. Draw the block schematic of a MTI radar and explain and compare MTI radar with CW Radar. 10

13. With the help of a block diagram explain the operation of a conical scan tracking radar and compare conical scan tracking radar with sequential lobing tracking radar. 10

14. a) What are the different types of satellite orbits ? Discuss their merits and demerits. 6

    b) A satellite is orbiting in a Geosynchronous orbit of radius 41500 km. Find the velocity and time of orbit. If $g_0 = 398600.5\ km^3/s^2$. 4

15. Compare the major differences, advantages, disadvantages and applications of different multiple access techniques used in satellite communication. 10

16. Derive general link equations. Find out expressions for $\frac{C}{N}$ and $\frac{G}{T}$ ratio's and explain the importance of these ratio's on satellite link design. 10

17. Short notes on **two** of the following : 10

    i) Radar displays

    ii) Space Craft Antennas

    iii) Satellite Data Communication protocols.