

Register No:

B.TECH., DEGREE EXAMINATIONS: NOV/DEC 2012

Fifth Semester

INFORMATION TECHNOLOGY

ECE271: Telecommunication Systems

Time: Three Hours

Maximum Marks: 100

Answer All the Questions:-

PART A (10 x 1 = 10 Marks)

1. The 50Ω coax is connected to a 73Ω antenna. The SWR is
 - a) 0.685
 - b) 1
 - c) 1.46
 - d) 2.92
2. In a klystron amplifier, velocity modulation of the electron beam is produced by the
 - a) Collector
 - b) Catcher cavity
 - c) Cathode
 - d) Buncher cavity
3. The height of a satellite in a synchronous equatorial orbit is
 - a) 100 m
 - b) 6800 m
 - c) 22,300 m
 - d) 35,860 m
4. Most commercial satellite activity occurs in which band(s)?
 - a) L
 - b) C and Ku
 - c) X
 - d) S and P
5. Which type of the fiber optic cable has least modal dispersion?
 - a) Single - mode step index
 - b) Multi- mode step index
 - c) Single- mode graded index
 - d) Multi-mode graded index
6. Which fiber optic cable system is used to transmit time – multiplexed system?
 - a) FDDI
 - b) SONET
 - c) Ethernet
 - d) Fiber channel
7. What is the name of the dialing system used in modern telephones?
 - a) Rotary pulse
 - b) Audio pulse
 - c) Multi tone alphanumeric
 - d) Dual-tone multi-frequency
8. How many data channels does basic rate ISDN have?
 - a) 1
 - b) 2
 - c) 3
 - d) 24

9. The maximum distance that can be accommodated between base and mobile with the guard time of $123 \mu\text{s}$ is
- a) 3.69 km b) 36.9 km c) 369 km d) 3690 km
10. The number transmitted by the base station to identify the system operator is
- a) System identification number b) Electronic serial number
- c) Mobile identification number d) Base station number

Part B(10 x 2 = 20 Marks)

11. List the three paths that a radio signal may take through space.
12. At what frequencies are lens antenna used? Why?
13. Why do satellites normally use UHF and higher frequencies?
14. How can multiple earth stations share a satellite on the same frequencies?
15. Fiber optic cables with attenuations of 1.8, 3.4, 5.9 and 18 dB are linked together. Calculate the total loss.
16. In a 4 channel WDM system with a 2.48 Gbits/s rate on each, how many bits are transmitted per second?
17. Name the four digital cellular phone standards.
18. State the specifications for primary rate ISDN.
19. List the functions of the control channels in the AMPS system.
20. Differentiate between circuit switched and packet switched data communication.

Part C (5 x 14 = 70 Marks)

21 a) (i) One of the most critical aspects of any antenna system is ensuring that the maximum amount of power is transferred from the transmitter to the antenna. How is this done? Discuss various methods to accomplish this task. (7)

(ii) Explain the principle of different types of dipole antennas. (7)

(OR)

b) (i) With a neat sketch explain the construction of a reflex klystron microwave oscillator. (7)

(ii) Explain the physical construction of the helical, bicone and patch antennas. (7)

22 a) Draw the basic block diagram of a satellite earth station, name the basic sub systems and explain the functions of each.

(OR)

b) What factors do you think determine an earth station's ability to select and distinguish one satellite from another closely adjacent satellite in orbit? Explain how they are overcome.

23 a) (i) Could an incandescent light be used for a fiber optic transmission system? Explain its possible benefits and disadvantages. (7)

(ii) Compare Single mode fibers and Graded index fibers. Explain the requirements for fiber materials. (7)

(OR)

b) (i) Discuss various kinds of losses that an optical signal might suffer while propagating through fiber? (7)

(ii) Describe Fiber splicing and connectors. (7)

24 a) (i) Draw the standard telephone circuit diagram showing connection to central office and explain the principle involved in the call setup. (10)

(ii) What is the principle of FAX? (4)

(OR)

b) (i) Describe how one cordless telephone is prevented from interfering with another nearby cordless telephone? (7)

(ii) Draw the block diagram of a cellular telephone system and explain. (7)

25 a) (i) Describe the parameters of GSM. (6)

(ii) Suppose we are communicating on a cell phone using a digital modem at 9600 b/s.

How many bits will be lost during,

a) Blank and burst signaling? (4)

b) Handoff, if it results in a 0.5 s loss of signal? (4)

(OR)

25 b) (i) State and compare the modulation schemes used by the control channel in analog AMPS and the digital control channel used in the TDMA digital cell phone system. (7)

(ii) Suppose we are designing pico cells for an indoor cellular system. If we assume people using the system are walking at a speed of 5 m/s or less, what is the smallest cell radius we could have if we wanted to have handoffs occur no more often than once every 45 seconds? (7)
