Computer Science & Engineering Department

CpE 471 Communications

Time: 120 mins

Sample Midterm

Student Name: _____

I.D # _____

Question	**max**	**obt.**
1	10	
2	10	
3	5	
4	5	
5	5	
6	5	
7	35	
Total	**75**	

Good Luck

Dr.Elleithy

Question 1 [10 pts]

Show the encoded signal for the given data using the given mechanisms.

(Initial values are zero volts for all techniques)

	Initial	1	1	0	0	1	1	0
NRZ-L								
Bipolar-AMI								
Manchester								
Differential Manchester								
B8ZS								

Question 2 [10pts]

A PCM encoder accepts a signal with a full-scale voltage of 20 V and generates 10-bit codes using uniform quantization. Find:

(a) normalized step size

(b) actual step size in volts

(c) actual maximum quantized level in volts

(d) normalized resolution

(e) actual resolution

Question 3 [5 pts]

Suppose that data are stored on 1.4 Mbyte floppy diskettes that weigh 30 g each. Suppose that an airlines carries 10000 kg of these floppies at a speed of 1000 km/h over a distance of 5000 km. What is the data transmission rate in bits per second of this system?

Question 4 [5 pts]

Stories abound of people who receive radio signals in fillings in their teeth. Suppose you have one filling that is 2.5 mm long that acts as a radio antenna. That is, it is equal in length to one-half the wavelength. What frequency do you receive.

Question 5 [5 pts]

A digital signaling system is required to operate at 56000 bps If the signal used has 8 levels, what is the minimum required bandwidth of the channel?

Question 6 [5 pts]

Given a channel with an intended capacity of 32 Mpbs, the bandwidth of the channel is 4 MHZ. What SNR in db is required to achieve this capacity

Question 7 [35 pts]

One point is deducted for a wrong answer. No points are deducted for unanswered question

1. With this type of multiplexing, multiple input signals are modulated to different frequencies within available output bandwidth of a single composite circuit and subsequently demodulated back intoindividual signals on the output end of the composite circuit or channel.
a. FDM
b. TDM
c. STDM
d. DTM

2. Most of today's voice-grade dial-up circuits (phone lines) were designed to handle a range of frequencies from 300 Hz to 3300 Hz, which is called
a. analog
b. digital
c. bandwidth
d. I-P-O

3. Data that is in some type of electrically-based format that the data communications equipment can interpret is said to be
a. transmitted
b. encoded
c. analog
d. none of these

4. In this type of packet-switched network, virtual circuits enabling message packets to follow one another, in sequence, down the same connection or physical circuit, is known as
a. unreliable
b. connection-oriented
c. global
d. connectionless

5. Phase modulation of a carrier wave is represented by
a. a longer or shorter wavelength
b. an increased or decreased wave height
c. a shift or departure from the normal continuous pattern
d. a square wave

6. Receiving and transmitting simultaneously over dial-up two-wire circuits is called
a. digital data services
b. half-duplex
c. full-duplex
d. bi-polar symmetry

7. All of the following are physical characteristics of an analog wave that can be altered or modulated except
a. amplitude
b. frequency
c. parallel
d. phase

8. The device in a telephone company building which connects your phone equipment to the phone equipment of the party you wish to call is a(n)
a. CO switch
b. leased line
c. modem
d. analog

9. With this type of multiplexing, each of the multiple input signals is allocated 100 percent of the total bandwidth for a portion of the time, yielding the appearance of a dedicated circuit whether the attached device is active or not.
a. FDM
b. TDM
c. STDM
d. DTM

10. Which internetworking device operates at the Network layer of the 7 layer OSI model?
a. gateway
b. router
c. bridge
d. repeater

11. A four-phase shift modulation technique for increasing the number of bits/baud which can be interpreted at a time is called
a. tribit
b. quadrature phase shift keying
c. trellis coded modulation
d. quadrature amplitude modulation

12. Which internetworking device operates at the Data-link layer of the 7 layer OSI model?
a. gateway
b. router
c. bridge
d. repeater

13. Amplitude modulation of a carrier wave is represented by
a. a longer or shorter wavelength
b. an increased or decreased wave height
c. a shift or departure from the normal continuous pattern
d. a square wave

14. In TDM, the process of checking each connected terminal in order to see if any data is ready to be sent is known as
a. checking
b. flow control
c. framing
d. polling

15. Which of the following is the type of transmission in which each data bit of a byte, when transmitted, travels simultaneously down its own wire?
a. demodulation
b. stop bit
c. baud
d. parallel

16. The number of signaling events per second is called
a. bps
b. digital transmission
c. baud rate
d. byte

17. This type of transmission uses start and stop bits after each character.
a. asynchronous
b. synchronous
c. bps
d. four-wire

18. Which internetworking device operates at the Physical layer of the 7 layer OSI model?
a. gateway
b. router
c. bridge
d. repeater

19. In this type of packet-switched network, packets do not follow one another in order down an actual or virtual circuit or connection.
a. reliable
b. connection-oriented
c. global
d. connectionless

20. Quadrature phase shift would use which of the following to obtain 8 possible interpretations per detectable event?
a. dibit
b. tribit
c. quadbit
d. bit

21. Protocols are considered
a. circuits
b. software
c. media
d. hardware

22. A normal voice-grade line that bypasses the carrier's switching equipment is called a
a. dial-up line
b. circuit-switched line
c. null modem line
d. none of these

23. Frequency modulation of a carrier wave is represented by
a. a longer or shorter wavelength
b. an increased or decreased wave height
c. a shift or departure from the normal continuous pattern
d. a square wave

24. Repeaters:
a. amplify signals in both directions
b. connect different segments of the LAN
c. is a physical layer device
d. all the above

25. In half duplex channels messages can be sent in both directions at the same time.
a. True b. False

26. Full duplex channels are used in cable TV.
a. True b. False

27. Digital signals are more reliable than analog signals.
a. True b. False

28. The baud rate is equal to bps in binary systems.
a. True b. False

29. Frequency modulation can not be used with time division multiplexing
a. True b. False

30. Start and stop bits are needed in synchronous transmission.
a. True b. False

31. Manchester encoding is better to use in synchronous transmission than NRZ.
a. True b. False

32. Amplitude modulation is more sensitive to noise than frequency modulation.
a. True b. False

33. Data link layer checks if the transmission is error free.
a. True b. False

34. Network traffic is burst.
a. True b. False

35. Flow control is a function of network layer.
a. True b. False