UNIVERSITI TEKNOLOGI MARA
FINAL EXAMINATION

COURSE	:	**INTRODUCTION TO DATA COMMUNICATION AND NETWORKING**
COURSE CODE	:	**ITT300**
EXAMINATION	:	**DECEMBER 2019**
TIME	:	**3 HOURS**

INSTRUCTIONS TO CANDIDATES

1. This question paper consists of three (3) parts :   PART A (30 Questions)
    PART B (8 Questions)
    PART C (3 Questions)

2. Answer ALL questions from all three (3) parts.

    i)   Answer PART A in the Objective Answer Sheet.
    ii)   Answer PART B and PART C in the Answer Booklet. Start each answer on a new page.

3. Do not bring any material into the examination room unless permission is given by the invigilator.

4. Please check to make sure that this examination pack consists of:

    i)   the Question Paper
    ii)   an Answer Booklet – provided by the Faculty
    iii) an Objective Answer Sheet – provided by the Faculty

5. Answer ALL questions in English.

DO NOT TURN THIS PAGE UNTIL YOU ARE TOLD TO DO SO

This examination paper consists of 12 printed pages

PART A

1. The term _____ refers to the structure or format of the data, which means the order in which they are presented

    a)   semantic
    b)   syntax
    c)   security
    d)   timing

2. Electronic Industries Association (EIA) is _____.

    a)   the largest professional engineering society
    b)   a non-profit organization devoted to the promotion of electronics manufacturing concerns
    c)   responsible for research and establishments of standards for telecommunications and data systems
    d)   a multinational body whose membership is drawn mainly from the standards creation committee

3. In mesh topology, devices are connected via _____.

    a)   multipoint link
    b)   point to point link
    c)   secondary link
    d)   primary link

4. Electromagnetic waves ranging in frequencies between 3 kHz and 1 GHz are called _____.

    a)   radio waves
    b)   microwaves
    c)   infrared
    d)   broadcasting

5. In electromagnetic spectrum, the frequencies in the range 30MHz to 300MHz are known as _____.

    a)   High Frequency (HF)
    b)   Ultra High Frequency (UHF)
    c)   Very High Frequency (VHF)
    d)   Super High Frequency (SHF)

6. In line-or-sight propagation, very high-frequency signals are transmitted in straight lines directly from antenna to _____.

   a) sky
   b) earth
   c) antenna
   d) satellite

7. Which address does the router look at when a host on network A sends a message to a host on network B?

   a) Logical
   b) Physical
   c) Port
   d) Specific

8. Mail services are available to network users through the _____ layer.

   a) session
   b) transport
   c) presentation
   d) application

9. _____ provides a reliable connection-oriented transport layer services to applications.

   a) Stream Control Transmission Protocol (SCTP)
   b) Transport Control Protocol (TCP)
   c) User Datagram Protocol (UDP)
   d) Address Resolution Protocol (ARP)

10. Given frequency 24Hz corresponding period would be _____.

    a) 87.9ms
    b) 41.7ms
    c) 90ms
    d) 23ms

11. What is the bandwidth of a signal that ranges from 40 kHz to 4 MHz?

    a) 36 MHz
    b) 360 kHz
    c) 3.96 Mhz
    d) 396 kHz

12. _____ can be defined as the range of frequencies being supported by a particular transmission medium.

    a) Frequency Spectrum
    b) Frequency Carrier
    c) Bandwidth
    d) Frequency

13. A constellation diagram is a diagram that defines the_____ and _____ signal elements.

    a) amplitude, phase
    b) frequency, phase
    c) amplitude, frequency
    d) amplitude, time

14. If the baud rate for 4PSK is 400 baud, the bit rate is _____ bps.

    a) 400
    b) 800
    c) 1200
    d) 200

15. Field of MAC frame that alerts receiver and enables it to synchronize is known as _____.

    a) SFD
    b) preamble
    c) source address
    d) destination address

16. _____ uses long-wave 1310-nm single mode fiber.

    a) 10GBase-S
    b) 10GBase-E
    c) 10GBase-L
    d) 10GBase-M

17. In _____, auto negotiation allows two devices to negotiate the mode or data rate of operation

    a) Gigabit Ethernet
    b) Ten-Gigabit Ethernet
    c) Fast Ethernet
    d) Standard Ethernet

18. In IEEE 802.11, when a frame is going from a station to an AP, the address flag is
    _____.

    a) 01
    b) 00
    c) 11
    d) 10

19. In Bluetooth, the _____ link is used when data integrity is more important than avoiding latency.

    a) SCL
    b) SCO
    c) ACO
    d) ACL

20. A (an) _____ is actually a multiport repeater. It is used to create connection between stations in a physical star topology.

    a) active hub
    b) passive hub
    c) switch
    d) bridge

21. Which of the following hexadecimal notation represents the Ethernet address **01011101 10011010 10111111 00011011 01110000 11100101**?

    a) 5B : 9A : BF :1C : 70 : E5
    b) 5B : 9A : BF :1B : 70 : E5
    c) 5D : 9A : BF :1C : 70 : E5
    d) 5D : 9A : BF :1B : 70 : E5

22. In Ethernet addressing, if the least significant bit of the first byte is 1, the address is
    _____.

    a) unicast
    b) multicast
    c) broadcast
    d) reserved

23. Five channels with a bandwidth of 4kHz for each are channels to be multiplexed together. What is the minimum required bandwidth of the link if there is a need for guard bands of 500Hz using FDM?

    a)   20000Hz.
    b)   22kHz
    c)   20MHz.
    d)   22Hz.

24. What is the number of bits in a frame if the multiplexer combines six 10kbps channels using a time slot of 2 bits?

    a)   10
    b)   11
    c)   12
    d)   13

25. *"A special frame circulates in the network and each station has a predecessor and a successor"*. This statement refers to _____

    a)   token passing
    b)   polling
    c)   reservation
    d)   channelization

26. In poll function, when response is positive then primary reads data and returns a/an

_____

    a)   waiting frame.
    b)   acknowledgment frame.
    c)   receiving frame.
    d)   sending frame.

27. Carrier Sense Multiple Access (CSMA) method was developed to increase the

_____

    a)   collision.
    b)   performance.
    c)   transmission.
    d)   station.

28. In IEEE 802.11 frames, when values of *To DS* and *From DS* are 00, it means the frame is not going to a(an) _____

    a) distributed system.
    b) adhoc system.
    c) infrastructure system.
    d) cellular system.

29. You have 10 users plugged into a hub running 10Mbps half-duplex. The connection from each host to the server via the switch running 10Mbps half-duplex. How much bandwidth available for each host to the server?

    a) 100kbps.
    b) 100Mbps.
    c) 10kbps.
    d) 10Mbps.

30. On corporate network, hosts on the same VLAN can communicate with each other, but they are unable to communicate with hosts on different VLANs. What is needed to allow communication between the VLANs?

    a) A switch with an IP address on the physical interface connected to the switch.
    b) A switch with an access link that is configured between the switches.
    c) A router with a trunk link that is configured between the switches.
    d) A router with an IP address on the physical interface connected to the switch.

(30 MARKS)

PART B

QUESTION 1

Given the frequency-domain graph in **Figure 1**, answer the following:

a) Define the meaning of frequency spectrum. List all the frequencies of the spectrum.

(2 marks)

b) Calculate the bandwidth of frequency spectrum.

(2 marks)

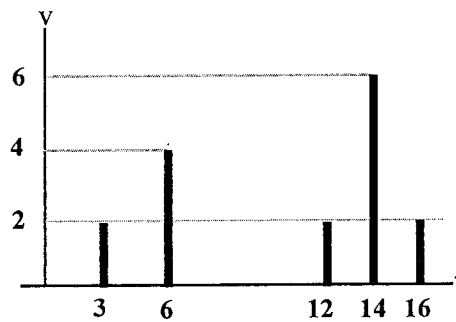c) State the type of signal based on the frequencies of the spectrum on the graph

(1 mark)

Figure 1

QUESTION 2

Calculate the baud rate for the given bit rate and type of modulation:

a) Bit rate: 2000bps, type of modulation: FSK

(2 marks)

b) Bit rate: 4000bps, type of modulation: ASK

(2 marks)

c) Bit rate: 6000bps, type of modulation: 4-PSK

(2 marks)

(40 MARKS)

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QUESTION 3

Figure 2 shows a multiplexer in a synchronous TDM system. Each output contains 4 bits taken from each input plus 1 framing bit. Illustrate the output frames going out from the multiplexer.
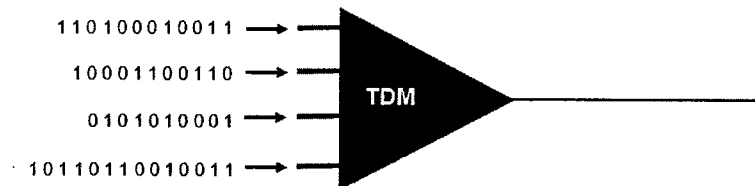

110100010011 →

10001100110 →

0101010001 →

·10110110010011 →

TDM

Figure 2

(4 marks)

QUESTION 4

a) What is the significance of the twisting in the twisted pair cable?

(2 marks)

b) How does sky propagation differ from line of sight and identify the type of wireless transmission for both propagations.

(3 marks)

QUESTION 5

Illustrate and briefly discuss the behaviour of **THREE (3)** persistence strategy methods in Carrier Sense Multiple Access (CSMA).

(5 marks)

QUESTION 6

a) List **TWO (2)** categories of frames in IEEE 802.11 wireless LAN.

(2 marks)

b) Explain **TWO (2)** types of Backbone network. Give an example for each.

(4 marks)

QUESTION 7

a) Find the length of burst error based on the diagram in **Figure 3**:

1	1	0	1	1	0	0	0	1	1	1	1	0	0

Data send

1	1	0	0	1	0	0	0	1	1	0	1	0	0

Data received

Figure 3

(2 marks)

b) A sender has three data items to send which are **0094h**, **006Dh** and **00ADh**. Show the calculation of the parity bit using the two-dimensional parity-check method. Assume even-parity is being used.

(3 marks)

QUESTION 8

NRZ communication Sdn.Bhd is granted the block 201.18.172.0/24. The administrator want to create 64 subnets. Find the new subnet mask in CIDR notation and dotted-decimal notation.

(4 marks)

PART C

QUESTION 1

Three channels, one with a bit rate of 190 kbps and another two with bit rate of 180 kbps, are to be multiplexed using pulse stuffing TDM with two synchronization bits. Answer the following questions:

a) What is the size of a frame in bits?

(2 marks)

b) What is the frame rate?

(2 marks)

c) What is the duration of a frame?

(2 marks)

d) What is the data rate?

(2 marks)

e) What is the bit duration?

(2 marks)

QUESTION 2

a) Given that a computer receives five data items 1011, 1100, 1001, 1111, 0101 with a checksum of 0111. By using checksum error detection method, determine whether the received data items can be accepted or rejected (show your work)

(4 marks)

b) Given the CRC divisor 110011 calculate the CRC check value for the data represented by following sequence of bits: 10010101011(show your work)

(6 marks)

QUESTION 3

Globe Communication corporation has been assigned a class B network with address of 135.1.0.0 /25. Their network administrator need to add 10 new subnets to fulfil the company's computer network configuration.

a) Find the new subnet mask used for the subnetting process

(2 marks)

b) Find the number of addresses in each subnet

(2 marks)

c) Find the first and last addresses in subnet number 1.

(3 marks)

d) Find the address range, first and last addresses in subnet number 10

(3 marks)

(30 MARKS)

END OF QUESTION PAPER