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MONASH University

## Semester One 2018
## Sample Examination Paper

## Faculty of Information Technology

**EXAM CODES:** **FIT3165**

**TITLE OF PAPER:** **COMPUTER NETWORKS – PAPER 1**

**EXAM DURATION:** 2 hours writing time

**READING TIME:** 10 minutes

***THIS PAPER IS FOR STUDENTS STUDYING AT: (tick where applicable)***

☐ Caulfield ☑ Clayton ☐ Parkville ☐ Peninsula
☐ Monash Extension ☐ Off Campus Learning ☐ Malaysia ☑ Sth Africa
☐ Other (specify)

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**No examination materials are to be removed from the room.** This includes retaining, copying, memorising or noting down content of exam material for personal use or to share with any other person by any means following your exam.
Failure to comply with the above instructions, or attempting to cheat or cheating in an exam is a discipline offence under Part 7 of the Monash University (Council) Regulations.

**AUTHORISED MATERIALS**

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|---|---|---|
| **OPEN BOOK** | ☐ **YES** | ☑ **NO** |
| **CALCULATORS** | ☑ **YES** | ☐ **NO** |
| **SPECIFICALLY PERMITTED ITEMS** | ☐ **YES** | ☑ **NO** |

**if yes, items permitted are:**

**INSTRUCTIONS**

1. The FIT3031 exam consists of **2 parts**.
2. Part 1 consists of **FIVE** questions; please answer **ALL** questions in the exam script book
3. Total marks - 100. This exam contributes 60% to your result for this unit.

***Candidates must complete this section if required to write answers within this paper***

STUDENT ID: __ __ __ __ __ __ __ __ __ __ __ DESK NUMBER: __ __ __ __ __

# FIT3165 Computer Networks

Topics Excluded in Exam: Wireshark & Socket Level Programming

**Please note:** Solutions are **NOT** provided to the sample exam questions.

## FIT3165 Exam Part 1

### Sample questions: -

1. Which layers of the TCP/IP protocol suite are involved in a link-layer switch?

2. When we say that the transport layer multiplexes and demultiplexes application layer messages, do we mean that a transport-layer protocol can combine several messages from the application layer in one packet? Explain.

3. Assume we want to connect two isolated hosts together to let each host communicate with the other. Do we need a link-layer switch between the two? Explain.

4. What is a protocol? What is a protocol data unit (PDU)?

5. What is a protocol architecture? What are some advantages to layering as seen in the TCP/IP architecture?

6. List the major disadvantages with the layered approach to protocols.

7. Compare and contrast the following transport layer flow control protocols.
    a) Stop-and-Wait
    b) Go-Back-N &
    c) Selective-Repeat
8. Compare and contrast the following Datalink layer flow control Automatic Repeat Request (ARQ) protocols.
    d) Stop-and-Wait method
    e) Go-Back-N method
    f) Selective-Reject method
9. What is the maximum size of the TCP header? What is the minimum size of the TCP header?

10. In TCP, does a FIN segment close a connection in only one direction or in both directions?

11. Can you explain how TCP, which uses the services provided by the unreliable IP, can provide reliable communication?

12. Compare and contrast classless and classless IP addressing?

13. In classless addressing, what is the value of prefix length (n) if the size of the block (N) is one of the following?

    a. N= 64
    b. N= $2^{10}$
    c. N= $2^{18}$

14. What are the reasons for packet fragmentation and reassembly at the network layer?

15. Distinguish between communication at the network layer and communication at the data-link layer.

16. Explain the concept of transport layer multiplexing and de-multiplexing of application layer messages?

17. Explain why flags are needed when we use variable-size frames.

18. What is the purpose of minimum Hamming distance?

19. If the Divisor is 10011 and the Dataword is "1010101010" Find the Codeword with the help of Figure-5.13, which shows the method to calculate the Cyclic Redundancy check (CRC) encoder at the Transmitter. *Note this is also called as Frame Check Sequence (FCS) used in the Datalink layer for FRAMES in error detection*?

    In the second part of the calculations if the received Codeword is "10101010100110" verify with the help of Figure-5.14, if the data Integrity of codeword is Valid or NOT?

20. Define what data transparency or bit stuffing is HDLC protocol? Explain how bit stuffing is achieved?

21. What are the three frame types supported by HDLC? Describe each of them.

22. A World Wide Web server is usually set up to receive relatively small messages from its clients but to transmit potentially very large messages to them. Explain, then which type of ARQ protocol (selective reject, go-back-N) would provide less of a burden to a particularly popular WWW server.

23. Why is there no need for CSMA/CD on a full-duplex Ethernet LAN?

24. What are the common Standard Ethernet implementations?

25. Compare the medium of a wired LAN with that of a wireless LAN in today's communication environment.

26. Explain why the MAC protocol is more important in wireless LANs than wired LANs?

27. Explain why there is more attenuation in a wireless LAN than in a wired LAN, ignoring the noise and the interference.

28. There is no acknowledgment mechanism in CSMA/CD, but we need this mechanism in CSMA/CA. Explain the reason

29. Which of the following are causes of transmission impairment?
    a) Attenuation
    b) modulation
    c) noise

30. Define synchronous TDM and compare it with statistical TDM.

31. A signal has passed through three cascaded amplifiers, each with a 4 dB gain. What is the total gain? How much is the signal amplified?

32. We measure the performance of a telephone line (4kHz of bandwidth). When the signal is 10V, the noise is 10 mV. What is the maximum data rate supported by this telephone line?

33. A digital signalling system is required to operate at 1200 bps. If a signal element encodes a 4-bit word, what is the minimum required bandwidth of the channel?

34. Explain what multiplexing is, List and define the three main types of Multiplexing?

35. List four common LAN topologies and briefly describe their methods of operation.

36. What is the difference between a hub and a layer 2 switch?

37. What is the difference between a store-and-forward switch and a cut-through switch?

38. Explain mixed configuration with reference to Ethernet, and other high-speed Ethernet technologies?

**Please work out all the tutorial questions similar to theoretical review questions and problem-based questions. Refer to all the Tutorials, & solutions**

## Important Disclaimer: Preparing for Your EXAM

*It is advisable to complete your required preparation(s) as quickly as possible and be prepared at least 1 weeks before your exam. The sample exam and coverage can provide ONLY sample preparation materials to help you prepare for the exam. The Sample exam Questions above ARE NOT designed to provide you with all exam coverage for final exam assessment of your current skill levels, but to orient you to the style of question used in the actual final exam assessment. DO NOT treat the sample questions as the ONLY scope for your practice exam, or as the actual exam. The final Questions will vary considerably in their content, coverage and the level of difficulty.*

# FIT3031 Exam Part 2 (40 marks)

## II SAMPLE MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question. (40 marks)

1) Which of the following is true with respect to the data link layer?

   a. It accepts streams of bits from the application layer.
   b. It is responsible for getting a message from one computer to another (one node to another) without errors.
   c. It does not perform error detection.
   d. It performs routing functions.
   e. It organizes data from the physical layer and passes these coherent messages to the application layer.

2) Multiplexing is the process of,

   a. Merging multiple digital or analog signals into a composite baseband signal.
   b. Decomposing a composite data stream into its digital or analog components.
   c. Fourier transformation of analog signals into digital wave forms.
   d. All of the above.
   e. None of the above.

3) Wavelength Division Multiplexing is a form of,

   a. TDM.
   b. FDM.
   c. STDM.
   d. None of the above.

4) Encoding and decoding of LAN signals is done at which of the following OSI layers?,

   a. Transport layer.
   b. Physical layer.
   c. Data link layer.
   d. None of the above.

5) The way in which the network end device, or stations, are attached to the network is termed as,

   a. Wiring layout.
   b. Wiring design.
   c. Topology.
   d. None of the above.

6) Which of the following is a valid reason for fragmentation?

   a. Smaller sized packets have lower overheads.
   b. Smaller sized packets are easier to process.
   c. Smaller sized packet may improve error control.
   d. Smaller sized packets travel at higher propagation speeds.

7) The transport-layer packet in the TCP/IP protocol suite is called

   a. a message
   b. a datagram

c. a segment or a user datagram
d. a frame

8) In the TCP/IP protocol suite, the _____ layer is responsible for moving frames from one hop (node) to the next.
   a. physical
   b. data link
   c. transport
   d. network

9) In the TCP/IP protocol suite, a logical address is the identifier at the _____.
   a. network layer
   b. transport layer
   c. data-link layer
   d. application layer

10) The application layer in the TCP/IP protocol suite is usually considered to be the combination of _____ layers in the OSI model
   a. application, presentation, and session
   b. application, transport, and network
   c. application, data-link, and physical
   d. network, data-link, and physical

11) HTTP uses the services of _____.
   a. UDP
   b. IP
   c. TCP
   d. DNS

12) A client program normally uses _____ port number. A server program normally uses _____ port number.
   a. a well-known; an ephemeral
   b. an ephemeral; a well-known
   c. a private; a well-known
   d. None of the choices are correct

13) UDP is a _____ transport protocol.
   a. connectionless, reliable
   b. connection-oriented, unreliable
   c. connectionless, unreliable
   d. None of the choices are correct

14) At the transport layer, to define the processes, we need two identifiers called _____.
   a. logical addresses
   b. physical addresses
   c. port addresses
   d. None of the choices are correct

15) The ports ranging from 0 to 1,023 are called the _____ ports. The ports ranging from 1,024 to 49,151 are called _____ ports. The ports ranging from 49,152 to 65,535 are called the _____ ports.
   a. well-known; registered; dynamic or private
   b. registered; dynamic or private; well-known
   c. private or dynamic; well-known; registered
   d. private or dynamic; registered; well-known

16) UDP packets have a fixed-size header of _____ bytes.
    a. 16
    b. 8
    c. 40
    d. 32

17) TCP groups a number of bytes together into a packet called a _____.
    a. bytes, user datagram
    b. bytes, segment
    c. messages, datagram
    d. messages, segment

18) Communication in TCP is _____.
    a. simplex
    b. half-duplex
    c. full-duplex
    d. None of the choices are correct

19) The inclusion of the checksum in the TCP segment is _____.
    a. optional
    b. mandatory
    c. depends on the type of data
    d. None of the choices are correct

20) In TCP, a SYN + ACK segment consumes _____ sequence numbers.
    a. no
    b. three
    c. two
    d. one

21) In TCP, an ACK segment, if carrying no data, consumes _____ sequence number(s).
    a. no
    b. one
    c. two
    d. None of the choices are correct

22) _____ control refers to the mechanisms and techniques to keep the load below the capacity.
    a. flow
    b. error
    c. congestion
    d. None of the choices are correct

23) The performance of a network can be measured in terms of _____.
    a. delay
    b. throughput
    c. packet loss
    d. all of the choices are correct

24) The IP header size is _____ bytes long.
    a. 20 to 60
    b. 20
    c. 60
    d. None of the choices are correct

25) _____ allows a site to use a set of private addresses for internal communication and a set of global Internet addresses for communication with the rest of the world.
    a. DHCP
    b. NAT
    c. IMCP

d. None of the choices are correct

26) Which error detection method involves polynomials?
a. CRC
b. Simple parity check
c. Two-dimensional parity check
d. Checksum

27) In the 1-persistent approach, when a station finds an idle line, it _____.
a. sends immediately
b. waits 0.1 s before sending
c. waits 1 s before sending
d. waits a time equal to (1 - p) seconds before sending

28) A _____ is a local address. Its jurisdiction is over a local network.
a. link-layer address
b. logical address
c. port number
d. None of the choices are correct

29) The _____ sublayer is responsible for the operation of the CSMA/CD access method and framing.

a. LLC
b. MII
c. MAC
d. None of the choices are correct,

30) Each station on an Ethernet network has a unique _____ address imprinted on its network interface card (NIC).
a. 16-bit
b. 32-bit
c. 64-bit
d. None of the choices are correct.

31) In the Ethernet frame, the _____ field contains error detection information.
a. CRC
b. preamble
c. address
d. SFD

32) A VLAN as a local area network configured by_____.
a. software
b. physical wiring
c. software or physical wiring
d. None of the choices are correct.

33) A repeater is a connecting device that operates in the _____ layer(s).
a. physical
b. physical and data link
c. data link and network
d. physical, data link and network

34) A link-layer switch is a connecting device that operates in the _____ layer(s).
a. physical
b. physical and data link
c. data link and network
d. physical, data link and network

35) In IEEE 802.11, the _____ is a time period used for collision avoidance.
   a. NAV
   b. BSS
   c. ESS
   d. None of the choices are correct.

36) In IEEE 802.11, the addressing mechanism can include up to _____ addresses.
   a. four
   b. five
   c. six
   d. None of the choices are Correct.

37) _____ conversion involves three techniques: line coding, block coding, and scrambling.
   a. Analog-to-digital
   b. Digital-to-analog
   c. Analog-to-analog
   d. Digital-to-digital

38) Block coding can help in _____ and _____ at the receiver.
   a. synchronization and error detection
   b. synchronization and attenuation
   c. error detection and attenuation
   d. error detection and distortion

39) AM, FM, and PM are examples of _____ conversion.
   a. digital-to-digital
   b. digital-to-analog
   c. analog-to-analog
   d. analog-to-digital

40) Which multiplexing technique shifts each signal to a different carrier frequency?
   a. FDM
   b. TDM
   c. WDM
   d. PDM

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