



Undergraduate Programme
Department of Computer Science and Mathematics
Semester 1 Year 2019

FINAL EXAMINATION PAPER

ITC203 System and Software Architecture

Important Instructions to Students:

1. Read the questions, instructions carefully and answer the questions.
2. You are allowed an **extra 10 minutes reading time** (during this time, you are not allowed to write with pen) and **180 minutes (3 Hours)** to complete this paper.
3. Silent, non-programmable calculators are allowed, but not supplied.
4. Write all your answers in the answer booklet provided. If you need extra sheets, please ask from the supervisor. Write your name, course code and student identification number in the answer booklet and in the attendance sheet.
5. This Final Course Examination Paper is worth 100 marks contributes 50% of the total course assessments.
6. This paper contains Two (2) sections A and B. All questions are compulsory to answer.
7. Write all your answers legibly. The marker has the right to award zero for answers that are not legible.
8. This is a **Closed Book Examination**. The University views plagiarism, cheating and dishonest practice as serious offences and if found, offenders are penalized.

Examination Paper Content (Format):

<u>Section</u>	<u>Question</u>	<u>Content</u>	<u>Marks</u>	<u>Suggested Time</u>
A	1-20	Multiple Choice	20	30 minutes
B	1- 32	Open Ended Questions	80	150 minutes
		TOTAL	100	180 Minutes

Section A: Multiple Choice

(20 marks)

Instructions:

Write the letter that represents the best answers in your Answer Booklet.

Answer all the questions

1. When developing an information system, IS professionals follow a series of steps called a _____.
 - a. project life cycle
 - b. systems development life cycle
 - c. project development life cycle
 - d. service development life cycle

2. The _____ discipline is the set of activities for determining the structure of a specific information system that fulfills the system requirements.
 - a. design
 - b. requirements
 - c. modeling
 - d. architecture

3. Early mechanical computation devices were built to perform _____.
 - a. text processing
 - b. mathematical simulation
 - c. repetitive mathematical calculations
 - d. repetitive text operations

4. A particle of light is called a _____.
 - a. muon
 - b. photon
 - c. quantum
 - d. meson

5. In the decimal numbering system, the period or comma is called a _____.
 - a. place holder
 - b. division point
 - c. marker point
 - d. decimal point

6. The _____ data type has only two data values—true and false.
 - a. Boolean
 - b. integer

- c. floating point
- d. character

7. The ____ section of the CPU performs all computation and comparison operations.
- a. register
 - b. ALU
 - c. shifter
 - d. control unit
8. During the ____ cycle of the CPU, data inputs are prepared for transformation into data outputs.
- a. execution
 - b. store
 - c. fetch
 - d. wait
9. Each clock cycle the CPU spends waiting for a slower device is called a ____.
- a. suspend state
 - b. block state
 - c. hold state
 - d. wait state
10. The term ____ describes primary storage devices that are implemented as microchips, can read and write with equal speed, and can randomly access bytes, words, or larger data units.
- a. RAM
 - b. PROM
 - c. ROM
 - d. semiconductor
11. Modern computers use memory implemented with ____.
- a. vacuum tubes
 - b. resistors
 - c. quasiconductors
 - d. semiconductors
12. Each cell in the matrix representing one part of a digital image is called a ____.
- a. bubble
 - b. pixel
 - c. dot
 - d. block

13. The ____ of a display is the number of pixels displayed per linear measurement unit.
- a. resolution
 - b. refinement
 - c. accuracy
 - d. pitch
14. A ____ message contains instructions that control some aspect of the communication process.
- a. wait
 - b. parse
 - c. command
 - d. train
15. A complete ____ of a sine wave follows its full range from zero to positive peak, back to zero, to its negative peak, and then back to zero again.
- a. cycle
 - b. wave
 - c. crest
 - d. trough
16. ____ is a specific time point in a wave's cycle.
- a. Pattern
 - b. Phase
 - c. Trough
 - d. Crest
17. The term ____ refers to the spatial organization of network devices, physical routing of network cabling, and flow of messages from one network node to another.
- a. network infrastructure
 - b. network topology
 - c. network path
 - d. network interface
18. Most large-scale delivery services use a ____ system to connect source and destination nodes.
- a. send and relay
 - b. store and forward
 - c. store and forget
 - d. send and forget

19. ____ topology is the path messages traverse as they travel between end and central nodes.
- Physical
 - Virtual
 - Somatic
 - Logical
20. Each network covering a floor or building is called a ____.
- wide area network
 - metropolitan area network
 - local area network
 - zone network

Section B: Open-Ended questions

(80 marks)

There are 32 questions. All are compulsory.

1. What are the components of a communication channel and communication protocol? (2 marks)
2. Describe frequency modulation, amplitude modulation, and phase-shift modulation. (2 marks)
3. How can noise and distortion be introduced into a transmission medium? How does a channel's S/N ratio affect the reliability of data transmission? (2 marks)
4. Mention two advantages of wireless transmission using RF waves compared with infrared and visible light waves? (2 marks)
5. Describe simplex, half-duplex, and full-duplex transmission. (2 marks)
6. Differentiate between analog and digital signals. (1 mark)
7. Define noise and Attenuation in communication terms. (2 marks)
8. Describe Distortion and what do you understand by the term EMI (Electromagnetic Interferences)?(2 marks)
9. List and describe four physical topologies. (4 marks)
10. What was ARPANET? (1 mark)
11. Describe the function of each layer of the TCP/IP model. (5 marks)
12. What is the function of a hub? How does it differ from a switch or router? (3 marks)

13. What does a programming language define? Why were fourth-generation languages developed? (2 marks)
14. List two capabilities of a symbolic debugger. (2 marks)
15. List three components that an integrated development environment generally includes. (3 marks)
16. What are the differences between source code, object code, and executable code? (3 marks)
17. Compare assemblers, compilers, and interpreters. (3 marks)
18. Describe the role of the operating system. (1 marks)
19. What's the difference between a real resource and a virtual resource? (2 marks)
20. What are the goals of an OS resource allocation function? (1 mark)
21. Describe the functions of the kernel, service, and command layers of an OS. (3 marks)
22. What is a process control block, and what is it used for? (1 mark)
23. What is a thread? What resources does it share with other threads in the same process? (2 marks)
24. Compare static and dynamic linking. (2 marks)
25. Mention the five steps that FMS follows to complete the file open operation? (5 marks)
26. List the four FMS layers and describe their functions. (4 marks)
27. What's the difference between the logical and physical structure of a file? What are the advantages of not having an application program interact directly with the physical file structure? (3 marks)
28. Compare storage area networks and network-attached storage. Which is more common in environments where many servers in the same location access the same data? (3 marks)
29. What is middleware and explain the term cloud computing (2 marks)
30. Do the terms Internet and Web describe the same thing? (2 marks)
31. What are the four components of an URL? (2 marks)
32. Describe at least six standard Internet and Web protocols.(HTML, XML, HTTP, FTP, SMTP, MIME, POP, IMAP4). (6 marks)