

Third Term Test

Grade]

Subject] Communication Technology

Paper

Hours

Instructions:

- * *Use of calculators is **not** allowed.*

- (1) A – Batch, B – Real-time
- (2) A – Real-time, B – Batch
- (3) A – Online, B – Offline
- (4) A – Offline, B – Online
- (5) A – Manual, B – Automatic

5. Which of the following best describes Firmware?
- (1) Software that runs only on the internet
 - (2) Software permanently embedded into hardware
 - (3) Software that can be easily removed by users
 - (4) Software used for word processing
 - (5) Software stored only in secondary storage
6. Which of the following best describes the digital divide?
- (1) Difference between digital and analog systems
 - (2) Gap in access to ICT resources among different groups
 - (3) Difference in data transmission speeds
 - (4) Separation between hardware and software
 - (5) Inequality in data storage capacity
7. Why is Charles Babbage considered the “Father of the Computer”?
- (1) He invented vacuum tubes, which were used in first-generation computers for processing data
 - (2) He created the Pascaline, an early mechanical calculator used for arithmetic operations
 - (3) He developed the first fully electronic digital computer capable of high-speed processing
 - (4) He followed the concept of input, processing, and output (IPO cycle) in computing systems
 - (5) He designed the Difference Engine, a mechanical general-purpose computing machine with features similar to modern computers
8. A company wants to convert printed text documents into editable digital text files. Which technology should be used?
- (1) OMR
 - (2) MICR
 - (3) OCR
 - (4) Barcode Reader
 - (5) Flatbed Scanner
9. Consider the following statements about Mainframe Computers:
- A. They can support many users simultaneously
 - B. They are typically used as personal computers
 - C. They are large and expensive systems
- Which of the following is correct?
- (1) A only
 - (2) A and B only
 - (3) A and C only
 - (4) B and C only
 - (5) All A, B, C
10. Consider the following statements about printers.
- A. Impact printers are slower compared to most modern printers
 - B. Non-impact printers are less noisy.
 - C. Both types always print character-by-character
- Which of the following is correct?
- (1) A only
 - (2) A and B only
 - (3) B and C only
 - (4) A and C only
 - (5) All A, B, C

11. Which of the following communication buses are used by the CPU to send the memory location of the instruction to be fetched?
- A. Address Bus
 - B. Control Bus
 - C. Data Bus
- (1) A only (2) B only
(3) C only (4) A and B only
(5) A, B and C
12. Which of the following is a limitation of parallel computing?
- (1) Tasks always execute faster regardless of the complexity or dependency between processes
 - (2) Tasks cannot be stored in memory or managed efficiently during execution
 - (3) Tasks cannot always be divided into smaller independent parts suitable for parallel processing
 - (4) It requires no computational resources such as processors or memory to perform operations
 - (5) It completely eliminates all types of errors that may occur during processing
13. Convert 101.010_2 into decimal
- (1) 5.0125 (2) 5.25 (3) 5.12
(4) 0.125 (5) -5.25
14. A 4bit ALU which is based on one's complement arithmetic is used to do the following addition. $1101+1011$. The answer should be;
- (1) -7 (2) -6 (3) 6
(4) 7 (5) 24
15. Binary representations of some English words using the 7-bit ASCII coding system are given below.
Whole White
- 01110111 01101000 01101111 01101100 01100101 00100000 01110111 01101000 01101001 01110100 01100101
- Hexadecimal representation of the above is;
- (1) 77 68 6F 6C 65 77 68 69 74 65 (2) 77 68 6F 6C 65 20 77 68 69 74 65
(3) 77 68 6F 6C 65 20 69 74 65 69 74 (4) 77 68 6F 6C 65 69 74 6F 6C 65
(5) 77 68 6F 6C 65 69 74 20 77 68 69
16. Least significant digit in 476.022_{10} is ;
- (1) 4 (2) 0 (3) 6
(4) 7 (5) 2
17. The decimal value represented by 8 bit two's complement number 11101101 is,
- (1) 11101100 (2) 00010011 (3) 236
(4) -236 (5) -19

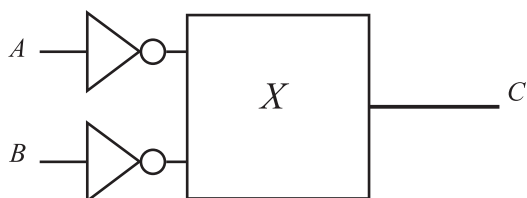
18. Which of the following statements regarding the characteristics of SRAM and DRAM within a computer system is correct?

- (1) DRAM is significantly faster than SRAM
- (2) SRAM can be used for main memory
- (3) DRAM can be used for main memory
- (4) SRAM and DRAM are non-volatile storage mediums
- (5) SRAM needs frequent refresh.

19. Considering all three options

- A. A and B are inputs to two NOT gates.
- B. The outputs of these NOT gates are then given as inputs to a logic gate X.
- C. The output of gate X is C.
- D. Gate X can be NAND, NOR, or XOR.

Which of the following gate(s) can be used as X so that the output $C = 0$ when both inputs to X (i.e., outputs of the NOT gates) are 0?



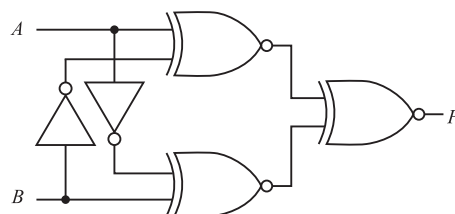
- (1) NAND only
- (2) NOR only
- (3) XOR only
- (4) All three (NAND, NOR, and XOR)
- (5) NOR or NAND only

20. Which of the following is the most simplified form of $A(\overline{BC}) + B\overline{C} + \overline{A}BC + BC$?

- (1) $A + B$
- (2) $\overline{B}(A\overline{C} + \overline{A}C) + B$
- (3) $\overline{C}(A\overline{B} + B) + C(\overline{A}B + B)$
- (4) $A\overline{C} + \overline{A}C + B$
- (5) $\overline{A}C + B$

21. What is the output of the logic circuit shown in the figure?

- (1) 0
- (2) 1
- (3) A
- (4) B
- (5) $A + B$



22. Only a 2-input NAND gate is provided to represent the Boolean expression If $F = (\overline{X} + \overline{Y})(Z + W)$, how many gates are required for a solution with minimal cost?

- (1) 2
- (2) 3
- (3) 4
- (4) 5
- (5) 6

23. Consider the Karnaugh-map shown here. Which of the following is the correct simplified logical expression corresponding to the groups shown in the Karnaugh map?

- (1) $B\bar{D} + BD$ (2) $\overline{BD} + BD$
 (3) $A\bar{C} + \bar{A}C$ (4) $B + D$
 (5) $(\bar{B} + \bar{D})(B + D)$

$\begin{matrix} AB \\ CD \end{matrix}$	00 AB	01 $A\bar{B}$	11 $\bar{A}\bar{B}$	10 $\bar{A}B$
00 CD	0	1	1	0
01 $C\bar{D}$	1	0	0	1
11 $\bar{C}\bar{D}$	1	0	0	1
10 $\bar{C}D$	0	1	1	0

24. A digital circuit produces an output $F = 1$ only when, exactly one of the inputs A or B is 1, AND input C is 1. Which of the following Boolean expressions correctly represents this system?

- (1) $F = (A + B)C$ (2) $F = (AB)C$
 (3) $F = (A \oplus B)C$ (4) $F = (A + B) + C$
 (5) $F = (\bar{A}\bar{B})C$

25. A security system activates an alarm ($F = 1$) when:

- Sensor X is OFF (0), AND either Y is ON (1) OR Z is OFF (0) Which of the following logic expressions represents the system?

- (1) $F = X(Y + Z)$ (2) $F = \bar{X}(Y + \bar{Z})$
 (3) $F = \bar{X}(Y\bar{Z})$ (4) $F = (X + Y)(\bar{Z})$
 (5) $F = \bar{X}Y + \bar{Z}$

26. The block size of a disk is 2KB. A portion of its FAT is given below. The blocks belong to two files: data1.bin and data2.bin. Which of the following correctly gives the directory entry and allocated disk space for data1.bin and data2.bin respectively?

Block	Value
50	51
51	-1
52	53
53	54
54	-1
55	

- (1) data1: 50, 4KB data2: 52, 6KB (2) data1: 52, 6KB data2: 50, 4KB
 (3) data1: 50, 2KB data2: 52, 4KB (4) data1: 51, 2KB data2: 54, 2KB
 (5) data1: 52, 4KB data2: 50, 6KB

27. The function of the Memory Management Unit (MMU) is to:

- (1) Execute arithmetic and logical operations required for processing data within the central processing unit
- (2) Manage input and output operations by coordinating communication between external devices and the processor
- (3) Translate virtual memory addresses into corresponding physical memory addresses during program execution
- (4) Store instructions temporarily in memory while programs are being processed by the system
- (5) Control system security policies by managing access permissions and protecting system resources

28. Which of the following statements about the swapping technique in an operating system are correct?

- A. Swapping involves moving processes temporary between main memory (RAM) and virtual memory.
- B. Swapping helps to increase the degree of multiprogramming.
- C. Swapping involves moving a process permanently from main memory to virtual memory.

- (1) A only
- (2) B only
- (3) A and B only
- (4) B and C only
- (5) A, B and C

29. Which of the following is the most common real-world example of spooling technique operating system?

- (1) Saving a file to a USB drive
- (2) Loading a webpage from the internet
- (3) Running multiple programs simultaneously using multitasking
- (4) Sending multiple print jobs to a printer
- (5) Defragmenting the hard disk to improve read speed

30. Which scheduler is responsible for deciding which process is moved from the job pool into the ready queue, thereby controlling the degree of multiprogramming?

- (1) Short-term scheduler
- (2) Medium-term scheduler
- (3) Long-term scheduler
- (4) CPU dispatcher
- (5) I/O scheduler

31. During a context switch, why is the PCB essential?

- (1) It deletes the old process from memory so the new process can use all available RAM
- (2) It transfers the process directly from one CPU core to another without any delay
- (3) It compresses the process state to save memory while another process runs
- (4) It saves the current process state (registers, program counter, etc.) so execution can be accurately resumed later
- (5) It notifies all other processes that the CPU is now being used by a different process.

32. A system uses a logical address space of 16 bits. The page size is 1 KB.

What are the number of bits in the page number and the offset?

- (1) Page number = 6 bits, Offset = 10 bits
- (2) Page number = 10 bits, Offset = 6 bits
- (3) Page number = 8 bits, Offset = 8 bits
- (4) Page number = 4 bits, Offset = 12 bits
- (5) Page number = 12 bits, Offset = 4 bits

33. Which of the following is a major drawback of linked allocation in file systems?

- (1) It wastes memory due to unused spaces within blocks
- (2) It requires a large amount of contiguous disk space
- (3) It has overhead due to storing pointers in each block
- (4) It does not allow files to grow dynamically
- (5) It provides very fast direct access to any block

34. Which of the following statements about the seven-state process model are correct?

- A. A process in the *Blocked* state can move directly to the *Running* state when the required event occurs.
- B. A process in the *Ready Suspended* state must first be moved to the *Ready* state before it can be executed.
- C. A process in the *Running* state can be moved to the *Blocked Suspended* state if it requires an I/O operation and is swapped out.

- (1) A only
- (2) B only
- (3) B and C only
- (4) A and C only
- (5) A, B and C

35. Frequency of a signal is defined as:

- (1) The maximum amplitude is the highest point of a waveform from its equilibrium position.
- (2) The number of complete oscillatory cycles of a periodic signal that pass a fixed reference point per unit time.
- (3) The vertical height of the waveform measured from the equilibrium position, showing the strength or intensity of the signal
- (4) The position of a point within a wave cycle at a given moment.
- (5) The speed at which the signal travels through a transmission medium, representing how fast the signal propagates

36. Consider the following statements about noise, attenuation and distortion.

- A. Noise is unwanted signal that affects transmission
- B. Distortion means change of signal shape
- C. Attenuation means delay in transmission

Which of the above statements are correct?

- (1) A only
- (2) A and B
- (3) B and C
- (4) A and C
- (5) A, B and C

37. Consider the following statements regarding data transmission and layer responsibilities in the TCP/IP model:

- A. Point-to-point delivery happens at the Data Link layer, where switches use MAC addresses to forward packets between nearby devices.
- B. End-to-end communication is handled by the Transport layer using protocols like TCP for reliable data transfer.
- C. UDP guarantee packet order or reliability during transmission.

Which of the statement(s) above is/are correct?

- (1) A only
- (2) B only
- (3) A and B only
- (4) B and C only
- (5) All A,B,C

38. Which of the following statements about the Public Switched Telephone Network (PSTN) are **incorrect**?

- A. PSTN is a circuit-switched network that establishes a dedicated communication path between two users during a call.
- B. PSTN primarily uses packet switching to transmit voice data efficiently over digital networks.
- C. PSTN can carry both analog and digital signals, depending on the part of the network being used.

- (1) A only
- (2) B only
- (3) A and B only
- (4) B and C only
- (5) A, B and C

39. Which of the following correctly distinguishes guided and unguided transmission media?

Which of the following statements correctly describes guided and unguided transmission media?

- (1) Guided media always has higher bandwidth than unguided media.
- (2) Unguided media includes coaxial cables, twisted pair, and optical fiber.
- (3) Guided media cannot cover long distances without repeaters, whereas unguided media can transmit unlimited distances.
- (4) Unguided media is completely free from electromagnetic interference.
- (5) The guided media is not fast, while the unguided media is fast.

40. Which network device operates on MAC addresses?

- (1) Hub
- (2) Router
- (3) Repeater
- (4) Modem
- (5) Switch

41. A school wants to set up a network with the following requirements: easy installation, less cost, ability to add new computers without disrupting the network, and centralized management. Which topology is most suitable?

- (1) Bus Topology
- (2) Ring Topology
- (3) Tree Topology
- (4) Mesh Topology
- (5) Star Topology

42. What is the main usage of port numbers in networking?

- (1) Port numbers identify applications or services on a device.
- (2) Port numbers assign unique IP addresses to devices.
- (3) Port numbers determine the physical path of network cables.
- (4) Port numbers increase the signal strength of data.
- (5) Port numbers encrypt data for secure communication.

43. In the context of ALOHA and its improvement to Ethernet, what was the key innovation introduced by Ethernet (Carrier Sense Multiple Access with Collision Detection – CSMA/CD) that improved upon pure ALOHA?

- (1) It required all devices to transmit at fixed time slots.
- (2) It allowed devices to transmit simultaneously without any restrictions.
- (3) It introduced a central controller to grant permission to transmit.
- (4) It allowed devices to detect and reduce collisions during transmission.
- (5) It eliminated the need for acknowledgements completely.

44. A company has been allocated the IP address 172.25.0.0/16. They need to create subnets to support exactly 500 usable hosts per subnet. What is the most appropriate subnet mask to use?

- (1) 255.255.192.0
- (2) 255.255.244.0
- (3) 255.255.254.0
- (4) 255.255.255.254
- (5) 255.255.255.128

45. Given the network 192.168.10.12/22, which of the following is a valid subnet ID within this network?

- (1) 192.168.8.0
- (2) 192.168.10.0
- (3) 192.168.11.128
- (4) 192.168.14.0
- (5) 192.168.15.255

Conceder following Scenario

In Library Management System, the core process handles everything from checking book availability to manage loans and fines; usually include the processes such as Manage Books (Adding / removing titles from the inventory), Search/Inquiry (Checking if a book is available), Issue / Return (Handling the actual borrowing transaction), Manage Fines (Calculating penalties for late returns).

46. In a Level 1 Data Flow Diagram for a Library Management System, described above, which of the following would be considered a Data Store?

- A. Member
- B. Book
- C. Issue Book
- D. Generate Fine Report

- (1) A only
- (2) B only
- (3) C only
- (4) D only
- (5) A and B only

47. Which statement correctly distinguishes Agile from Waterfall?

- (1) Agile is iterative and flexible, Waterfall is linear and sequential
- (2) Agile ignores user feedback, while Waterfall emphasizes it
- (3) Agile cannot be used for software projects, Waterfall can
- (4) Waterfall uses prototyping extensively, Agile never does
- (5) Agile and Waterfall are identical in approach and principles

48. Which of the statements are correct regarding documentation within the System Development Life Cycle (SDLC):

- A. Documentation is essential during system analysis
- B. Documentation is essential during system development
- C. Documentation is essential during system design
- D. Documentation is essential during Review and Maintenance

- (1) A only
- (2) A & B only
- (3) B & C only
- (4) C & D only
- (5) All A, B, C & D

49. Which statement describes the following component used in SSADM?

D3	Book
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- (1) Manual 3rd Data store, can be used in context diagram
- (2) Digital 3rd data store, can be used in L1 DFD
- (3) Temporary 3rd data store, can be used in L1 DFD
- (4) Digital 3rd process can be used in context diagram
- (5) Digital 3rd process can be used in L1 DFD

50. Which of the following is a non-functional requirement for a modern air conditioning system?

- (1) The unit must allow the user to schedule "On/Off" times via a mobile app.
- (2) The system must automatically switch to "Dry Mode" when humidity exceeds 60%.
- (3) The outdoor compressor unit must have a mean time between failures $\geq 5,000$ hours.
- (4) The indoor unit must be equipped with a concealed LED display that clearly and accurately shows the current room temperature to the user when activated.
- (5) The system must provide a "Turbo" setting to reach the target temperature faster.