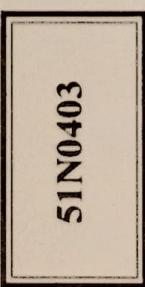


Roll No.

Total Page No. : 3



51N0403

**B.TECH. V SEM (NEW SCHEME) MAIN
EXAMINATION 2023-24
ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING-V**

5AM4-03 - Computer Networks

**Common to CS, AI, AD, AM, CA, CD, DS, IO,
IT, MC, CM, CY**

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1 _____

2 _____

Part-A

10×2=20

1. What do you mean by data communication ?
2. What do you mean by network topology ?
3. Explain data framing.
4. What is sliding window ?
5. What is need for classless addressing ?
6. What is subnetting ?
7. What are the services provided by transport layer ?
8. Describe flow control in transport layer ?
9. What is DNS ?
10. Explain about HTTP ?

Part-B

5×4=20

1. Discuss about the ethernet cabling.
2. What is Error ? Explain types of error.
3. Explain the process of Error detection using LRC with example.
4. A network on the internet has a subnet mask of 255.255.240.0. What is the maximum number of hosts it can handle ?
5. Explain Flow control and Buffering in Transport Layer.
6. Write short notes on e-Mail.
7. Write short notes on Wireless Sensor Networks.

Part-C

3×10=30

1. Explain the layers in OSI reference model and illustrate their functions.

2. Explain about ALOHA and CDMA in detail.
- ~~3.~~ Explain the role of network layer and transport layer in TCP/IP Model.
4. Explain TCP header format and discuss the relevance of various fields.
5. How name servers are managed in DNS ?

Total Page No. : 3

Roll No.

51N0410



**B.TECH. V SEM (NEW SCHEME) MAIN
ACAD. SESSION 2023-24
(ARTIFICIAL INTELLIGENCE)-V
AND OTHER BRANCHES**

5AI5-15 - Introduction to Blockchain

**Common to CS, AI, AD, AM, CA, CD, DS, IT, MC,
CM, CY**

Time : 2 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1 _____

2 _____

F-110

(1)

P.T.O.

Part-A

$10 \times 2 = 20$

- Q. 1. What is blockchain technology ?
- Q. 2. List the feature of cryptography.
- Q. 3. List the key feature of bitcoin currency.
- Q. 4. How do blockchain use public and private key cryptography ?
- Q. 5. Is it possible to modify the data once it is written in a block ? Justify.
- Q. 6. What is the use of sidechain in blockchain ?
- Q. 7. Discuss about different types of consensus in blockchain.
- Q. 8. Give the names of protocols in blockchain.
- Q. 9. What is the use of ethereum blockchain ?
- Q. 10. How does blockchain technology benefits the industry ?

Part-B

$5 \times 4 = 20$

- Q. 1. Explain double spend problem with solution of how to minimize this problem.
- Q. 2. Describe in detail about the proof of work consensus algorithm with its advantages and disadvantages.
- Q. 3. Explain in detail about incentive model with its uses in ethereum blockchain.
- Q. 4. Describe in detail about different version of blockchain with application of each.
- Q. 5. Explain the structure of bitcoin blockchain with its components.
- Q. 6. Explain the difference between proof of stock and delegated proof of stack.
- Q. 7. Is there a role of blockchain in responsible supply chains ? Explain blockchain uses in supply chain management.

Part-C

$3 \times 10 = 30$

- Q. 1. Describe in detail about working of public key cryptography in blockchain with suitable diagram and its real life application.
- Q. 2. Explain the working principle of bitcoin blockchain architecture with its different operations and features.
- Q. 3. Discuss working of architectural components of the ethereum blockchain with feature and application.
- Q. 4. Explain the principle of public blockchain maintaining high security enabling greater accountability and trust in the supply chain for healthcare sector.
- Q. 5. What is the role of consensus algorithm for distributed systems ? Explain practical Byzantine fault tolerance and delegated Byzantine fault tolerance algorithm for distributed systems.

Roll No.

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51N0401

51N0401

**B.TECH. V SEM (NEW SCHEME) MAIN
ACAD. SESSION 2023-24**

**ARTIFICIAL INTELLIGENCE & DATA
SCIENCE-V AND OTHER BRANCHES**

5AD4-01 - OPERATING SYSTEMS

**COMMON TO CS, AI, AD, AM, CA, CD, DS, IO, IT,
MC, CM, CY**

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1. NIL

2. NIL

Part-A

10×2=20

1. What are the two main functions of an operating system ?
2. Provide two programming examples in which multithreading does not provide better performance than a single-threaded solution.
3. What system calls have to be executed by a command interpreter or shell in order to start a new process ?
4. In what ways does the Linux setuid feature differ from the setuid feature in standard Unix ?
5. How are the access-matrix facility and the role-based access-control facility similar ? How do they differ ?
6. In what situations would using memory as a RAM disk be more useful than using it as a disk cache ?
7. Show that, if the wait() and signal() semaphore operations are not executed atomically, then mutual exclusion may be violated.
8. Describe two kernel data structures in which race conditions are possible. Be sure to include a description of how a race condition can occur.
9. Is it possible to have a deadlock involving only a single process ? Explain your answer.
10. Why are segmentation and paging sometimes combined into one scheme ?

Part-B

5×4=20

1. What is the purpose of interrupts ? What are the differences between a trap and an interrupt ? Can traps be generated intentionally by a user program ? If so, for what purpose ? What is the meaning of the term busy waiting ? What other kinds of waiting are there in an operating system ? Can busy waiting be avoided altogether ? Explain your answer.

2. What are two differences between user-level threads and kernel-level threads ? Under what circumstances is one type better than the other ? What is the difference between kernel and user mode ? Explain how having two distinct modes aids in designing an operating system. Describe the actions taken by a kernel to context-switch between processes.
3. A CPU-scheduling algorithm determines an order for the execution of its scheduled processes. Given n processes to be scheduled on one processor, how many different schedules are possible ? Give a formula in terms of n . What advantage is there in having different time-quantum sizes at different levels of a multilevel queueing system ?
4. Consider a logical address space of 64 pages of 1,024 words each, mapped onto a physical memory of 32 frames.
- How many bits are there in the logical address ?
 - How many bits are there in the physical address ?
5. Consider a logical address space of 32 pages with 1,024 words per page, mapped onto a physical memory of 16 frames.
- How many bits are required in the logical address ?
 - How many bits are required in the physical address ?
6. Consider the scheduling algorithm in the operating system for time-sharing threads.
- What is the time quantum (in milliseconds) for a thread with priority 10 ? With priority 55 ?
 - Assume that a thread with priority 35 has used its entire time quantum without blocking. What new priority will the scheduler assign this thread ?
 - Assume that a thread with priority 35 blocks for I/O before its time quantum has expired. What new priority will the scheduler assign this thread ?

7. A shared variable x , initialized to zero, is operated on by four concurrent processes W, X, Y, Z as follows. Each of the processes W and X reads x from memory, increments by one, stores it to memory and then terminates. Each of the processes Y and Z reads x from memory, decrements by two, stores it to memory, and then terminates. Each process before reading x invokes the P operation (i.e. wait) on a counting semaphore S and invokes the V operation (i.e. signal) on the semaphore S after storing x to memory. Semaphore S is initialized to two.

- (a) What is the maximum possible value of x after all processes complete execution ?
- (b) what is the minimum possible value of x after all processes complete execution ?

$3 \times 10 = 30$

Part-C

1. Consider the following set of processes, with the length of the CPU burst given in milliseconds :

Process	Burst Time	Priority
P1	10 9	3
P2	1	1
P3	2	3
P4	1	4
P5	5	2

- (a) Draw four Gantt charts that illustrate the execution of these processes using the following scheduling algorithms : FCFS, SJF, non-preemptive priority (a smaller priority number implies a higher priority), and RR (quantum = 1).
- (b) What is the turnaround time of each process for each of the scheduling algorithms in part a ?

- (c) What is the waiting time of each process for each of these scheduling algorithms ?
- (d) Which of the algorithms results in the minimum average waiting time (over all processes) ?
2. Consider the following resource-allocation policy. Requests for and releases of resources are allowed at any time. If a request for resources cannot be satisfied because the resources are not available, then we check any processes that are blocked waiting for resources. If a blocked process has the desired resources, then these resources are taken away from it and are given to the requesting process. The vector of resources for which the blocked process is waiting is increased to include the resources that were taken away. For example, consider a system with three resource types and the vector Available initialized to $(4, 2, 2)$. If process P_0 asks for $(2, 2, 1)$, it gets them. If P_1 asks for $(1, 0, 1)$, it gets them. Then, if P_0 asks for $(0, 0, 1)$, it is blocked (resource not available). If P_2 now asks for $(2, 0, 0)$, it gets the available one $(1, 0, 0)$ and one that was allocated to P_0 (since P_0 is blocked). P_0 's Allocation vector goes down to $(1, 2, 1)$, and its Need vector goes up to $(1, 0, 1)$.
- (a) Can deadlock occur ? If you answer "yes," give an example. If you answer "no," specify which necessary condition cannot occur.
- (b) Can indefinite blocking occur ? Explain your answer.
3. Consider the following page reference string : 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. How many page faults would occur for the following replacement algorithms, assuming one, two, three, four, five, six, and seven frames ? Remember that all frames are initially empty, so your first unique pages will cost one fault each.
- (a) LRU replacement
- (b) FIFO replacement
- (c) Optimal replacement.
4. Assume that we have a demand-paged memory. The page table is held in registers. It

takes 8 milliseconds to service a page fault if an empty frame is available or if the replaced page is not modified and 20 milliseconds if the replaced page is modified. Memory-access time is 100 nanoseconds. Assume that the page to be replaced is modified 70 percent of the time. What is the maximum acceptable page-fault rate for an effective access time of no more than 200 nanoseconds ?

5. Some file systems allow disk storage to be allocated at different levels of granularity. For instance, a file system could allocate 4 KB of disk space as a single 4-KB block or as eight 512-byte blocks. How could we take advantage of this flexibility to improve performance ? What modifications would have to be made to the free-space management scheme in order to support this feature ? Discuss the reasons why the operating system might require accurate information on how blocks are stored on a disk. How could the operating system improve file system performance with this knowledge ?

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Roll No.

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51N2304

51N2304

**B.TECH. V SEM (NEW SCHEME) MAIN
EXAMINATION 2023-24
COMPUTER SCIENCE & ENGINEERING
(Cyber Security)-V**

5CY4-04 - Information Security Management

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1 _____ NIL _____

2 _____ NIL _____

Part-A

$2 \times 10 = 20$

Q. 1. What are cybersecurity and cyberspace ?

Q. 2. Write the issues in Email security.

F-162

(1)

P.T.O.

- Q. 3. Explain the need and principles of security.
- Q. 4. Explain security management.
- Q. 5. Define the term Risk Evaluation and Risk Treatment.
- Q. 6. What do you mean by human resource security and security awareness and education ?
- Q. 7. State the relationship between security governance and security management.
- Q. 8. What is system assessment approaches ?
- Q. 9. Explain the following term mobile device security and physical asset management.
- Q. 10. Explain the following :
- (a) Risk analysis
 - (b) Risk evaluation

Part-B

$5 \times 4 = 20$

- Q. 1. What are value of standard ? Explain good practice for information security in details.
- Q. 2. What are the functions of Information Security ?
- Q. 3. What are the five principal services provided by PGP ?
- Q. 4. What is CIS critical security controls for effective cyber defense ? Explain in detail.
- Q. 5. What do you mean by information classification and handling.
- Q. 6. Difference between security management and information management.
- Q. 7. What is ISO suite of information security standards and NIST cyber security framework and documents ? Explain each term in detail with the help of example.

Part-C

$3 \times 10 = 30$

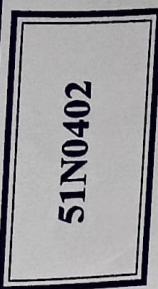
- Q. 1. What is human resource security and security awareness in education ? Also explain ITU-T security documents and effective cyber security.

- Q. 2. Discuss hardware life cycle management and office equipment in detail.
- Q. 3. What is Security Governance components ? Explain Risk Treatment and Risk Assessment in detail.
- Q. 4. Discuss Payment Card Industry Data Security Standard. What are COBIT-5 for information security ?
- Q. 5. Write short note on the following :
- (a) Consequences Identification
 - (b) Asset Identification
 - (c) Treat Identification

Total Page No. : 3

Roll No.

51N0402



**B.TECH. V SEM (NEW SCHEME) MAIN
EXAMINATION 2023-24
ARTIFICIAL INTELLIGENCE & MACHINE
LEARNING-V**

**5AM4-02) - Computer Organization and
Architecture**

**Common to CS, AI AD, AM, CA, CD, DS, IO, IT,
MC, CM, CY)**

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1 _____

2 _____

F-102

(1)

P.T.O.

Part-A

10×2=20

1. Describe the term Register with suitable example. 2
2. What do you mean by micro-operation ? 2
3. With a suitable example, explain arithmetic micro-operation. 2
4. What is the need of control word in a computer system ? 2
5. Explain the use of memory address register and memory data register. 2
6. Discuss the need of input-output processor. 2
7. Solve $(1101.10)_2 - (1000.10)_2$ using 2's complement subtraction method. 2
8. Write the full form of RISC and CISC. 2
9. Explain the use of instruction register. 2
10. What do you mean by memory transfer ? Give suitable example. 2

Part-B

5×4=20

1. What is the need of addressing modes ? Explain following addressing modes : 4
 - (i) Direct
 - (ii) Register
 - (iii) Indirect.
2. Categorize the types of RAM Design block diagram of 512×16 RAM. How many address line and data line will this RAM has ? 4
3. Convert following arithmetic expression into reverse polish notation : 4
$$A \times B + A \times (B \times D + C \times E)$$

4. Give the concept of the following : 4
- (i) Page map table
 - (ii) Pipeline
 - (iii) SIMD.

5. Show the block diagram of the hardware that implement the following register transfer language : 4

$$yT_2 : R_2 \leftarrow R_1 + R_2$$

6. Let initial value of register R is 1101110. What will be contents of register R after performing logical shift left, circular shift right and arithmetic shift right. 4

7. Explain different types of computer memory with the help of memory hierarchy. 4

Part-C

3×10=30

1. Describe Flynn taxonomy of parallel machine models. An instruction is stored at location 300 with its address field at location 301. The address field has the value 400. A processor register R1 contains the number 200 Evaluate the effective address if addressing mode of instruction is : 10

- (i) Direct
- (ii) Immediate
- (iii) Relative.

2. Demonstrate the working of following types of address mapping in relation to cache memory : 10

- (i) Associative mapping
- (ii) Direct mapping
- (iii) Set associative mapping.

3. Explain the block diagram of DMA chip. Write meaning of every pin of chip. With a neat diagram explain working of DMA. 10

4. With a suitable example, explain 1-address, 2-address and 3-address instructions related to CPU organization. 10

5. Solve $(+13) \times (-7)$ using Booth multiplication algorithm. 10

Roll No.

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51N2305

51N2305

**B.TECH. V SEM (NEW SCHEME) MAIN
EXAMINATION 2023-24**

**COMPUTER SCIENCE & ENGINEERING
(Cyber Security)-V**

5CY4-05 - Cryptography and Information Security

Time : 3 Hours]

[Max. Marks : 70

[Min. Passing Marks :

Instructions to Candidates :

Part-A : Short Answer Type Questions (up to 25 words) $10 \times 2 = 20$ marks. All 10 questions are compulsory.

Part-B : Analytical/Problem Solving questions $5 \times 4 = 20$ marks. Candidates have to answer 5 questions out of 7.

Part-C : Descriptive/Analytical/Problem Solving questions 3×10 marks = 30 marks. Candidates have to answer 3 questions out of 5.

Schematic diagrams must be shown wherever necessary. Any data you feel missing may suitably be assumed and stated clearly. Units of quantities used/calculated must be stated clearly.

Use of the following supporting materials is permitted during examination.
(Mentioned in form no. 205).

1 _____

2 _____

F-163

(1)

P.T.O.

Part-A $2 \times 10 = 20$

1. What is meant by Denial of service attack ?
2. What is Active and Passive Attack ?
3. What are the different modes of operation in DES ?
4. What are the operations used in AES ?
5. What is meant by message authentication ?
6. What is hash function ?
7. What is MIME ?
8. Write two transport layer protocol ?
9. What is authentication header ?
10. What is single sign on ?

Part-B $5 \times 4 = 20$

1. Differentiate between Active attacks and passive attacks.
2. Explain the key Expansion process in AES.
3. What are the requirements of the cryptographic hash functions ?
4. What are the requirements of web security ?
5. What is e-mail security ? Explain the technique for e-mail security ?
6. Explain technical deficiencies of Kerberos v4.
7. Difference between Substitution Cipher technique and Transposition Cipher technique.

Part-C $3 \times 10 = 30$

1. Explain the security services classifications and security mechanisms in detail.

- 2/ Explain the key expansion and round functions of Blowfish algorithm.
3. Explain the different message authentication functions.
4. Explain Secure Socket Layer in detail.
- 5/ Explain Encapsulating IP Security Payload in detail.
