

**DEPARTEMNT OF COMPUTER SCIENCE AND ENGINEERING  
NATIONAL INSTITUTE OF TECHNOLOGY, TIRUCHIRAPPALLI-15.  
CSPC51 – Computer Architecture  
VI Semester - Section B / Cycle Test 1**

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**Date: 19.09.2022  
Max:Marks: 20**

**Answer ALL Questions**

1. What is the difference between computer architecture and computer organization? (2)
2. Derive and explain Amdahl's law. (3)
3. What are pros and cons of each cache organization? (3)
4. What is virtual memory? Explain the need for virtual memory. (2)
5. Suppose we have made the following measurements: (5)  
Frequency of FP operations = 25%  
Average CPI of FP operations = 4.0  
Average CPI of other instructions = 1.33  
Frequency of FPSQR = 2%  
CPI of FPSQR = 20

Assume that the two design alternatives are to decrease the CPI of FPSQR to 2 or to decrease the average CPI of all FP operations to 2.5. Compare these two design alternatives using the processor performance equation.

6. With an example explain the cache optimization technique to reduce the miss rate. (3)
7. What is the effect of power consumption by giving priority to read misses over writes? (2)



Class / Semester : III yr CSE / V sem.

Time : 2:30 to 3.30 P.M

Venue & Date : ORION F11& F12 & 19/09/2022

Max. Marks : 20

Answer all questions

1. What do you mean by physical data independence? (1)
2. Define views. How views are created in SQL? What are the problems associated with views? (2)
3. What are compatible relations? List two operations that are applied on compatible relations. (2)
4. Consider Ternary relationship exist between Employee, his skillset and the Project assigned to him. How will you break it into binary relationship? Assume your own attributes and draw the ER diagram for both the binary and ternary form of relationship for the above scenario. (2)
5. Read the following case study, which describes the data requirements for a video rental company. The video rental company has several branches throughout the USA. The data held on each branch is the branch address made up of street, city, state, and zip code, and the telephone number. Each branch is given a branch number, which is unique throughout the company. Each branch is allocated staff which includes a Manager. The Manager is responsible for the day-to-day running of a given branch. The data held on a member of staff is his or her name, position, and salary. Each member of staff is given a staff number, which is unique throughout the company. Each branch has a stock of videos. The data held on a video is the catalog number, video number, title, category, daily rental, cost, status, and the names of the main actors, and the director. The catalog number uniquely identifies each video. However, in most cases, there are several copies of each video at a branch, and the individual copies are identified using the video number. A video is given a category such as Action, Adult, Children, Drama, Horror, or Sci-Fi. The status indicates whether a specific copy of a video is available for rent. Before hiring a video from the company, a customer must first register as a member of a local branch. The data held on a member is the first and last name, address, and the date that the member registered at a branch. Each member is given a member number, which is unique throughout all branches of the company. Once registered, a member is free to rent videos, up to maximum of ten at any one time. The data held on each video rented is the rental number, the full name and number of the member, the video number, title, and daily rental, and the date the video is rented out and date returned. The rental number is unique throughout the company. (5)
  - a) Identify the main entity types of the video rental company.
  - b) Identify the main relationship types between the entity types described in (a) and represent each relationship as an ER diagram.
  - c) Determine the mapping constraints for each relationship described in (b). Represent the constraints for each relationship in the ER diagrams created in (b).
  - d) Identify attributes and associate them with entity or relationship types. Represent each attribute in the ER diagrams created in (c).

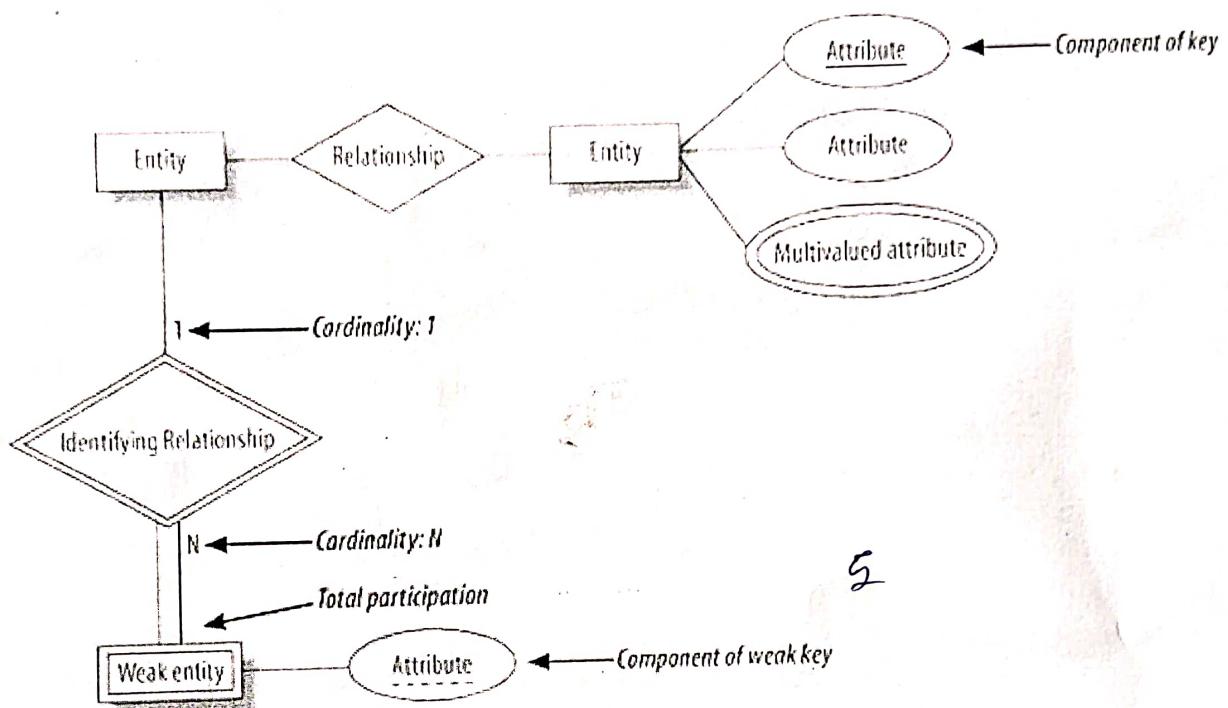
e) Determine candidate and primary key attributes for each (strong) entity type.

f) Using your answers (a) to (e) attempt to represent the data requirements of the video rental company as a single ER diagram. State any assumptions necessary to support your design.

g) Convert the ER diagram to Relational model.

Q. Discuss about referential integrity constraints with respect to data base modification? (2)

Q. Consider the following ER diagram. While converting to relational model, how many tables are possible? (1)



Q. A relation R(A, B, C, D, E, F, G, H) and set of functional dependencies are

$CH \rightarrow G$ ,

$A \rightarrow BC$ ,

$B \rightarrow CFH$ ,

$E \rightarrow A$ ,

$F \rightarrow EG$

2\* 6

Then how many possible super keys are present? Also find possible candidate keys. (3)

Q. The following table has two attributes A and C where A is the primary key and C is the foreign key referencing A with on-delete cascade. (2)

A	C
2	4
3	4
4	3
5	2
7	2
9	5
6	4

all

List the set of all tuples that must be additionally deleted to preserve referential integrity when the tuple (3,4) is deleted.

DEPARTMENT OF COMPUTER SCIENCE & ENGINEERING

V SEMESTER B.TECH, CYCLE TEST 1

CSPC53 COMPUTER NETWORKS

DATE: 20/09/2022

Answer All Questions

MAX. MARKS: 20

1. Assume that source S and destination D are connected through two intermediate devices and all these devices are in the same network. Determine how many times each packet has to visit the transport, network, data link and physical layer during a transmission from S to D. 2 4 4 4 (2)
2. The person X uses Yahoo mail service to exchange mails with other users. Assume that Y has received a mail from X. Y and his mail server are in the different network. After reading the mails, Y decided to store X's mails separately in his mailbox. Later, he forwards that mail to Z who is in the same network. For this situation, draw a neat architecture diagram to show all these activities along with the required entities and protocols. (3)
3. Design S-Box to encrypt 8-bit data. Assume the values of input data as per your choice and check whether your S-Box decrypts the data correctly or not. (3)
4. Draw the TCP State Transition diagram with all possible transitions. (4)
5. What is the window size for host A, if the congestion window is 3500? Also assume that the receiver(host B) has a buffer size of 5000 bytes, 1000 bytes of consumed data and 1000 bytes of acknowledged and unconsumed data? (2)
6. What is the use of pseudo header in UDP checksum calculation? Analyse the possibilities of having the checksum with all 0's and all 1's in UDP. (3)
7. Hosts A and B are communicating over a TCP connection, and Host B has already received from A all bytes up through byte 126. Suppose Host A then sends two segments to Host B back-to-back. The first and second segments contain 80 and 40 bytes of data respectively. In the first segment, the sequence number is 127, the source port number is 302, and the destination port number is 80. Host B sends an acknowledgment whenever it receives a segment from Host A.
  - (i) In the second segment sent from Host A to B, what are the sequence number, source port number, and destination port number? 208 302 80 (3)
  - (ii) If the first segment arrives before the second segment, in the acknowledgment of the first arriving segments, what is the ACK number, the source port number, and the destination port number? 208 302 80 (3)
  - (iii) If the second segment arrives before the first segment, in the ACK of the first arriving segment, what is the ACK number? 127 (3)

127

127

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 DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

B.Tech (CSE) - Cycle Test 1 – July - December 2022

CSPC54– Introduction to Artificial Intelligence and Machine learning

Semester: V , ‘B’

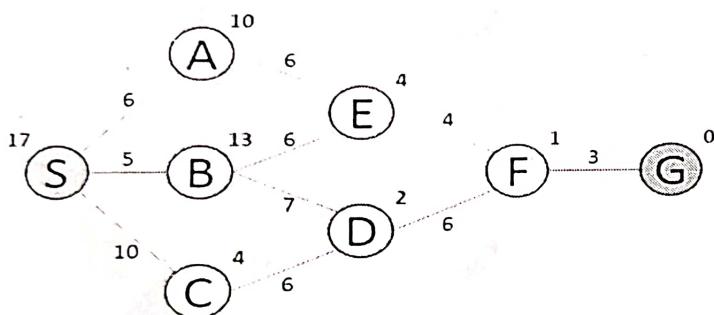
Max Marks: 15

Curriculum: NITTUGCSE20

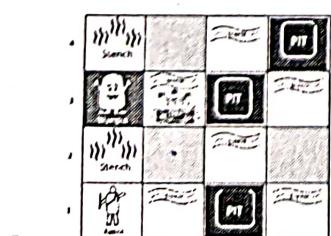
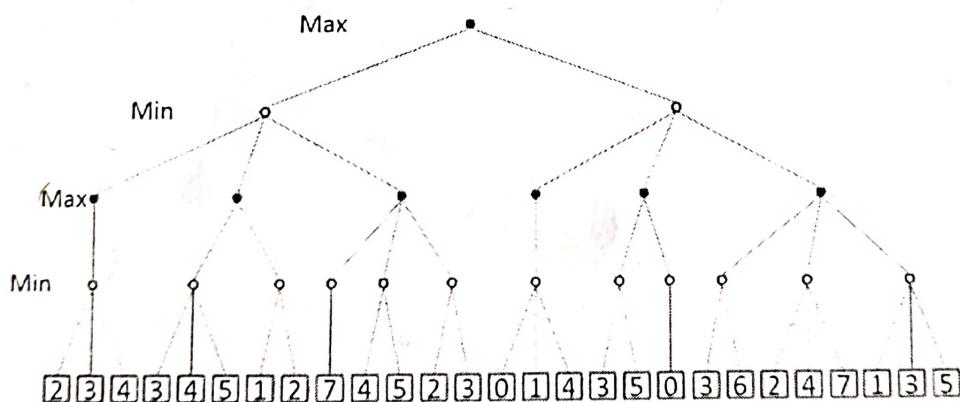
Time: 1 hour

Date of Exam: 20<sup>th</sup> September 2022

1. Give PEAS for the following activities: (2)
  - a. Bidding an item at an auction
  - b. Agriculture yield prediction agent
2. Give a complete problem formulation for the following problem so that the implementation is possible. “You have three jugs, measuring 12 gallons, 8 gallons, and 3 gallons and a water faucet. You can fill the jugs up or empty them out from one to another or onto the ground. You need to measure out exactly one gallon.” (2)
3. Consider the following representation of a town. Perform A\* search algorithm and greedy best first search algorithm. Determine the route and the cost to reach the goal from the source. Compare the performance of the two algorithms for this sample. Justify whether the heuristics is admissible. (4)



4. Determine the values of each node by applying minimax procedure. Show the results after applying  $\alpha\beta$  pruning. (4)



5. Consider the Wumpus world. Assuming that the agent has moved to square (2,2), write propositional logic statements that are valid at the junction and deduce the presence of wumpus in cave W<sub>1,3</sub>. (3)

--- Best Wishes ---

fill



## Department of Computer Science and Engineering

### CSPE 51 – Augmented and Virtual Reality

#### Cycle Test - 1

Date : 21.09.2022

Time : 10 – 11 am

Max. Mark : 20

Answer all the questions

1. a) Find out what type of reality technology is used in the following and why? (2)

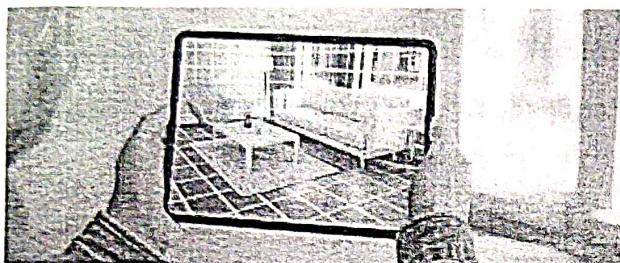


Figure. a

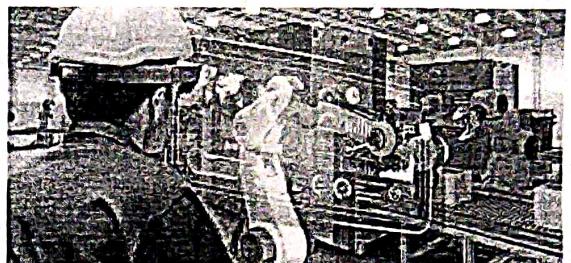
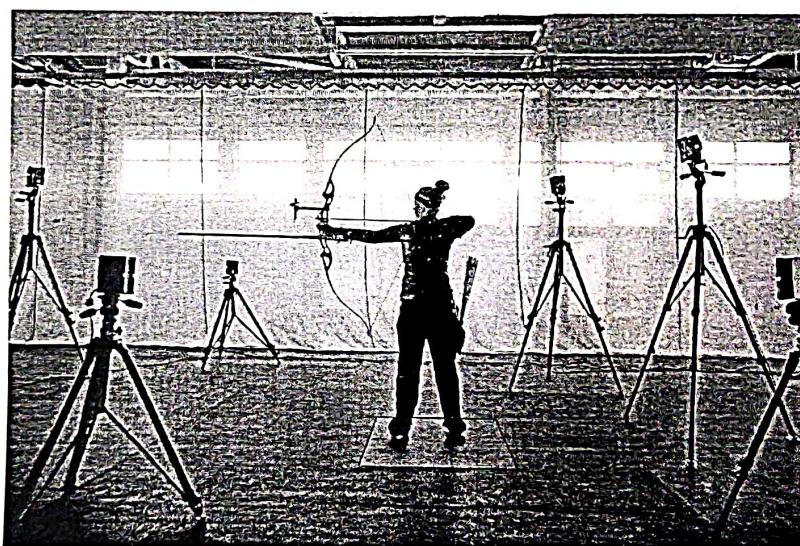
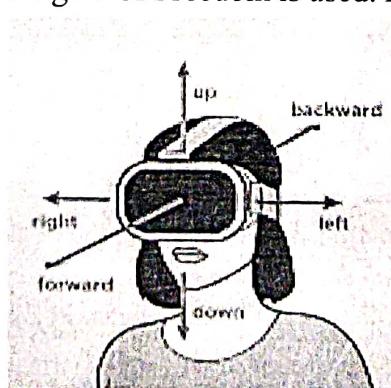


Figure. b

- b) What kind of tracking system used in the given VR system? Justify your answer. (2)



- c) In the below image, find out what kind of Degree of Freedom is used. Explain each of them. (2)



- d) Is it possible to experience VR in the computer or smart phone without headset? Justify your answer. (2)

(P.T.O.)

## Scaling

2. a) Explain the different coordinate system used from design of object to rendering of them on the devices. (2)
- b) Which type of display is suitable for the following devices. And also explain why it is appropriate? (2)
- i) Pen Plotter
  - ii) Scanner
- c) Check whether the following statement is correct (Provide an example) (3)  
“Reflection of line about Y-axis and then reflecting the reflected object about the diagonal line  $y = -x$  is same as that of rotation about 270 degrees in anti-clockwise direction”.
- d) Reflect the triangle ABC about the line  $y = x + 2$ . The coordinates of the triangle are A (2,4,2), B (4,6,2) and C (2,6,2). (5)



**National Institute of Technology Tiruchirappalli**

**BRANCH: Computer Science and Engineering**

**B.Tech. V Semester-Section B, Cycle Test 1**

**SUB. CODE & TITLE: CSPE56 & Cloud Computing**

**DATE: 21.09.2022, TIME: 60 MIN, Max. Marks: 20, No. of Pages:01**

**Instructions:** Answer all the questions.

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1. Which cloud delivery models are applicable for the following scenarios? Justify your answer.
  - a) If you want to host an email service for your company, you could buy computing power from a cloud vendor, then install databases and applications to run your email service. [1M]
  - b) For email hosting, along with computing power, you could buy application servers and databases as a service directly from the cloud vendor and then set up your email service. [1M]
2. Which cloud deployment models are applicable for the following scenarios? Justify your answer.
  - a) A global company has decided to offer video streaming solutions for business to share their ideas and presentations and pitch them to clients. They wish to adopt cloud scaling to enable larger bandwidth and speed. [1M]
  - b) A retail company has websites that require high performance. They have on-premise servers to handle the work, but sometimes during seasons of sales, they experience periods of spikes in traffic. [1M]
3. Differentiate cluster computing and grid computing [2M]
4. Define the terms given below [2M]

a) Virtualization	c) Measured Usage
b) Elasticity	d) On-demand Usage
5. Discuss the limitations of cloud computing with real-time example [2M]
6. a) Mention the reasons to implement a Logical Network Perimeter. [1M]  
b) What are the virtual firewall's and virtual network's purposes in Logical Network Perimeter? [1M]
7. Write about the common logical units provided by cloud storage mechanisms. [2M]
8. a) Define VIM and mention its purpose. [0.5M]  
b) Briefly explain the two basic configurations of the failover system. [1.5M]
9. Explain Remote Administration System in detail with diagrams. [4M]

\*\*\*\*\*All The Best\*\*\*\*\*

File  
Object  
Block  
Database