20APC0507T

B.Tech. DEGREE EXAMINATION, JULY 2024.

Fourth Semester

Computer Science and Engineering

COMPUTER NETWORKS

(RU 20 Regulations)

(Regular & Supplementary)

Time : 3 Hours

Max. Marks : 70

PART — A

Compulsory question.

(10 × 2 = 20 Marks)

1. (a) What is meant by Internet?

    (b) Explain delay and Loss.

    (c) Explain about FTP and HTTP.

    (d) What is meant by DNS?

    (e) Define Multiplexing and De-multiplexing.

    (f) Explain about tcp and udp protocols.

    (g) What are routing algorithms?

    (h) What is Virtual Circuit?

    (i) What are Error-Detection techniques?

    (j) What is meant by Lan?

PART — B

Answer ONE full question from each Unit.   (5 × 10 = 50 Marks)

All questions carry equal marks.

UNIT I

2. Explain History of Computer Networking and the Internet.

Or

3. Explain Different layers of Computer Network.

Turn Over

UNIT II

4. Demonstrate DNS-The Internet's Directory Service in detail.

Or

5. Explain Peer-to-Peer Applications in detail.

UNIT III

6. Explain the Principles of Congestion Control.

Or

7. Explain Transport-Layer Services.

UNIT IV

8. Explain Virtual Circuit and Datagram Networks.

Or

9. Explain Routing in the Internet and Multicast Routing.

UNIT V

10. Explain about Retrospective: A Day in the Life of a Web Page Request.

Or

11. Explain Switched Local Area Networks in detail.

———————

20APC0505T

22RU1A0514

B.Tech. DEGREE EXAMINATION, JULY 2024.

Fourth Semester

Computer Science and Engineering

COMPUTER ORGANIZATION AND ARCHITECTURE

(RU20 Regulations)

(Regular & Supplementary)

Time : 3 Hours   Max. Marks : 70

PART — A

(Compulsory Question)   (10 × 2 = 20 Marks)

1. (a) Explain fetch routine in symbolic micro instruction.

   (b) Mention typical Logical address representation.

   (c) Explain Secondary Storage.

   (d) What is meant by BUSES?

   (e) What are Data Hazards?

   (f) List out typical characteristics of multiprocessors.

   (g) Define delayed node.

   (h) What is Conditional branching?

   (i) Mention the I/O ports.

   (j) What is vector processing.

PART — B

Answer ONE full question from each unit.   (5 × 10 = 50 Marks)

All questions carry equal marks.

UNIT I

2. Explain the Fundamental Concepts of processing unit.

Or

3. With neat sketch. Explain the diagram of Control Unit.

Turn Over

UNIT II

4. Explain Semiconductor RAM Memories.

Or

5. Explain the relationship between address and memory space in Virtual memory system.

UNIT III

6. Explain the Forms of Parallel Processing.

Or

7. Explain Influence on Instruction Sets in Pipelining.

UNIT IV

8. Explain about the addressing modes of 8086.

Or

9. Explain Flag register of 8086 and its functions.

UNIT V

10. Explain Architecture of 8051 microcontroller.

Or

11. Explain addressing modes and instruction set of 8051.

_____

20APC0504T

B.Tech. DEGREE EXAMINATION, JULY 2024.

Fourth Semester

Computer Science and Engineering

DATABASE MANAGEMENT SYSTEMS

(RU20 Regulations)

(Regular & Supplementary)

Time : 3 Hours   Max. Marks : 70

PART — A

(Compulsory Question)   (10 × 2 = 20 Marks)

1. (a) Define functional dependency and name it's types.

   (b) What is DBMS

   (c) Define decomposition.

   (d) What is meant by Database Schema?

   (e) What are Null Values?

   (f) Define Triggers.

   (g) Define Top-k Optimization

   (h) Explain Query Optimization.

   (i) Explain Serializability.

   (j) Define Isolation and Atomicity.

PART — B

Answer ONE full question from each Unit.   (5 × 10 = 50 Marks)

All questions carry equal marks.

UNIT I

2. Define normalization and explain detail about normal forms.

Or

3. Explain Database systems applications and Purpose of Database Systems.

Turn Over

UNIT II

4. What is relational algebra? List all the relational algebra operations. Explain following operations: SELECT, PROJECTION, JOIN with examples.

Or

5. Explain the Features of Good Relational Designs.

UNIT III

6. Explain Triggers in SQL in detail.

Or

7. Explain SQL Data types and schemas.

UNIT IV

8. Explain Transformation of Relational Expressions.

Or

9. Discuss join operations in Query Processing.

UNIT V

10. Explain Timestamp-based Protocols and Validation-based Protocols.

Or

11. Explain Implementation of Isolation Levels.

———————

20APC0506T

B.Tech. DEGREE EXAMINATION, JULY 2024.

Fourth Semester

Computer Science and Engineering

OPERATING SYSTEMS

(RU20 Regulations)

(Regular & Supplementary)

Time : 3 Hours   *Max. Marks : 70*

PART — A

(Compulsory Question)   (10 × 2 = 20 Marks)

1. (a)   What is meant by systems calls?

    (b)   Describe debugging.

    (c)   What is meant by Thread libraries?

    (d)   What is meant by Mutexes?

    (e)   What are the differences between paging and segmentation?

    (f)   Define Paging.

    (g)   What is meant by Deadlock?

    (h)   What are the attributes of the file?

    (i)   Define Cryptography.

    (j)   What is meant by Access matrix?

PART — B

(Answer ONE full question from each Unit; All questions carry equal marks)

(5 × 10 = 50 Marks)

UNIT I

2.   What is meant by Operating System? Explain the functions of Operating system.

Or

3.   Explain the Operating system Design and Implementation.

Turn Over

UNIT II

4. Explain Inter-process communication in Client Server system.

Or

5. Determine the average waiting time and average turnaround time for FCFS, SJF with pre-emption and round robin (time slice = 2ms) scheduling algorithms for given process, burst and arrival times are given below.

Process	Burst Time	Arrival Time
P1	4	0
P2	2	1
P3	3	2
P4	5	3
P5	1	4

UNIT III

6. (a) Discuss the need of page replacement in demand paging.

   (b) Given page reference string with 4 frames: 1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6. Compare the number of page faults for LRU, FIFO and optimal page replacement algorithm.

Or

7. Explain Contiguous memory allocation in detail.

UNIT IV

8. Describe Banker's Algorithm.

Or

9. Explain Deadlock avoidance and Deadlock prevention.

UNIT V

10. Discuss program threats, system and network threats of operating system in detail.

Or

11. Explain the Goals of protection, Principles and domain of protection in detail.

———————

20APC0506T

20ABS5409

B.Tech. DEGREE EXAMINATION, JULY 2024.

Fourth Semester

Computer Science and Engineering

PROBABILITY AND STATISTICS

(RU 20 Regulations)

(Regular & Supplementary)

Time : 3 Hours   *Max. Marks : 70*

SECTION — A

Compulsory question.   **(10 × 2 = 20 Marks)**

Answer ALL the questions of the following:

1. (a) Collection of data in short note.

    (b) Define Population and Sample in short note.

    (c) Explain about the probability axioms in short note.

    (d) Define Central Tendency.

    (e) What is Probability distribution in short note?

    (f) Explain about the normal distribution in short note.

    (g) Explain about the two types of errors and power of the test in detail.

    (h) Explain about the test for single mean and difference of means in detail.

    (i) Explain the concept of testing hypothesis for small samples in detail.

    (j) Explain Chi-square test for goodness of fit.

SECTION — B

Answer ONE full question from each Unit; All questions carry equal marks.

(5 × 10 = 50 Marks)

UNIT I

2. (a) Explain the principle and method of least squares in detail.

    (b) The two regression equations of the variables x and y are $3x + 2y - 26 = 0$, $2x + 4y - 20 = 0$.

    Find

    (i) the mean values of x and y

    (ii) the standard deviation y, if variance of x is 9 and

    (iii) correlation coefficient between x and y.

Or

Turn Over

3. (a) The table below shows the scores of two students, Alice and Bob, in three subjects: Math, Physics, and Chemistry. Calculate the Rank Correlation coefficient between Alice and Bob's scores in these subjects.

Subject	Alice's Score	Bob's Score
Math	80	75
Physics	85	70
Chemistry	90	80

   (b) Define regression coefficients. State its properties.

UNIT II

4. (a) State and prove Baye's theorem and how it is used in real life scenario?

   (b) A random variable X has the following probability function.

X	0	1	2	3	4	5	6	7
$P(X)$	0	K	2K	2K	3K	K²	2K²	7K²+ K

   (i) Determine K

   (ii) Determine $P(X < 3)$

   (iii) Determine $P(X > 6)$

   (iv) Determine $P(0 < X < 3)$

Or

5. (a) Give various definitions of probability. State and prove Addition theorem on probability for two events.

   (b) Define the terms trial, events, sample space, probability and laws of probability.

UNIT III

6. (a) Interpret the properties of normal distribution and its applications.

   (b) The mean weight of 500 students in a college is 75 kgs and S.D is 7 kgs. Assume that the Weighs are normally distributed. Find how many 7 students' weight (i) In between 60-70 kgs (ii) More than 92 kgs.

Or

7. (a) In a Binomial distribution consisting of 10 independent trials, probability of 1 and 2 successes is 0.268435 and 0.30199 respectively. Find the parameter 'p' of the distribution.

   (b) Suppose X is a binominal random variable with parameters of $n = 3$ and p. if $P(X = 1) = 0.3$, $P(X = 2) = 0.2$ and $P(X = 0) = 3P(X = 3)$. Find E (X).

2

20ABS5409

8. (a) Explain the concept of estimation, interval estimation and confidence intervals in detail.

(b) Explain about the critical and acceptance regions, level of significance in detail.

Or

9. (a) Explain two types of errors and power of the test in detail.

(b) A company wants to estimate the proportion of defective products in a batch of 1000 units produced. A random sample of 200 units is selected from the batch, and it is found that 40 of them are defective. Calculate the standard error of proportion for this data.

UNIT V

10. (a) Define student t distribution and state its properties.

(b) Suppose you are a researcher investigating the effect of a new teaching method on student exam scores. You have collected data on exam scores from two groups of students: one group taught using the traditional teaching method, and the other group taught using the new method. You want to determine if there is a significant difference in the mean exam scores between the two groups, the below following data:

Group 1 (Traditional Method):

Sample size $(n1) = 25$

Mean exam score $(\bar{x}1) = 72$

Sample standard deviation $(s1) = 8$

Group 2 (New Method):

Sample size $(n2) = 30$

Mean exam score $(\bar{x}2) = 78$

Sample standard deviation $(s2) = 7$

Assuming equal variances, conduct a hypothesis test to determine if there is a significant difference in the mean exam scores at a 5% level of significance.

Or

11. (a) Explain the procedure of variance ratio test or F – test.

	Under 20	20 - 39	40 - 59	60 and above
Liked the food	320	80	110	200
Disliked the food	50	15	70	60
Indifferent	30	5	20	40

(b) Using chi-square test to derive the conclusion.

_____

20ABS5409

20ABS5409

B.Tech. DEGREE EXAMINATION, JULY 2023.

Fourth Semester

CSE

PROBABILITY AND STATISTICS

(RU20 Regulations)

Time : 3 Hours

Max. Marks : 70

PART — A

Answer the following.

(10 × 2 = 20 Marks)

1. (a) Define sample and statistic.

(b) Write two measures of dispersion.

(c) Define equally like events.

(d) Show that $Var(ax) = a^r\, Var(ax)$.

(e) Define continuous random variable.

(f) Mean and variance of which distribution are equal? Mention them.

(g) Define statistical hypothesis.

(h) What are the criteria of a good estimator?

(i) Define F-distribution.

(j) Define Chi-Square for independence of attributes.

PART — B

(Answer ONE full question from each Unit; All questions carry equal marks)

(5 × 10 = 50 Marks)

UNIT – I

2. Explain various measures of central tendency with its merits and demerits. (10)

Or

3. Find rank correlation coefficient from the following data. (10)

Students	1	2	3	4	5	6	7	8	9
Statistics	35	55	45	50	35	45	29	52	45
Physics	65	70	40	70	45	50	52	46	58

Turn Over

4. (a) Write definitions of probability. (5)

(b) Two cards are drawn from a well shuffled pack of 52 cards. Find the probability that they are (i) Two aces (ii) A king and a queen (5)

Or

5. (a) State and prove Bay's theorem. (5)

(b) There are 3 urns contains the number of balls as follows: (5)

Urn I	2 Black	3 Red	1 White
Urn II	1 Black	1 Red	2 White
Urn III	5 Black	3 Red	4 White

Of these an Urn is selected at random and a red ball is drawn. Find that it is drawn from Urn II.

UNIT – III

6. Prove that Poisson distribution as a limiting case of Binomial distribution. (10)

Or

7. (a) Write the normal distribution with mean and variance properties. (5)

(b) In a normal distribution, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution? (5)

UNIT – IV

8. (a) Write the test procedure for single proportion. (5)

(b) In a sample of 1000 people in Maharashtra, 540 are rice eaters and the rest are wheat eaters. Can we assume that both rice and wheat are equally popular in Maharashtra at 1% level of significance? (5)

Or

9. (a) Explain the following terms: (5)

(i) Two types of errors

(ii) Level of Significance

(iii) Power of Test

(b) A random sample of size 50 has a standard deviation of 11.8 drawn from a normal population. Can we assume that the sample has been drawn from the population with standard deviation of 10? (5)

10. (a) A certain stimulus administered in each of the patients resulted in the following change in the blood pressure: (5)

5, 2, 8, –1, 3, 0, 6, -2, 1, 5, 0, 4.

Can it be concluded that the stimulus will increase the blood pressure.

(b) Write the properties of t-distribution. (5)

Or

11. (a) Explain the procedure of F-distribution. (5)

(b) In random samples of sizes 10 and 15, the unbiased estimators of variances are found to be 5 and 9 respectively. Can we reasonably conclude that the population variances are equal? (5)

—————

20APC0504T

B.Tech. DEGREE EXAMINATION, JULY 2023.

Fourth Semester

Computer Science and Engineering

DATABASE MANAGEMENT SYSTEMS

(RU 20 Regulations)

Time : 3 Hours

Max. Marks : 70

PART — A

(Compulsory Question)

Answer the following.   （10 × 2 = 20 Marks)

1.   (a)   Define data independence. How do you implement data independence in DBMS? Explain.

(b)   Briefly explain weak entity type.

(c)   Elaborate the importance of computing closure of functional dependencies.

(d)   Define decomposition.

(e)   Explain nested queries with examples.

(f)   Explain the following Operators in SQL with examples

(i) SOME

(ii) NOT IN.

(g)   Define join operation. Explain with an example.

(h)   Define Top-k Optimization.

(i)   Define durability and atomicity of a transaction.

(j)   What is transaction rollback?

PART — B

Answer ONE full Question from each Unit; All questions carry equal marks

(5 × 10 = 50 Marks)

UNIT-I

2.   Describe data models, database languages and database architecture in detail. (10)

Or

3.   (a)   Discuss the representation of total participation and multi valued attribute in an E/R diagram.

(5)

(b)   Construct an ER-Diagram for a hospital with a set of patients and set of medical doctors. Associated with each patient a log of the various tests and examinations conducted.

(5)

Turn Over

UNIT-II

4. Given Relation, R=(A,B,C,D,E,F,G) and Functional Dependencies F={ {A,B}→{C}, {A,C}→{B}, {A,D}→{E}, {B}→{D}, { B,C}→{A},{E}→{F}}. Check whether the following decomposition of R into R1=(A,B,C), R2=(A,C,D,E) and R3=(A,D,F) is satisfying the lossless Decomposition property. (10)

Or

5. What is relational algebra? List all the relational algebra operations. Explain Following operations: SELECT, PROJECTION, JOIN and DIVISION with examples. (10)

UNIT-III

6. Explain about Integrity Constraints with suitable examples. (10)

Or

7. (a) Differentiate between Procedural and Declarative Query languages with suitable example. (5)

(b) Explain various DML functions in SQL with examples. (5)

UNIT-IV

8. Discuss join operations in query processing with examples. (10)

Or

9. Discuss about Transformation of Relational Expressions in Query Optimization. (10)

UNIT-V

10. Consider the following schedule of three transactions (10)

T1: r1(X), w1(X); T2: w2(X); and T3: w3(X)

Schedule S: r1(X); w2(X); w1(X); w3(X);

Check whether the Schedule S is view equivalent to any serial schedule or not?

Give Justification to your answer with neat explanation.

Or

11. Write and discuss any two advanced recovery techniques and their uses. (10)

___

2

20APC0504T

20APC0505T

B.Tech. DEGREE EXAMINATION, JULY 2023.

Fourth Semester

Computer Science and Engineering

COMPUTER ORGANIZATION AND ARCHITECTURE

(RU20 Regulations)

Time : 3 Hours

Max. Marks : 70

PART — A

(Compulsory Question)

Answer the following. (10 × 2 = 20 Marks)

1. (a) Explain the advantages of a single vs multiple bus organization.

    (b) What is hardwired control?

    (c) Differentiate between strobe and handshake methods.

    (d) Brief out the types of ROM's.

    (e) Advantages of delayed branching.

    (f) Differentiate between write-through and write-back protocol.

    (g) Differentiate between minimum and maximum mode operation.

    (h) Define various instruction set of 8086 processor.

    (i) Differentiate between 8051 and 8086.

    (j) Brief out the various memory instructions used in 8051.

PART — B

Answer ONE full question from each unit; All questions carry equal marks.

(5 × 10 = 50 Marks)

UNIT – I

2. With neat sketch, Explain the execution of a complete instruction.

Or

3. Explain micro programmed control in detail.

Turn Over

UNIT – II

4. Explain various types of RAM's in detail.

Or

5. Explain about the DMA in detail.

UNIT – III

6. What is branching and how it is handled in a pipelined processor?

Or

7. Write about the following: (a) Array processor (b) organization of UMA and NUMA?

UNIT – IV

8. Explain the register organization in 8086.

Or

9. What is an interrupt and how interrupts are handled in 8086?

UNIT – V

10. Write about the following:
    (a) IO ports of 8051
    (b) Addressing modes of 8051

Or

11. Write about:
    (a) Memory organization
    (b) 8051 Architecture

_____

20APC0506T

B.Tech. DEGREE EXAMINATION, JULY 2023.

Fourth Semester

Computer Science and Engineering

OPERATING SYSTEMS

(RU 20 Regulations)

Time : 3 Hours

Max. Marks : 70

PART — A

Compulsory question

Answer the following.   (10 × 2 = 20 Marks)

1. (a) Difference between system software and application software.

 (b) Write process control system calls for windows and Linux.

 (c) What is meant by Critical section?

 (d) List process states with neat sketch.

 (e) Write a short note on swapping process in OS.

 (f) Difference between internal and external fragmentation.

 (g) How dead lock can be avoided?

 (h) What is Ostrich algorithm

 (i) What is cryptography?

 (j) Define Access matrix.

PART — B

Answer ONE full question from each Unit.   (5 × 10 = 50 Marks)

All questions carry equal marks.

UNIT – I

2. Define operating system. Explain operating system operations.   (10)

Or

3. Explain Device and file system calls in detail with examples.   (10)

Turn Over

UNIT – II

4. Discuss solution for dining philosophers' problem using monitors. (10)

Or

5. Explain about Readers writers' problem.

UNIT – III

6. (a) Discuss the need of page replacement in demand and paging. (10)

(b) Given page reference string with four frames:

1, 2, 3, 4, 2, 1, 5, 6, 2, 1, 2, 3, 7, 6, 3, 2, 1, 2, 3, 6

Compare the number of page faults for LRU, FIFO and optimal page replacement algorithm.

Or

7. Explain the concept of paging in memory management. (10)

UNIT – IV

8. Consider the following snapshot of a system with four processes (P1, P2, P3, P4) and three resources (A, B, C).Apply dead lock avoidance algorithm and show that the system is in safe or not and give the order of execution of processes. (10)

Pro cess	Allocation			Max			Available		
	A	B	C	A	B	C	A	B	C
P1	0	1	0	7	5	3	3	3	2
P2	2	0	0	3	2	2			
P3	4	0	1	9	0	4			
P4	2	1	1	2	2	2			

Or

9. Explain about File system structure in detail with suitable figures. (10)

UNIT – V

10. Explain principles and domain of protection in detail. (10)

Or

11. Explain about computer security classification. (10)

———

20APC0506T

20APC0507T

B.Tech. DEGREE EXAMINATION, JULY 2023.

Fourth Semester

Computer Science and Engineering

COMPUTER NETWORKS

(RU20 Regulations)

Time : 3 Hours   Max. Marks : 70

PART — A

(Compulsory Question)

Answer the following.   **(10 × 2 = 20 Marks)**

1. (a) Define Internet.

    (b) Write a short note on history of computer networking.

    (c) Write a short note on HTTP.

    (d) What is Internet's Directory service.

    (e) What are the principles of Reliable Data transfer.

    (f) Write a short note on connection-oriented service.

    (g) Write a short note on Routing on the Internet.

    (h) What is virtual circuit network and explain with example.

    (i) What is Error Detection. List out the types.

    (j) Give a brief note network virtualization.

PART — B

Answer ONE full question from each unit; All question carry equal marks.

(5 × 10 = 50 Marks)

UNIT – I

2. Explain in detail about Network core and network edge with neat sketch.

Or

3. Explain in detail about TC Players with a neat sketch in detail.

Turn Over

4. Explain in detail about electronic mail.

Or

5. Explain in detail about FTP protocol with its functionalities.

UNIT – III

6. Explain about various congestion control algorithms.

Or

7. Explain in detail about FDM multiplexing technique.

UNIT – IV

8. Define Routing? Explain Shortest path routing algorithm with example.

Or

9. Explain about Broadcast routing algorithm with example.

UNIT – V

10. Give a brief note Hamming distance error correction method with example.

Or

11. Explain about Retrospective : A Day in the Life of a Web Page Request.

———

20APC0507T