

B.Tech. (CSE/IT) – 5th Sem
SOFTWARE ENGINEERING
ACCS-16504

Time: 03 Hours

Maximum Marks: 60

Instructions to Candidate:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

($10 \times 2 = 20$)

Q1)

- i) Differentiate between functional and non-functional requirements.
- ii) What do you mean by software reuse?
- iii) Write the formulae used for effort estimation by basic COCOMO model.
- iv) Describe the term project planning and control in brief.
- v) Describe in brief about the term function-oriented software design.
- vi) What is the difference between software and a program?
- vii) Differentiate between coupling and cohesion.
- viii) What do you understand by Software Configuration Management?
- ix) Differentiate between white-box and black-box testing.
- x) Differentiate Error, Fault and Failure.

Section – B

($4 \times 5 = 20$)

- Q2) What do you understand by Software Quality Assurance? Also discuss the steps needed for Quality Assurance.
- Q3) Discuss project scheduling using PERT and GANTT charts with the help of suitable example.

- Q4)** What are software components? How software repositories are helpful in developing Software?
- Q5)** Differentiate between Six Sigma, ISO, and SEI-CMMI approach for software quality.
- Q6)** What are the different types of software maintenance that a software product might need? Explain the different maintenance process model used.

Section – C

($2 \times 10 = 20$)

- Q7)** Draw DFD of level 0 and level 1, class diagram for the following problem:
“Guest can reserve rooms in a hotel in advance or on the spot depending upon the availability. The operator would add data pertaining to the guests such as name, arrival time, balance paid and type of room (AC, non AC, Deluxe and suit). The SW should uniquely assign a token number on allotment of room. The hotel catering services manager would input the quantity and type of food items as and when consumed by guests along with token number of the guest and corresponding date and time”
- Q8)** a) Explain basic COCOMO model in detail.
b) Assume that the size of an organic type software product has been estimated to be 32,000 lines of source code. Assume that the average salary of software engineers be Rs. 15,000/- per month. Determine the effort required to develop the software product and the nominal development time.
- Q9)** Explain the following Software life cycle models in detail:
a) Prototyping Model
b) Spiral Model

Total No. of Questions: 09

Total Marks:

**B.Tech. (CSE/IT) – V Sem
Big Data Analytics
ACCS – 16503**

Maximum Marks: 60

Time: 03 Hours

Instructions to candidates:

- 1) Attempt all the questions from Section A
- 2) Attempt any four questions from Section B.
- 3) Attempt any two questions from Section C.

Section – A

(10 × 2 = 20)

Q1)

- a) Define Hadoop and list its Ecosystem components.
- b) Explain replication in HDFS. Write the syntax for setrep command in HDFS.
- c) Why is the block size very large in HDFS as compared to the traditional file system?
- d) Explain how does Apache Pig use Hadoop GLOBS in a load statement?
- e) List and explain the complex data types in Apache Pig along with examples.
- f) Explain the various daemons associated with data storage and data processing in Hadoop. Write the commands to start and stop them.
- g) Explain the load and foreach operator in Apache Pig. Write examples for each..
- h) Differentiate between run and exec commands in Apache Pig. Write syntax also.
- i) Explain safemode in HDFS. What are the reasons for a namenode to enter safemode?
- j) Explain the purpose of “sample” and “rank” commands in Apache Pig. Give suitable examples.

Section – B

(4 × 5 = 20)

- Q2) Explain, in detail, the architecture of HDFS with the help of a suitable diagram.
- Q3) Explain the following joins in Apache Pig: (i) Inner (ii) Outer (iii) Self. Write suitable examples.
- Q4) Explain the read and write operations in HDFS. Draw a suitable diagram for each.
- Q5) Explain along with purpose, syntax, various switches and outputs, the following HDFS commands:

- (a) stat (b) put (c) rm (d) fsck

Q6) Write a Pig script to analyse a text file "hamlet.txt" and find the most occurred start letter in all the words present in the file. Eg. If the file contains following text: "Hi good evening. Hope you are good. Have a blast", the output should be (H,3).

Section - C

Q7) (a) Draw a neat diagram and explain in detail the architecture of Apache Pig. (10 x 2 = 20)
(b) Explain in detail NoSQL databases.

Q8) Explain the following functions in Pig: (a) GetWeekYear() (b) BagToString() (c)ToDate()
(d) TOKENIZE() (e) AddDuration(). Take suitable examples and show outputs.

Q9) Consider the movies dataset(movies.csv), which has details like serial number, movie name, date of release, rating and runtime(in seconds). A sample of the dataset looks like:

1. 1, The nightmare before Christmas, 1993-03-11, 3.9, 4568
2. 2, The mummy, 1932-09-23, 3.5, 4388

Write the answers to the following queries:

- (a) Assume a suitable schema for this file and load this file in the root of HDFS in a folder "ACET".
- (b) List all the movie names and release date for the movies which contain the string "wild" and "west" in their names, rating is null and release year is not between 1940 and 1955.
- (c) Count the number of movies released in the 25th week of the year 1956 with a rating of more than 4 and movie names ending with "S".
- (d) Rank the movies in a continuous manner. Ranking should be based on the release year in ascending order.
- (e) Create a relation which limits the number of movies to 1000 and a rating of more than 3.

**B. Tech (CSE-1/2) – 5th Semester
ACCS-16505 INFORMATION SECURITY
TEST-1**

Time: 2 hours**Maximum Marks: 30****Instruction to Candidates:**

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section – A**(5 × 2 = 10)****Q1)**

- i. List the different security services of X.800.
- ii. Elaborate the various techniques used in steganography.
- iii. Explain Euler's Theorem with different cases.
- iv. Discuss BLOWFISH cipher with diagram.
- v. Convert the plaintext "ATTACK FROM MIDDLE EAST" to cipher text using key "PISTOL" with Vigenere cipher.

Section – B**(2 × 5 = 10)**

Q2) Explain, how key generation, encryption & decryption takes place in RSA algorithm taking $p=3$, $q=5$ and $M=6$.

Q3) Explain the key distribution scenario between Initiator S & Responder R with diagram. Also, list the major issues in KDC.

Q4) Differentiate between the following:-

- a) Link encryption & End to End encryption.
- b) Stream Cipher v/s Block Cipher

Section – C**(1 × 10 = 10)**

Q5) Discuss the following:-

- a) Triple DES.
- b) Vernam Cipher with example.

Q6) Explain, how 64 bits of plaintext will be converted to 64 bits of cipher text when value of round=1 and key size=64 bits in DES algorithm. Also, explain the concept of round function & S box with diagram.

B.Tech. (CSE) – Sem 5th

SUBJECT NAME: Design and Analysis of Algorithms

ACCS-16592

MST2

Maximum Marks: 30

Instructions to Candidates:

- 1) Section-A contains FIVE questions. All questions are compulsory.
- 2) Section-B . Attempt any TWO questions.
- 3) Section-C. Attempt any ONE question.

Section - A $(5 \times 2 = 10)$ **Q1.**

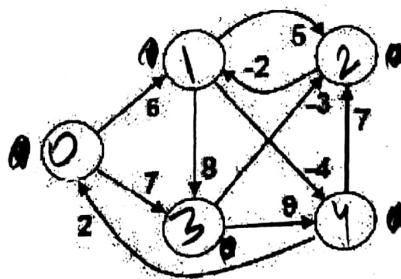
- i) Define Minimum spanning tree.
- ii) Define term chromatic number.
- iii) Explain steps involved in greedy strategy.
- iv) Define spurious hit in pattern matching
- v) What is backtracking? How does it helps in solving problem?

Section -B $(2 \times 5 = 10)$

Q2. Solve the following knapsack using Greedy strategy taking all possible Criteria. $W=30$

Item	Weight	Value
1.	5	50
2.	20	140
3.	10	60
4.	12	60

Q3. Explain the working fundamental of Bellman Ford algorithm? Write the algorithm for bellman ford and using that algorithm solve the following graph.

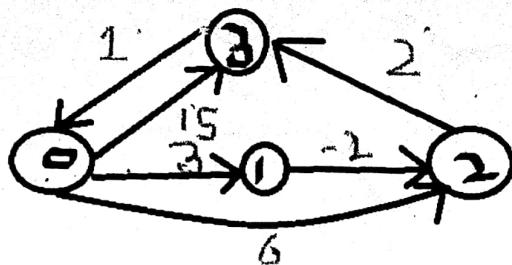


Q4. Give you knowledge about P and NP class of problems? Explain in detail.

SECTION-C

(1 × 10 = 10)

Q5. Write Floyd Warshall algorithm and Explain the concept using following graph.



Q6. Explain knuth morris pratt in detail with example and algorithm.

SUBJECT NAME: Design and Analysis of Algorithms

ACCS-16502

Time: 2 Hours

Maximum Marks: 30

Instructions to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section- A

(5 × 2 = 10)

Q1)

- i) Define optimal substructure and overlapping sub problems.
- ii) Find the Longest common subsequence in the following 2 sequences using dynamic programming
 $A = A, D, C, B, A, C, D, A, B, D$ $B = A, B, D, B, A, A.$
- iii) Find Theta notation(Θ) for
 - a. $f(n)=3n^4+5n+7$
 - b. $f(n)=4n^2+15n+7$
- iv) When does the worst case of quick sort occur?
- v) Write the Algorithm of Insertion Sort, Also do the analysis.

Section-B

(2 × 5 = 10)

- Q2)** Explain the concept of asymptotic notations using suitable graphs and mathematical representations.
- Q3)** Differentiate between quick sort and randomized quick sort. Why there is need of Randomized Quicksort? Justify your answer with suitable algorithm
- Q4)** Write a recursive algorithm for merge sort along with subalgorithms using Divide and Conquer Strategy. Sort the following elements using merge sort [310, 285, 179, 652, 421, 323, 861, 256, 450, 520]. Also give the complexity analysis of merge sort.

Section -C

($1 \times 10 = 10$)

- Q5) Given 4 Matrices with following dimension A=5X6, B=6X2, C=2X4, D=4X2. Optimally parenthesize this chain using dynamic programming. Construct all the necessary tables.
- Q6) Explain Heapsort algorithm with all the sub algorithms and do its analysis for all cases
Consider the following elements 20,10,5,4,25,70,60,40.

B.Tech. (CSE) – 5THSem
DESIGN AND ANALYSIS OF ALGORITHMS
ACCS-16502

Time: 03 Hours

Maximum Marks: 60

Instructions to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

(10 × 2 = 20)

Q1)

- i. Give differences between Bellmen ford and Dijkstra algorithms?
- ii. Define optimal substructure problem?
- iii. State valid shift with reference to string matching.
- iv. Give complexity of quick sort and why it called quicksort.
- v. Give example of NP complete problem.
- vi. Name variants of shortest path problem.
- vii. Define optimal substructure problem?
- viii. What is MST?
- ix. Give the complexity of heapsort.
- x. Give steps for achieving greedy algorithms.

Section – B

(4 × 5 = 20)

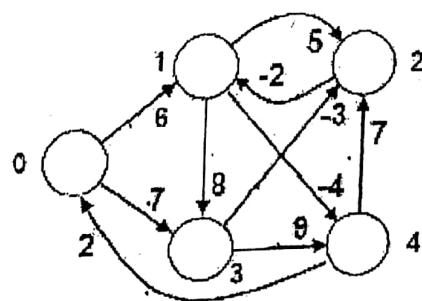
- Q2**) Explain the concept of asymptotic notations using suitable graphs and mathematical representations.
- Q3**) Explain Naïve and brute force algorithms with examples
- Q4**) Find Theta notation(Θ) for
- $f(n)=3n^4+5n+7$
 - $f(n)=4n^2+15n+7$
- Q5**) Differentiate between NP hard and NP complete problems.
- Q6**) Solve the following fractional knapsack using Greedy strategy taking all possible criteria. $W=30$

Item	Weight	Value
1.	5	50
2.	20	140
3.	10	60
4.	12	60

Section – C

(2 × 10 = 20)

- Q7**) Compute the optimal cost and find an optimal parenthesization of matrix chain product.
Whose sequence of dimensions is :
[30, 35, 15, 5, 10]
- Q8**) Explain Heapsort algorithm with all the sub algorithms and do its analysis for all cases
Consider the following elements 20,10,5,4,25,70,60,40.
- Q9**) What is the working fundamental of Bellman Ford algorithm? Write the algorithm for bellman ford and using that algorithm solve the following graph.



**B.Tech. (CSE/IT) -5th Sem
PROGRAMMING IN JAVA
ACCS-16501**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

(10 × 2 = 20)

Q1)

- i) How a thread is similar to a program?
- ii) Write any two methods of String Buffer class.
- iii) Define garbage collection.
- iv) Differentiate between interface and abstract class.
- v) List four features of java Language.
- vi) Give complete meaning of statement "public static void main(String arg[])".
- vii) Interfaces are able to extend more than one Interface but a Class can't extend more than one Class" - Why?
- viii) Why do we need socket programming?
- ix) Define dynamic dispatch method.
- x) JVM is a platform dependent (T/F). Justify your answer.

Section – B

(4 × 5 = 20)

Q2) What is an Applet? How applets are different from standalone java application program?

Discuss.

Q3) Write a program to implement the Fibonacci series using for loop control structure.

Q4) Explain Multithreading .How java implements its thread model?

Q5) Write programs to demonstrate the difference between method overloading and method overriding in java.

Q6) Explain the try-catch structure. Is it compulsory for a Try Block to be followed by a Catch block in Java for Exception handling? Differentiate between throw and throws/

Section - C

(2 × 10 = 20)

Q7) a) Differentiate between Alive () and join () with help of the program.

b) Explain the various steps of JDBC with the help of program.

Q8) a) Define inheritance. Demonstrate the use of super keyword in inheritance with the help of example.

b) Write a program that prints the difference between the largest and smallest element in an array.

Q9) a) Explain the details that make java the most popular, preferable language over the years.

b) Differentiate between final, finalize and finally.

**AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR
(AUTONOMOUS COLLEGE)**

Roll No.
Total No. of Questions: 06

Total No. of Pages: 01

**B.Tech. (CSE/IT) -5th Sem
PROGRAMMING IN JAVA
ACCS-16501**

Time: 02 Hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Q1)

Section - A

(5 × 2 = 10)

- i) By which method we can change the name of thread?
- ii) Define Inter thread communication.
- iii) If one java program contain two classes using the concept of multithreading, then if we write run () instead of start () in the program code .What will happen then?
- iv) What is the length of application box made by the following java program?

```
import java.awt.*;
import java.applet.*;
public class myapplet extends Applet{
    graphic g; g.drawString("A simple applet",20,20);}
```
- v) Why we use the adapter classes in java? Write the syntax.

Section -- B

(2 × 5 = 10)

Q2) Explain any five types of layout managers with program code.

Q3) Write down the steps and program to connect Frontend java with Backend Database(SQL).

Q4) Write a Java program for client/server interaction by using sockets.

Section - C

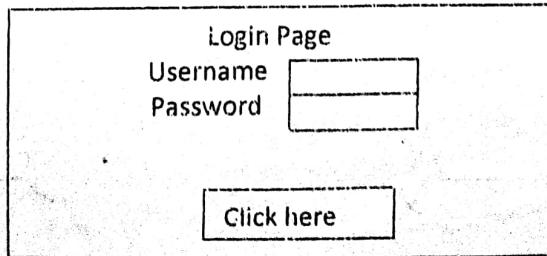
(1 × 10 = 10)

Q5) a) What is an applet? Which method is used to output a String in an applet? Explain the life cycle of an applet? Write a program code to display some text in application box and to run java file instead of html file.

b) Define Multithreading .Write the program code for different ways of multithreading .Which way of multithreading is better and why?

Q6) a) When we need to synchronized the code of a program? What are the advantages and disadvantages of synchronization? Explain the concept with help of program code.

b) Write a java program for following image and implement event listener on click here button.



Time: 2 hours

**B. Tech (CSE-1/2) – 5th Semester
ACCS-16505 INFORMATION SECURITY
TEST-2 (NOV-2019)**

Total No. of Pages: 01

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section – A

(5 × 2 = 10)

Q1)

- i. List the various alert codes of TLS.
- ii. Why we use the concept of firewall.
- iii. Explain different types of intruders. *Malware*
- iv. Differentiate between Transport & Tunnel mode of IPSec.
- v. Explain the process used in MD5 algorithm.

Section – B

(2 × 5 = 10)

Q2) Explain X.509 certificate in detail.

Q3) Elaborate Header format of AH protocol with diagram.

Q4) Discuss Kerberos 4 authentication dialogue with diagram.

Section – C

(1 × 10 = 10)

Q5) i) What do you mean by malware? Explain different types of malicious software.

ii) Explain Message Authentication code with diagram. How confidentiality is achieved in MAC?

Q6) i) Discuss Record protocol in SSL with diagram. Also, explain how MAC is calculated?

ii) What are the various services provided by SET? Explain the concept of dual signature.

B.Tech (CSE/IT) -5th Sem
SOFTWARE ENGINEERING (ACCS-16504)
Sessional-1

Time: 2 hrs

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section-A

(5 × 2 = 10)

- Q1.
- i. Differentiate between functional and non-functional requirements.
 - ii. Draw use case diagram for online shopping system.
 - iii. "A software engineer must design the modules with goal of high cohesion and low coupling." Is the above statement true or not? Justify your answer.
 - iv. Differentiate between object oriented and function oriented design?
 - v. Assume that the size of an Semi-detached type software product has been estimated to be 52 kilo lines of source code. Assume that average salary of software engineers are Rs. 24,000 per month. Determine the effort required to develop the software product and the nominal development time.

Section-B

(2 × 5 = 10)

- Q2. Describe software size metrics. How is function point metric advantageous over LOC metric? ↗
- Q3. How Spiral Model is different from other models? Why it is considered as the Meta model. ↗
- Q4. Draw a context diagram and a level-I DFD for Student Management System. Consider suitable data to complete the description.

Section-C

(1 × 10 = 10)

- Q5 Define Unified Modeling Language. Draw the Class Diagram, Sequence diagram, Collaboration diagram, Activity diagram and State Chart Diagram for ATM Transaction System.
- Q6. Explain COCOMO Model in detail.
- 

B.Tech (CSE/IT) -5thSem
SOFTWARE ENGINEERING (ACCS-16504)
Sessional-2

Total No. of Pages: 02

Time: 2hrs

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section-A

Q1.

- i. Define test drivers and test stubs. Why they are required? $(5 \times 2 = 10)$
- ii. Differentiate between verification and validation.
- iii. Give different types of maintenance that a software product might need. Why is such maintenance required?
- iv. Define the terms reverse engineering and reengineering.
- v. What is the availability of software having Mean time between failure= 40days and mean time to repair= 9hours?

Section-B

$(2 \times 5 = 10)$

Q2. Explain the features of ISO 9000 model. Compare ISO 9000 and CMM model. Specify advantages and disadvantages of these models.

Q3. Define the term: testing. Explain different types of testing techniques in detail.

Q4. a) Draw control flow graph and calculate cyclomatic complexity of given problem (3)

```
1. if(x == 1) {  
2.   if(y == 1) {  
3.     print('HAPPY ');  
4.   } else {  
5.     print('SAD');  
6.   }  
7. }  
8. print ('END')
```

b) List the problems you would face if you were developing several versions of the same product according to a client's request, and you were not using any configuration management tools. (2)

Roll No.

Total No. of Questions: 06

Total No. of Pages: 01

B.Tech. (CSE) -5thSem

PROGRAMMING IN JAVA (ACCS-501)

SESSIONAL-1

Time: 2 hrs

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section-A

(5 × 2 = 10)

Q1.

- i) Give output and justify your answer

```
public class Test
{
    public static void main(String[] args)
    {
        System.out.print("Y" + "O");
        System.out.print('L' + 'O');
    }
}
```

- ii) Differentiate between string, string buffer and string builder with the help of an example.

- iii) How java is platform independent language?

- iv) Give output and justify your answer

```
Class Test {
    public static void main(String[] args) {
        for (int i = 0; i < 1; i++) {
            System.out.println("Hello");
            break;
        }
    }
}
```

- v) Give output and justify your answer

```
public class A {
    public static void main(String[] args)
    {
        if(true)
            break; } }
```

Section - B

- (2 × 5 = 10)
Q2. Define usage of final, finally and finalize with the help of an example. Is there any way to skip finally block of exception even if some exception occurs in the exception block?
- Q3. How we can create a package in Java? What are the different methods for importing packages in Java? Explain with the help of a program. Does importing a package import its sub-packages as well in Java?
- Q4. Differentiate between the terms method overloading and method overriding. Can we override static method? Explain with the help of example.

Section C

(1 × 10 = 10)

- Q5. (a) How the exceptions are handled in Java? Give difference between checked and unchecked exceptions. There are three statements in a try block – statement1, statement2 and statement3. After that there is a catch block to catch the exceptions occurred in the try block. Assume that exception has occurred in statement2. Does statement3 get executed or not? (6)
(b) Explain architecture of JVM. (4)
- Q6. (a) Define Abstract Class. Can we use final and abstract keyword at a time? Justify your answer. Can abstract class implements interface in Java? Does it require to implement all methods of an interface? (6)
(b) Give difference between super and this keyword. Can you use this () and super () both in a constructor? (4)

Roll No.

AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR
(AUTONOMOUS COLLEGE)

Total No. of Questions: 03

Total No. of Pages: 01

B.Tech. (CSE-4) - 3rd Sem.

OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: ACCS-16302

Part-IV

Time: 01 Hour

Maximum Marks: 24

Instructions to Candidate:

- 1) Section-A and B is Compulsory.

Section A

(6 * 2 = 12)

Q1)

- What is the use of pure virtual function? ✓
- When we use sizeof operator? *abstract class*
- What is the use of pure virtual function? ✓
- Write down the syntax for class templates. ✓
- How we can use virtual destructor? ✓
- What do you mean by generic programming? ✓

Section - B

(2 * 6 = 12)

Q2) Discuss about various file opening modes in C++. Write a program to write the content into a file and then read the same using file handling in C++.

Q3) a. Write a program to overload the '+' operator.

b. Write a program to demonstrate the operation of static binding of the member function of the class.

book * p1
p1-> disp
p1-> obj

size of (char *)

Instruction to Candidates:

- 1) Section-A: All questions are compulsory.
- 2) Section B: Attempt any two questions.
- 3) Section C: Attempt any one question.

Section A

(5*2=10)

- 1.
- (a) Explain Big data and its application areas.
 - (b) Explain heartbeats, block reports and rereplication.
 - (c) Explain the various HDFS & YARN daemons and the commands to start & stop them.
 - (d) Write commands to transfer a file "cse5.txt" from the local file system to HDFS and set its replication factor to 5.
 - (e) Explain the du command in HDFS along with its switches. Give examples.

Section B

(2*5=10)

2. Explain safemode of HDFS in detail. What are the conditions in which safemode is activated. Also write dfsadmin commands associated with it.
3. Explain the Ecosystem of Hadoop in detail. Draw a suitable diagram also.
4. Explain in detail NoSQL databases.

Section – C

(1*10=10)

5. Explain the architecture of HDFS. Also explain replica placement policy of HDFS. Draw relevant diagrams.
6. Write HDFS commands for the following scenarios and also show the relevant outputs:
 - ✓ Create a file "xyz.txt" in the local file system. List the file in detail.
 - ✓ Create a directory "ACET" in HDFS root.
 - ✓ Transfer the file "xyz.txt" to the "ACET" folder without using the put command.
 - ✓ Change the permissions of this file so that only the owner and the group have full access to it.
 - ✓ Remove the file "xyz.txt" from the "ACET" directory.
 - ✓ Check whether this file "xyz.txt" is now present in the trash.

Instructions to Candidates:

- 1) Section-A: All questions are compulsory.
- 2) Section B: Attempt any two questions.
- 3) Section C: Attempt any one question.

Section A

(5*2=10)

1.
 - (a) Differentiate between Pig and SQL.
 - (b) Explain the following Pig operators: (i) store (ii) sample. Take suitable examples.
 - (c) Explain the complex data types in Pig. Take suitable examples.
 - (d) Differentiate between COUNT () and COUNT_STAR () by taking a suitable example.
 - (e) Differentiate between group and co group operator in Pig. Take suitable examples.

Section B

(2*5=10)

2. Consider a text file “abc.txt”. Write a Pig script to find the most occurred start letter from this file. For example, if the file contains the following text “Hello. How are you? How is work? How are you doing?”, your output should be (o, 7).
3. Explain the various joins in Pig. Write their syntax and suitable examples.
4. Explain the architecture of Pig in detail. Draw a suitable diagram.

Section – C

(1*10=10)

5. Explain the following Pig functions by writing their purpose, syntax, example and output:
(a) INDEXOF() (b) REPLACE() (c) TOKENIZE() (d)ToDate() (e) DaysBetween()
6. Consider a dataset (mov.csv) which has details like serial number, movie name, release date, rating and runtime (in seconds). Copy this file into the root of HDFS. Load this file into a relation and assign a suitable schema to it.

A sample of the dataset is as follows:

- 1, The Nightmare Before Christmas,11-09-1993, 3.9, 4568
- 2, The Mummy, 10-10-1932, 3.5, 4388
- 3, Orphans of the Storm, 08-11-1921, 3.2, 9062

Using the above dataset write answers for the following queries:

- (a) Display the movie names and release year of all movies released before 1985 which do not have a null in the rating and duration is less than 1 hour
- (b) Display the movie names and rating of all movies in which movie name contains the word “west” or the word “wild” which have a null rating and released in the month of September.
- (c) Split this dataset into three relations, one containing movie data with rating <3.5, another with movie data containing rating>=3.5 but less than 4.0 and remaining in the third relation. Store all these relations in the root of HDFS.
- (d) Display the average duration of all the movies released in 10th week of a year.

B.Tech. (CSE) IV Semester
COMPUTER NETWORKS (ACCS-16403)
Sessional Test 1

Max Time: 02:00 hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A: All questions are compulsory.
- 2) Section B: Attempt any two questions.
- 3) Section C: Attempt any one question.

Section A

(5*2=10)

1.

- a. Which switching method uses store and forward technique ? Explain.
- b. A spectrum has a range of frequencies 100Hz,200Hz,300Hz,500Hz. Calculate its bandwidth
- c. Explain terms attenuation, jitter, noise, distortion.
- d. Explain Term Shannon Capacity . calculate it if the bandwidth is 200 and S/N is 28db
- e. Draw the Differential Manchester encoding waveform for 1011001101.

$$t = b_2 \times (1 + \sin(\omega t))$$

Section B

(2*5=10)

2. Explain CRC and Checksum methods for Error detection with a suitable example.
3. Explain IEEE 802.3 network with its frame format .
4. Explain multiplexing. Why do we use it ? Explain all of its types with suitable diagrams.

Section - C

(1*10=10)

5. Explain OSI Reference Model in detail with functions of each layer.
6. Explain all Error Control Methods with diagram for each.

Second Year Semester
COMPUTER NETWORKS (ACCS-16403)
Sessional Test 2

Max Time: 02:00 hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A: All questions are compulsory.
- 2) Section-B: Attempt any two questions.
- 3) Section-C: Attempt any one question.

Section A

(5*2=10)

1.

- a. Explain 6 flags of TCP frame format.
- b. Explain Denial of service attack in computer networks.
- c. Differentiate between HTTP and HTTPS
- d. Classify the following IP addresses . find their NetID and HostID for each.
 - 192.168.2.14
 - 126.0.2.24
 - 218.1.1.26

C - 3 1 / H
B - 2 / X
- e. Differentiate between IPV4 and IPV6 ip addressing techniques.

Section B

(2*5=10)

2. Explain Classful and Classless IP Addressing in detail with example for each.
3. Explain all Routing Algorithms in detail with functioning of each algorithm.
4. Explain IP Packet format with all its fields.

Section -- C

(1*10=10)

5. Explain Congestion control algorithms in detail with functioning of each method.
Explain 802.11 Architecture in detail with all of its versions.

No. of Questions: 06

**B.Tech. (CSE/IT)– 4th Sem
Relational Database Management System
ACCS-16405**

Time: 02 Hours

Instruction to Candidates:

M.Marks: 30

- 1) Section-A contains Five questions. All questions are compulsory.

- 2) Section-B contains Three questions. Attempt any Two questions.

- 3) Section-C contains Two questions. Attempt any One question.

Section - A (5 × 2 = 10)

- i) Briefly explain types of locks.

- ii) Give the significance of view. Give syntax of CREATE VIEW.

- iii) Define Dirty Read problem. Give example.

- iv) Differentiate between 3NF and BCNF

- v) Give the usage of triggers.

Section – B(2 × 5 = 10)

- Q5) Explain following w.r.t Concurrency:

- a. 2PL

- b. Starvation and its solution

- Q6) Explain any two:

- a. Log based recovery

- b. Distributed databases

- c. Shadow paging

- Q2) Create a cursor to display name and salary of top four employees according to their salary from emp table.
- Q3) List various threats to the data. Also give their counter measures.

S.NO.	NAME	COUR SE	SUB #	SUBNA ME	TEACHER	ROOM	Normal Form:	
							RESULT	MARKS
1507	PANKAJ	COMP	100	CS1	ANURAG	10	PASS	30
2101	SHWETA	ACCT	300	SP	KAPIL	16	COMPT	30
			100	CS1	ANURAG	10	PASS	30
3562	RANJIT	COMP	400	CS2	ANURAG	10	PASS	30
			450	CO	KAPIL	16	COMPT	30
1942	GAGAN	COMP	325	BF	SUMIT	38	PASS	30
			400	CS2	ANURAG	10	FAIL	30
			450	CO	KAPIL	16	FAIL	30
			300	SP	ANURAG	10	PASS	30
			20	DBSW	KAPIL	16	PASS	30
			0					30

**AMRITSAR COLLEGE OF ENGINEERING AND
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Roll No.

Total No. of Questions: 06

Total No. of Pages: 01

B.Tech. (CSE/IT) - 4th Sem

RELATIONAL DATABASE MANAGEMENT SYSTEM

ACCS-16405

Maximum Marks: 30

Time: 2 Hours

Instructions to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one question.

Section-A

Q1. What is the use of check constraint? Give example. (5 × 2 = 10)

Q2. Differentiate between strong and weak entity. Give their symbols also.

Q3. What are the main functions of a DBA?

Q4. Write complete syntax of select statement with example.

Q5. Explain DDL, DML & DCL.

Section-B

Q2. Elaborate the 3-level architecture of a DBMS along with the components involved: Create and Mapping.

Q3. Define joins. Explain different types of joins with example.

Q4. List significant differences between a file-processing system and a Database system.

Section-C

(1 × 10 = 10)

Q5. Define term data model. Differentiate between Hierarchical, Network data model and relational data model along with their advantages and disadvantages. Given structure of relation emp:-

e_id	e_name	sal	dept_id	dept_name	Dob

a) Write the sql command:

i. To create above table with e_id as primary key (named as pk).

ii. To display the number of employees in each department.

iii. To display sum of salary of all employees as Total_salary.

iv. To display the name of employees who were born in the month of March

v. To display the id of employee with second highest salary.

b) Draw the ER diagram of university system comprising of student, teacher, department and course. Each student belongs to only one department.

Department can have any no. of courses but one course can be registered in only one department. The teacher can be employed in only one department but department can have any no. of teachers. Each department has one head. A course can be taught by only one teacher but a teacher can teach any number of courses. A student can be enrolled in many courses and a course can have many students.



**AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR
(AUTONOMOUS COLLEGE)**

**Roll No.
Total No. of Questions: 09**

Total No. of Pages: 02

**B.Tech. (CSE/IT) – 4th Sem
RELATIONAL DATABASE MANAGEMENT SYSTEM
ACCS-16405**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

(10 × 2 = 20)

Q1)

- i) What do you mean by cardinality and degree of a relation?
- ii) What are the various types of transaction failures that may occur in a system ?
- iii) What is the output of the following query?
`SELECT TRUNC(1234.5678,-2) FROM DUAL;`
- iv) What are the various threats to a database ?
- v) What is Fully Functional dependency?
- vi) Differentiate between File System and DBMS approach.
- vii) Name Relational Algebra Operators.
- viii) If R1 is a relation with 6 rows and R2 is a relation with 2 rows, how many rows will the Cartesian Product of R1 and R2 have ?
- ix) Explain referential integrity constraint with an example.
- x) Write syntax for trigger creation.

Section – B

(4 × 5 = 20)

- Q2) What do you mean by transaction? Explain ACID properties of a transaction.**
- Q3) Explain various Recovery Techniques in detail with example.**
- Q4) Draw and explain the three level architecture of the database system .**
- Q5) What are locks ? Discuss locking techniques for concurrency control in detail.**
- Q6) Write a PL/SQL program to display the employee information of a given department number using explicit cursor.**

Section – C

(2 × 10 = 20)

- Q7) What is normalization? Discuss various normal forms with the help of example. Also differentiate 3NF and BCNF.**
- Q8) Write the following:**
 - a) **Serializability of Schedules**
 - b) **Distributed Database**
- Q9) Consider the following relational database and give an expression in SQL to express each of the following queries :**
employee (employee-name, street, city)
works (employee-name, company-name, salary)
company (company-name, city)
managers (employee-name, manager-name).
 - (a) Find the name of all employees uniquely who work for ABC Company .
 - (b) Find the names of all employees who live in the same cities as the companies for which they work.
 - (c) Find the names of all employees who earn more than the average salary of all employees of their company.
 - (d) Find the name of all employees who do not work for ABC Company but earn more than \$10000 per annum.
 - (e) Find name of all employees whose name starts from S.

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Roll No.

No.ofQuestions:08

Total pages:01

**B.Tech(CSE) -3thSem
COALP- TEST-2
ACCS-16303**

Time: 75mins

Maximum Marks: 24

Instructions to Candidates:

- 1) Section-A contains six questions. All questions are compulsory.
- 2) Section-B contains two questions. All questions are compulsory..

Section-A

Q1)

(6 × 2 = 12)

- i. What are 2-address and 3-address instructions? Give example.
- ii. What is asynchronous data transfer? Explain its types.
- iii. What is subroutine call and PSW?
- iv. What is hardware and software interrupts? Give examples.
- v. What is RISC and CISC?
- vi. Explain various types of addressing modes.

Section-B

(2 × 6 = 12)

- ~~Q2)~~ Explain the concept of Stack organization. Also state its implementations using register and memory

- ~~Q3.~~ Explain the various modes that are used to transfer data between peripherals, CPU and memory.

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3rd Test

CSE - 3rd Sem.

Section - A

(i) Attempt all questions from Section - A and B.

Q(1)

- i) Define Binomial Distribution.
- ii) Define Normal Distribution.
- iii) Define Critical region.
- iv) Six Dice are thrown 729 times. How many times do you expect at least three dice to show a five or six?
- v) Six coins are tossed 6400 times. Using Poisson distribution, determine the approximate probability of getting six heads \times times
- vi) Define Chi - square test.

Section - B

(2 x 6 = 12)

- Q2) The height of 6 randomly chosen sailors are in inches are 63, 65, 68, 70, 71 and 72. Those of 9 randomly chosen are 61, 62, 65, 66, 69, 70, 71, 72 and 73. Test whether the sailors are on the average taller than soldiers.
- Q3) In a normal distribution, 31% items are under $x = 45$ and 1% items are over $x = 64$. Find the mean and standard deviation of the distribution.

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Roll No.

No.ofQuestions:08

Total pages:01

B.Tech(CSE-1) -3thSem

COALP- TEST-3

ACCS-16303

Time: 75mins

Maximum Marks: 24

Instructions to Candidates:

- 3) Section-A contains six questions. All questions are compulsory.
- 4) Section-B contains two questions. All questions are compulsory..

Section-A

(6 × 2 = 12)

Q1)

*Part A
Part C*

- i. What is Page fault?
- ii. What do you mean by pipelining? Discuss its types.
- iii. Explain the concept of I/O processor.
- iv. What do you mean by Associative memory?
- v. Explain the memory hierarchy giving features of each level.
- vi. What is Instruction pipelining?

Section-B

(2 × 6 = 12)

Q2. Explain the concept of Virtual memory. Also state its advantages as well as problems associated with it.

Q3. Explain the features of cache memory. Also discuss various mapping techniques used for accessing it.

Time: 02 Hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section - A is **Compulsory**.
- 2) Attempt any **Two** questions from Section - B.
- 3) Attempt any **One** question from Section - C.

Section - A

Q1)

(5 × 2 = 10)

- i) Define symmetric difference of two sets.
- ii) Prove that $(A^c)^c = A$.
- iii) Let $A = \{1, 2, 3, 4, 5, 6, 7, 8\}$ and R be relation on A defined by $(x, y) \in R$ iff y is divisible by x . Find the relation R on A and hence find A^{-1} .
- iv) Define into function with example..
- v) Define complement of a graph.

Section - B

- Q2)** Consider the set Z of integers we say that $x \equiv y \pmod m$ iff $m | (x-y)$. Show that \equiv is an equivalence relation.
- Q3)** Consider function $f: N \rightarrow N$ where N is set of natural numbers defined by $f(n) = n^2 + n + 1$. Show that f is one one and not onto.
- Q4)** Explain different types of ten graphs with example.

(2 × 5 = 10)

Section - C

- Q5)** State and prove Euler formula on graph.
- Q6)** Each of the following defines a relation on the set N of positive integers
- $R: x > y$ $S: x + y = 10$ $T: x + 4y = 10$ for all $x, y \in N$
- Determine which of the relations are i) reflexive ii) symmetric iii) transitive
iv) antisymmetric

aeb, bea

AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR
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Roll No.
Total No. of Questions: 06

Total No. of Pages: 01

B.Tech. (CSE/IT) – 4th Sem
Discrete Structures
ACCS 16402

Time: 02 Hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section - A is Compulsory.
- 2) Attempt any Two questions from Section - B.
- 3) Attempt any One question from Section - C.

Section - A

(5 × 2 = 10)

Q1)

- i) Define sum and product rule.
- ii) Prove that $n(A \cup B) = n(A) + n(B) - n(A \cap B)$.
- iii) Define monoid.
- iv) Define zero divisors.
- v) Solve $a_r - 7a_{r+1} + 10a_{r+2} = 0$. Given that $a_0 = 0, a_1 = 3$.

Section - B

(2 × 5 = 10)

Q2) Among the first 1000 positive integers

- a) Determine the integers which are not divisible by 5, nor by 7, nor by 9.
- b) Determine the integers divisible by 5, but not by 7 nor by 9.

Q3) Find the general solution of $S_k - 3S_{k+1} - 4S_{k+2} = 4^k$.

Q4) Prove that every field is an integral domain but converse is not true.

Section - C

(1 × 10 = 10)

Q5) Use generating function to solve the recurrence relation to find the sequence and its generating function. $S_{n+2} = S_{n+1} + S_n$ where $S_0 = 1, S_1 = 1$.

Q6) Prove that intersection of two normal subgroups of a group G is again a normal subgroup of G.

189
1894

Total No. of Questions: 03

Total Marks: 24

Instruction to Candidates:

- All questions are compulsory.

Section-A

Q1.

- What is type conversion?
- What is encapsulation?
- Explain dangling pointer with an example.
- What is inline function? Give an example.
- Write a c++ program to show how pass by reference work?
- Explain difference between structure and union.

Section-B

- Q2. a) What do you mean by function overloading? When do we need it? Give an example.
b) Write a c++ program to calculate the maximum of two numbers using function with parameters and return value.
- Q3. a) What are the differences between object oriented and procedural programming?
b) What is the purpose of new and delete operators and also write c++ code to demonstrate the use of these operators.

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Roll No.
Total No. of Questions: 03

Total No. of Pages: 01

B.Tech (CSE1) – 3rd Sem
Data Structures
ACCS-16301
Test I

Maximum Marks: 24

Instructions to Candidate:

- 1) Section-A contains six questions. All questions are compulsory.
- 2) Section-B contains two questions. All questions are compulsory.

Section – A

(6*2=12)

Q1.

- i) How array is different from linked list?
ii) Calculate the worst case complexity for the program where polynomial equation is $4n^3 + 2n + 1$
iii) What is time space trade off?
iv) Consider the following deque where DEQUE is allocated 6 memory cells

LEFT=2, RIGHT=5 DEQUE: = _____, London, Berlin, Rome, Paris, _____

Describe the deque, including LEFT and RIGHT as the following operations take place

- a) Athens is added to the left
- b) Two cities are deleted from the right
- c) Madrid is added on the left
- d) Moscow is added on the right

RDMPSS

v) Convert the given infix expression into postfix using stacks

$A * (B + C * D) + E$

w) What are priority queues?

Section – B

(2*6=12)

Q2. Write an algorithm which deletes the first node from LINKEDLIST.

Q3. (a) What are circular queues? What are the various operations performed on circular queues? Write an algorithm of any one operation related to circular queues. (4 marks)

(b) What is the difference between linear and non-linear data structure? (2 marks)

KS: 24

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Roll No.

No. of Questions: 08

Total pages: 01

2 = 12

B.Tech(CSE) -3th Sem

COALP- TEST-1

ACCS-16303

Time: 75mins

Maximum Marks: 24

Instructions to Candidates:

- 1) Section-A contains six questions. All questions are compulsory.
- 2) Section-B contains two questions. All questions are compulsory..

Section-A

Q1)

(6 × 2 = 12)

- i. What are the various types of registers and their function in basic computer?
- ii. What is BUS?
- iii. Define microoperations with example. Give the format for microinstructions.
- iv. State the difference between Microprogrammed and Hardwired control organization.
- v. List various memory reference instructions.
- vi. What are Shift microoperations? Explain its types.

Section-B

(2 × 6 = 12)

- Q2. What is Instruction cycle? Give the flowchart of instruction cycle to determine different types of instructions.
- Q3. What is program interrupt? Explain program interrupt with the flowchart of interrupt cycle

$x + y$

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2nd Test
Amritsar College of Engg. and Tech., Amritsar
CSE - 3rd Sem.
Mayush Kanna

- (i) Attempt all questions from Section - A and B.

Q(1)

(i) Find the Largest eigen value and corresponding eigen vector of the matrix

$$\begin{bmatrix} 6 & 5 \\ 1 & 2 \end{bmatrix}$$

($6 \times 2 = 12$)

- (ii) Write Improved Euler method.
 (iii) Write R.K 3rd order method.
 (iv) Solve $dy/dx = xy^2 + y$, at $x = 0.5$ given that $y(0) = 1$ by Improved Euler Method.
 (v) Solve $dy/dx = x + y$, at $x = 0.5$ given that $y(0) = 1$ by Modified Euler Method.
 (vi) Write R.K 4th order method for simultaneous differential equation.

Section - B

($2 \times 6 = 12$)

- (Q2) Solve the equations $2x + 8y + 2z = 14$, $6x + 6y - z = 13$, $2x - y + 2z = 5$ by gauss-jordan method.
 (Q3) Solve $dy/dx = -xy^2$ by Runge - Kutta 4th order method, Find $y(0.6)$, given that $y = 1.7231$ at $x = 0.2$.

Take $h = 0.2$.

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First Test

CSE – 3rd Sem.

Instructions to students:

(i) Attempt all questions from Section – A and B.

Section – A

Q(1)

- (i) Define Periodic function with suitable example.
- (ii) Find a_o in the Fourier series expression of x^3 in the interval $0 < x < \pi$,
- (iii) Fnd Laplace Transformation of $t^2 e^{-t} \sin 2t$.
- (iv) Fnd Laplace Transformation of $\sin 3t \sinh 4t$.
- (v) Find P.D.E by eliminating arbitray function from the equation $z = f(t)$.
- (vi) Solve the equation $(D^3 - 3D^2 D' + 2D') z = 0$.

Section – B

Q2) Obtain the Fourier Series of $|\cos x|$ in the interval $-\pi < x < \pi$.

Q3) Fnd Laplace Transformation of (i) (ii)

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Total No. of Questions: 03

Total No. of Pages: 01

B. Tech. (CSE-I) – 3rd Sem.
OBJECT ORIENTED PROGRAMMING USING C++

Subject Code: ACCS-16302
Test-II (Part-III)

Time: 01 Hour

Maximum Marks: 24

Instructions to Candidate:

- 1) Section – A and B is Compulsory.

Section A

(6 * 2 = 12)

- Q1)
I. What is access specifier?
II. Write down the syntax of nested class.
III. What do you mean by dynamic constructor?
IV. How we can remove ambiguity?
V. Write down the syntax for copy constructor.
VI. When we use const keyword?

Section – B

(2 * 6 = 12)

- Q2) Write a program to perform class as a friend of another class.

- Q3) a) Write a program to demonstrate object composition.

- b) Write a program to demonstrate the use of static data members.

B.Tech

A
rent method
it can be used

(6+2)

AMRITSAR COLLEGE OF ENGINEERING & TECHNOLOGY

DEPARTMENT OF COMPUTER SCIENCE ENGINEERING

SUBJECT NAME: DIGITAL CIRCUIT AND LOGIC DESIGN

SUBJECT CODE: (ACEC - 16302)

TEST NO: 1
PART - I and II

Section - A (12 Marks)

Total Marks : 2

Note: All questions carry equal marks (2 mark each)

Q1:

Realize NOR gate using NAND gate.

Simplify the $(\bar{A} + \bar{B})(\bar{A} + B)$ using boolean algebra.

Add $(57)_{10}$ and $(26)_{10}$ in BCD.

Calculate the value of base X if $(225)_X = (341)_X$.

Solve $(13)_{10} - (25)_{10}$ using 2's complement arithmetic.

Convert $(10110110)_2$ to gray code.

Section - B (12 Marks)

Note: All questions carry equal marks (6 mark each)

Q2: Simplify the expression $F(A, B, C, D) = \Sigma m(1, 5, 7, 8, 9, 11, 14, 15)$ using K-map. Also implement it using NAND gates only.

Q3: Minimize the $Y(A, B, C, D) = \Sigma m(1, 5, 6, 12, 13, 14) + d(2, 3, 4, 11)$ using Q-M method. Also verify your answer using K-map.

Q2 Simplify
 $f = \sum m(0, 1, 1, 1, 1, 1, 1, 1)$
3 Solve for PI
 $m(0, 1, 4, 5, 6, 7, 1, 1)$

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Roll No.

Total No. of Questions: 03

**Section I&II
B. Tech 3rd Sem A2
Subject : DCLD (ACEC-16302)**

Time: 01 Hour

Maximum Marks: 24

Instruction to Candidates:

All questions are **Compulsory**.

Section-A

(6 × 2 = 12)

Q1)

- i) Subtract $(10101)_2$ from $(11011)_2$ using the 1's complement method.
- ii) Write truth table of full adder and Maxterms for it.
- iii) Obtain BCD addition of $(28)_{10}$ and $(76)_{10}$.
- iv) State and proof the DeMorgan's laws.
- v) What will be the highest number in decimal number system, that can be converted into 4 places of Hexa-decimal number.
- vi) Convert $Y = \Sigma m(1,3,5)$ into SOP and POS canonical forms.

Section-B

(6 × 2 = 12)

Q2 Simplify the following expression using K-map.

$$Y = \Sigma m(0,1,7,9,11,13,15,16,17,23,25,27)$$

Q3 Solve for PI are EPI and obtain minimize equation using QM-method

$$Y = \Sigma m(0,1,4,5,6,7,8,9,10,12,14)$$

Roll No.

Total No. of Questions: 03

Total Marks: 24

Instruction to Candidates:

- All questions are compulsory.

Section-A

Q1.

- i) What is type conversion?
- ii) What is encapsulation?
- iii) Explain dangling pointer with an example.
- iv) What is inline function? Give an example.
- v) Write a c++ program to show how pass by reference work?
- vi) Explain difference between structure and union.

Section-B

- Q2. a) What do you mean by function overloading? When do we need it? Give an example.
- b) Write a c++ program to calculate the maximum of two numbers using function with parameters and return value.
- Q3. a) What are the differences between object oriented and procedural programming?
- b) What is the purpose of new and delete operators and also write c++ code to demonstrate the use of these operators.

Instructions to Candidate:

- 1) Section – A and B is **Compulsory**.

Section A $(6 \times 2 = 12)$ **Q1)**

- i) What is dangling/wild pointers?
- ii) How we can use new and delete operator?
- iii) What is data hiding?
- iv) What is the use of const keyword?
- v) What is the use of cin.getline() function?
- vi) What is Encapsulation?

Section – B $(2 \times 6 = 12)$

- Q2)** a. What do you mean by call by value and call by reference? Explain with the help program.
 b. Write a program to explain bit field in C++.
- Q3)** a. What do you mean by function overloading? Write a program to find cube of a number.
 b. Write a program to print given pattern:

```

 1
 2 3
 4 5 6
 7 8 9 10
  
```

Roll No. 1401359

Total No. of Questions: 03

Total No. of Pages: 01

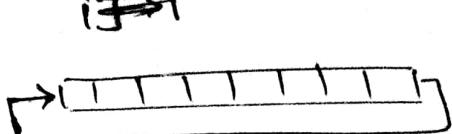
B.Tech (CSE-2) -3rd Sem
DATA STRUCTURES (ACCS-16301)
TEST-1

Time: 2hrs

Maximum Marks: 24

Instruction to Candidates:

- 1) Section-A. All questions are compulsory.
- 2) Section-B contains two questions. All questions are compulsory.



Section-A

Q1.

(6 × 2 = 12)

- i. Define Big O Notation.
- ii. Differentiate between overflow and underflow.
- iii. What are the advantages of linked list over array?
- iv. Suppose a queue is maintained by a circular array QUEUE with N=12 memory cells.

Find the number of elements in QUEUE if

- a) FRONT=4, REAR=8
- b) FRONT=10, REAR=3

v. Which data structure can be used to test a palindrome? Justify your answer.

vi. Consider the following deque where DEQUE is allocated 6 memory cells:

LEFT=2, RIGHT=5 DEQUE: _____, London, Berlin, Rome, Paris, _____

Describe the deque, including LEFT and RIGHT, as the following operations take place:

- a) Athens is added on the left.
- b) Two cities are deleted from the right.
- c) Madrid is added on the left

Section-B

(2 × 6 = 12)

Q2. a) An array S [-10...5, 20...50] requires one byte of storage. If beginning location is 1600 determine the location of S [15][20] by using rows and columns method. (3)

b) Write down algorithm for deletion in a 2 way linked list. (3)

Q3. a) Write an algorithm to insert an item after a given node in a linked list. (3)

b) Translate the following infix expression into postfix expression using tabular method.

$$((p-r^s*u)*(v-w)/x))$$

(3)

Note: ^ indicates exponent operator

**B.Tech (CSE1) – 3rd Sem
Data Structures
ACCS-16301
Test III**

Maximum Marks: 24

Instructions to Candidate:

- 1) Section-A contains six questions. All questions are compulsory.
- 2) Section-B contains two questions. All questions are compulsory.

Section – A

(6*2=12)

Q1.

- i) What is collision in hashing?
- ii) Write down the complexity of bubble sort in best and worst case.
- iii) Which is efficient searching technique and why?
- iv) What is hash function? Name different hash functions.
- v) Sort the following list of numbers using shell sort technique:
List is 32,66,23,57,55,65,70,44,1.
- vi) Consider the following 4-digit employee numbers 9614,5882,6712,4409. Find the two digit hash address using folding method.

Section – B

(2*6=12)

Q2. Write an algorithm for merge sort.

Q3. Which is most efficient sorting technique among bubble sort or quick sort and Why? Show the contents of the array after every pass for a given data set using quick sort technique

48, 67, 26, 44, 13, 23, 98, 57, 100, 75, 1

Instructions to Candidate:

Section-A contains six questions. All questions are compulsory.

Section-B contains two questions. All questions are compulsory.

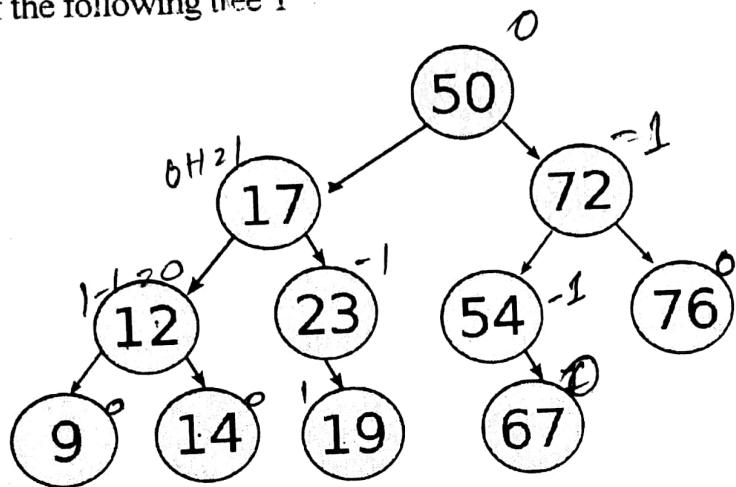
Section – A

(6*2=12)

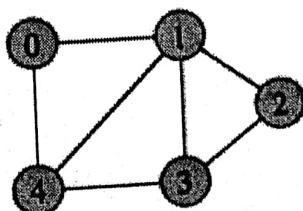
i.

What is the purpose of Warshall's algorithm?

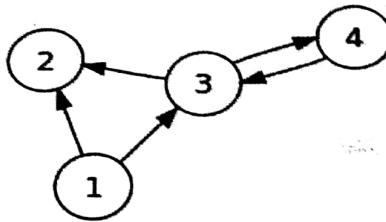
Write down the formula to calculate balance factor of AVL search tree and also calculate the balance factor of the following tree T



- ii) What is the difference between min heap and max heap? ✓ ✓
- iv) Construct B Tree of following elements of order 4
1,6,8,2,9,12,15,7,18,3,4,20
- v) Draw the adjacency matrix of given undirected graph.



vi) Calculate the in degree and out degree of every vertex of given graph



Section - B

(2*6=12)

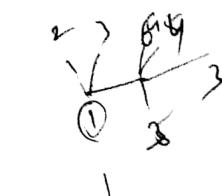
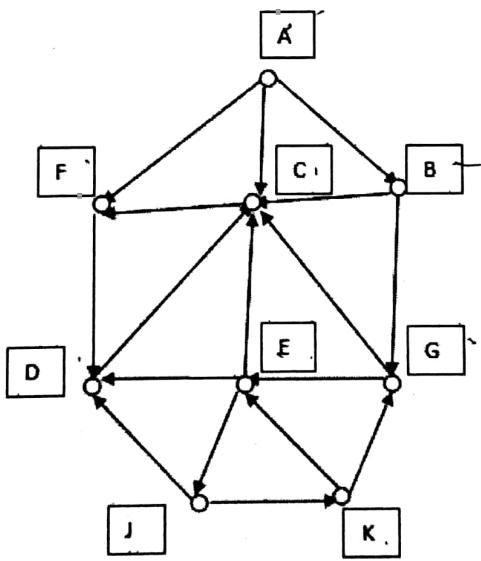
Q2 Find the inorder of given traversal

Preorder: 50, 27, 16, 4, 12, 34, 29, 44, 88, 65, 52, 77, 93, 92

Postorder: 12, 4, 16, 29, 44, 34, 27, 52, 77, 65, 92, 93, 88, 50

Q3. (a) What is the difference between depth and height of a tree? (1 mark)

(b) Consider the graph G in the following fig. Suppose G represents the daily flights between some cities of some airlines and suppose people want to fly from city A to J with minimum number of stays. Calculate it by using BFS technique. (5 marks)



**AMRITSAR COLLEGE OF ENGINEERING AND TECHNOLOGY, AMRITSAR
(AUTONOMOUS COLLEGE)**

Roll No.

Total No. of Questions: 09

Total No. of Pages: 02

**B.Tech. (CSE/IT) – 3rd Sem
Data Structures
ACCS-16301**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

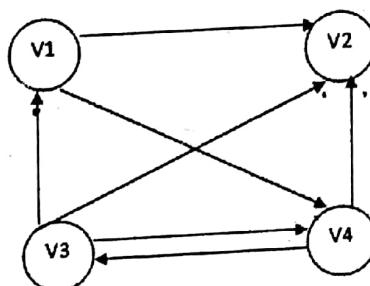
(10 × 2 = 20)

Q1)

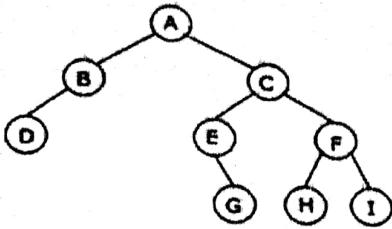
i) Consider the 4-digit student roll numbers 9211, 4231, 6213, 5509. Find the 2 digit hash address of each roll number by using folding method.

ii) What are the various applications of stacks?

iii) Calculate the indegree and outdegree of given graph



- iv) Write down the formula to calculate balance factor of AVL tree. Also calculate the balance factor of given expression tree $(5y+x)^3(4z+w)$
- v) What is rear and front of queue?
- vi) Define rehashing with suitable example
- vii) Find the preorder and inorder of following tree



- viii) Write down the best and worst case complexity of bubble sort.
- ix) What is the purpose of Warshall Algorithm?
- x) Why is it difficult to perform binary search on a linked list?

Section – B

(4 × 5 = 20)

Q2) Convert given infix expression into postfix using stack $(A+B \uparrow D) / (E-F) + G$

Q3) Which sorting technique is more preferable among quick sort and bubble sort and Why? Sort the given list of element by using quick sort technique 31, 26, 20, 17, 44, 54, 77, 55, 93

Q4) Write an algorithm to insert an element in a circular queue.

Q5) Write a note on the following:

i. B-TREE

ii. DFS

Q6) a) Differentiate between linear and non linear data structure 3 marks

b) Differentiate between underflow and overflow. 2 marks

Section – C

(2 × 10 = 20)

Q7) a) Suppose the two sorted array are given as

$A[4]=\{1,3,5,7\}$ and $B[4]=\{2,4,6,8\}$.

Write an algorithm to obtain the output $C[8]=\{1,2,3,4,5,6,7,8\}$. 5 marks

b) What are the various advantages of linked list over arrays? 5 marks

Q8) Write an algorithm to insert an element at the beginning of a linked list. 10 marks

5 marks

Q9) a) Draw tree of given traversal order

Preorder 25, 15, 10, 4, 12, 22, 18, 24, 50, 35, 31, 44, 70, 66, 90

5 marks

Postorder 4, 12, 10, 18, 24, 22, 15, 31, 44, 35, 66, 90, 70, 50, 25

b) Sort the given list of elements by using radix sort technique and show result of each pass
3417, 8226, 2493, 2346, 9577, 1331, 3554, 8555, 7820 5 marks

B.Tech (CSE/IT):- 3rd Sem. (2016 Onward Batch)
Subject Name: Engineering Math - III
Subject Code: ACAM - 16302

Time: 3 hour.

Maximum Marks: 60

Instruction to Candidates.

- 1) Section - A is Compulsory.
- 2) Attempt any Four questions from Section - B.
- 3) Attempt any Two questions from Section - C.

Section - A

- Q1)** (2 marks each)
- (i) Find a_0 in the Fourier series expression of $x^2 - x$ in the interval $(-\pi, \pi)$ ✓
 - (ii) Define Even and Odd functions with examples ✓
 - (iii) Find Laplace transform of $\cos \sqrt{t}$. ✓
 - (iv) Find Laplace transform of $e^{2t} \cos^2 t$. ✓
 - (v) Solve $(D^3 - D^2 + D^2 + D + D^3) z = 0$ ✓
 - (vi) Form a partial differential equation from $2z = (ax + y)^2 + b$ by eliminating arbitrary constants. ✓
 - (vii) What are the properties of Normal distribution? ✓
 - (viii) If the mean of a Binomial distribution is 3 and the variance is 1.5, find the probability of obtaining at least 4 success. ✓
 - (ix) Explain Critical region in sampling. ✓
 - (x) Define Chi - $\Sigma (O_i - E_i)^2 / E_i$.

Section - B

(3 marks each)

Q2) Obtain Fourier series of e^{ax} in the range $-l < x < l$. ✓

Q3) Find Laplace Transformation of $\frac{1 - \cos 2t}{t}$. ✓

Q4) Solve: $(D^2 - 3DD' + 2D'^2)z = 2 e^{2x+3y} + \sin(x-2y)$. ✓

Q5) Solve the linear system of equations $2x + 2y + 4z = 18$, $x + 3y + 2z = 13$,
 $3x + y + 3z = 14$ by Gauss - Elimination method. ✓

Q6) In a Normal distribution, 29% of the items are under 35 and 20 % are over 54. Find
the mean and standard deviation of the distribution.

Section - C

(10 marks each)

Q7) Obtain Fourier series of $f(x) = |\sin x|$ in the range $-\pi < x < \pi$. ✓

Q8) Using Runge - Kutta method of fourth order, find $y(0.2)$ and $y(0.4)$ given that

$y(0) = 1$. Take $h = 0.2$ for the equation $\frac{dy}{dx} = 3x + y^2$. ✓

Q9) Two random samples are drawn from 2 normal population are as follows:

A	17	27	18	25	27	29	13	17
B	16	16	20	27	26	25	21	

Test whether the samples are drawn from the same normal population.

Time: 3 Hours

Maximum Marks: 60

Instructions to Candidates:

- 1) Section- A is **Compulsory**.
- 2) Attempt any **Four** questions from Section- B.
- 3) Attempt any **Two** questions from Section- C.

Section-A

(10 X 2 = 20)

Q1)

- i) What are Sequential Circuits? ✓
- ii) Define 1's and 2's complement.
- iii) What are Excess-3 codes?
- iv) Realize OR gate using NAND gate only.
- v) Convert gray code 11011010 to binary code.
- vi) What do you mean by Positive and Negative logic?
- vii) What is the difference between canonical form and standard form? ✓
- viii) Define Accuracy and Resolution? ✓
- ix) Explain the toggle in Flip-flops?
- x) What are State diagrams? ✓

(4 x 5=20)

- Q2) Draw the circuit of TTL NAND gate & explain its operation. Compare the TTL & ECL logic families.
- Q3) What are A/D converters? Explain Single and Dual slope A/D converter
- Q4) State and prove De'Morgans Laws
- Q5) Design a 2-bit Priority Encoder using basic gates.
- Q6) Convert JK flip flop to SR flip flop

Section-C

(2 x 10=20)

- Q7) What are counters? Explain its types. Also explain Ring and Johnson counter.
- Q8) What are flip flops? Explain Master-slave JK flip-flop.
- Q9) Solve the following function using Q-M method. Also verify it by using K-map

$$Y = \Sigma m(0, 1, 6, 7, 8, 9, 13, 14, 15)$$

**B. Tech. (CSE/ IT/ ECE) – 3rd Sem.
OBJECT ORIENTED PROGRAMMING USING C++
Subject Code: ACCS-16302**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section - A is Compulsory.
- 2) Attempt any Four questions from Section - B.
- 3) Attempt any Two questions from Section - C.

Section - A

(10 × 2 = 20)

Q1)

- i) What is Generic Function?
- ii) Distinguish between overloading and overriding.
- iii) What do you mean by abstract class?
- iv) What is the use of this pointer?
- v) Discuss the use of new and delete operator.
- vi) List ios flags with examples.
- vii) What do you mean by empty class?
- viii) Differentiate between gets() and getline().
- ix) What do you mean by encapsulation?
- x) Write the order of execution of constructors and destructors.

Section – B

(4 × 5 = 20)

- Q2) Write a program to demonstrate the use of static data members.
- Q3) Write a program to perform type conversion from basic type to class type.
- Q4) Write a program for finding and removing the concept of ambiguity.

Q5) Explain bit fields with the help of an example.

Q6) Define function overloading. Explain with the help of program.

Section - C

($2 \times 10 = 20$)

Q7) a. Define the concept of Object Slicing with suitable example.

b. Write a program to overload the '+' operator.

Q8) a. Write a program to perform virtual destructor.

b. What are the different concepts of object oriented programming?

Q9) a. What is template? Write a program to find the square a number with the help of function template.

b. Write a program to input information into a file using open () and close () function.

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Roll No.

Total No. of Questions: 09

Total No. of Pages: 02

**B. Tech. (CSE / IT) - 5th Semester
INFORMATION SECURITY
ACCS-16505**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

(10 × 2 = 20)

Q1)

- i. Define intruder.
- ii. What is linear cryptanalysis?
- iii. Brief about tunnel model.
- iv. Define Trojan horse & zombie.
- v. Explain the components of Symmetric cipher model.
- vi. List out the limitations of MAC.
- vii. Explain Blowfish encryption algorithm
- viii. What are the different types of firewall?
- ix. Explain KDC with diagram.
- x. Convert the plaintext “ATTACK FROM MIDDLE EAST” to cipher text using key “PISTOL” with Vigenere cipher.

Section - B

(4 × 5 = 20)

- Q2)** Discuss the encryption-decryption process used in DES.
- Q3)** Explain the encryption, decryption and key generation in RSA. Also perform the encryption and decryption for $p=3$, $q=11$, $e=7$ and $m=5$.
- Q4)** Write a note on X.509 directory authentication service.
- Q5)** Explain different types of authentication functions with examples.
- Q6)** Differentiate between the following:-
 - a) Link encryption & End to End encryption.
 - b) PRNG & TRNG of random numbers.

Section - C

(2 × 10 = 20)

- Q7)** Discuss the header format of AH protocol. Also, compare it with ESP.
- Q8)** Discuss design elements of Feistel cipher Structure. Also, explain encryption & decryption process in Feistel cipher Structure having 16 rounds with diagram.
- Q9)** Write a short note on the following:-
 - a) Key Management.
 - b) Secure Electronic Transaction.

Total No. of Questions: 09

Total No. of Pages:

**B.Tech. (CSE/IT) – 4th Sem
COMPUTER NETWORKS
ACCS - 16403**

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

Q1)

(10 × 2 = 20)

- i) Consider the case that a Mesh topology contains 10 nodes, how many physical links are required to connect those ?
- ii) Differentiate between TCP and UDP protocols.
- iii) Why the back-off time needs to be random in binary exponential algorithm ? Justify with a suitable reason.
- iv) Consider an IP address 192.168.0.1 . Calculate its NetId and HostId. Also tell suitable subnetmask for it.
- v) Consider that We have IP addresses as 192.168.0.1, 192.168.0.6, 192.168.0.42, 192.168.44.2, 192.168.44.16 . Make its sub-netting diagram for the case.
- vi) Explain the term Classless IP addressing. Where do we use it ?
- vii) Define terms attenuation, noise, distortion with diagram for each.
- viii) Which switching method uses store and forward technique ? Explain with diagram.
- ix) Differentiate between the terms thick Ethernet and thin Ethernet.
- x) Explain the Ethernet access method and its function.

Section – B

(4 × 5 = 20)

- Q2**) Explain Congestion control and its algorithms with diagram for each
- Q3**) Identify IP addresses, specify their subnet masks and calculate NetID and HostId for each.
- 192.168.45.1
 - 122.64.2.8
 - 234.22.45.6
 - 198.0.0.6
 - 144.1.12.16
- Q4**) Explain IP Packet format explaining all of its fields.
- Q5**) Explain Hamming code method for error detection. Solve this method for finding error on 5th position.
- Q6**) Explain all Error Control methods with diagram for each method.

Section – C

(2 × 10 = 20)

- Q7**) Explain OSI Reference model with explanation of each function of each layer.
- Q8**) Explain 802.11 WiFi Architecture, its services and compare all versions of it.
- Q9**) Explain all error detection methods with example for each.

**B.Tech. (CSE/IT) 4th - Sem
OPERATING SYSTEM (ACCS-16402)
Sessional-I**

Time: 02 Hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one questions.

Section - A

$(5 \times 2 = 10)$

Q1)

- i) What is process control block? What information does it contains? *process*
- ii) Describe the terms long term, medium term and short term scheduler. *long term*
- iii) What do you mean by batch operating system?
- iv) Define Turnaround time and Waiting time.
- v) Differentiate between preemptive and non-preemptive scheduling.

Section – B

$(2 \times 5 = 10)$

- Q2) What is critical section? Provide the solution for Reader/writer problem using semaphore.
- Q3) What is deadlock? List and explain four necessary conditions for deadlock to occur.
- Q4) Explain Banker algorithm in detail.

Section – C

$(1 \times 10 = 10)$

Q5) Given the following information

Job No	Arrival Time	CPU Cycle	Priority
1	0	75	3
2	10	40	1
3	10	25	4
4	80	20	5
5	85	45	2

Draw a timeline for each of the following scheduling algorithms and calculate average turnaround time and average waiting time for the following algorithms:

- SJF(Preemptive)
- Priority(preemptive)

Consider 1 as high priority and 5 is low priority.

Q6) Consider the following snapshot of a system

	Allocation				Max				Available			
	A	B	C	D	A	B	C	D	A	B	C	D
P0	0	0	1	2	0	0	1	2	1	5	2	0
P1	1	0	0	0	1	7	5	0	1	5	2	0
P2	1	3	5	4	2	3	5	6	1	5	2	0
P3	0	6	3	2	0	6	5	2	1	5	2	0
P4	0	0	1	4	0	6	5	6	1	5	2	0

Answer the following question using the banker's algorithm:

- What is the content of matrix "Need"?
- Is the System in a safe state?

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(AUTONOMOUS COLLEGE)**

Roll No.

**B.Tech. (CSE/IT) 4th - Sem
OPERATING SYSTEM (ACCS-16402)
Sessional-II**

Time: 02 Hours

Maximum Marks: 30

Instruction to Candidates:

- 1) Section-A contains five questions. All questions are compulsory.
- 2) Section-B contains three questions. Attempt any two questions.
- 3) Section-C contains two questions. Attempt any one questions.

Section - A

(5 × 2 = 10)

Q1)

- i) When do page fault occurs? Describe the action taken by O.S. when page fault occurs.
- ii) Describe the terms Trojan horse and virus.
- iii) Consider the following segment table:

Segment	Base	Length
0	219	600
1	2300	14
2	90	100
3	1327	580
4	1952	96

What are the physical addresses for the following logical addresses?

- i. 0, 430
 - ii. 1, 10
 - iii. 2, 500
 - iv. 3, 400
 - v. 4, 112
- iv) Differentiate between internal and external fragmentation with example.
v) Differentiate between protection and security.

Section – B

(2 × 5 = 10)

- Q2) For the partitions of 100K, 500K, 200K, 300K and 600K(in order), place the processes of size 212K, 417K, 112K and 426K(in order) according to First fit, Best fit and worst fit algorithm for both fixed size and variable size allocation.
- Q3) Explain the concept of paging with diagram in detail.

Q4) Define file system. Explain various file allocation methods.

Section – C

(1 × 10 = 10)

Q5) Consider the following 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 will occur for FIFO and LRU page replacement algorithms?

Assuming three frames (initially frames are empty).

Q6) What do you mean by disk scheduling. Consider a disk with 200 tracks and the queue has random requests from different processes in the order:

55, 58, 39, 18, 90, 160, 150, 38, 184

Initially arm is at 100. Calculate the total head movement for FIFO, SSTF, SCAN, C-SCAN.

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section - A is Compulsory.
- 2) Attempt any Four questions from Section - B.
- 3) Attempt any Two questions from Section - C.

Section - A (20 Marks)

$(10 \times 2 = 20)$

Q1)

- a) What is Python and why it is used?
- b) Differentiate between import and reload in Python.
- c) Explain the Python Input and Print statements. Take suitable examples.
- d) Explain Lambda function in Python by taking a suitable example.
- e) Differentiate between break and continue statements in Python. Take suitable examples.
- f) Differentiate between method overloading and method overriding.
- g) What is a tuple in Python?
- h) What is a module in Python? Explain the math module in python by taking suitable examples.
- i) What do you understand by abstract data types and abstract classes in Python?
- j) What is random module? Write a program in python to generate random numbers.

Section - B (20 Marks)

$(4 \times 5 = 20)$

- Q2) Explain strings in Python. What is string slicing? Explain the following string methods in python:
`index()`, `isalnum()`, `center()`, `capitalize()`.
- Q3) Explain a python function along with its syntax? Write a function to print hcf of two numbers.
- Q4) Explain inheritance in Python along with its types. Illustrate by taking suitable examples.
- Q5) Why file handling is required in Python? List and explain the various file opening modes. Write a program in python to illustrate reading and writing from/into a binary file.

Q6) Write a Python program to create a function which tells whether a given number is prime or not.

Section – C (20 Marks)

(10 x 2 = 20)

Q7) How can you analyze a “.CSV” file using Python? Consider a file “emp.csv” which contains the following information: empno, ename, salary. Write a Python program to analyze this file and print ename and salary of all employees who earn a salary greater than Rs. 20000. Also store this information into a file “sal.csv”.

Q8) What do you understand by Exceptions and Assertions in Python? List and explain the various types of Exceptions. Take suitable examples.

Q9) Write a well-documented Python program to create a function which searches for an element in a given list using the concept of Linear search. Invoke this function and show the relevant outputs for your programs.

B.Tech. (CSE/IT) – 3rd Sem
COMPUTER ORGANIZATION AND ASSEMBLY LANGUAGE PROGRAMMING
ACCS-16303

Time: 03 Hours

Maximum Marks: 60

Instruction to Candidates:

- 1) Section-A contains ten questions. All questions are compulsory.
- 2) Section-B contains five questions. Attempt any four questions.
- 3) Section-C contains three questions. Attempt any two questions.

Section - A

(10 × 2 = 20)

Q1)

- i) What is meant by RTL?
- ii) What do you mean by programmed I/O operations?
- iii) What is the difference between direct and indirect addressing? How many memory references are required in both the cases?
- iv) What is associative memory?
- v) What is the difference between two byte and three bytes instructions? Give example of each.
- vi) Differentiate between RICS & CICS architectures.
- vii) What do you mean by IOP?
- viii) List various memory reference instructions.
- ix) What is the size of data & address bus for a memory 2048 * 32?
- x) Write the use of Priority Interrupt.

Section - B

(4 × 5 = 20)

- Q2) What do you mean by DMA? Explain DMA transfer with diagram in detail.
- Q3) What is instruction code? Explain various types of computer instruction formats.
- Q4) What is the need of page replacement? Consider the following reference string

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

Find the no. of page faults with Optimal and LRU with four free frames which are empty initially.

- Q5) What do you mean by Interrupt? Explain program Interrupt cycle with flowchart.
- Q6) How asynchronous data transfer is achieved with the help of handshaking method?

Section - C

(2 × 10 = 20)

- Q7) What is addressing modes? Explain various addressing modes with example.

- Q8) Explain the following instructions with example:
 - i. SHLD 16-addr.
 - ii. LDA, 16-addr.
 - iii. DAD rp.
 - iv. ADI 8-bit data.
 - v. ANA r

- Q9) Write a short note on the following:

- a. Pipelining with example
- b. Arithmetic pipelining with example.