	DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE **Supplementary Summer Examination- 2023** **Course: B. Tech. Branch: All Branches Semester: III** **Subject Code & Name: (BTHM3401) Basic Human Rights** **Max Marks: 60 Date: 23/08/2023 Duration: 3 Hours**		
	Instructions to the Students: *1. All the questions are compulsory.* *2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.* *3. Use of non-programmable scientific calculators is allowed.* *4. Assume suitable data wherever necessary and mention it clearly.*		
		(Level/CO)	Marks
Q. 1	**Solve any One of the following**		
A)	Write short notes on: i) Liberty ii) Fraternity iii) Equality	**L2/CO2**	12
B)	Write short notes on: i) Secularism ii) Socialism iii) Nationalization	**L2/CO2**	12
Q.2	**Solve any Two of the following.**		
A)	'The French Revolution strengthened the zeal of democracy', justify.	**L3/CO2**	**6**
B)	How does the process of industrialism contribute to the mechanization of the human being?	**L3/CO2**	**6**
C)	'The balance between the rights and duties is an essential factor of the equality based society', elaborate.	**L3/CO3**	**6**
Q. 3	**Solve the following.**		
A)	Write a critical note on, 'how an individual became an essential part of the human society'.	**L3/CO3**	**6**
B)	What do you think about the violation of human rights in regard with the migrant workers?	**L4/CO4**	**6**
Q.4	**Solve any ONE of the following.**		
A)	'NGOs fight for justice in regard with land, water and forest', explain.	**L4/CO3**	**12**
B)	Write the notes on: i. Fundamental rights in the Constitution of India ii. Fundamental duties in the Constitution of India	**L2/CO1**	**12**

Q. 5	**Solve any TWO of the following.**		
A)	According to you what values are incorporated in the Preamble to the Constitution of India?	**L2/CO3**	**6**
B)	What is National Human Rights Commission?	**L4/CO3**	**6**
C)	Write a detailed note on the Universal Declaration of Human Rights?	**L1/CO3**	**6**
	***** End *****		

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2023

Course: B. Tech.Branch : All branches

Semester : IV

Subject Code & Name: (BTHM403) Basic Human Rights

Max Marks: 60 **Date: 20/01/2024** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	What are human rights? State and explain any 5 human rights	**CO1**	**6**
B)	State the interrelationship between society, religion and culture	**CO1**	**6**
C)	Elaborate the following terms: i) Unemployment ii) Rural Poverty	**CO1**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Throw light on rights of migrant people	**CO2**	**6**
B)	What are the human rights of mentally and physically challenged people? Explain	**CO2**	**6**
C)	Describe the following terms with illustration i) Freedom ii) Democracy	**CO2**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	What do you mean by NGO? Explain its different roles / activities with respect to human rights protection	**CO3**	**6**
B)	What are the different roles of NGOs in protection for the Environment in India?	**CO3**	**6**
C)	What are the different roles of NGOs in water conservation? Explain	**CO3**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	What are the fundamental rights of Indian citizen in the constitution of India?	**CO4**	**6**
B)	What are the fundamental duties of Indian citizen in the constitution of India?	**CO4**	**6**
C)	Discuss the Directive Principles of State Policy	**CO4**	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	What is UDHR? What are its provisions in India?	**CO5**	**6**
B)	What are the different functions and powers of National Human Rights Commission?	**CO5**	**6**
C)	What are the limitations of National Human Rights Commission? Explain	**CO5**	**6**

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular/Supplementary End Semester Examination – 2023

Course: B. Tech. **Branch :CSE(AI&DS)/AI&DS** **Semester :IV**

Subject Code & Name: (BTHM403)Basic Human Rights

Max Marks: 60 **Date:18/07/2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Write short note on American bill of rights.	**CO1**	**6**
B)	Write cause and effects of French revolution	**CO1**	**6**
C)	State interrelationship between society, religion & culture.	**CO1**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	What is social harmony? How it is maintained in the society	**CO2**	**6**
B)	Explain causes of rural poverty.	**CO2**	**6**
C)	What is social structure? State its impact on human behavior.	**CO2**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	Define terms state & individual liberty.	**CO3**	**6**
B)	Describe freedom & democracy in your word with illustration.	**CO3**	**6**
C)	What are the problems faced by migrant worker?	**CO3**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	What are silent feature of Indian constitution?	**CO4**	**6**
B)	What are the fundamental duties of Indian citizen?	**CO4**	**6**
C)	Illustrate the fundamental rights in the Constitution of India?	**CO4**	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	Discuss the Directive Principles of State Policy.	**CO5**	**6**
B)	What is difference between constitution and law?	**CO5**	**6**
C)	What is UDHR, what are its provisions in India?	**CO5**	**6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular & Supplementary Winter Examination-2023

Course: B. Tech. Branch : Artificial Intelligence & Allied Semester :III

Subject Code & Name: BTAIC303 & Data Structure and Algorithm using Python

Max Marks: 60 Date:06-01-24 Duration: 3 Hr.

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Write a program to reverse the given string	(BT3/CO1)	**6**
B)	What is mean by operators? List all operators and explain any two.	(BT2/CO1)	**6**
C)	Explain the use of break and continue statement with suitable example	(BT2/CO1)	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	What are functions? Explain different functions types with example.	(BT2/CO2)	**6**
B)	What is class and object? Write a program to initialize and display details of two student using classes and objects?	(BT3/CO2)	**6**
C)	What is Exception Handling? Explain how to handle exceptions?	(BT3/CO2)	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	Write algorithms for detecting node from Doubly linked list	(BT3/CO3)	**6**
B)	What is mean by array? Explain with suitable example	(BT2/CO3)	**6**
C)	Explain the concept of Stack with its operations.	(BT2/CO3)	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	Write python program for Binary Search algorithm.	(BT3/CO4)	**6**
B)	Define tree data structure? Explain Left and Right Rotation.	(BT2/CO4)	**6**
C)	Define hashing Techniques with its factions and application	(BT2/CO4)	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	Explain Insertion and Quick sort with algorithm.	(BT3/CO5)	**6**
B)	What is an algorithm? Explain time complexity and space complexity	(BT2/CO5)	**6**
C)	Write algorithm for insertion sort? Sort following element using insertion sort 40,30,20,50,45,60,10.	(BT3/CO5)	**6**

***** End *****

	DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE **Supplementary Winter-2023** **Course: B. Tech. Branch : Computer & Allied Engineering Semester :IV** **Subject Code & Name: BTCOC401 Design & Analysis of Algorithms** **Max Marks: 60 Date:16-01-24 Duration: 3 Hr.**		
	Instructions to the Students: 1. *All the questions are compulsory.* 2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in front of the question.* 3. *Use of non-programmable scientific calculators is allowed.* 4. *Assume suitable data wherever necessary and mention it clearly.*		
		(Level/CO)	Marks
Q. 1	Solve Any Two of the following.		12
A)	What is Algorithm? Explain criteria of Algorithms.	Remember	6
B)	What is Asymptotic Notations? Explain any three Asymptotic Notations.	Remember	6
C)	Define Max and Min Heap and write algorithm to insert into a heap.	Analysis	6
Q.2	Solve Any Two of the following.		12
A)	Write algorithm for Binary Search and calculate its time complexity.	Application	6
B)	Explain Quick Sort algorithm with its performance analysis.	Analysis	6
C)	Explain Strassen's Matrix Multiplication.	Remember	6
Q. 3	Solve Any Two of the following.		12
A)	Draw a state space tree for finding Four Queens problems solution.	Application	6
B)	Describe Graph Coloring Problem with suitable example	Analysis	6
C)	Explain Branch and Bound with suitable example.	Remember	6
Q.4	Solve Any Two of the following.		12
A)	Find an optimal solution to the knapsack instance n = 7, m = 15, (P_1 ,P_2, P_3 ,P_4 P_5 ,P_6 P_7) = (10,5,15,7,6,18,3), and (w_1, w_2, w_3, w_4, w_5, w_6, w_7) = (2,3,5,7,1,4,1).	Application	6
B)	What is Minimum Cost Spanning Tree? Explain with suitable example.	Remember	6
C)	Explain Job Sequencing with Deadlines.	Remember	6
Q. 5	Solve Any Two of the following.		12
A)	Analyze Floyd Warshals algorithm for Dynamic Programming.	Analysis	6
B)	Explain complexity class P and complexity class NP.	Remember	6
C)	Differentiate between Dynamic Programming and Greedy Algorithm.	Analysis	6

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Branch : Computer Engineering/ CSE/ CSE(AI&ML)

Course: S.Y B. Tech. **Semester :IV**

Subject Code & Name: BTCOC401 (Design and Analysis of Algorithm)

Max Marks: 60 **Date: 12/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following**		
A)	Define Algorithm? State the main characteristics of Algorithm	Knowledge	**6**
B)	Describe Asymptotic notations with expression	Understand	**6**
C)	Evaluate $9T(n/3) + n$	Evaluation	**6**
Q.2	**Solve Any Two of the following.**		
A)	Describe an algorithm for Merge Sort and find its time complexity	Understand	**6**
B)	Evaluate and write the algorithm for Quick sort describe its best and worst case with suitable example	Evaluation	**6**
C)	$\begin{bmatrix}6 & 7\\5 & 4\end{bmatrix}\begin{bmatrix}1 & 2\\3 & 4\end{bmatrix}$ Solve using Strassen's Matrix Multiplication, and Calculate its time complexity	Analysis	**6**
Q. 3	**Solve Any Two of the following.**		
A)	Draw a state space tree for finding four queens solutions	Understand	**6**
B)	Apply branch and bound technique to solve travelling salesman problem for the graph whose matrix is $\begin{matrix}\infty & 20 & 30 & 10 & 11\\15 & \infty & 16 & 4 & 2\\3 & 5 & \infty & 2 & 4\\19 & 6 & 18 & \infty & 3\\16 & 4 & 7 & 16 & \infty\end{matrix}$	Analysis	**6**
C)	Describe Graph Coloring Problem with suitable example	**Understand**	**6**
Q.4	**Solve Any Two of the following.**		
A)	Solve the Fractional Knapsack problem Given n = 5 objects and a knapsack capacity W = 60 profit= (30, 20 ,100,90,160) Weight = (5,10,20,30,40)	**Analysis**	**6**
B)	Solve an optimal Huffman code for the following set of frequencies a: 50 b: 25 c: 15 d: 40 e=75	**Analysis**	**6**
C)	Solve Job sequencing with deadlines n=4 , p=(100,10,15,27) and d =(2,1,2,1) find optimal solution	Analysis	**6**

Q. 5 Solve Any Two of the following.

A) Calculate the shortest path by using Floyd's Warshall Algorithm — Application — **6**

$$\begin{matrix} 0 & 4 & 5 \\ 2 & 0 & \infty \\ \infty & -3 & 0 \end{matrix}$$

B) Calculate the longest common subsequence for X={ A,B,C,B,D,A,B} — Application — **6**

Y={B,D,C,A,B,A}

C) Differentiate between Dynamic Programming and greedy Approach — Analysis — **6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Winter Semester Examination – Nov - 2019

Branch: Computer Science & Engineering **Sem.:- IV**

Subject:- Design and Analysis of Algorithms (BTCOC401) **Marks: 60**

Date:- 26/11/2019 **Time:- 3 Hrs.**

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Instructions to the Students

1. Each Question carries 12 marks.
2. Attempt **any Five** Questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

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Q.1)a)Solve the following recurrence relation using master method.

(i) $T(n) = 4T(n/2) + n$

(ii) $T(n) = 4T(n/2) + n^2$

(iii)$T(n) = 4T(n/2) + n^3$

Q.1)b) Explain different asymptotic notations.

Q.2)a)Write Strassen's algorithm to multiply two 2X2 matrices. Apply Strassen's algorithm to multiply following matrices.

$$A = \begin{Bmatrix} 1 & 1 \\ 1 & 1 \end{Bmatrix} \qquad B = \begin{Bmatrix} 2 & 2 \\ 2 & 2 \end{Bmatrix}$$

Q.2) b) Write an algorithm for merge sort . Apply merge sort on following array

A= 5 1 2 6 3 7 9 4

Q.3) a) Write Huffman Coding algorithm . Obtain Huffman tree for following data.

Characters	"a"	"b"	"c"	"d"	"e"
Frequency	6	11	19	35	50

Q.3) b) What are the different elements of greedy strategy ? Explain the steps to solve the problem by greedy strategy.

Q.4) a) Compute Longest Common Subsequence using Dynamic Programming approach for sequences X and Y if X =A, B, C, B, D, A, B and Y = B, D, C, A, B, A . What is the

length of LCS .

b) Compare Greedy Strategy , Dynamic Programming and Divide and Conquer approach.

Q.5)a) What is state space tree ?Using state space tree show that there exist an solution to 4-Queens problem .

b) Given n=6 weights, w={5,10,12,13,15,18} and M=30 .Find all possible subsets for which sum=M using sum of subsets algorithm.

Q.6) a) What is P class and NP class? Show relationship between them.

b) State the properties of Red- Black tree. Suppose that a node x is inserted into a red-black tree with RB-INSERT and then immediately deleted with RB-D ELETE . Is the resulting red-black tree the same as the initial red-black tree? Justify your answer.

**********Paper End**********

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY LONERE – RAIGAD -402 103

Semester Examination – Summer - 2019

Branch: Computer Engineering **Sem.:- IV**

Subject and Subject Code:- Design and Analysis of Algorithms (BTCOC401)

Date:- 14/05/2019 **Marks: 60** **Time:- 3 Hrs.**

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Instructions to the Students

1. Each Question carries 12 marks.
2. Attempt A**ny Five** Questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q.1. Attempt Any Three from the following questions. **(04*03=12)**

a) Define Big *O* notation? What is total time complexity of following code ?

```
int a,b,c,d,i.
{
        for (i = 0 ;i<=11; i++)
                {
                 a  = a+b;
                }
        d= c+a;
}
```

b) Define algorithm. What is the need of algorithm analysis ? Which factors affect runtime of algorithm?

c) Solve the following recurrence relation using characteristic polynomial.

$$t_n = \begin{cases} n & \text{if } n=0 \text{ or } n=1 \\ t_{n-1} + t_{n-2} & \text{, otherwise} \end{cases}$$

d) Solve the following recurrence using master method. Verify solution using substitution method.

$$T(n) = 2T(n/2) + cn$$

Q.2.Attempt the following questions **(06*02=12)**

a) Write an algorithm of merge sort and illustrate the operation on an array using Merge Sort.

A={5 2 4 7 1 3 2 6}

b)Multiply following two matrices using Strassen's matrix multiplication algorithm.

$$\text{Matrix A} = \begin{Bmatrix} 1 & 2 \\ 3 & 4 \end{Bmatrix} \quad \text{Matrix B} = \begin{Bmatrix} 5 & 6 \\ 7 & 8 \end{Bmatrix}$$

Matrix A = 1 2 Matrix B= 5 6

3 4 7 8

Q.3. Solve the following questions **(06*02=12)**

a) What is Greedy method? Explain elements of Greedy method.

b) Construct an optimal instance of Huffman Code for the following set of frequencies using Greedy method.

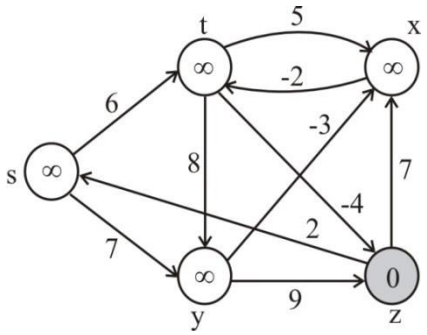
Characters	A1 "a"	A2 "b"	A3 "c"	A4 "d"	A5 "e"	A6 "f"
Frequency	45	13	12	16	9	5

Q.4. Solve the following questions: **(06*02=12)**

a) Determine longest common subsequence using dynamic programming approach for X and Y. What is the length of longest common subsequence?

X = < A, B, C, B, D, A, B > Y = < B, D, C, A, B, A >

b) Find the shortest path using Bellman Ford algorithm for the following graph. Note that vertex z is source vertex.



Q.5. Solve the following questions **(06*02=12)**

a) Solve the following 15-Puzzle Problem.

1	**2**	**3**	**4**
5	**6**		**8**
9	**10**	**7**	**11**
13	**14**	**15**	**12**

b) How 4- Queens problem is solved by backtracking approach? Explain with the help of state space tree.

Q.6. Attempt any three Questions: **(04*03=12)**

a) Explain Class P, Class NP and Class NPC problems in detail.

b) Insert the following keys into empty B-Tree with minimum degree 2. Show the configuration of B-Tree after each insertion operation.
Keys: F S Q K C L H T V W M R N P A B X Y D Z E

c) What do you mean by Red Black Tree?. What are the characteristics of Red Black tree?

d) Explain Polynomial time reduction with example.

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2023

Course: B. Tech. Branch :Computer Science & Engineering /Computer Engineering/Computer Science & Engineering (AI& ML)/ AIDS (2020-2021)/ Computer Science & Design **Semester : IV**

Subject Code & Name: BTES405 Digital Logic Design & Microprocessor

Max Marks: 60 **Date:25-01-24** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Explain error detecting and correcting codes.	Understand	**6**
B)	Define digital signals. Explain positive logic and negative logic.	Understand	**6**
C)	Explain types of Boolean postulates with example.	Understand	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Implement the expression using a multiplexer. $F(A,B,C,D) = \sum(0,2,3,6,8,9,12,14)$.	Analysis	**6**
B)	Design half adder and full adder circuit.	Synthesis	**6**
C)	$F(A,B,C,D) = \pi M\ (1,2,3,8,9,10,11,14).d(7,15)$.	Analysis	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	How do you eliminate the race around condition in a J-K Flip-Flop.	Remember	**6**
B)	What is meant by programmable counter? Mention its application.	Remember	**6**
C)	Write a short note on Parity Generator/ Checker.	Understand	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	What are the various registers of 8085 microprocessor. Discuss their function.	Remember	**6**
B)	Draw the block diagram of 8086 and explain its each block in brief.	Understand	**6**
C)	Explain different addressing modes of 8086.	Understand	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	Explain DMA Controller with neat block diagram.	Understand	**6**
B)	Explain following instructions 1) CMP. 2) AAS. 3) IMUL. 4) CBW. 5) TEST. 6) RCR.	Analysis	**6**
C)	Explain with examples different types of arithmetic instructions.	Analysis	**6**

***** End *****

	DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE **Winter Examination – 2022** **Course: B. Tech. Branch : Computr Engg/ CSE** **Semester :IV** **Subject Code & Name: BTES405 Digital Logic Design & Microprocessor** **Max Marks: 60 Date: Duration: 3 Hr.**		
	Instructions to the Students: *1. All the questions are compulsory.* *2. The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.* *3. Use of non-programmable scientific calculators is allowed.* *4. Assume suitable data wherever necessary and mention it clearly.*		
		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	**Differentiate between analog vs digital signal.**	**Analyzing**	**6**
B)	**Which gates are known as universal gates? Justify using examples.**	**Understanding**	**6**
C)	**State and prove any two theorems of Boolean algebra.**	**Applying**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	**How will you implement Full adder circuit? Draw the circuit diagram and derive equation for sum and carry.**	**Understanding**	**6**
B)	**Using K map, simplify Boolean equation for the following logic equation expressed by min terms? Y=F(A,B,C,D)=∑m(7,9, 10, 11, 12, 13, 14, 15)**	**Applying**	**6**
C)	**Differentiate between combinational and sequential logic circuit.**	**Analyzing**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	**Differentiate between synchronous and asynchronous counter.**	**Analyzing**	**6**
B)	**Explain SR Flip flop in detail.**	**Understanding**	**6**
C)	**Draw and explain serial in serial out shift register in detal.**	**Understanding**	**6**
Q.4	**Solve Any Two of the following.**		**12**
A)	**Diffrentiate in between 8085 & 8086 microprocessors.**	**Analyzing**	**6**
B)	**Draw & explain architecture of DMA controller.**	**Understanding**	**6**
C)	**Draw & explain 8086 block diagram.**	**Understanding**	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	**Classify different instruction set of 8086.**	**Analyzing**	**6**

B)	**Explain different addressing modes of 8086.**	**Understanding**	**6**
C)	**Explain assembly language programming tools.**	**Understanding**	**6**
	***** End *****		

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. **Branch : COMPUTER ENGG/CSE** **Semester :IV**

Subject Code & Name: BTES405 Digital Logic Design & Microprocessor

Max Marks: 60 **Date: 27/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	**What is Signal? Write Characteristics of Digital Signals.**	**Analyzing**	
B)	**Explain Digital Gate with their types.**	**Understanding**	
C)	**Write short note on Error Detecting and Correcting Codes.**	**Applying**	
Q.2	**Solve Any Two of the following.**		**12**
A)	**Explain the working of Multiplexer and De-Multiplexer.**	**Understanding**	
B)	**Write and explain with example Don't care conditions.**	**Applying**	
C)	**Minimize the four-variable logic function using k-map. $f(A,B,C,D) = \sum m(0, 1, 2, 3, 5, 7, 8, 9, 11, 14)$**	**Applying**	
Q. 3	**Solve Any Two of the following.**		**12**
A)	**Design 3-bit synchronous up counter using JK flip flops**	**Applying**	
B)	**Convert S-R FLIP-FLOP TO J-K FLIP-FLOP.**	**Applying**	
C)	**Write and explain any two applications of flip-flop.**	**Understanding**	
Q.4	**Solve Any Two of the following.**		**12**
A)	**Comparison of 8-bit, (8085) 16-bit (8086), and 32-bit microprocessors (80386)**	**Understanding**	
B)	**Draw and explain 8086 Internal Block Diagram.**	**Understanding**	
C)	**Write short note on Memory .**	**Understanding**	
Q. 5	**Solve Any Two of the following.**		**12**
A)	**Explain different type of Addressing modes of 8086.**	**Analyzing**	
B)	**Write different Data transfer instructions.**	**Analyzing**	
C)	**Write short note on Assemblers and compilers**	**Understanding**	

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Examination – 2023

Course: B. Tech. **Branch : Computer Engineering** **Semester :IV**

Subject Code & Name: **BTCOC403 Operating System**

Max Marks: 60 **Date: 20/01/2024** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	**Explain the importance of Real-Time Embedded systems.**	**Understand**	**6**
B)	**Define Operating System. List the objectives of an operating system.**	**Apply**	**6**
C)	**What is a Virtual Memory? Discuss the benefits of virtual memory technique.**	**Apply**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	**What is a process? Explain about various fields of Process Control Block.**	**Understand**	**6**
B)	**Using the given information about the process, calculate average waiting time and average turnaround time of each process under the following scheduling algorithm: 1)FCFS, 2)SJF 3) SJF (Preemptive mode)**	**Apply**	**6**

Process Id	Arrival Time	Burst Time
P1	0	8
P2	1	5
P3	3	4
P4	4	3
P5	1	3

C)	**Explain the steps involved in process creation and process termination.**	**Understand**	**6**
Q. 3	**Solve Any Two of the following.**		**12**
A)	**What is Dining Philosophers problem? Discuss the solution to Dining philosopher's problem using monitors.**	**Understand**	**6**
B)	**What are the semaphores? How do they implement mutual exclusion?**	**Understand**	**6**
C)	**What is a scheduler? List and describe different types of schedulers.**	**Understand**	**6**

Q.4	**Solve Any Two of the following.**		**12**
A)	**How does deadlock avoidance differ from deadlock prevention? Write about deadlock avoidance algorithm in detail.**	**Understand**	**6**
B)	**Given memory partition of 100 KB, 500 KB, 200 KB and 600 KB (in order). Show with neat sketch how would each of the first-fit, best-fit and worst fit algorithms place processes of 412 KB, 317 KB, 112 KB and 326 KB (in order).**	**Apply**	**6**
C)	**Write a short note on the following:** **i) Stable storage implementation ii) Free space management**	**Understand**	**6**
Q. 5	**Solve Any Two of the following.**		**12**
A)	**Consider the reference string: 7, 0, 1, 2, 0, 3, 0, 4, 2, 3, 0, 3, 2, 1, 2, 0, 1, 7, 0, 1 for a memory with three frames. Trace FIFO, optimal, and LRU page replacement algorithms.**	**Apply**	**6**
B)	**How to provide protection to a file system? Explain.**	**Understand**	**6**
C)	**Discuss the different file allocation methods with suitable example**	**Analysis**	**6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter-2023

Course: B. Tech. **Branch: Computer Engineering** **Semester: IV**

Subject Code & Name: BTCOC402 & Operating System

Max Marks: 60 **Date: 18/01/2024** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	List out different services of Operating Systems and Describe each service.	**(2)**	**6**
B)	What are system calls? Explain different categories of system calls with example?	**(2)**	**6**
C)	Describe different sub-components of an operating system.	**(2)**	**6**

Q.2	**Solve Any Two of the following.**			**12**
A)	Consider the following data with burst time given in milliseconds:		**(3)**	**6**

Process	Burst Time	Priority	Arrival time
P1	7	3	0
P2	4	1	2
P3	1	2	4
P4	4	4	5

i) Draw Gantt charts for the execution of these processes using FCFS, non-preemptive and preemptive SJF, and non-preemptive Priority scheduling.

ii) What is the Average waiting time of each process for each of the scheduling algorithm.

B)	Describe the actions taken by a kernel to context switch between kernel level threads		**(2)**	**6**
C)	Suppose the following jobs arrive for processing at the times indicated, each job willrun the listed amount of time.		**(3)**	**6**

Job	arrival time	burst time
1	0.0	9
2	0.2	5
3	1.2	2

i) Give a Gantt chart illustrating the execution of these jobs using the non- preemptive FCFS and SJF scheduling algorithms.

ii) what is turnaround time and wait time of each job for the above algorithms?

Q. 3 Solve Any Two of the following. **12**

A) Examine banker's algorithm after applying to the example given below A system has 5 processes, P1, P2, P3, P4 and P5. There are 2 types of resources A, and B. there are 10 instances of A, and 5 instances of B. At time T0, the situation is as follows; **(3)** **6**

Process-	Allocation-		Maximum	
	A	B	A	B
P1	0	1	7	5
P2	2	0	3	2
P3	3	0	9	0
P4	2	1	2	2
P5	0	0	4	3

Is the system in a safe state at time T0?

Suppose now a time T1, process P2 requests one additional instance of resource type A.

B) Describe necessary conditions for a deadlock situation to arise. **(2)** **6**

C) What is critical section problem and what are the requirements that need to be satisfied by any solution to critical section problem? Give a solution to a 2 processcritical section problem. **(2)** **6**

Q.4 Solve Any Two of the following. **12**

A) Consider a logical address space of 8 pages of 1024 words each, mapped on to a physical memory of 32 frames. **(3)** **6**

How many bits are there in the logical address?

How many bits are there in the physical address?

B) A process references 6 pages 1, 2, 3, 4, 5, 6 in the following order **(3)** **6**

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

Assuming that the replacement algorithm is LRU, Optimal and FIFO, find out the number of page faults during the sequence of references, starting with an empty main memory with 3 frames.

C) Explain with the help of supporting diagram how TLB improves the performance of a demand paging system. **(2)** **6**

Q. 5 Solve Any Two of the following. **12**

A) Consider two files systems A and B, that use contiguous allocation and linked allocation, respectively. A file of size 100 blocks is already stored in A and also in B. Now, consider inserting a new block in the middle of the file (between 50th and 51st block), whose data is already available in the memory. Assume that there are enough free blocks at the end of the file and that the file control blocks are already in memory. Let the number of disk accesses required to insert a block in the middle of the file in A **(3)** **6**

and B are n_A and n_B respectively, then the calculate value of $n_A + n_B$.

B) Suppose that a disk drive has 200 cylinders, numbered 0 to 199. the drive currently services a request at cylinder 50, and the previous request was at cylinder 25. the queue of pending request in FIFO order is 82,170,43,140,24,16,190 Starting from the current position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests, for each of the following algorithms i)FCFS ii) SSFT iii) SCAN iv)LOOK v) C-SCAN vi) C-LOOK. **(3)** **6**

C) What are the three methods for allocating disk space? Explain with help each method suitable diagram, merits and demerits. **(2)** **6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination – 2023

Course: B. Tech. **Branch: Computer Engineering** **Semester: IV**

Subject Code & Name: BTCOC402 Operating System

Max Marks: 60 **Date: 15.07.2023** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	Describe memory layout of multiprogramming operating system. State its advantages.	Understand	**6**
B)	Discuss design goals, polies and implementation of a typical operating system.	Understand	**6**
C)	Explain Virtual Machine (VM) based structure of operating system.	Remember	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	Describe the contents of Process Control Block (PCB).	Remember	**6**
B)	Explain the role of long term, short term and middle term scheduler in process scheduling.	Analyze	**6**
C)	Consider the following set of processes to be executing on uniprocessor system.	Apply	**6**

Processes	AT	BT
A	0	3
B	2	6
C	4	4
D	7	2

Draw the Gantt Chart and calculate average turnaround time and average waiting time for

i) SJF Non-preemptive

ii) SJF Preemptive

Q. 3	**Solve Any One of the following.**		**12**
A)	Explain the use of Resource Allocation Graph (RAG) in deadlock detection.	Analyze	**6**
B)	Write a pseudocode of Swap instruction used for process synchronization.	Understand	**6**
C)	Examine banker's algorithm for following snapshot of the system, there are 3 processes, P1, P2 and P3. And 3 resource types, R1, R2 and R3. There are 12 instances of resource type R1, 11 instances of resource type R2 and 20 instances of resource type R3.	Apply	**6**

At time T0, the situation is as follows-

Processes	Allocated Resources			Maximum resources		
	R1	R2	R3	R1	R2	R3
P1	2	2	3	3	6	8
P2	2	0	3	4	3	3
P3	1	2	4	3	4	4

State-

i) Contents of matrix Need.
ii) Is the system in a safe state at T0?

Q.4 Solve Any Two of the following. **12**

A) Consider the page reference string- Apply **6**
4, 7, 6, 1, 7, 6, 1, 2, 7, 2.
If there is there is three-page frames, calculate page faults for following algorithms-

i) FIFO page replacement
ii) LRU page replacement
iii) Optimal page replacement

B) Explain paging mechanism with neat diagram. State the importance of offset in it. Understand **6**

C) Discuss the need of page replacement. Differentiate between local and global page replacement. Analyze **6**

Q. 5 Solve Any One of the following. **12**

A) Explain the concept of file. State various file operations. Remember **6**

B) Discuss linked and index disk space allocation methods with neat sketch. Understand **6**

C) Write a note on free space management**.** Understand **6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Regular End Semester Examination – Summer 2022

Course: B. Tech. **Branch: Computer Engineering** **Semester: IV**

Subject Code & Name: BTCOC402 & Operating Systems

Max Marks: 60 **Date: 18/08/2022** **Duration: 3.45 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level)	**Marks**
Q. 1	**Solve Any Two of the following.** *(This is just a sample instruction)*		
A)	Define a virtual machine with neat diagram. Describe the concept and working of JVM. Explain what are the benefits of a VM?	**(2)**	**6**
B)	What is the purpose of command interpreter? Why is it usually separate from the Kernel?	**(2)**	**6**
C)	Describe major activities of an operating system in regard to: 1) Process management 3) Main Memory management 2) File management 4) Secondary storage management	**(2)**	**6**

Q.2 Solve Any Two of the following. *(This is just a sample instruction)*

A) Consider the following data with burst time given in milliseconds: **(3)** **6**

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

The process has arrived in the order P1, P2, P3, P4, P5.

i) Draw Gantt charts for the execution of these processes using FCFS, SJF, non-preemptive Priority and RR (quantum=2) scheduling.

ii) What is turnaround time and waiting time of each process for each of the scheduling algorithm.

B) What are co-operating processes? Describe the mechanism of inter process communication using shared memory and massage passing **(2)** **6**

C) Suppose the following jobs arrive for processing at the times indicated, each job will run the listed amount of time. **(3)** **6**

Job	arrival time	burst time
1	0.0	8
2	0.4	4
3	1.0	1

i) Give a Gantt chart illustrating the execution of these jobs using the non- preemptive FCFS and SJF scheduling algorithms.

ii) What is turnaround time and waiting time of each job for the above algorithms?

Q. 3 Solve Any Two of the following. *(This is just a sample instruction)*

A) Examine banker's algorithm after applying to the example given below. A system has 5 processes, P1, P2, P3, P4 and P5. There are 3 types of resources R1, R2 and R3. there are 10 instances of R1, 5 instances of R2 and 7 instances of R3. At time T0, the situation is as follows; **(3)** **6**

Process	**Allocation**			**Maximum**		
	R1	R2	R3	R1	R2	R3
P1	0	1	0	7	5	3
P2	2	0	0	3	2	2
P3	3	0	2	9	0	2
P4	2	1	1	2	2	2
P5	0	0	2	4	3	3

Is the system in a safe state at time T0?

Suppose now at time T1, process P2 requests one additional instance of resource type R1, is the system in a safe state?

B) Why is deadlock state more critical than starvation? Describe resource allocation graph with a deadlock, also explain resource allocation graph with a cycle but no deadlock. **(2)** **6**

C) Describe the bounded-buffer Producer-Consumer problem and give a solution for the same using semaphores. Write the structure of Producer and Consumer processes. **(2)** **6**

Q.4 Solve Any Two of the following. *(This is just a sample instruction)*

A) Given memory partitions of 150 K, 250 K, 500 K, 300 K and 600 K (in order) how would each of the first-fit, best-fit and worst-fit algorithms allocate processes of 212K, 417K, 112K and 426 K (in order)? Which algorithm makes the most efficient use of memory? **(3)** **6**

B)	Consider the following page reference string 1,2,3,4,2,1,5,6,2,1,2,3,7,6,3,2,1,2,3,6 Find out the number of page faults if there are 3 page frames, using the following page replacement algorithm i) LRU ii) FIFO iii) Optimal	**(3)**	**6**
C)	Describe the action taken by the operating system when a page fault occurs with neat diagram.	**(2)**	**6**

Q. 5 Solve Any Two of the following. *(This is just a sample instruction)*

A)	Describe the different file allocation methods. Also explain the methods of file implementation with merits and demerits.	**(2)**	**6**
B)	Suppose that a disk drive has 5000 cylinders, numbered 0 to 4999. the drive currently services a request at cylinder 1043, and the previous request was at cylinder 1225. the queue of pending request in FIFO order is 486, 1470, 913, 1774, 948, 1509, 1022, 1750, 130. Starting from the current position, what is the total distance (in cylinders) that the disk arm moves to satisfy all pending requests, for each of the following algorithms i) FCFS ii) SSFT iii) SCAN iv) LOOK v) C-SCAN.	**(3)**	**6**
C)	Describe how free-space management is implemented in file system. Also explain bit map with the help of an example	**(2)**	**6**

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

B. Tech Winter Semester Supplementary Examination: Nov.-2019

Branch: B.Tech. (Computer Engineering) **Sem: IV**

Subject with Subject Code: Operating System[BTCOC403] **Marks:60**

Date:- 30/11/2019 **Time: 3 Hrs**

Instructions to the Students:

1.Each question carries 12 marks.

2. Attempt **any five** questions of the following.

3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.

4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly

Marks

Q.1 Attempt the following questions.

(A) Define operating system. Enlist and explain different types of os. **06**

(B) List five services provided by an operating system, and explain how each creates convenience for users. In which cases would it be impossible for user-level programs to provide these services? Explain your answer. **06**

Q. 2 Attempt the following questions.

(A) Describe the actions taken by a kernel to context-switch between processes. **06**

(B) Using the given information about the processes, calculate Average Waiting Time and Average Turnaround Time of each process under following scheduling algorithms: **06**

a) First Come First Served

b) Shortest Job First

c) Round Robin (With time slice of 5 ms)

Process	Burst time(ms)
P1	5
P2	24
P3	16
P4	10
P5	3

Q.3 Solve any Two.

(A) What is Inter-process communication?Are function callback and inter-process communication same? **06**

(B) Explain why interrupts are not appropriate for implementing synchronization primitives in multiprocessor systems. **06**

(C) What are the requirements for the solution to critical section problem? **06**

Q.4 Attempt the following questions.

(A) Consider the deadlock situation that could occur in the dining-philosophers problem when the philosophers obtain the chopsticks one at a time. Discuss how the four necessary conditions for deadlock indeed hold in this setting. Discuss how deadlocks could be avoided by eliminating any one of the four conditions. **06**

(B) What are the Conditions for Deadlock to occur? Briefly explain. In a system, the following state of processes and resources are given: R1→ P1, P1→ R2, P2→ R3, R2→ P2, R3→ P3, P3→ R4, P4→ R3, R4→ P4, P4→ R1, R1→ P5. Draw Resource Allocation Graph for the system and check for deadlock condition. Explain your answer. **06**

Q.5 Attempt the following questions.

(A) Given five memory partitions of 100 KB, 500 KB, 200 KB, 300 KB, and 600 KB (ill order), how would the first-fit, best-fit, and worst-fit algorithms place processes of 212 KB, 417 KB, 112 KB, and 426 KB (in order)? Which algorithm makes the most efficient use of memory? **06**

(B) Compare the memory organization schemes of contiguous memory allocation, pure segmentation, and pure paging with respect to the following issues: **06**
a. External fragmentation
b. Internal fragmentation
c. Ability to share code across processes

Q.6 Attempt the following questions.

(A) Consider a reference string: 4, 7, 6, 1, 7, 6, 1, 2, 7, 2. the number of frames in the memory is 3. Find out the number of page faults respective to: **06**
1. Optimal Page Replacement Algorithm
2. FIFO Page Replacement Algorithm
3. LRU Page Replacement Algorithm

(B) In what situations would using memory as a RAM disk be more useful than using it as a disk cache? **06**

**********End of Paper**********

203 Comp IV

40

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DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE – RAIGAD -402 103

Semester Examination – Summer - 2019

Branch: Computer Science & Engineering **Sem.:-IV**

Subject with Subject Code:- Operating System (BTCOC403) **Marks:60**

Date:-20/05/19 **Time:- 3 Hr.**

Instructions to the Students

1. Each Question carries 12 marks.
2. Attempt **any Five** Questions of the following.
3. Illustrate your answers with neat sketches, diagram etc., wherever necessary.
4. If some part or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Q (1) Attempt any four of the following. 12

(a) What is an Operating System? Give its purpose. How it works similar to government?

(b) How are network computers different from traditional personal computers? Why do some systems store the O.S. in firmware and other on disk?

(c) In what ways, is the moduler, kernel approach similar to the layered approach? In what ways, does it differ from layered approach?

(d) How does the distinguish between kernel mode function as a rudimentary form of protection or system security? Enlist all Operating System services.

(e) Explain the architecture of UNIX Operating System. What is System Administration? Describe the roles of all the members of System Administration.

Q (2) Attempt any four of the following. 12

(a) Discuss the structure of a Regular file. Enlist different file attributes and directories.

(b) Discuss the role of Buffer in Operating System. How does we differentiate buffering with spooling?

(c) How buffer pools are used? Discuss advantages and disadvantages of Buffer Cache.

(d) What is an Inode? How to perform conversion of a Path Name to an Inode?

(e) What is page? How we replace it?

Q (3) Attempt any two of the following 12

(a) What is system call? What system calls have to be executed by a command interpreter or shell in order to start a new process? Why there is need of process creation and termination? Enlist different system calls for above two operations?

(b) What are the advantages and disadvantages of using the same system call interface for manipulating both files and devices? Discuss the roles of system calls for file system.

(c) Discuss how the user view of designing the operating system differs with abstract view. Enlist different tasks performed by Operating System.

Q (4) Attempt any four of the following 12

(a) What is process? Discuss process states and its transition.

(b) Explain Layout of System. How do we save the context of a process?

(c) What is System program? Discuss its categories with examples.

(d) What is shell? Discuss its applications and types. What is system boot?

(e) Why there is need of synchronization? What is critical section problem?

Q (5) Attempt any four of the following 12

(a) How do you prove the following solutions of critical section problem are correct? i) Mutual Exclusion is preserved.
ii) Progress requirement is satisfied.
Iii) Bounded waiting requirement is met.

(b) How do we differentiate Storage manegement with Device or I/O management?

(c) What is deadlock? Suggest necessary conditions for deadlock?

(d) If short term scheduler takes 10 ms to decide to execute a process for 100 ms, then how much percentage of CPU is being used simply for scheduling the work? Mention the role of scheduler with their types.

(e) What is dynamic storage allocation problem? Give its solution?

Q (6) Attempt any two of the following 12

(a) How do we differentiate memory management with task or process management?

(b) What is Interprocess Communication? Discuss its application.

(c) How do you differentiate paging with segmentation by giving explanation on page and segment table?

(d) Consider the following set of processes, with the length of the CPU burst given in ms:

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

The processes are assumed to have arrived in the order P1,P2,P3,P4,P5, all at time 0.

a) Draw Gantt charts that illustrates the execution of these processes using the following scheduling algorithms: FCFS, SJF, nonpreemptive priority.
b) What is the turnaround time of each process for each of the scheduling algorithms?
c) What is the waiting time of each process for each of these scheduling algorithms?

END

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter-2023

Course: B. Tech. **Branch : AI& Allied** **Semester :IV**

Subject Code & Name: Probability Theory and Random Processes BTBS404

Max Marks: 60 **Date:** 23-01-24 **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

(Level/CO) Marks

Q. 1 Solve Any Two of the following. **12**

A) A piece of equipment will function only when all the three components A, B, and C are working. The probability of failing of A during one year is 0.15, that of failing of B is 0.05 and that of C is 0.10. What is the probability that the equipment is will fail before the end of the year? L3/CO-1 **6**

B) Find the probability that in a random arrangement of letters in the word "ASSASSINATION" the four S's come consecutively. L3/CO-1 **6**

C) There are three bags; first contains 1 white, 2 red, 3 green balls; second contains 2 white, 3 red and 1 green and third contains 3 white,1 red and 2 green balls. Two balls are drawn at random from a bag chosen at random. There are found to be 1 white and 1 red. Find the probability that balls came from Second bag. L3/CO-1 **6**

Q.2 Solve Any Two of the following. **12**

A) A random variable X has the following distribution: L4/CO-2 **6**

X:	1	2	3	4	5	6
P(X):	2k	4k	6k	8k	10k	12k

Determine (i) k (ii) $P(X < 4)$ (iii) $P(2 \leq X < 5)$ (iv) $E(X)$ (v) Var (X)

B) A multiple choice test consists of 8 questions with 3 answers, with no negative marking for wrong answer. Student give answer randomly, to get distinction student must solve 75% correct answers. What is the chance that student must get distinction. L3/CO-2 **6**

C) Fit a Poisson distribution to the following L2/CO-2 **6**

x	0	1	2	3	4
p(x)	46	38	22	9	1

Q. 3 Solve Any Two of the following. **12**

A) Calculate Karl Pearson's coefficient of correlation for the following data L2/CO-3 **6**

x	45	70	65	30	90	40	50	75	85	60
y	35	90	70	40	95	40	60	80	80	50

Calculate its probable error by assuming 60 and 65 as working means. Discuss whether or not calculated correlation coefficient is significant?

B) If r=0.8, $\sum xy = 60, \sigma_y = 2.5$ and $\sum x^2 = 90$, where x and y are deviations from the respective means, compute the number of observations (n). L3/CO-3 **6**

C) Calculate the rank correlation coefficient of the following data. L3-CO-3 **6**

x	68	64	75	50	64	80	75	40	55	64
y	62	58	68	45	81	60	68	48	50	70

Q.4 Solve Any Two of the following. **12**

A) Obtain regression line of y on x for the following data L2/CO-4 **6**

x	1	2	3	4	5	6	7	8	9
y	9	8	10	12	11	13	14	16	15

Also, obtain an estimate of y which should correspond on the average to x=6.2

B) Given that for 100 items, the regression equations are $8x - 10y + 66 = 0$ and $40x - 18y = 214$. If variance of x is 9 then find L3/CO-4 **6**

1) Mean of x and y,
2) Correlation coefficient r_{xy}.
3) Standard deviation of y.

C) For a sample of firms, the correlation between the profit rate (x) and growth rate (y) is found to be +0.9. Given the following additional information L3/CO-4 **6**

	Profit rate (%)	Growth rate (%)
Mean	20	25
Standard deviation	3	3

1) Compute the regression equation of y onx.
2) Estimate the likely growth rate (y) when profit rate is 16%.

Q. 5	Solve Any Two of the following.		**12**
A)	A coin was tossed 484 times and the head turned up 265 times. Test the hypothesis that the coin is unbiased at 5% LOS.	L2/CO-5	**6**
B)	In a city A, 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5 of a random sample of 1600 school boys had the same defect. is the difference between the proportion significance?	L3/CO-5	**6**
C)	A sample of 100 electric bulbs produced by manufacturer A showed a mean life time of 1190 hours and a standard deviation of 90 hours. A sample of 75 bulbs produced by manufacturer B showed a mean life time of 1230 hours with the standard deviation of 120 hours. Is there a difference between the mean life time of two hands at significance level of i)5% and ii)1%	L3/CO-5	**6**

*** Best of Luck ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Supplementary Winter Semester Examination – 2023

Course: B. Tech. **Branch : Computer Science & Engineering** **Semester: IV**

Subject Code & Name: Probability Theory and Random Processes (BTBS404)

Max Marks: 60 **Date:23-01-24** **Duration: 3 Hr.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	A card is drawn from a well shuffled pack of playing cards. Find the probability that it is either a diamond or a king.	Understand	
B)	In a random arrangement of the letters of the word "MATHEMATICS". Find the Probability that all the vowels come together	Understand	
C)	Derive equation of Bayes' Theorem	Application	
Q.2	**Solve Any Two of the following.**		**12**
A)	Ten unbiased coin are tossed simultaneously. Find the probability of obtaining, i) exactly 6 heads ii) No head	Application	
B)	A continuous random variable has probability density function $f(x) = 6(x - x^2)$ where $0 \leq x \leq 1$. Find mean, variance, median.	Evaluation	
C)	A die is tossed twice. Getting 'an odd number' is termed as success. Find the probability distribution of the number of successes.	Understand	
Q. 3	**Solve Any Two of the following.**		**12**
A)	Calculate probable error. If the coefficient of correlation is 0.92 and number of pairs of items are 25.	Application	
B)	The ranks of some 16 students in Mathematics and Physics are as follows. Two numbers within brackets denote the ranks of the students in Mathematics and Physics: (1,1), (2,10), (3,3), (4,4), (5,5), (6,7), (7,2), (8,6), (9,8), (10,11), (11,15), (12,9), (13,14), (14,12), (15,16), (16,13). Calculate the rank correlation coefficient for the proficiencies of this group in Mathematics & Physics.	Application	
C)	What is Correlation? Explain its types and causation.	Understand	

Q.4 **Solve Any Two of the following.** **12**

A) Obtain the angle between the two lines of regression.

B) From the following data of the age of husband and age of wife, find two regression lines and calculate the husband's age when wife's age is 16. Analysis

Husband age	36	23	27	28	28	29	30	31	33	35
Wife age	29	18	20	22	27	21	29	27	29	28

C) If $\bar{x} = 8.2;\ \bar{y} = 12.4; \sigma_x = 6.2;\ \sigma_y = 20; r(x,y) = 0.9,$ find the lines of regression. Estimate the value of x for $y = 10$ and estimate y for $x = 10.$ Application

Q. 5 **Solve Any Two of the following.** **12**

A) A random sample of size 36 is taken from a normal population with known variance $\sigma^2 = 25.$ If the mean of the samples is $\bar{x} = 42.6$ test the null hypothesis $\mu = 45$ against the alternative hypothesis $\mu < 45$ with $\alpha = 0.05$ Application

B) Explain Null Hypothesis and Alternative Hypothesis. Evaluation

C) In a random sample of 340 students, 178 of the 210 females and 90 of the 130 males passed Statistics and Probability on their first take. Construct a 90% confidence interval for the population proportion of students who passed the subject. Application

***** End *****

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE

Summer Examination – 2023

Course: SYB.Tech. **Branch : AI&DS/CSE(AI&DS)** **Semester :IV**

Subject Code & Name: Probability Theory and Random Processes(BTBS404)

Max Marks: 60 **Date:20/07/2023** **Duration: 3 Hrs.**

Instructions to the Students:

1. *All the questions are compulsory.*
2. *The level of question/expected answer as per OBE or the Course Outcome (CO) on which the question is based is mentioned in ( ) in front of the question.*
3. *Use of non-programmable scientific calculators is allowed.*
4. *Assume suitable data wherever necessary and mention it clearly.*

		(Level/CO)	Marks
Q. 1	**Solve Any Two of the following.**		**12**
A)	A chartered accountant applies for a job in two firms X and Y.The probability of his being selected in the firm X is 0.7, and being rejected in the firm Y is 0.5, and the probability of at least one of his applications being rejected is 0.6.What is the probability that he will be selected is one of the firms?	**CO1**	**6**
B)	The factory F_1 produces 1000 articles, 20 of them being defective; the factory F_2 Produces 4000 articles, 40 of them being defective and the F_3 produces 5000 articles, 50 of them being defective. If one article is chosen from all these articles put in one stockpile and is found to be defective, find the probability that it is from the factory F_1.	**CO1**	**6**
C)	Two dice are rolled, find the probability of getting sum is equal to (i) 6 (ii) more or equal to 10	**CO1**	**6**
Q.2	**Solve Any Two of the following.**		**12**
A)	A random variable X has the following distribution: Determine (i) k (ii) $P(X < 4)$ (iii) $P(2 \leq X < 5)$ (iv)$E(X)$ (v) Var(X)	**CO2**	**6**

X:	1	2	3	4	5	6
P(X):	2k	4k	6k	8k	10k	12k

B) Fit the Binomial Distribution to the following data

X:	0	1	2	3	4
F:	28	62	46	10	4

CO2 **6**

C) In a sample of 1000 students, the mean and standard deviation of marks Obtained by the students in a certain test are 14 and 2.5. Assuming the distribution to be normal find the number of students getting marks (i)between 12 and 15, (ii) above 18, (iii) below 8 [Given :For a S.N.V. z area between $z = 0$ to $z = 0.4$ is 0.1554 , between $z = 0$ to $z = 0.8$ is 0.2881,that between $z = 0$ to $z = 1.6$ is 0.4452, between $z = 0$ to $z = 2.4$ is 0.4918]

CO2 **6**

Q. 3 Solve Any Two of the following. **12**

A) 10 students of B.Sc. Obtained following marks in statistics in internal assessment (X) and university examination (Y) as Calculate (i) the Karl Pearson's coefficient of correlation (ii)standard error (iii)probable error from the following data:

CO3 **6**

X:	6	8	12	15	18	20	24	28	31
Y:	10	12	15	15	18	25	22	26	28

B) Obtain Rank Correlation Coefficient (ρ), for the following data,

CO3 **6**

X	68	64	75	50	64	80	75	40	55	64
Y	62	58	68	45	81	60	68	48	50	70

C) Test the significance of the correlation for the following value based on the number of observation :

i. 10 & ii. 100, $r = 0.4$ & $r = 0.9$

CO3 **6**

Q.4 Solve Any Two of the following. **12**

A) The data about sales and advertisement expenditure of a firm is given below

6

	sales	advertisement expenditure
Mean	40	6
Standard Deviation	10	1.5

Coefficient of correlation, r = 0.9

a) Estimate the likely sales for a proposed advertisement expenditure of Rs 10 crores.

b) What should be the advertisement expenditure if the firm proposes a sales target of 60 crores of rupees?

CO4

B) Obtain the equation of the regression lines form the following data,

X	91	97	108	121	67	124	51	73	111	57
Y	71	75	69	97	70	91	39	61	80	47

CO4 **6**

C) In a partially destroyed laboratory record, only the lines of regression of y on x and x on y are available as $4x - 5y + 33 = 0$ & $20x - 9y = 107$ Respectively. Calculate $\bar{x}$ & $\bar{y}$ & the coefficient of correlation between x & y

CO4 **6**

Q. 5 Solve Any Two of the following. **12**

A) A coin was tossed 484 times and the head turned up 265 times. Test the hypothesis that the coin is unbiased at 5% LOS. **CO5** **6**

B) In a city A, 20% of a random sample of 900 school boys had a certain slight physical defect. In another city B, 18.5 of a random sample of 1600 school boys had the same defect. is the difference between the proportion significance? **CO5** **6**

C) A sample of 100 electric bulbs produced by manufacturer A showed a mean life time of 1190 hours and a standard deviation of 90 hours. A sample of 75 bulbs produced by manufacturer B showed a mean life time of 1230 hours with the standard deviation of 120 hours. Is there a difference between the mean life time of two hands at significance level of i)5% and ii)1% **CO5** **6**

*** End ***

DR. BABASAHEB AMBEDKAR TECHNOLOGICAL UNIVERSITY, LONERE-RAIGAD-402103

Summer Semester Examination, 2022

B.Tech. Computer Engineering /CSE/ CSE(AI&ML).

Semester: IV Max. Marks: 60

Subject: Probability Theory & Random Processes/Probability and Statistics [BTBS404]

Date: 24/08/2022 Time: 3.45 Hrs

Instructions to the Student:

1. Each question carries 12 marks
2. All Questions are compulsory
3. Illustrate your answers with neat sketches diagram etc. wherever necessary.
4. If some pare or parameter is noticed to be missing, you may appropriately assume it and should mention it clearly.

Marks

Que: 1 Attempt any TWO of the following questions. [12]

A] i) What is the chance that a non-leap year should have fifty three Sundays?

ii) Urn A contains 5 red and 3 white memory chips; the urn B contains 2 red and 6 white memory chips. If a chip is drawn from each box what is the probability that they are both of the same colour?

B] A committee of 4 persons is to be appointed from 3 officers of the production department, 4 officers of the purchase department, 2 officers of the sales department and 1 chartered accountant. Find the probability of the committee in the following manner:

i) There must be one from each category.
ii) It should have at least one from the purchase department.
iii) The chartered accountant must be in the committee

C] In a certain college 25% of boys and 10% of girls are studying mathematics. The girls constitute 60% of the students. If a student is selected at random and is found to be studying mathematics, find the probability that the student is a (i) girl and (ii) a boy.

Que: 2 Attempt any TWO of the following questions. [12]

A] i) A continuous random variable has the probability density function $f(x)f(x)$ as

$$f(x) = \begin{cases} ke^{-x}, & x > 0 \\ 0, & elsewhere \end{cases}$$

Determine the constant k k.

ii) Obtain the probability distribution of X, the number of heads in three tosses of a coin. Also find the expected number of heads appearing when a fair coin is tossed three times.

B] Fit a Binomial distribution to the following observation:

x	0	1	2	3	4	5
f	2	14	20	34	22	8

C] Sacks of sugar packed by an atomic loader having an average weight of 100 kg with standard deviation 0.250 kg. Assuming normal distribution find chance of sack get weighing less than 99.5 kg. (Given: $A(2) = 0.4772$ $A(2) = 0.4772$)

Que: 3 Attempt the following questions. [12]

A] From the following data, calculate the rank correlation coefficient by Karl Pearson's method

x	6	2	10	4	8
y	9	11	?	8	7

Arithmetic means of X and Y series are 6 and 8 respectively.

B] From the following table, calculate the coefficient of correlation by Karl Pearson's method

x	48	33	40	9	16	16	65	24	16	57
y	13	13	24	6	15	4	20	9	6	19

Que: 4 Attempt the following questions. [12]

A] Obtain the least square regression line of y on x for the following data.

x_i	6	2	10	4	8
y_i	9	11	5	8	7

Also, obtain an estimate of y which should correspond on the average to $x = 5.$ $x = 5.$

B] The equation of two lines are $2x = 8 - 3y2x = 8 - 3y$ and $2y = 5 - x$ $2y = 5 - x$. Find the mean values of x and y. Find the value of correlation coefficient.

Que: 5 Attempt the following questions. [12]

A] i) A die was thrown 6000 times and a throw of 5 or 6 was obtained 3240 times. On the assumption of random throwing, do the data indicate an unbiased die?

ii) There are 30% and 25% respectively of faired haired people in the two large populations. Is this difference likely to be hidden in samples of 1200 and 900 respectively from the two populations?

B] A full-time Ph.D. students received an average salary of $12,837 according to U.S. Department of Education. The dean of graduate studies at a large state University feels that Ph.D. students in his state earn more than this. He surveys 44 randomly selected students and finds their average salary is $14,445 with a standard deviation of $150. With $\alpha = 0.05,$ $\alpha = 0.05,$ is the dean correct?