[Total No. of CO's: 5] Seat No: [Total No. of Pages: 2]

G. H. Raisoni College of Engineering and Management, Pune.
(An Autonomous Institution)
S.Y B. Tech (Information Technology) (Term-III)
ESE Winter-2020 (2019/2016 Pattern)
Graph Theory and Combinotrics (BITL19203_ BITL205)

[Time:3 Hour] **[Max. Marks-60]**

COURSE OUTCOME:

1. Describe the fundamental concepts of discrete mathematics to solve the engineering problems.
2. Identify, select & apply the appropriate data structures to solve real life problems.
3. Apply the counting principles to determine probabilities.
4. Analyze concepts of number theory.
5. Understand concepts of groups and rings.

Instructions to the candidates:

1) ***(CO1/CO2/CO….)at the beginning of question/sub question indicates the course outcome related to the question.***
2) ***All questions compulsory.***
3) ***Neat diagrams must be drawn wherever necessary.***
4) ***Figures to the right indicate full marks.***
5) ***Assume suitable data, if necessary.***
6) ***Other Instructions, if any.***

CO	*Sub Question*		
CO1	*a)*	Show that if A, and B are sets, then $\|A \cup B\| = \|A\| + \|B\| - \|A \cap B\|$.	*4*
	b)	Determine whether $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology	4
		OR	
	c)	Solve the recurrence relation together with initial Condition given $a_n = 3a_{n-1} + 2a_{n-2}$ with $a_1 = -2, a_2 = 4$	4
	d)	Write the symbolic notation of following proposition 1) Vandana's smartphone has at least 32 GB of memory 2) If you get 100% on the final, then you will get an A 3) If it is sunny, then we will go to the beach 4) There are 13 items in a baker's dozen.	4
CO2	*a)*	Use Warshall's Algorithm to find the transitive closure of the following relation on the set A={1,2,3,4} , R={(1,2), (1,3), (1,4), (2,3), (2,4), (3,4)}.	4
	b)	Describe the representation of graph with suitable example.	*4*
		OR	
	c)	Construct Binary search tree for the following data. 50, 70, 60, 20, 90, 10, 40, 100	4
	d)	Determine the number of edges in a graph with 6 nodes, 2 of degree 4 and 4 of degree 2. Draw two such graphs.	4
CO3	*a)*	How many ways are there to form a committee, if the committee consists of 3 educationalists and 4 socialist, if there are 9 educationalists and 11 socialist?	4
	b)	What is the coefficient of $x^{12}y^{13}$ in the expansion of $(2x - 3y)^{25}$ and $(x+y)^{25}$	4

c) Write an algorithm for generating combination and explain one example with the algorithm. 4

O4 a) Convert the hexadecimal expansion of each of these integers to a binary expansion. 1) $(135AB)_{16}$ 2) $(ABBA)_{16}$ 3) $(DEFACED)_{16}$ 4) $(2ED)_{16}$ 4

b) Encrypt the message STOP POLLUTION by translating the letters into numbers, applying the given encryption function, and then translating the numbers back into letters. a) $f(p) = (p + 4) \bmod 26$ b) $f(p) = (p + 21) \bmod 26$ 4

c) Describe the prime factorization method used for finding GCD and LCM of two integers with example. 4

CO5 a) Let A={ 0,1,x,y} be a set with four element, with addition and multiplication defined by 4

+	0	1	x	y
0	0	1	x	y
1	1	x	y	0
x	x	y	0	1
y	y	0	1	x

×	0	1	x	y
0	0	0	0	0
1	0	1	x	y
x	0	x	0	x
y	0	y	x	1

Is A is a field ? Is A is a Integral domain ? Justify your answer.

b) Describe the following terms with example 4
1) Integral Domain 2) Homomorphism of group

c) Let G be the set of all non-zero real numbers and let a*b=ab/2. 4
Show that (G *) is an abelian group

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l No. of CO's :04] Seat No: [Total No. of Pages:01]

G. H. Raisoni College of Engineering and Management, Pune.
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S.Y B. Tech (Information Technology) (Term-III)
ESE Winter-2020 (2019 Pattern)

Computer Architecture & Microprocessor based systems(BITL19201)

Time:-- 1.5 Hours] [Max. Marks-30]

Course Outcome:

Graduate shall be able to:

1. Describe fundamental units of Computer System
2. Understand the taxonomy of microprocessors and knowledge of contemporary microprocessors
3. Demonstrate programming using the various addressing modes and instruction set of 8086 microprocessor
4. Use the concept of memory management & multitasking of 80386 microprocessor.

tructions to the candidates:

1. *(CO1/CO2/CO….)at the beginning of question/sub question indicates the course outcome related to the question.*
2. *All questions compulsory.*
3. *Neat diagrams must be drawn wherever necessary.*
4. *Figures to the right indicate full marks.*
5. *Assume suitable data, if necessary.*

CO1	a)	Draw the diagram to shows how the CPU reads the value 16 from the memory location 2450.	[4]
	b)	Consider the signed decimal value, −56.256 and represent it in the format of Floating point representation	[4]
CO2	a)	Illustrate the performance of Bus interface unit in 8086 Architecture with diagram	[4]
	b)	Find the statues of all control and statue bit in Flag register after performing the execution of following instruction, if the value of AX=9878h and BX=3208h . Add AX, BX	[4]
		OR	
	c)	Compare the Near and Far CALL with example.	[4]
CO3	a)	Demonstrate the performance of instruction and directives with example. 1)MUL 2)ROR 3)DEC 4)DAA	[4]
	b)	Calculate the effective and physical address of following instructions as well as output of instruction after execution. DS:7880,SS=3980,CS=3890,BP=6798h, 1. MOV AX,[0765+BP]	[3]
CO4	a)	Write a short note on software interrupt.	[3]
	b)	Draw and explain the control register format of 80386	[4]

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G. H. Raisoni College of Engineering and Management, Pune.
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S.Y B. Tech (Information Technology) (Term-III)
ESE Winter-2020 (2019 Pattern)
Graph Theory and Combinotrics (BITL19203)/ BITL 25

[Time:3 Hour] **[Max. Marks-60]**

COURSE OUTCOME:

1. Describe the fundamental concepts of discrete mathematics to solve the engineering problems.
2. Identify, select & apply the appropriate data structures to solve real life problems.
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6) ***Other Instructions, if any.***

CO1	*a)*	Show that if A, and B are sets, then $\|A \cup B\| = \|A\| + \|B\| - \|A \cap B\|$.	4
	b)	Determine whether $[(p \rightarrow q) \wedge (q \rightarrow r)] \rightarrow (p \rightarrow r)$ is a tautology	4
		OR	
	c)	Solve the recurrence relation together with initial Condition given $a_n = 3a_{n-1} + 2a_{n-2}$ with $a_1 = -2, a_2 = 4$	4
	d)	Write the symbolic notation of following proposition 1) Vandana's smartphone has at least 32 GB of memory 2) If you get 100% on the final, then you will get an A 3) If it is sunny, then we will go to the beach 4) There are 13 items in a baker's dozen.	4
CO2	*a)*	Use Warshall's Algorithm to find the transitive closure of the following relation on the set A={1,2,3,4} , R={(1,2), (1,3), (1,4), (2,3), (2,4), (3,4)}.	4
	b)	Describe the representation of graph with suitable example.	4
		OR	
	c)	Construct Binary search tree for the following data. 50, 70, 60, 20, 90, 10, 40, 100	4
	d)	Determine the number of edges in a graph with 6 nodes, 2 of degree 4 and 4 of degree 2. Draw two such graphs.	4
CO3	*a)*	How many ways are there to form a committee, if the committee consists of 3 educationalists and 4 socialist, if there are 9 educationalists and 11 socialist?	4
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[Total No. of CO's : 4] Seat No: [Total No. of Pages: 02]

G. H. Raisoni College of Engineering and Management, Pune.
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S.Y B. Tech (Information Technology) (Term-III)
ESE Winter-2020 (2016 Pattern)
Data Structures (BCOL201)

[Time:- 3 Hours] **[Max. Marks: 60]**

OURSE OUTCOME:

. Describe the concepts of Data Structure
. Apply the concepts of linked list, searching and sorting
. Develop algorithms using stack and queues
. Identify the applications of data structure
. Create applications using data structure

nstructions to the candidates:
1) *(CO1/CO2/CO….)at the beginning of question/sub question indicates the course outcome related to the question.*
2) *All questions compulsory.*
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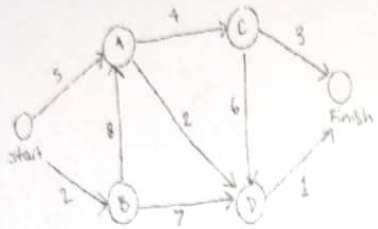
4) *Figures to the right indicate full marks.*
5) *Assume suitable data, if necessary.*
6) *Other Instructions, if any.*

CO1	a)	Describe Call by reference with example.	[4]
	b)	Illustrate with suitable example how structure members can be accessed using pointers.	[4]
	c)	Define recursion and explain how recursion is different from iterative function.	[4]
		OR	
	d)	Write a function to reverse a given string without using built in function.	[4]
CO2	a)	Write function to construct 'A' as an array of integers with the values 12, 4, 6,7, 8 into array A. Sort the numbers in ascending order using Merge Sort methods and display before and after sorting.	[6]
	b)	Write a function to insert data into beginning and end of the singly linked list.	[6]
		OR	
	c)	Describe the Application of doubly linked list in dynamic storage management.	
CO3	a)	Choose appropriate data structure to convert following infix expression to postfix-(a/(b-c+d))*(e-a)+c	[6]
	b)	Describe with suitable example how circular queue is useful for memory	[6]

utilization

O4	a)	Illustrate with example threaded binary tree.	[6]
	b)	Identify and explain the data structure to find the shortest path from source to destination for following graph.	[6]



CO5	a)	Use appropriate data structure to create binary search tree for the following data-1,2,3,4,8,7,6,5,11,10,12	[6]
	b)	Create a function to display the data in preorder post-order and in-order traversal.	[6]

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