

UNIVERSITI TUN HUSSEIN ONN MALAYSIA

FINAL EXAMINATION SEMESTER I **SESSION 2018/2019**

COURSE NAME

: DISCRETE STRUCTURE

COURSE CODE

: BIT 11003

PROGRAMME CODE : BIT

EXAMINATION DATE : DECEMBER 2018 / JANUARY 2019

DURATION

: 3 HOURS

INSTRUCTION

: A) ANSWER ALL QUESTIONS

B) PLEASE WRITE YOUR

ANSWERS IN THIS QUESTION

BOOKLET

C) CALCULATOR IS NOT

ALLOWED

THIS QUESTION PAPER CONSISTS OF TEN (10) PAGES

CONFIDENTIAL



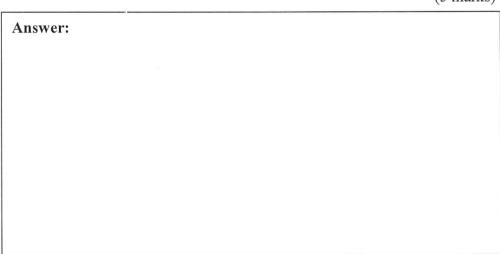
Q1	(a)	Determine whether the following set identity is true using Venn
		diagram. $(A - B) - C \subseteq A - C$

(6 marks)

	,
Answer:	

(b) By definition of Difference in set operations, demonstrate that $A - B = A \cap \overline{B}$ using a typical element argument.

(5 marks)



- (c) Let set $A = \{1, a, \{3, t\}, 4\}$.
 - (i) Find the cardinality of A

(1 mark)

Answer:

(ii) Identify the truth value of the statement, $3 \in A$.

(1 mark)

Answer:

(iii) Provide the reason of your answer in c(ii).

(2 marks)

Answer:



Q2 (a) If p is true, q is false, and r is true, what is the truth value of each statement?

(i) $(p \lor \sim q) \Rightarrow \sim q$ (2 marks)

Answer:

(ii) $(\sim p \land q) \Rightarrow \sim r$ (2 marks)

Answer:

(iii) $(p \lor \sim q) \Leftrightarrow \sim (p \land q)$ (2 marks)

Answer:

(b) A restaurant displays the sign "Good food is not cheap" and a competing restaurant displays the sign "Cheap food is not good". Use the truth table to verify whether the two restaurants saying the same thing.

(7 marks)

Answer:

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(c) Let ψ be the formula

$$\psi = (\sim (p \to q)) \to (q \land \sim r)$$

Obtain a Disjunctive Normal Form (DNF) and Conjunctive Normal Form (CNF) for $\boldsymbol{\psi}.$

(7 marks)

Answer:	
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Q3	(a)	Prove by mathematical induction that $3 \mid n^3 - n$ for every positive integers n .
		(10 marks
		Answer:

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(b)

is true by using mathematical induction method.	
Answer:	(10 marks
AH5WCI.	
,	,

Q4	(a)	Define Euler circuit.	
			(2 marks)
		Answer:	
	(b)	Suppose that in a group of 5 people: A, B, C, D, and E, th pairs of people are acquainted with each other. • A and C • A and D • B and C • C and D	e following
		• C and E	
		(i) Sketch a graph G to represent this situation.	(3 marks)
		Answer:	
		(ii) Draw an adjacency matrix for G.	(5 marks)
		Answer:	



Q5 (a	ı) Give	Given $X = \{1, 2, 3, 4, 5, 6\}$ and a relation R on X is define as				
	R =	$\{(1,2),(2,1),(2,3),(3,4),(4,5),(5,6)\}$	}. Describe			
	(i)	If R is reflexive. Give the reason.	(1 mark)			
	An	swer:				
	(ii)	If <i>R</i> is symmetric. Give the reason.	(1 mark)			
	An	swer:				
	(iii)	If R is transitive. Give the reason.	(1 mark)			
	An	swer:				
(t) Let	$R = \{(1, u), (1, v), (2, w), (3, w)\}$ and				
(-		$S = \{(u, 1), (v, 2), (v, 3), (w, 3), (x, 4), (y, 1), (y, 4)\}.$				
	(i)	Examine $S \circ R$. Then find $S \circ R$.	,, ,, ,,			
	, ,		(4 marks)			
	(ii)	Examine $R \circ S$. Then find $R \circ S$	(3 marks)			
	An	swer:	(5 marks)			
(0	e) (i)	Draw the graphical representation f	for the relation			
		$\{(a,a),(a,b),(b,c),(c,b),(c,d),(c,$	(l,a),(d,b) (2 marks)			
	An	swer:	(=			
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Q6

(a)

(ii)	Suppose that $A = \{1, 2, 3\}$ and $B = \{1, 2\}$. Let R be the relation from A to B defined by aRb if $a \in A, b \in B$ and $a > b$. Represent relation R in matrix form.
	(3 marks)
Answ	er:
the pro	ler the algorithm shown in Figure Q6 . This algorithm calculates oduct of matrices $a[]$ and $b[]$, and stores the result in matrix Determine a big-O estimate for the execution time of this hm.
begin fo	<pre>re mmult(a[1 to n, 1 to n], b[1 to n, 1 to n]:real) or i := 1 to n</pre>
end Figu	re Q6: An algorithm for matrix multiplication.
	(9 marks)

Answer:			
W		 ****	



(b)

Analyze the following situation.	
The bonus of an employee will be 100% of outstanding performance, 70% of the basic performance and zero for all other case	ne basic salary fo salary for averag
Write an algorithm to calculate and print the to listributed by the organization.	tal bonus amount to l
	Solution: (11 mark
Answer:	
MISWEL:	
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- END OF QUESTION -

