KEMENTERIAN PENDIDIKAN TINGGI POLITEKNIK MALAYSIA KUCHING SARAWAK **JABATAN MATEMATIK, SAINS DAN KOMPUTER**		COURSE CODE/ COURSE NAME		DBM2033	
		COURSEWORK ASSESSMENT		TUTORIAL 1	
		SESSION		DECEMBER 2017	
NAME		DURATION	20 MINS	CLO1	
				CLO2	20 MARKS
REGISTRATION NO.				CLO3	
PROGRAMME/ SECTION	DDT2B	TOTAL MARKS			20 MARKS

Instructions

- Answer ALL questions. Write your answers in the spaces provided.
- Show your working to get marks. You may use a non-programmable scientific calculator.

Question 1 [CLO2, C2]

Construct a truth table for $(P \rightarrow Q) \wedge (Q \rightarrow R)$. Is it a tautology?

[4 marks]

It is not a tautology.

P	Q	R	$P \rightarrow Q$	$Q \rightarrow R$	$(P \rightarrow Q) \wedge (Q \rightarrow R)$
T	T	T	T	T	T
T	T	F	T	F	F
T	F	T	F	T	F
T	F	F	F	T	F
F	T	T	T	T	T
F	T	F	T	F	F
F	F	T	T	T	T
F	F	F	T	T	T

Note:
Full correct answers for row 1-3, 2 marks will be given.
For each row 4-6, 1 mark will be given.
1 mark will be given for the correct answer (Tautology)

Question 2 [CLO2, C2]

Given the statements below convert the following sentences into symbolic logic form.
P: Ed goes camping.
Q: Mountain lions are near.
R: It is snowing.

[4 marks]

(a) It is snowing and Ed goes camping. $R \wedge P$
(b) It is not true that mountain lions are near but Ed does not go camping. $\sim(Q \wedge \sim P) = \sim Q \vee P$
(c) It is a clear day or Ed does not camp. $\sim R \vee \sim P$
(d) Either it is a clear day or mountain lions are near. $\sim R \oplus Q$

Note:
Each correct answer will be given 1 mark.

Question 3 [CLO2, C2]

Let $A(x)$ be the predicate "x likes running", $B(x)$ the predicate "x likes playing badminton" and $C(x)$ the predicate "x likes playing tennis" where the universe discourse is the set of all students in university.

Build each of the following quantification in English.

[6 marks]

(a) $\exists x(B(x) \wedge C(x) \wedge \sim A(x))$
Some of the students in university like playing badminton and tennis but they don't like running.

(b) $\forall x\big(B(x) \rightarrow A(x)\big)$
If all the students in university like playing badminton then they likes running.

(c) $\exists x\big(B(x) \wedge C(x)\big) \leftrightarrow \exists x A(x)$
Some of the students in university like playing badminton and tennis if and only if they like running.

(d) $\forall x\big(A(x) \wedge C(x)\big)$
All students in university like running and playing tennis.

Note:
Each correct answer for (a) and (c) will be given 2 marks.
Each correct answer for (b) and (d) will be given 1 mark.

Question 4 [CLO2, C3]

Convert each of the following into a symbolic proof and supply the justifications for each step.

[6 marks]

(a) For me to carry my umbrella it is necessary that it rain. When it rains I always wear my hat. Today I did not wear my hat. Therefore, it must not raining and so I am not carrying my umbrella.

$u \rightarrow v$	Premise 1	
$r \rightarrow h$	Premise 2	**1 mark**
$\sim h$	Premise 3	
$\sim r$	2, 3 Modus Tollens	**1 mark**
$\sim u$	1, 4 Modus Tollens	**1 mark**

(b) You cannot be both happy and rich. Therefore, you are either not happy, or not rich. Now you do appear to be happy. Therefore you must not be rich.

$\sim(h \wedge r)$	Premise 1	**0.5 mark**
$\sim h \vee \sim r$	1, DeMorgan 2	**1 mark**
h	Premise 3	**0.5 mark**
$\sim r$	2, 3 Disjunctive Syllogism	**1 mark**