1. Two propositions p and q are defined as follows:

p: the number ends in zero

q: *the number is divisible by 5*

(a) Write in words

(i) $p \Rightarrow q$;

(ii) the converse of $(p \Rightarrow q)$.

(b) Write in symbolic form

(i) the inverse of $(p \Rightarrow q)$;

(ii) the contrapositive of $(p \Rightarrow q)$.

Working:

Answers:

(a) (i) .....

.....

(ii) .....

.....

(b) (i) .....

(ii) .....

(Total 4 marks)

2. Let p and q be the statements

p: you watch the music TV channel
q: you like music

(a) Consider the following logic statement.

If you watch the music TV channel then you like music.

(i) Write down in words the inverse of the statement.

(ii) Write down in words the converse of the statement.

(4)

(b) Construct truth tables for the following statements:

(i) $p \Rightarrow q$.

(ii) $\neg p \Rightarrow \neg q$.

(iii) $p \vee \neg q$.

(iv) $\neg p \wedge q$.

(4)

(c) Which of the statements in part (b) are logically equivalent?

(1)
(Total 9 marks)

3. Consider the statement *"If a figure is a square, then it is a rhombus"*.

(a) For this statement, write in words

(i) its converse;

(ii) its inverse;

(iii) its contrapositive.

(b) Only one of the statements in part(a) is true. Which one is it?

Working:

Answers:

(a) (i) .....
.....
(ii) .....
.....
(iii) .....
.....

(b) .....

(Total 8 marks)

4. Consider the following logic statements:

p: x is a factor of 6

q: x is a factor of 24

(a) Write $p \Rightarrow q$ in words.

(1)

(b) Write the converse of $p \Rightarrow q$.

(1)

(c) State if the converse is true or false and give an example to justify your answer.

(2)

(Total 4 marks)

1. (a) (i) *If the number ends in zero then it is divisible by 5* (A1)

(ii) *If the number is divisible by 5 then it ends in zero* (A1)

(b) (i) $\neg p \Rightarrow \neg q$ (A1)

(ii) $\neg q \Rightarrow \neg p$ (A1)

[4]

2. (a) (i) *If you do not watch the music TV channel,* (C1)
then you do not like music. (C1)

(ii) *If you like music,* (C1)
then you watch the music TV channel. (C1) 4

(b)

				(i)	(ii)	(iii)	(iv)
p	q	$\neg p$	$\neg q$	$p \Rightarrow q$	$\neg p \Rightarrow \neg q$	$p \vee \neg q$	$\neg p \wedge q$
T	T	F	F	**T**	**T**	**T**	**F**
T	F	F	T	**F**	**T**	**T**	**F**
F	T	T	F	**T**	**F**	**F**	**T**
F	F	T	T	**T**	**T**	**T**	**F**

(A4) 4

Note: *Award (A1) for each correct bold column.*
(ft) with errors in (ii) which are same as in (i).

(c) ($\neg p \Rightarrow \neg q$) and ($p \vee \neg q$) are logically equivalent. (C1) 1

Note: *Follow through with candidate's answers to part (b) (i), (ii), (iii) and (iv).*
This may mean there are no equivalent statements.

[9]

3. (a) (i) *If a figure is a rhombus, then it is a square.* (A1)(A1) (C2)

(ii) *If a figure is not a square, then it is not a rhombus.* (A1)(A1)(C2)

(iii) *If a figure is not a rhombus, then it is not a square.* (A1)(A1)(C2)

(b) (iii) is true. (A2)(C2)

[8]

4. (a) If x is a factor of 6 then x is a factor of 24 (A1) 1

(b) If x is a factor of 24 then x is a factor of 6 (or $q \Rightarrow p$) (A1) 1

(c) False (R1)

4, 8, 12 are all factors of 24 but not of 6
(any one of the three factors will do) (A1) 2
[4]