

Computer science
Year 11 AOL Quarter 2-1
Topic 2

45 Minutes

Instructions to candidates

- Do not open this examination paper until instructed to do so.
- Answer all question in the answer booklet.
- The maximum mark for this examination paper is **[30 marks]**.

Answer **all** questions.

1. i. This modifier is used in Java programs means that a value assigned to a variable cannot be changed. Name this modifier. [1]

- ii. This modifier is used to create a global variable within a Java class file. Name this modifier. [1]

2. State the purpose of the memory data register (MDR). [1]

3. i. The ASCII character code for '7' is 00110111. Convert this binary to hexadecimal. [2]

- ii. One of the limitations of ASCII is the relative small number of possible combinations. This is not useful for character sets such as Chinese characters. UNICODE solves this problem by encoding each character using 2 bytes of information. How many characters are possible using UNICODE? [1]

4. (a) Identify **one** characteristic of random access memory (RAM). [1]

- (b) What is cache memory? [1]

5. Construct a truth table for the logic expression

$$A \text{ NOR } (B \text{ AND } C)$$

A	B	C	working area	O

[4]

Note: full marks can only be achieved if the sequence of inputs is in order starting at 000

6. State the binary equivalent of the denary number 37. [1]
 *note denary is just another name for decimal

7. The following table lists types of memory. Draw lines connecting each type to either “Primary” or “Secondary”

SSB	
RAM	
CACHE	
ROM	
USB	

PRIMARY
SECONDARY

[5]

8. Outline a difference between Primary and Secondary Memory. [2]

A car has features that monitor its speed, direction and distance from the car in front. This is shown in **Figure 1**.

Figure 1: Rules to control car motion

Input	Binary representation	Description
A	0	Car is less than 20 metres from the vehicle in front.
	1	Car is 20 metres or more from the vehicle in front.
B	0	Car is travelling in reverse or stationary.
	1	Car is travelling forward.
C	0	Car speed is more than 130 kilometres per hour.
	1	Car speed is 0–130 kilometres per hour.

For example, if the car is travelling forward, input B would have a binary representation of 1.

9. Construct a logic diagram with inputs A, B, and C and output Z to represent the following scenario:

Output Z equals 1 when:

the car is travelling forward AND it is less than 20 metres from the vehicle in front.

OR

the car speed is more than 130 km per hour.

In all other conditions, output Z equals 0.

[4]

An additional row (input D) is to be added to assist when the car is in reverse or stationary. Input D checks if there are obstructions less than 3 metres from the rear of the car.

10. State the rules that need to be added to Figure 1 to test this condition.

[2]

11. Draw a truth table for an XOR gate.

[2]

12. Determine the value of the following expression given that the input values for F, S and T are:

`F = 5`

`S = 30`

`T = true`

`F >= 25 AND S >= 10 AND S <= 130 AND T = true`

You must show your working.

[2]