

**TIME: 1 HOURS 20 MINUTE
MARKS**

TOTAL: 60

ANSWER ALL QUESTIONS

QUESTION ONE

(Total: 60 marks)

Attempt all of the following. Electronic Calculators are not permitted. *Write down and show all your manual calculations in your exam book.*

- i. Convert the following numbers to Decimal (Base 10)
 - a. $(10110101)_2$ (4 marks)
 - b. $(572)_8$ (4 marks)
- ii. Convert the following numbers to Binary (Base 2).
 - a. $(7520)_8$ (3 marks)
 - b. $(433)_{10}$ (4 marks)
- iii. Convert the following number to Hexadecimal (Base 16)
 - a. $(14210)_{10}$ (4 marks)
 - b. $(6556)_8$ (4 marks)
- iv. Convert the following numbers to Octal (Base 8).
 - a. $(10110101000)_2$ (3 marks)
 - b. $(2E9)_{16}$ (4 marks)

QUESTION TWO

(Total: 5 marks)

Categorise the following hardware based on its usages into the following categories:

- (a) CPU (b) Memory (c) Input device (d) Output device (e) Storage Device (f) Communication device

- 1. Solid State Drive
- 2. Printer
- 3. Keyboard
- 4. WiFi Router
- 5. Random Access Memory

QUESTION THREE

(Total: 5 marks)

Determine the time required to complete 50 instructions by a Single core CPU (Perform 1 instructions per clock cycle) with a clock frequency of 600 MHz.

QUESTION FOUR

(Total: 20 marks)

- c. Construct a logical circuit from the given logical expression. Use only the basic logic gates (NOT, AND, OR) (10 Marks)

$$X = D\overline{ABC} + C\overline{(A+B)}$$

- b. Construct a truth table for the following Boolean expression. (10 Marks)

$$X = \bar{A} + BC(A + \bar{C})$$