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Cambridge International Advanced Subsidiary and Advanced Level

MARK SCHEME for the October/November 2015 series

9608 COMPUTER SCIENCE

9608/21 Paper 2 (Written Paper), maximum raw mark 75

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1 **(i)** 40 [1]

(ii) 314.2(0) [1]

(iii) 16 // ERROR as identifier Z has not been declared [1]

(iv) TRUE [1]

2 **(i)** (Single) software program [1]
Features for:
program editor/writing/editing
translation // interpreter/compiler
testing program code **//** observe outputs } 2 points to score [1]

(ii) Syntax checking (on entry)
Structure blocks (e.g. IF structure and loops begin/end highlighted)
General prettyprint features
Automatic indentation
Highlights any undeclared variables
Highlights any unassigned variables
Commenting out/in of blocks of code
Visual collapsing / highlighting of blocks of code
Single stepping
Breakpoints
Variable/expressions report window [MAX 3]

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3 (a)

	Inputs		Output	
Test Case	InA	InB	OutZ	
1	TRUE	TRUE	**FALSE**	[1]
2	TRUE	FALSE	**TRUE**	[1]
3	FALSE	TRUE	**TRUE**	[1]
4	FALSE	FALSE	**TRUE**	[1]

(b)
```
IF InA = TRUE AND InB = TRUE
   THEN
      OutZ ← FALSE
   ELSE
      OutZ ← TRUE
ENDIF
```

Mark as follows

Structure: `IF – THEN – ELSE – ENDIF` [1]

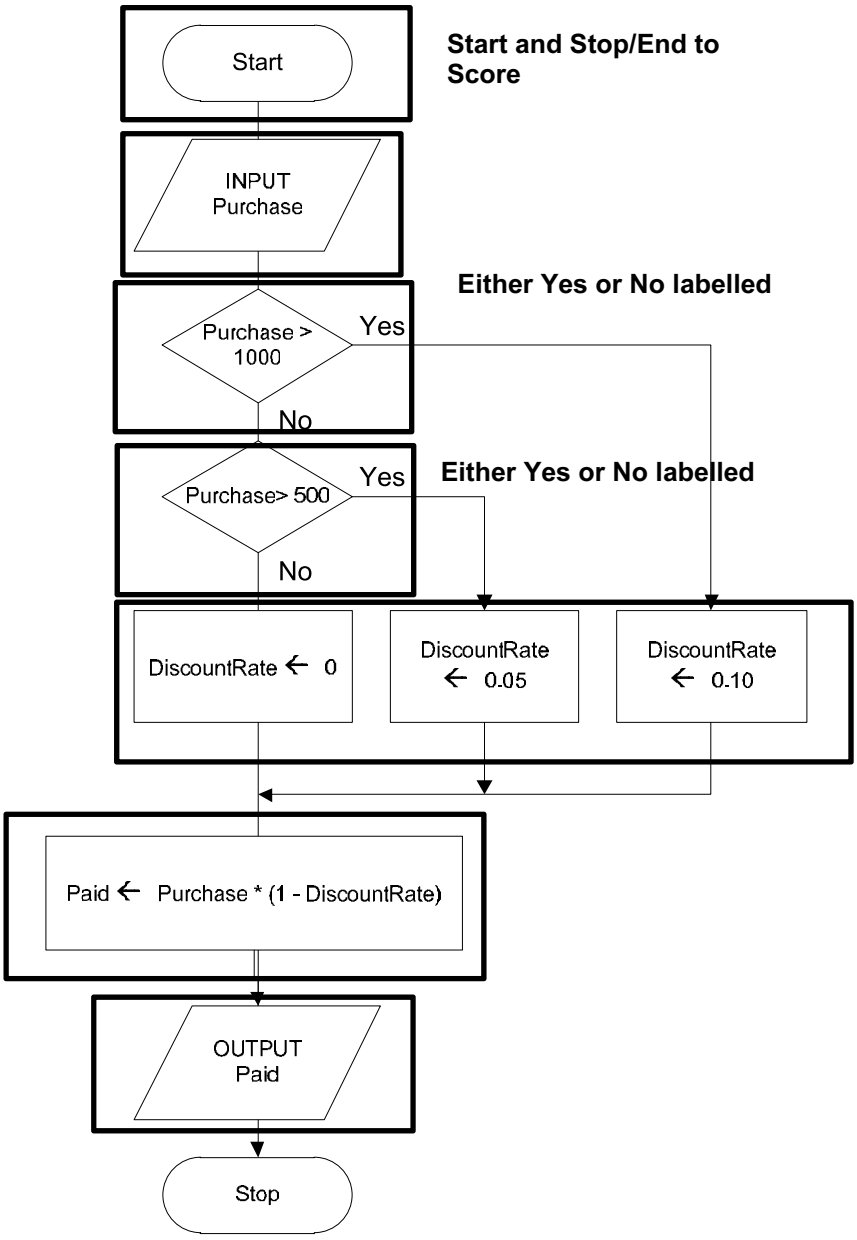
Condition: `InA = TRUE AND InB = TRUE` [1]

Logic:
```
OutZ ← FALSE (when condition true)
OutZ ← TRUE (when condition false)
```
[1]

Alternative answer (worth 3 marks):
```
OutZ ← NOT(InA AND InB)
OutZ ← NOT InA OR NOT InB
```

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4



Start and Stop/End to Score

Either Yes or No labelled

Either Yes or No labelled

[MAX 6]

[Total: 6]

[MAX 6]

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5 (a)

Identifier	Data type	Description	
YearCount	INTEGER	Loop counter /// Age of the car	[1]
PurchasePrice	INTEGER	Purchase price of the car	[1]
CurrentValue	REAL // CURRENCY **Allow: SINGLE** **Refuse: DOUBLE**	The changing depreciated value	[1]

Must have correct identifier + Data type + Description to score

(b)

```
OUTPUT "Enter Purchase price"
INPUT PurchasePrice
CurrentValue ← PurchasePrice                                    [1]
YearCount ← 1
WHILE YearCount < 9 AND CurrentValue >= 1000                    [2]
      Note: Penalise: inclusion of $
   IF YearCount = 1                                             [1]
      THEN
         CurrentValue ← CurrentValue * (1 - 40/100)
      ELSE
         CurrentValue ← CurrentValue * 0.8                      [1]
   ENDIF
   OUTPUT YearCount,  CurrentValue
   YearCount  ← YearCount + 1                                   [1]
ENDWHILE
```

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6 (a) Combination of staff and task number // the pair of numbers // the pair of random numbers [1]
//there will be duplicates /repeats//some staff tasks will not be generated [1]

(b) (i) `04 // 03` [1]

(ii) `27 // 28` [1]

(iii) `20` [1]

(iv) `11 / 12` [1]

(c) (i) Zero [1]

(ii) `Completed <> 60 // NewStaffTask = FALSE` [1]
Allow: Inclusion of the WHILE

(iii) Determines whether this combination of `StaffNum` and `TaskNum` has been completed [1]
Assigns value TRUE if not already generated [1]
Flags that this is the first time this staff + task has been selected/to exit the loop [1]
Outputs the new staff + task number [1]

[MAX 3]

(iv) `TaskGrid : ARRAY[1:5, 1:12] OF BOOLEAN`
1 mark | 1 mark [2]

(d) ***Pseudocode …***

`(SELECT) CASE (OF) + ENDCASE` using `StaffNo`
1 mark 1 mark

```
(CASE) 1: StaffName ← "Sadiq"                    1
(CASE) 2: StaffName ← "Smith"
(CASE) 3: StaffName ← "Ho"
(CASE) 4: StaffName ← "Azmah"
(CASE) 5: StaffName ← "Papadopolis"
                                  (all four cases …)   1
ENDCASE // ENDSELECT                                   [4]
```

Visual Basic

```
Select Case StaffNo
   Case 1
      StaffName = "Sadiq"
   Case 2
      StaffName = "Smith"
   Case 3
      StaffName = "Ho"
   Case 4
      StaffName = "Azmah"
   Case 5
      StaffName = "Papadopolis"
End Select
```

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7 (a) (i) CAT [1]
Ignore any opening + closing quotes

(ii) 13 [1]

(iii) 83 [1]

(iv) 15 [1]

(b) *Input of string …*
Correct syntax (for both prompt and assignment)
Uses `MyString` identifier } [1]

`StringTotal` set to 0 [1]

FOR loop:
`FOR - NEXT` keywords // (Python) correct indentation [1]
Correct start and /end boundaries [1]
Note: the end boundary must use the language length function/method // alternative Python syntax

Isolate single character number [1]

Followed by the use of Asc (VB) // Ord (Python)
Assigned to `NextNum` } [1]

Added to `StringTotal` [1]

Correct syntax for the output of the string and number [1]

[MAX 6]

Python …

```
MyString = input('key in string')

StringTotal = 0
for i in range (0, len(MyString)):
    NextNum = ord(MyString[i])
    StringTotal = StringTotal + NextNum

print(MyString, StringTotal)
```

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Visual Basic…

```
Dim MyString As String
Dim StringTotal As Integer
Dim i As Integer
Dim NextNum As Integer

Console.Write("key in string")
MyString = Console.ReadLine
StringTotal = 0
For i = 1 To Len(MyString) // MyString.Length
   NextNum = Asc(Mid(MyString, i, 1))
   StringTotal = StringTotal + NextNum
Next

Console.WriteLine(MyString & "  " & Str(StringTotal))
```

Pascal …

```
VAR MyString     : String ;
VAR StringTotal  : Integer ;
VAR i            : Integer ;
VAR NextNum      : Integer ;
VAR SingleChar   : Char;

begin
   Writeln('key in string');
   readln(MyString) ;
   StringTotal := 0 ;

   For i := 1 To Length(MyString) do
      begin
         SingleChar := MyString[i] ;
         NextNum := Ord(SingleChar) ;
         StringTotal := StringTotal + NextNum  ;
      end ;

   WriteLn(MyString, StringTotal) ;

   ReadLn() ;
End.
```

(c) Used to provide an integrity/verification check [1]
Used as a checksum [1]
The total can be recalculated by the receiving software [1]
If any of the characters have been incorrectly transmitted the recalculated total and transmitted total will not match [1]
[MAX 2]

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8 (a) r [1]
Ignore inclusion of any quotes

(b) (i) 2 [1]
Ignore inclusion of any quotes for part (i), (ii) and (iii)

(ii) + [1]

(iii) 7 [1]

(c) (i)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
2	5	3	8	40	-	1	1/40

[2]

(ii)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
3	4	1	4	16	+	16	1

[2]

(iii)

N1	N2	N3	N4	BottomAnswer	Op	TopAnswer	OUTPUT
7	9	2	3	27	+	39	
						12	
							1 12/27

[3]

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(d) (i) Adaptive (maintenance) [1]

(ii) Allow more than two fractions to be added [1]
Numerator/denominator more than 1 digit [1]
Multiply and division also possible [1]
Allow brackets [1]
Give answer as decimal number [1]
Lowest possible denominator [1]
Trap any fraction which has a zero numerator [1]
Allow the input of vulgar fraction(s) [1]

[MAX 3]

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