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**UNIVERSITI TUN HUSSEIN ONN
MALAYSIA**

**FINAL EXAMINATION
SEMESTER I
SESSION 2016/2017**

COURSE NAME : ALGORITHM AND PROGRAMMING
COURSE CODE : BIC10204
PROGRAMME CODE : BIS / BIP / BIW / BIM
EXAMINATION DATE : DECEMBER 2016 / JANUARY 2017
DURATION : 2 HOURS AND 30 MINUTES
INSTRUCTION : ANSWER ALL QUESTIONS

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THIS QUESTION PAPER CONSISTS OF SEVEN (7) PAGES

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Q1 Determine the output of the following code segments.

```
(a)  jum = 1;
      int nom;
      for (nom = 2; nom < 9; nom += 2)
      {
          jum+= nom;
          printf ("%d \t ",jum);
      }
      printf ( "\n %d",nom );
```

(5 marks)

```
(b)  jum = 9;
      nom = 10;
      do
      {
          jum - = 5;
          printf ("%d %d", nom+2, jum);
      }
      while (nom!=10);
```

(2 marks)

(c) Assume that the input is 43.2.

(2 marks)

```
double w;
void kira (int w)
{
    printf ("The output is %f", w+5);
}
void main ( )
{
    printf ("Please enter a value : ");
    scanf ("%lf", &w);
    kira (w);
}
```

(d) Assume that the input is 3.

(2 marks)

```
void main ( )
{
    int g,s;
    printf ("\n Please insert a value : ");
    scanf ("%d", &g);
    s=power(g);
    printf("The integer value is : %d", s);
}
int power (int g)
{
    return g*g*g;
}
```

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Q2 Answer the following questions based on **Figure Q2**.

```

#include <stdio.h>
void Display (int);
void New_Line ();
main()
{
    int a, b, c;
    a=5; b=2; c=8;
    Display (a); Display (b); Display (c); New_Line();
}
void Display (int x)
{
    printf("%d", x);
}
void New_Line ()
{
    printf("\n");
}
    
```

Figure Q2

(a) Determine the output for the program in **Figure Q2**. (1 mark)

(b) Modify line 8 in the program to obtain the following output. (4 marks)

52
8

(c) Determine the output if line 8 in the program is replaced with `Display (b); New_Line (); Display (a); Display (c);`. (1 mark)

(d) Determine whether each of the following statements is **TRUE** or **FALSE**.

(i) Line ²~~3~~ can be written as `void Display (int x);`. (1 mark)

(ii) Line ³~~4~~ can be written as `void New_Line(void);`. (1 mark)

(iii) Line 6 and line 7 can be simplified to `int a=5; b=2; c =8;`. (1 mark)

(iv) Same output can be obtained if line 8 is replaced with `Display (a, b, c);`. (1 mark)

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Q3 (a) Specify the value of x for each of the following expressions.

(i) $x = 7 + 4 * 8 / 2 - 1.$ (1 mark)

(ii) $x = 2 \% 2 + 2 * 4 - 4.$ (1 mark)

(iii) $x = (9 * 9 - (3 + (9 * 3 / 3))).$ (1 mark)

(iv) $x = 35 / 5 * 3 \% 2.$ (1 mark)

(v) $x = 12 / 3 \% 4 * 5 - 5.$ (1 mark)

(b) Rewrite the code segment given in **Figure Q3(b)** using a do loop statement. (8 marks)

```
int sum=0, num;
scanf ("%d", &num);
while (num >= 0)
{
    sum += num;
    scanf("%d", &num);
}
```

Figure Q3(b)

(c) Write a program to produce an output shows in **Figure Q3(c)** using looping statement. (10 marks)

```

*
**
* *
* *
* *
*****
```

Figure Q3(c)

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Q4 (a) Determine the output for the program in **Figure Q4(a)**.

(6 marks)

```
#include <stdio.h>
int main (void)
{
    cons int N=6;
    int i, j;

    for (i=1; i<=N+1; i++)
    {
        for (j=1; j<=N; j++)
        }
    printf ("%c", 'A' + ((i+j-2) % N));
    {
        printf ("\n");
    }
    return 0;
}
```

Figure Q4(a)

(b) Write a character-valued function named `convertToGrade` that has a single type `int` parameter named `mark` based on **Figure Q4(b)**. The function should return the letter that corresponds to the given mark.

(10 marks)

Mark	Letter
0-49	F
50-59	D
60-69	C
70-79	B
80-100	A
Others	X

Figure Q4(b)

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Q5 Answer Q5(a) - Q5(c) based on the given case study in Figure Q5.

As a software engineer in Meteorologist Department, you have requested to develop C program in order to detect hurricane categories based on the wind speed as shown in given table. The program will ask user to enter wind speeds, analyze the category for each wind speeds and print the information based on the category.

Category	Wind speeds	Information
1	From 74 to 95 mph	Minimal damage to property
2	From 96 to 110 mph	Moderate damage to property
3	From 111 to 130 mph	Extensive damage to property
4	From 131 to 155 mph	Extreme damage to property
5	Over 155 mph	Catastrophic damage to property

Figure Q5

- (a) Write a pseudo-code to perform the detection of hurricane categories. (10 marks)

- (b) Define the following functions:
 - (i) Function `input()` that will allow user to enter a wind speed value. The function will return the entered value to function caller. (3 marks)

 - (ii) Function `category()` that will receive a wind speed value from function caller. The function will determine and return a category value based on the wind speed. (10 marks)

 - (iii) Function `display()` that will receive the category value from function caller. The function will display information based on the category. (9 marks)

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- (c) Write a main program that will ask user to enter wind speed value. Then determine a category for the wind speed. Based on the category, display a corresponding message presented in **Figure Q5**. Call the functions defined in **Q5(b)(i) – Q5(b)(iii)** to produce the following sample output.

Sample output:

Please enter wind speed: 98
Moderate damage to property

(8 marks)

- END OF QUESTIONS -



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