

**AGA KHAN UNIVERSITY EXAMINATION BOARD
HIGHER SECONDARY SCHOOL CERTIFICATE**

CLASS XII

ANNUAL EXAMINATIONS 2022

Computer Science

Total Time: 2 hours 10 minutes

Total Marks: 65 (50-Theory & 15-Alternate to Practical)

INSTRUCTIONS

1. Read each question carefully.
2. Answer the questions on the separate answer sheet provided. DO NOT write your answers on the question paper.
3. There are 100 answer numbers on the answer sheet. Use answer numbers 1 to 65 only.
4. Question Distribution

| | |
|---------|------------------------------|
| Theory | Alternate to Practical (ATP) |
| 50 MCQs | 15 MCQs |

5. In each question, there are four choices A, B, C, D. Choose ONE. On the answer grid, black out the circle for your choice with a pencil as shown below.

| Correct Way | Incorrect Ways |
|-------------------|-------------------|
| 1 (A) (B) (C) (D) | 1 (A) (B) (C) (D) |
| | 2 (A) (B) (C) (D) |
| | 3 (A) (B) (C) (D) |
| | 4 (A) (B) (C) (D) |

Candidate's Signature

6. If you want to change your answer, ERASE the first answer completely with a rubber, before blacking out a new circle.
7. DO NOT write anything in the answer grid. The computer only records what is in the circles.
8. The marks obtained on the 50 MCQs will be equated to the total marks of 85 for the theory examination results.
9. You may use a scientific calculator if you wish.

THEORY (Questions 1-50)

1. The compiler shows error while executing the given variable name.

\$pecial,T@sk

The compiler will execute this variable name if it is written as

- A. \$pecial_T@sk
 B. Special T@sk
 C. Special_Task
 D. \$pecial,Task
2. The total memory storage occupied by five variables (v, w, x, y and z) in a program is 20 bytes.

Based on this memory storage, the variables must have been declared as

| | |
|---------------------------------------------------------|---------------------------------------------------------|
| float v, w; double x; long int y; short int z; | float v; double w, x; long int y; short int z; |
| A | B |
| float v; double w; long int x, y; short int z; | float v; double w; long int x; short int y, z; |
| C | D |

3. All of the following statements will store value 3.75 in the variable **y** EXCEPT

- A. float y = 15/4;
 B. float y = 15.0/4;
 C. float y = 15/4.0;
 D. float y = (float)15/4;

4. The escape sequence which is used to produce beep sound is

- A. \a
 B. \b
 C. \r
 D. \t

Use the given program to answer Q.5 and Q.6.

```
#include <iostream>
using namespace std;
int a, b;
int main ()
{
    int j=2, k=3;
    j==5;
    k=8;
    a=k+j;
    b=j-k;
    cout<<a<<"\n";
    cout<<-b;
    return 0;
}
```

5. The option that shows the number of local and global variables used in this program is

| | Local Variable | Global Variable |
|---|----------------|-----------------|
| A | 2 | 2 |
| B | 0 | 4 |
| C | 4 | 0 |
| D | 4 | 2 |

6. The output of this program is

| | |
|----|----|
| 5 | 5 |
| 1 | -1 |
| A | B |
| 10 | 10 |
| -6 | 6 |
| C | D |

7. Which of the following expressions has NO relational operators?

- A. (x!=y)||!(y!=z)
- B. (x!=y)||!(y&&z)
- C. (x>=y)&&(y&&z)
- D. (!x||y)&&(!y&&z)

8. The CORRECT example of single-line comment in a program is

| | |
|------------------|------------------|
| //Work From Home | /*Work From Home |
| A | B |
| */Work From Home | \\Work From Home |
| C | D |

9. Consider the given statement.

float K = 2498739823.789;

The value of K that will be displayed as output is

- A. 2498739823
- B. 2.49874e+009
- C. 2.49874e+12
- D. 2498739823.789

10. When a single character is entered, then a program reads it without waiting for the enter key to be pressed.

This must be written as

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>#include <iostream> using namespace std; int main() { char S; cin>>S; cout<<"The Character is:"<<S; return 0; }</pre> | <pre>#include <iostream> using namespace std; int main() { char S=getch(); cout<<"The Character is:"<<S; return 0; }</pre> |
| A | B |
| <pre>#include <iostream> #include <conio.h> using namespace std; int main() { char S; cin>>S; cout<<"The Character is:"<<S; return 0; }</pre> | <pre>#include <iostream> #include <conio.h> using namespace std; int main() { char S = getch(); cout<<"The Character is:"<<S; return 0; }</pre> |
| C | D |

11. To use cin, cout, sqrt, pow and setw in a program, the number of header files required is
- A. two.
 - B. three.
 - C. four.
 - D. five.
12. An operator with lowest precedence is
- A. &&
 - B. +=
 - C. --
 - D. *
13. The for loop statement is followed by
- A. braces that contain three expressions separated by semicolon.
 - B. parentheses that contain three expressions separated by semicolon.
 - C. braces that contain two expressions separated by inverted commas.
 - D. parentheses that contain two expressions separated by inverted commas.
14. If a for loop repeats a code more than one time, then which of the following expressions execute(s) more than one time during the execution of loop?
- I. Initialisation Expression
 - II. Test Expression
 - III. Increment/ Decrement Expression
- A. I only
 - B. II only
 - C. I and III
 - D. II and III
15. The MOST suitable programming structure to check whether a number is even or odd is
- A. arrays.
 - B. strings.
 - C. for loop.
 - D. if-else statement.

16. Consider the given program.

```
#include <iostream>
using namespace std;
int main ()
{
    int a=10;
    if(a<10)
        cout<<2*5<<endl;
        cout<<3*6<<endl;
    return 0;
}
```

Upon execution, this program will

- A. display syntax error.
 - B. display output 10.
 - C. display output 18.
 - D. not display any output.
17. Which of the following gives back the control of flow of execution to the calling function?
- A. exit()
 - B. return
 - C. break
 - D. default

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18. Consider the given program.

```
#include <iostream>
using namespace std;
int main ()
{
    char ch='b';

    switch(ch)
    {
        case 'A' :
            cout<<"Dog"<<endl;
            break;
        case 'B' :
            cout<<"Cat"<<endl;
            break;
        case 'C' :
            cout<<"Horse"<<endl;
            break;
        default :
            cout<<"Monkey"<<endl;
    }
    return 0;
}
```

The output of this program is

- A. Dog
- B. Cat
- C. Horse
- D. Monkey

19. Consider the given program.

```
#include <iostream>
using namespace std;
int main ()
{
    int w=20;
    do
    {
        w=w+1;
        cout<<w<<endl;
    } while(w<15 );
    return 0;
}
```

Upon execution, the program will display

- A. 14
- B. 20
- C. 21
- D. no output

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20. Consider the given program.

```
#include <iostream>
using namespace std;
int main()
{
    int x;
    for(int i=1; i<=3; i++)
    {
        x=i*2;
    }
    cout<<x;
    return 0;
}
```

The program can be rewritten by using while loop as

| | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>#include <iostream> using namespace std; int main() { int x, i=1; while(i<3) { x=i*2; i=i+1; } cout<<x; return 0; }</pre> | <pre>#include <iostream> using namespace std; int main() { int x, i=1; while(i<=3) { x=i*2; i=i+1; } cout<<x; return 0; }</pre> |
| A | B |
| <pre>#include <iostream> using namespace std; int main() { int x, i=1; while (i<3) { x=i*2; } cout<<x; return 0; }</pre> | <pre>#include <iostream> using namespace std; int main() { int x, i=1; while (i<=3) { x=i*2; } cout<<x; return 0; }</pre> |
| C | D |

21. Consider the given syntax.

```
if(condition 1)
{
  //statements
  if(condition 2)
  {
    //statements
  }
}
```

This is the syntax of

- A. simple if statement.
- B. if-else statement.
- C. else-if statement.
- D. nested if statement.

22. Consider the given program.

```
#include <iostream>
using namespace std;

int main() {
  int k;
  cout<<"Enter an integer value "<<endl;
  cin>>k;
  if(k!=0)
  {
    if(k>0)
    {
      cout<<"Cricket"<<endl;
    }
    else
    {
      cout<<"Hockey"<<endl;
    }
  }
  else
  {
    cout<<"Football"<<endl;
  }
  return 0;
}
```

To get the output Football, the input should be

- A. -1
- B. 0
- C. 1
- D. 2

23. Consider the given C++ program showing the initialisation of an array named as example and having integer data type.

```
int example[2][3]
{{1,3,15,11},
{12,8,9,17},
{4,10,16,7}};
```

The option that CORRECTLY replaces 16 with 20 in this array is

- A. example[3][3]=20;
 - B. example[2][3]=20;
 - C. example[3][2]=20;
 - D. example[2][2]=20;
24. A one-dimensional array named as **num** is required to store up to 10 values.

The array will be declared as

- A. num int[10];
 - B. num int{ 10};
 - C. int num[10];
 - D. int num{10};
25. Which of the following statements is TRUE about arrays?
- A. The data type of an array must be an integer.
 - B. The data type of all elements of array is the same.
 - C. The index number of all elements of array is the same.
 - D. The index number of an array is enclosed by braces.

26. Consider the given array declaration.

```
int Q[7];
```

The total memory size occupied (in bytes) by this array is

- A. 7
 - B. 14
 - C. 28
 - D. 56
27. Consider the given declaration of an array.

```
int sample_array[3][4];
```

The array can store up to

- A. 7 integer values.
- B. 9 integer values
- C. 12 integer values.
- D. 20 integer values.

28. Consider the given statement.

```
strcpy(x,y);
```

Upon execution, the statement will copy the content of

- A. variable x into variable y.
- B. variable y into variable x.
- C. variables x and y into another variable.
- D. another variable into variables x and y.

Use the given program to answer Q.29, Q.30 and Q.31.

```
#include <iostream>
int W(int c);
using namespace std;
int main()
{
    int a=W(24);
    cout<<a+3;
}
int W(int c)
{
    int b;
    b=c/4*2;
    return b;
}
```

29. In the given program, the code which defines the function W() is

- A. int a=W(24);
- B. int W(int c);
- C. int W(int c)
- D. W(24);

30. The output of the program is

- A. 6
- B. 9
- C. 15
- D. 27

31. For this program, which of the following option shows CORRECT categorisation of formal and actual parameters?

| | Formal Parameters | Actual Parameters |
|---|-------------------|-------------------|
| A | c | 24 |
| B | b | 24 |
| C | 24 | c |
| D | 24 | b |

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32. An example of user-defined functions is

- A. div()
- B. abs()
- C. mul()
- D. pow()

33. The statement that shows the CORRECT use of arguments with a user-defined function named as **Sample** is

- A. int Sample(int x, int y);
- B. Sample(int x, int y);
- C. Sample(x, y);
- D. int Sample(x, y);

34. Consider the given three programming statements related to a user-defined function named as **Y**.

```
int Y(int j, int k);
int Y(int j, int k)
Y(j, k);
```

The option that shows the CORRECT placement of these statements in a program, with respect to the main function, is

| | Before the Main Function | Inside the Main Function | After the Main Function |
|---|--------------------------|--------------------------|-------------------------|
| A | int Y(int j, int k) | int Y(int j, int k); | Y(j, k); |
| B | Y(j, k); | int Y(int j, int k) | int Y(int j, int k); |
| C | int Y(int j, int k) | Y(j, k); | int Y(int j, int k); |
| D | int Y(int j, int k); | Y(j, k); | int Y(int j, int k) |

Use the given program to answer Q.35, Q.36 and Q.37.

```
#include <iostream>
using namespace std;
void T(int a, int b)
{
    int c;
    c=a;
    a=b;
    b=c;
    cout<<a<<endl;
    cout<<b;
    a=a+10;
    b=b+5;
}

int main()
{
    int x=20, y=30;
    T(x,y);
    return 0;
}
```

35. The number of components of user-defined function that are shown in this program is

- A. One
- B. Two
- C. Three
- D. Four

36. The actual and formal parameters in this program are categorised as

| | Actual Parameters | Formal Parameters |
|---|-------------------|-------------------|
| A | a and b | x and y |
| B | x and y | a and b |
| C | a, b and c | x and y |
| D | x and y | a, b and c |

37. The output of the program is

| | |
|----|----|
| 20 | 30 |
| 30 | 20 |
| A | B |
| 30 | 40 |
| 35 | 25 |
| C | D |

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38. Which of the following functions is always present in a C++ program?

- A. cin
- B. cout
- C. gets function
- D. main function

Use the given program to answer Q.39 and Q.40.

```
#include <iostream>
using namespace std;
int main () {
    float a=17.8;
    float *b;
    b=&a;
    cout<<"a variable: "<<a<<endl;
    cout<<"b variable: "<<b<<endl;
    cout<<"*b variable: "<<*b<<endl;
    return 0;
}
```

39. Which of the following statements is TRUE about the program?

- A. Variable a is a pointer variable.
- B. Variable a stores the memory address of variable b.
- C. Variable b stores the value of variable a.
- D. Variable b is a pointer variable.

40. What is the output of this program?

(Note: The memory address in the output of this program may vary upon execution.)

| | |
|-------------------------------------------------------------------------------|-------------------------------------------------------------------|
| a variable: 17.8 b variable: 0x7ffd83cba8b4 *b variable: 0x7ffd83cba8b4 | a variable: 17.8 b variable: 0x7ffd83cba8b4 *b variable: 17 |
| A | B |
| a variable: 17.8 b variable: 0x7ffd83cba8b4 *b variable: 17.8 | a variable: 17 b variable: 17 *b variable: 0x7ffd83cba8b4 |
| C | D |

41. The symbol that is used for the declaration of a pointer is

- A. *
- B. &
- C. #
- D. %

42. Consider the given code.

```
int w=100, x=200;
int *y=w, *z=&x;
y=z;
```

The CORRECT interpretation of this code is that

- A. z points to w.
- B. y points to x.
- C. value of x is assigned to w.
- D. value of w is assigned to x.

43. The process of combining functions and data into a single unit is called

- A. abstraction.
- B. inheritance.
- C. encapsulation.
- D. polymorphism.

44. A feature due to which an object behaves differently in different situations is

- A. abstraction.
- B. inheritance.
- C. encapsulation.
- D. polymorphism.

45. Two objects named as **num1** and **num2** are created that belong to a class named as **Calculate**. The code for this task is

- A. num1:num2 Calculate;
- B. Calculate num1:num2;
- C. num1, num2 Calculate;
- D. Calculate num1,num2;

46. The data member and member functions can be accessed in the same class and the derived class.

With reference to the given statement, the option that shows the access specifiers used to give access to these members is

| | Access Specifiers | | |
|---|-------------------|-----------|---------|
| | Public | Protected | Private |
| A | Yes | Yes | Yes |
| B | Yes | Yes | No |
| C | No | No | Yes |
| D | No | Yes | Yes |

47. In object-oriented programming (OOP), a key feature that allows to create more than one function in a program having the same name but different signatures is
- A. function overriding.
 - B. function inheritance.
 - C. function overloading.
 - D. function encapsulation.
48. In object-oriented programming (OOP), the number of inheritance access specifiers is
- A. two.
 - B. three.
 - C. four.
 - D. five.
49. Which of the following is a CORRECT characteristic of a destructor?
- A. It is used to release the memory from an object of a class.
 - B. It is used to initialise the object of a class.
 - C. It has the same name as the class name.
 - D. It can be overloaded.
50. The name of a destructor starts with a symbol and is followed by a name.

Which of the following options is CORRECT for the destructor?

| | Starts with | Followed by |
|---|-------------|-------------|
| A | * | Class name |
| B | ~ | Class name |
| C | ~ | Object name |
| D | * | Object name |

ALTERNATE TO PRACTICAL (ATP: Questions 51-65)

51. $J = (K > L) || (M \% N == 4);$

For this statement, the value 0 will be stored in variable **J** when the values of **K**, **L**, **M** and **N** variables are

| | K | L | M | N |
|---|----|-----|----|----|
| A | -8 | -10 | 20 | 16 |
| B | -5 | -3 | 26 | 7 |
| C | 7 | 9 | 40 | 6 |
| D | 8 | 8 | 36 | 8 |

Use the given program to answer Q.52, Q.53 and Q.54.

```
#include <iostream>
using namespace std;
int main()
{
    for(int m=16; m>10; m--)
    {
        cout<<m<<" ";
        m--;
    }
    return 0;
}
```

52. The output of the given program is

- A. 10 12 14 16
- B. 16 14 12 10
- C. 12 14 16
- D. 16 14 12

53. If the code **for (int m=16; m>10; m--)** is replaced with **for (int m=10; m<=16; m--)**, then the number of times loop code will be repeated is

- A. one.
- B. six.
- C. seven.
- D. infinite.

54. If the for loop code is rewritten using the while loop then the code will be

| | |
|--------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| <pre>int m=16; while(m>10) { cout<<m<<" "; m--; }</pre> | <pre>int m=16; while(m>10) { cout<<m<<" "; m=m-2; }</pre> |
| A | B |
| <pre>int m=10; while(m>16) { cout<<m<<" "; m--; }</pre> | <pre>int m=10; while(m>16) { cout<<m<<" "; m=m-2; }</pre> |
| C | D |

Use the given program to answer Q.55, Q.56, Q.57 and Q.58.

```
#include <iostream>
using namespace std;
int main()
{
    int num1=10, num2=5;
    char w;
    cout<<"Enter j, k, p or q"<<endl;
    cin>>w;
    if(w=='j')
    {
        cout<<num1+num2<<endl;
    }
    else if(w=='k')
    {
        cout<<num1-num2<<endl;
    }
    else if(w=='p')
    {
        cout<<num1*num2<<endl;
    }
    else if(w=='q')
    {
        cout<<num1/num2<<endl;
    }
    else
    {
        cout<<"Invalid Input";
    }
    return 0;
}
```

55. The input of this program to get output 50 should be

- A. j
- B. k
- C. p
- D. q

56. If the input of the program is Q, then the output displayed will be

- A. 15
- B. 10
- C. 2
- D. Invalid Input

57. How many conditions are there in the given program?

- A. 4
- B. 5
- C. 6
- D. 7

58. The switch statement code that can replace the else-if code in the given program is

| | |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <pre>switch(w) { case 'j': cout<<num1+num2<<endl; break; case 'k': cout<<num1-num2<<endl; break; case 'p': cout<<num1*num2<<endl; break; case 'q': cout<<num1/num2<<endl; break; default: { cout<<"Invalid Input"; } }</pre> | <pre>switch(w) { case (j): cout<<num1+num2<<endl; break; case (k): cout<<num1-num2<<endl; break; case (p): cout<<num1*num2<<endl; break; case (q): cout<<num1/num2<<endl; break; default: { cout<<"Invalid Input"; } }</pre> |
| A | B |
| <pre>switch(w) { case 'j': cout<<num1+num2<<endl; break; case 'k': cout<<num1-num2<<endl; break; case 'p': cout<<num1*num2<<endl; break; case 'q': cout<<num1/num2<<endl; break; else: { cout<<"Invalid Input"; } }</pre> | <pre>switch(w) { case=(j): cout<<num1+num2<<endl; break; case=(k): cout<<num1-num2<<endl; break; case=(p): cout<<num1*num2<<endl; break; case=(q): cout<<num1/num2<<endl; break; default: { cout<<"Invalid Input"; } }</pre> |
| C | D |

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59. The APPROPRIATE way to initialise a one-dimensional array named **P** and storing five percentage values in it would be

- A. double P[5] = {80.7, 90.5, 88.9, 75.4, 91.3};
- B. int P[5] = {80.7, 90.5, 88.9, 75.4, 91.3};
- C. double P[4] = {80.7, 90.5, 88.9, 75.4, 91.3};
- D. int P[4] = {80.7, 90.5, 88.9, 75.4, 91.3};

60. Consider the given program.

```
#include <iostream>
using namespace std;
int G(int a, int b);
int main()
{
    int p=5, q=10, r;
    r=G(p,q);
    cout<<r;
    return 0;
}
int G(int a, int b)
{
    int ans;
    ans=a+b*a-b;
    return ans;
}
```

The output of this program is

- A. -75
- B. -45
- C. 45
- D. 65

61. Consider the given code.

```
int a, b;
int *c, d;
int e,*f;
```

The number of pointer variables and integer variables in this code is

| | Pointer Variables | Integer Variables |
|---|-------------------|-------------------|
| A | 3 | 2 |
| B | 2 | 3 |
| C | 3 | 3 |
| D | 2 | 4 |

62. The statement that will display the value of a is

- A. cout<<*a;
- B. cout<<&a;
- C. cout<<*b;
- D. cout<<&b;

Use the given code to answer Q.63, Q.64 and Q.65.

```
class SMPL {  
private:  
double x=3;  
double y=4;  
double z=5;  
public:  
double J_fnc()  
{  
cout<<x*y<<endl;  
return 0;  
}  
double K_fnc()  
{  
cout<<x+y*z;  
return 0;  
}  
};
```

63. The number of data members in the class SMPL is

- A. two.
- B. three.
- C. five.
- D. seven.

64. The code that would declare two objects named as P1 and P2 of the SMPL class would be

- A. P1:P2 SMPL;
- B. P1, P2 SMPL;
- C. SMPL P1:P2;
- D. SMPL P1, P2;

65. If the function K_fnc() is accessed with the help of an object of class SMPL, then the output it will give is

- A. 0
- B. 12
- C. 23
- D. 35

Please use this page for rough work

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