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ENROLLMENT NUMBER:

STUDENT NAME:

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Maximum Marks : 100
Duration : 60 Minutes
Total Questions : 50

Test Paper Type

BB

Class

12

iiO **16th**
INTERNATIONAL
INFORMATICS
OLYMPIAD
2019-2020

Instructions for the Candidates

1. MUST MARK YOUR STREAM IN OMR SHEET FOR IIO. (C++, JAVA, PYTHON OR MULTIMEDIA)
2. Write your 12 digit Roll Number and your name on top of the question Paper in the given space.
3. Keep the OMR Sheet in good/neat condition. Do not fold/damage the OMR Sheet.
4. This Booklet contains 110 questions in all comprising the following 6 Sections:

Section-A	Fundamentals of Computer Science (15 Questions)	1.75 Marks each
Section-B	Computer Science (C++) (20 Questions)	2 Marks each
Section-C	Informatics Practices (Java) (20 Questions)	2 Marks each
Section-D	Python (20 Questions)	2 Marks each
Section-E	Multimedia & Web Technology (20 Questions)	2 Marks each
Section-F	Reasoning and Aptitude (15 Questions)	2.25 Marks each

Section A and F are compulsory for all students. Opt any one from Section B, C, D & Section E.
5. Mark your answer (A, B, C or D) on the Answer Sheet with Pencil or Black/Blue Ball point Pen.
6. Return the OMR sheet to the invigilator.

Section-A
Fundamentals of Computer Science

1. In which of the following form MS-Word insert a formula?
 - A. Numbers
 - B. A field code
 - C. Text
 - D. Values
2. Which PowerPoint view works best for adding slide transitions?
 - A. Slide show view
 - B. Slide sorter view
 - C. Slide view
 - D. Reading view
3. Bridge is used in network to:
 - A. separate LANs
 - B. connect LANs
 - C. control network speed
 - D. All of these
4. Which of the following is not a way to complete a cell entry in excel?
 - A. Pressing Enter key
 - B. Pressing Spacebar
 - C. Clicking the Enter button on the Formula bar
 - D. Pressing any arrow key on the keyboard
5. How can the page border in MS-Excel 2013 be set ?
 - A. From Edit menu
 - B. From Tools menu
 - C. From Home
 - D. You can not set page border in Excel
6. What is the difference between Slide Design and Auto Content Wizard in MS-PowerPoint 2013?
 - A. AutoContent Wizard is just the wizard version of Slide Design.
 - B. Slide Design asks your choice in steps but Auto Content Wizard does not let you make choices.
 - C. Slide Design does not provide sample content but Auto Content Wizard provides sample content too.
 - D. There is no difference.
7. Which of the following is a telephone connection over the Internet?
 - A. VoIP
 - B. GSM
 - C. Modem
 - D. CDMA
8. A virus that migrates freely within a large population of unauthorized email user is called a _____.
 - A. flame war
 - B. worm
 - C. macro
 - D. plagiarism
9. Which of the following statement is true?
 - A. You can insert text boxes from drawing toolbar in PowerPoint.
 - B. You cannot insert text boxes from drawing toolbar in PowerPoint.
 - C. Text boxes are provided when you choose a layout and can't be inserted afterwards.
 - D. All of these
10. In MS Word you can insert hyperlink by:
 - A. pressing Ctrl+K or by choosing Hyperlink from Insert menu.
 - B. pressing Ctrl+Shift+K or by choosing Hyperlink from Insert menu.

- C. pressing Ctrl+K or by choosing Hyperlink from Format menu.
- D. pressing Ctrl+Shift+K or by choosing Hyperlink from Format menu.

11. Which one of the following commands is used to check whether a server is running or not?
 - A. ipconfigure
 - B. ping
 - C. cmd
 - D. All of these
12. When was the world's first laptop computer introduced in the market and by whom?
 - A. Hewlett-Packard, 1980
 - B. Epson, 1981
 - C. Laplink Traveling Software Inc, 1982
 - D. Tandy Model-200, 1985
13. Which of the following devices is used to connect two systems, especially if the systems use different protocols?
 - A. hub
 - B. bridge
 - C. gateway
 - D. repeater
14. _____ cable is not affected by potential shifts in the electrical ground, nor does it produce sparks.
 - A. Fiber optic
 - B. Co-axial
 - C. UTP
 - D. STP
15. _____ programs are automatically loaded and operates as a part of browser.
 - A. Widgets
 - B. Plug-ins
 - C. Add-ons
 - D. Utilities

Section-B
Computer Science (C++)

16. What will be the return value of the following code?

```
{Class1 *ptr = new Class1();  
.....  
return ptr;}
```

 - A. object of Class1
 - B. reference of Class1
 - C. reference to ptr
 - D. object pointed by ptr
17. How many copies of a class static member are shared between objects of the class?
 - A. A copy of the static member is shared by all objects of a class.
 - B. A copy is created only when at least one object is created from that class.
 - C. A copy of the static member is created for each instantiation of the class.
 - D. No memory is allocated for static members of a class.
18. Which looping process is best used when the number of iterations is known?
 - A. for
 - B. while
 - C. do-while
 - D. all looping processes require that the iterations be known

19. Which of the following operators below allow to define the member functions of a class outside the class?

- A. :: B. ?
C. :? D. %

20. Which of the following is not a standard exception built in C++?

- A. std::bad_creat B. std::bad_alloc
C. std::bad_cast D. std::bad_typeid

21. What is the output of the following C++ program?

```
#include<iostream>
using namespace std;
class abc
{public:
int i;
abc(int i) {
i = i; }
int main(){
abc m(5);
cout<<m.i;
return 0;}
```

- A. 5 B. 0
C. Error D. None of these

22. What is the output of this program?

```
#include<iostream>
using namespace std;
#define PI 3.14159
int main (){
float r = 2;
float circle;
circle = 2 * PI * r;
cout<<circle;
return 0;}
```

- A. 12.5664 B. 13.566
C. 10 D. compile time error

23. What is the fundamental unit of information of writer streams?

- A. Characters B. Bytes
C. Files D. Records

24. When is Virtual Table created?

- A. Every Class has VTable
B. Class inherited from other Class
C. When a Class overrides the function of Base class
D. Class has atleast one Virtual Function

25. Which of the following statements correctly describes an interface?

- A. It's a concrete class
B. It's a super class
C. It's a type of abstract class
D. It's a subclass

26. Which of the following is dereferencing operator?

- A. & B. ||
C. * D. !

27. If a base class member access is public, and an inherited class accesses specifier is private, which of the following statement is true?

- A. The base class member can be accessed by derived class objects.

B. The base class member cannot to accessed by the derived class members.

C. The derived class members can be accessed by the base class objects.

D. All of these

28. What will be the output of the code given below?

```
#include <iostream>
using namespace std;
int a(int m){
return ++m;}
int b(int n){
return ++n;}
int main(){
int p=0, q=0;
p+=a(b(q));
q+=b(a(q));
cout<<p<<q;
return 0;}
```

- A. 22 B. 221
C. 21 D. Compiler Error

29. In the for loop, if the condition is missing, then?

- A. It is assumed to be present and taken to be true.
B. It is assumed to be present and taken to be false.
C. It results in the syntax error.
D. It gives error during compiling the code.

30. What is the syntax of friend function?

- A. friend<class name1><<class name 2>
B. friend class name;
C. friend class name
D. All of these

31. What is the output of this program?

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

- A. 35 B. 20
C. 25 D. 30

32. What is the output of this program?

```
#include <iostream>
using namespace std;
int main(){
int i, j;
j = 10;
i = (j++, j+ 100, 999 + j);
cout<<i;
return 0;}
```

- A. 1000 B. 11
C. 1010 D. 1001

33. Which option is used to input a string with blank spaces?

- A. inline B. getline
C. putline D. All of these

34. What will be the output of the following code?

```
int main(){
int x = 10;
int&p = x;
cout<<&p <<&x;
return 0;}
```

- A. print 10 and the address of x
- B. run time error
- C. print the address of x and p twice
- D. print the address of p and x

35. Which of the following operators cannot be overloaded?
- A. >>
 - B. ? :
 - C. .
 - D. No such operator exists

Section-C Informatics Practices (Java)

16. Which constructor creates an empty string buffer with the specified capacity as length?
- A. StringBuffer()
 - B. StringBuffer(String str)
 - C. StringBuffer(int capacity)
 - D. All of these

17. Which function is used to perform some action when the object is to be destroyed?
- A. finalize()
 - B. delete()
 - C. main()
 - D. All of these

18. The methods wait() and notify() are defined in:
- A. java.lang.Thread
 - B. java.lang.Runnable
 - C. java.lang.Object
 - D. java.lang.ThreadGroup

19. Which is a valid keyword in java?
- A. interface
 - B. string
 - C. float
 - D. unsigned

20. Which of these statements is incorrect?
- A. Every class must contain a main () method.
 - B. There can be only one main () method in a program.
 - C. Applets do not require a main () method at all.
 - D. main () method must be made public.

21. What will be the output of the following code:

```
class Test{
public static void main (String [] args){
int [] [] x = new int[] [] {{2,4}, {6,8}};
System.out.print (x [1] [1]);}}
```

- A. 2, 8
- B. 8
- C. Compilation error can occur
- D. Results in an exception

22. Which of the following methods is invoked by the garbage collector?

- A. destructor
- B. constructor
- C. finally
- D. finalize

23. What will be the output of the following code?

```
class code{
public static void main (String[] args){
int x,y, result;
int a,p;
x = 4; y = 20; a = 8;
result = x+a;
p = y+a;
System.out.println ("x+a:" +result);
System.out.println ("y+a:" +p);}}
```

- A. x+a:12
- B. x+a:=28
- y+a:28
- y+a:12
- C. x+a:=24
- D. x+a:=4
- y+b:=12
- y+b:=20

24. Which is used to separate the hierarchy of the class while declaring an import statement?

- A. Package
- B. Applet
- C. Browser
- D. All of these

25. Which of these interface is not a part of Java's collection framework?

- A. List
- B. Set
- C. SortedMap
- D. SortedList

26. Which of these keywords must be used to monitor for exceptions?

- A. try
- B. finally
- C. throw
- D. catch

27. Which of these helps insert elements at a specific position in a collection?

- A. ArrayList
- B. LinkedList
- C. Any
- D. All of these

28. What is the output of this program?

```
class bitwise_operator{
public static void main(String args[]){
int a =3;
int b =6;
int c = a | b;
int d = a & b;
System.out.println(c + " " + d);}}
```

- A. 7 2
- B. 7 7
- C. 7 5
- D. 5 2

29. Which of the following is true about methods in an interface in java?

- A. An interface can contain only abstract method.
- B. We can define a method in an interface.
- C. Private and protected access modifiers can also be used to declare methods in interface.
- D. All of these

30. Predict the output of the following code:

```
class ABC
{public static void main(String args[])
{String s1 = new String("silverzone");
String s2 = new String("silverzone");
if (s1 == s2)
System.out.println("Equal");
else
System.out.println("Not equal");}}
```

- A. Silverzone
- B. Equal
- C. Not equal
- D. Error

31. Exception is subclass of ____ class.

- A. Exception
- B. Throwable
- C. RuntimeException
- D. IOException

32. Which of the following is true?
- A class can extend more than one class.
 - A class can implement only one interface.
 - A class can extend only one class and can implements more than one interface.
 - A class can extend only one class and can implements only one interface.

33. Which class does not override the equals() and hashCode() methods, inheriting them directly from class Object?
- java.lang.String
 - java.lang.Double
 - java.lang.StringBuffer
 - java.lang.Character

34. What is the output of the following program?

```
class Derived {
public void getDetails() {
System.out.println("Derived class");}
public class Test extends Derived{
protected void getDetails(){
System.out.println("Test class");}
public static void main(String[] args)
{Derived obj = new Test(); // line xyz
obj.getDetails();}}
```

- Test class
 - Compilation error due to line xyz
 - Derived class
 - Compilation error due to access modifier
35. Which of this statement is incorrect?
- Switch statement is more efficient than a set of nested ifs.
 - Two case constants in the same switch can have identical values.
 - Switch statement can only test for equality, whereas if statement can evaluate any type of boolean expression.
 - It is possible to create a nested switch statements.

Section-D (Python)

16. What is the output of the following?

```
print('{:,.} '.format('1112223334'))
```

- 1,112,223,334
- 111,222,333,4
- 1112223334
- Error

17. What is the order of precedence of following operator in python?

i. Parentheses	ii. Exponential
iii. Division	iv. Multiplication
v. Addition	vi. Subtraction

- i, ii, iii, iv, v, vi
- ii, i, iii, iv, v, vi
- ii, i, iv, iii, v, vi
- i, ii, iii, iv, vi, v

18. To generate a random integer between 0 and 10, use _____.
- random.randint (0, 10)
 - random.randrange (0, 9)
 - random.rangdrange (1, 9)
 - random.randint (0, 9)

19. What is the output of the following?

```
a = 8.6
b = 2
print a//b
```

- 4.3
- 4.0
- 4
- Compilation error

20. What is the return type of function id?

- int
- float
- boolean
- dict

21. What is the output of the following program:

```
print('{0:.-2%}'.format(1.0/3))
```

- 0.33
- 0.33%
- 33.33%
- 33%

22. If a function does not return a value, by default, it returns _____.

- none
- int
- double
- public

23. Suppose list1 is [1, 3, 2], What is list1 * 2?

- [2, 6, 4]
- [1, 3, 2, 1, 3]
- [1, 3, 2, 1, 3, 2]
- [1, 3, 2, 3, 2, 1]

24. What is the output of this expression, 3*1**3?

- 27
- 9
- 3
- 1

25. What is the output of the following?

```
x=(i for i in range(3))
for i in x:
print(i)
```

- 0 1 2
- 0 1 2 0 1 2
- Compile error
- Runtime error

26. What is called when a function is defined inside a class?

- Module
- Class
- Another function
- Method

27. What is the output of the following program :

```
i = 0
while i < 5:
print(i)
i += 1
if i == 3:
break
else:
print(0)
```

- 0 1 2 0
- 0 1 2
- Error
- None of these

28. What command is used to shuffle a list 'L'?

- L.shuffle()
- random.shufflelist(L)
- shuffle(L)
- random.Shuffle(L)

29. Which method is used to convert raw byte data to a string?

- Encode()
- Decode()
- Convert()
- tostring()

30. What is the output of the following code?

```
print type([1,2])
```

A. <type 'tuple'> B. <type 'int'>
C. <type 'complex'> D. <type 'list'>
31. What gets printed?

```
def f(): pass
print type(f())
```

A. <type 'function'>
B. <type 'tuple'>
C. <type 'NoneType'>
D. <type 'str'>
32. What should the below code print?

```
print type(1j)
```

A. <type 'complex'>
B. <type 'unicode'>
C. <type 'int'>
D. <type 'float'>
33. What is the output of the following code?

```
print type(lambda:None)
```

A. <type 'NoneType'>
B. <type 'tuple'>
C. <type 'type'>
D. <type 'function'>
34. What is the output of the program given below?

```
a = [1,2,3,None,(),[,]
print len(a)
```

A. syntax error B. 4
C. 5 D. 6
35. Suppose t = (1, 2, 4, 3), which of the following is incorrect?
A. print(t[3]) B. t[3] = 45
C. print(max(t)) D. print(len(t))

Section-E Multimedia & Web Technology

16. Which of the following groups of colors consist of equal amounts of all basic colors ?
A. purple, green, and red
B. black, blue, and gray
C. white, red and gray
D. white, black and gray
17. The density of pixels on a screen is known as:
A. resolution. B. pixility.
C. pixel depth. D. screen clarity
18. What is the process that condenses files to be stored in less space and therefore, sent faster over the Internet?
A. Data condensation
B. Data compression
C. Zipping
D. Defragmentation
19. Which one of the following resource is not necessarily required on a file server?
A. secondary storage B. processor
C. network D. monitor

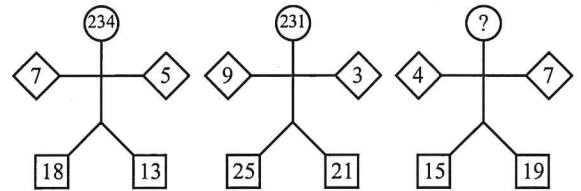
20. Audio compression can be used for:
A. Speech or Music
B. Voice and Data
C. Picture and Colors
D. Video and Voice
21. In a real-time video conference, data from the server is _____ to the client sites.
A. unicast
B. multicast
C. broadcast
D. All of these
22. _____ is an application protocol that establishes, manages, and terminates a multimedia session.
A. RIP B. SIP
C. DIP D. None of these
23. Name the hardware that creates sound from a mathematical representation.
A. Sound Synthesizer
B. Stampers
C. Speaker
D. Sons
24. Guidelines for creating a well-done presentation include all except:
A. maintain a consistent appearance.
B. keep it simple
C. make it lively.
D. use a large variety and quantity of sounds, animation, and bells and whistles.
25. MIDI stands for:
A. Musical Instruction and Digitized Instruments.
B. Musical Instrument Digital Interface.
C. Music and Instruments Digitized Instantly.
D. Musical Interface Digitally Integrated.
26. _____ is sophisticated Pc based program for editing WAV files.
A. Cubase B. Sound forge
C. Cool edit D. Pro Tools
27. Usually, _____ video is transferred through FireWire.
A. bit-mapped B. analog
C. digital D. digitized
28. Multimedia system requires hard real time scheduling:
A. to ensure critical tasks will be serviced within timing deadlines.
B. to deliver the media file to the client.
C. to minimize the delay.
D. for security.
29. Which one of the following are uncompressed audio formats?
A. WAV, AIFF B. FLAC, WavPack
C. MP3, Vorbis D. Both A and B
30. Alpha Channel is not supported by :
A. GIF B. PNG
C. TIFF D. BMP

31. In teardown state of real time streaming protocol:
- the server resources for client.
 - server delivers the stream to client.
 - server suspends delivery of stream.
 - server breaks down the connection.
-
32. Which company developed the AU audio format?
- Apple
 - Sun
 - Netscape
 - Cisco
-
33. Which of the following statements is true?
- MIDI files are generally larger than WAV files.
 - Video files are generally much larger than audio files.
 - Audio and video are one and the same.
 - Nearly all 5 minute movie clips are under 1M in size.
-
34. Which of the following file extensions would be used for a Quick Time movie?
- avi
 - mpg
 - mov
 - sgi
-
35. VRML stands for which of the following?
- Very Real Marking Language
 - Virtual Reality Marking Language
 - Virtual Reality Markup Language
 - Virtual Reality Makeup Language

Section-F
Reasoning and Aptitude

36. Find the missing term.
3, 5, 202, 521, 903, 1311, ?
- 1524
 - 1666
 - 1722
 - 2021
-
37. To establish the same relationship between two pair of terms on either side of '::' choose the option that will replace the question mark(?).
- $$\frac{B * L * Q}{V} : 10 :: \frac{N * D * A}{Y} : ?$$
- 13
 - 17
 - 25
 - 31
-
38. There are AB axis in such a way that A is in north and B is in south direction. There is CD axis in such a way that C is in west direction and D is in east direction. AB axis and CD axis intersect at a point O in such a way that AO is 12m, OB is 14m, OC is 12m, OD is 13 m. A person starts walking from point P which is 4m to the west of point O and walks 10m in north direction to reach point Q and then he takes a turn to his right and walks 17m and stops at point R. Another person starts walking from point D and walks 14m in south direction to reach point T, then turns to his right and walks 20 m and stops at point U.
- What is the distance between point 'R' and point 'T'?
- 33m
 - 24m
 - 20m
 - 15m

39. Find the missing term.



- 62
- 97
- 115
- 122

40. How many pairs of letters are there in the word 'BRIGHTER', each of which have as many letters between them in the word as they have between them in the English alphabet?
- One
 - Two
 - Three
 - More than Three

41. Find the water image.

D&L°9G@7R

- D&Γ%δD@7B
- D&Γ%δE@ΔB
- D&Γ°δE@ΔB
- D&Γ%δD@ΔB

42. In a certain code language:

- "Inside result happy spirit" is written as "ae me le ue".
- "Picture down morning inside" is written as "de le te ge".
- "Happy picture good spirit" is written as "te ae ue ce".
- "Spirit win morning spark" is written as "de ye we ae".

What is the possible code for "good spirit down"?

- ce me ge
- pe me ge
- ce ae ge
- pe ce ge

43. A solid cube of each side 8 cms, has been painted red, blue and black on pairs of opposite faces. It is then cut into cubical blocks of each side 2 cms.

How many cubes have two faces painted red and black and all other faces unpainted?

- 4
- 8
- 16
- 32

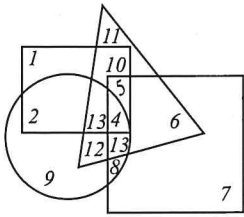
44. Study the information carefully and answer the questions given below.

In a family of eight members there are three married couples and five female members. G is daughter-in-law of B, who has two children. D is the aunt of C, who is unmarried. F is father-in-law of H and is married to E. A is the father of D.

How is H related to E?

- Mother
- Grand father
- Son in law
- Daughter

45. In the following diagram, police officer represents circle, corrupt represents triangle, poet represents square and married represents rectangle



The area representing unmarried police officers who are not corrupt but are poets is

- A. 8
B. 9
C. 2
D. 4
46. In the following questions, the symbols @, #, %, \$ and © are used with the following meaning as illustrated below-

- ' $P\#Q$ ' means ' P is neither greater than nor equal to Q '
- ' $P©Q$ ' means ' P is neither equal to nor smaller than Q '
- ' $P\%Q$ ' means ' P is neither smaller than nor greater than Q '
- ' $P\$Q$ ' means ' P is not smaller than Q '
- ' $P@Q$ ' means ' P is not greater than Q '

Now in each of the following questions assuming the given statements to be true, find which of the three conclusions I, II and III given below them is/are definitely true and give your answer accordingly.

Statements:

- $K \$ M$
- $M © O$
- $O @ R$
- $R © T$

Conclusions:

- I. $K © R$
II. $O \# K$
III. $R © K$

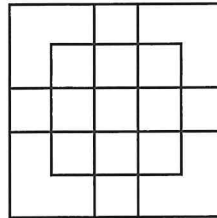
- A. Only II is true
B. Only I and II are true
C. Only II and III are true
D. None is true

47. Find the missing term.

7	5	13	100
10	15	21	234
8	20	6	12
6	9	4	?

- A. 45
B. 56
C. 62
D. 83

48. Find the number of squares.



- A. 23
B. 25
C. 27
D. 30

Directions for questions 49 & 50: Study the following information carefully and answer the questions given below-

A, B, C, D, E, F, G and H are eight persons sitting around a rectangular table. Four of them are sitting on the middle side of table and facing away from the center and other four of them are sitting at the corner of table and they are facing towards the center of the table. They all have different age. The age of all the four persons who sit at the corner of table is multiple of 3 and the age of all four persons who sit at the middle of table is multiple of 2. E sits third to the left of A. A faces outside. Two persons sit between E and the one whose age is 54. H sits second to the right of one whose age is 54 year. Three persons sit between H and B, whose age is 76 year. One of immediate neighbor of H is 69 year old person. C sits second to right of one whose age is 69 year. Only one person sits between C and F. The age of one who sits second to left of F is one year less than B. The age of one who is immediate neighbor of one whose age is 75 year is equal to difference between the age of B and A. D is not immediate neighbor of E. The age of one of them is 27 year but he is not immediate neighbor of B. The age of H is perfect square and his age lies between the age of B and A. The age of D is 1 year less than the age of H.

49. Which one of the following sits immediate left of G?

- A. F
B. G
C. E
D. D

50. The difference of age between F and C is?

- A. 69 year
B. 51 year
C. 27 year
D. 42 year