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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

11

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. The inputs of a NAND gate are connected together. The resulting circuit is:
A. OR gate B. AND gate
C. NOT gate D. XOR gate

2. If you want to keep track of different editions of a document which features of MS-Word will you use?
A. Editions B. Versions
C. Track Change D. All of these

3. Which one of the following statement is not the benefit of firewall?
A. It limits security exposure.
B. It is used for logging internet activity.
C. It enforces the organizations security policy.
D. It protects against virus.

4. Which of the following uses radiowaves instead of wires or cables for links between devices?
A. Ethernet B. Token ring
C. WLAN D. All of these

5. Which keystroke is used for updating a field in MS-Word?
A. F6 B. F9
C. F11 D. F12

6. Which of the following is the correct definition of cookie?
A. It is a password stored by a web server.
B. It is a virus that corrupts other web file.
C. It is a message given to a web browser by a web server.
D. It is intentionally created deceptive message that collects user's personal information.

7. Which of the following devices is used to connect two systems using different protocols?
A. Modem B. Repeater
C. Gateway D. Bridge

8. Which option can be used to set custom timings for slides in a presentation?
A. Slider Timer B. Slide Show Setup
C. Rehearsal D. Slider Timings

9. What is the use of window + L shortcut key in the windows operating system?
A. To open Run dialog B. To open utility manager
C. To lock the window D. To display window help

10. In MS-Excel, which is used to perform what if analysis?
A. Solver B. Goal seek
C. Scenario Manager D. All of these

11. The process of a computer receiving information from a server on the Internet is known as:
A. pulling B. pushing
C. downloading D. transferring

12. _____ use continuous physical phenomena to model the problem being solved.
A. Analog computers B. Digital computers
C. Hybrid computers D. None of these

13. In which type of backup storage data is read in a sequence?
A. Direct access B. Serial access
C. Storage access D. Permanent access

14. Difference between binary coding and binary coded decimal is:
A. binary coding has a decimal format.
B. BCD has no decimal format.
C. binary coding is pure binary.
D. BCD is pure binary.

15. How we can view a cell comment in MS-Excel 2013?
A. By clicking the display comment command on the window menu.
B. By clicking the comment command on the view menu.
C. By clicking the edit comment commands on the Insert menu.
D. By placing the mouse pointer over the cell.

Section-B
Computer Science (C++)

16. Assume class TEST. Which of the following statements is/are responsible to invoke copy constructor?
A. TEST T2(T1) B. TEST T4 = T1
C. T2 = T1 D. Both A and B

17. How can we define member function outside the class ?
A. Using union B. Using structure
C. Using pointers D. Using scope resolution

18. Which of the following concepts means determining at runtime what method to invoke?
A. Data hiding B. Dynamic typing
C. Dynamic binding D. Dynamic loading

19. Find the wrong statement/s about abstract class.
A. We cannot create its objects.
B. We cannot create pointers to an abstract class.
C. It contains at least one pure virtual function.
D. We can create references to an abstract class.

20. Which of the following cannot be used with the keyword virtual?
A. Class B. Member functions
C. Constructor D. Destructor

21. The global object's constructor function is executed:
A. as soon as object is created but after execution of main().
B. before main() is executed.
C. in main() i.e. when main() is executing.
D. in the reverse order of declaration.

22. Which of the following is correct?
A. Do {
 Statement ;}
 while (condition);
C. Do {
 Statement ;}
 while (statement)

- B. Do {
 Condition ;}
 while (statement)
D. Do {
 Statement ;}
 while (condition)

23. In C++, _____ operator is used for dynamic memory allocation.

- A. scope resolution B. conditional
C. new D. membership access

24. If a program uses inline function, then the function is expanded inline at _____.

- A. compile time B. run time
C. Both A and B D. None of these

25. A pointer pointing to a variable that is not initialized is called _____.

- A. Void Pointer B. Null Pointer
C. Empty Pointer D. Wild Pointer

26. We cannot overload the function in which of the following?

- A. Return function B. Derived function
C. Called function D. Caller

27. What is the output of the following program?

```
#include<iostream>
using namespace std;
main(){
short unsigned int i =0;
cout<<i--;}

```

- A. 0 B. Compile error
C. 65535 D. 32767

28. Can a structure contain pointer to itself?

- A. Yes B. No
C. Compilation Error D. Runtime Error

29. What is the result of the following program?

```
int y = 7;
int ans = ++y;
cout<<"ans="<<ans;
cout<<,"y="<<y;

```

- A. ans=8,y=7 B. ans=7, y=7
C. ans=8,y=8; D. None of these

30. Predict the output of the following program:

```
#include <iostream>
using namespace std;
int main (){
try{
throw 20;}
catch(int e){
cout<<"An exception occurred" << e <<endl;}
return 0;}

```

- A. 20
B. An exception occurred
C. Error\
D. An exception occurred 20

31. Find the output of the following:

```
#include<iostream>
using namespace std;
int&fun(){
static int a =10;
return a;}
int main(){
int&y = fun();
y = y +20;
cout<<fun();
return 0;}

```

- A. 10 B. 20
C. 30 D. 40

32. In the following program f() is overloaded.

```
void f(int x){
}void f(signed x){
}main(){
}

```

- A. True B. False
C. Error D. Can't say

33. What is the output of the following program?

```
#include<iostream>
using namespace std;
main(){
class student {
int rno =10;
} v;
cout<<v.rno;}

```

- A. 10
B. Garbage
C. Runtime error
D. Compile error

34. Consider the following code:

```
class TEST{
private:
introll_no;
public:
int age;
char name[20];
private:
int grade;
protected:
char gender[20];
private:
private:
int m1, m2, m3;};

```

In general view, is this class definition valid?

- A. Yes
B. No
C. Cant say
D. Error

35. Default value of static variable is _____.

- A. 0
B. 1
C. Garbage value
D. Compiler dependent

Section-C
Informatics Practices (Java)

16. Consider the following code:

```
class X implements Runnable{
public static void main(String args[]){
/* Missing code? */
public void run() {}
}

```

Which of the following line of code is suitable to start a thread?

- A. Thread t = new Thread(X);
B. Thread t = new Thread(X); t.start();
C. X run = new X(); Thread t = new Thread(run); t.start();
D. Thread t = new Thread(); x.run();

32. `public class Test { }`
What is the prototype of the default constructor?
A. `Test()` B. `Test(void)`
C. `Public Test()` D. `Public Test(void)`
33. What is the result of compiling and running the following program?
`public class test {
public static void main(String args[]) {
int i = -1;
i = i >> 1;
System.out.println(i);}}`
A. 0 B. 63
C. -1 D. 127
34. What is a function in java?
A. A way of storing values.
B. An entity that receives inputs and outputs.
C. A sequence of characters enclosed by quotes.
D. A type of compute.
35. Which of the following is not a keyword in Java.
A. `emun` B. `transient`
C. `instanceof` D. `strictfp`

Section-D (Python)

16. What Will Be the output of the following?
`s = "\t\tWelcome\n"`
`print(s.strip())`
A. `\t\tWelcome\n` B. `Welcome\n`
C. `Welcome` D. `\t\tWELCOME`
17. Which of the following creates a pattern object?
A. `re.regex(str)` B. `re.create(str)`
C. `re.compile(str)` D. `re.assemble(str)`
18. What is the output of the following?
`print('The sum of {0:b} and {1:x} is {2:o}'.format(2,10,12))`
A. The sum of 2 and 10 is 12
B. The sum of 10 and a is 14
C. The sum of 10 and a is c
D. Error
19. Which one of the following have the same precedence?
A. Addition and Subtraction
B. Multiplication and Division
C. Addition and Multiplication
D. Both A and B
20. _____ is a simple but incomplete version of a function.
A. Stub
B. Function
C. A function developed using bottom-up approach
D. A function developed using top-down approach
21. What is the output of the following?
`print('{:#}'.format(1112223334))`
A. `1,112,223,334` B. `111,222,333,4`
C. `1112223334` D. Error

22. What is a function in java?
A. A way of storing values.
B. An entity that receives inputs and outputs.
C. A sequence of characters enclosed by quotes.
D. A type of compute.
23. What gets printed?
`def f(): pass`
`print type(f())`
A. `<type 'function'>`
B. `<type 'tuple'>`
C. `<type 'NoneType'>`
D. `<type 'str'>`
24. What is the output of
`print 0.1 + 0.2 == 0.3?`
A. True B. False
C. Machine dependent D. Error
25. Which of the following functions gets a space-padded string with the original string left-justified to a total of width columns?
A. `isupper()` B. `join(seq)`
C. `len(string)` D. `ljust(width[, fillchar])`
26. In Python, a string literal is enclosed in _____.
A. parentheses B. single-quotes
C. double-quotes D. Both B and C
27. What will be the output of the following code snippet?
`a=[1,2,3,4,5,6,7,8,9]`
`print(a[:2])`
A. `[1,2]` B. `[8,9]`
C. `[1,3,5,7,9]` D. `[1,2,3]`
28. If a function does not return a value, by default, it returns _____.
A. none B. int
C. double D. public
29. To insert 5 to the third position in list1, we use which command?
A. `list1.insert(3,5)`
B. `list1.insert(2,5)`
C. `list1.add(3,5)`
D. `list1.append(3,5)`
30. What will be displayed by the call `nPrint('a', 4)`?
A. `aaaaa` B. `aaaa`
C. `aaa` D. infinite loop
31. What is the output of the following?
`print('The sum of {0} and {1} is {2}'.format(2, 10, 12))`
A. The sum of 2 and 10 is 12
B. The sum of 0 and 1 is 2
C. Runtime error
D. Compile error
32. What is the type of `sys.argv`?
A. tuple B. list
C. string D. set

33. You can use _____ to create an empty set.

- A. {}
- B. ()
- C. []
- D. set()

34. What is the output of the following?

- ```
print("xyyzyzxy".count('yy',1))
```
- A. 2
  - B. 0
  - C. 1
  - D. Error

35. What type of data is: a=[(1,1),(2,4),(3,9)]?

- A. Array of tuples
- B. List of tuples
- C. Tuples of lists
- D. Invalid type

## Section-E

### Multimedia & Web Technology

16. Devices that are used primarily to transport data between the processor and the user are known as:

- A. Data transfer device
- B. Basic storage devices
- C. Networking devices
- D. Data presentation device

17. A self-replicating computer program which sends copies of itself to other nodes on the computer network without any user intervention is known as:

- A. Computer virus
- B. Computer trojan
- C. Computer worm
- D. Web Script

18. Moving Picture Experts Group (MPEG-2), was designed for high-quality DVD with a data rate of:

- A. 3 to 6 Mbps
- B. 4 to 8 Mbps
- C. 5 to 6 Mbps
- D. 6 to 6 Mbps

19. In Real Time Interactive Audio Video, Jitter is introduced in real-time data by delay between:

- A. Frames
- B. Layers
- C. Pixels
- D. Packets

20. A \_\_\_\_\_ buffer is required for real-time traffic.

- A. playback
- B. reordering
- C. sorting
- D. None of these

21. What are images included in many software titles called ?

- A. clipart
- B. pop ups
- C. jpg files
- D. bmp files

22. All except \_\_\_\_\_ can squeeze music files to a fraction of their original size.

- A. AAC
- B. MP3
- C. WMA
- D. P2P

23. Which of the following is an audio repository?

- A. A web presentation that warehouses audio files.
- B. A library cataloguing all MIDI music.
- C. A website that provides tutorials on sound.
- D. A web server capable of playing audio files.

24. Which of the following is false?

- A. There are at least 100 different plugins.
- B. Multimedia annoys many Web users because it forces them to learn to program.
- C. Standards are evolving for multimedia formats.
- D. Compression plays a big role in how fast multimedia elements can be transferred over the Internet.

25. Which technique is referred to as inline scripting?

- A. The use of SCRIPT tags in line with the HEAD and BODY tags
- B. The addition of the INLINE tag within the controlling HTML
- C. The embedding of scripting instructions within certain HTML tags
- D. The physical justification of the script (major routines on the left, and lesser routines indented and on the right)

26. The MIME text file is saved with \_\_\_\_\_ extension.

- A. HTM
- B. HMT
- C. HTML
- D. JS

27. The Flash player is an example of a \_\_\_\_\_.

- A. movie reader
- B. streaming software
- C. compression software
- D. multimedia Plug-in

28. Out of the following, which one will be altered or modified by a computer virus?

- A. Operating System
- B. Speed of Network Connectivity
- C. Application Software
- D. All of these

29. Which of the following statements is true?

- A. MIDI files are usually larger than WAV files.
- B. Video files are much larger than audio files.
- C. Same format is used to create audio and video files.
- D. All video clips consume around 10 MB space.

30. When a program assigns 8 bits to a pixel, that pixel can display one of up to \_\_\_\_\_ colors.

- A. 32
- B. 64
- C. 256
- D. 1,024

31. Software that can create art that a designer can rotate, view from a variety of angles, and take two-dimensional "snapshots" of the best views is known as:

- A. 3-D modeling software.
- B. photo database software.
- C. photo management software.
- D. gray-scale graphics software.

32. \_\_\_\_\_ is a display device that is used as picture tubes in television receivers.

- A. CRT
- B. LCD
- C. TFT
- D. All of these

33. Which of the following tags cannot be used to include audio on a Web page?  
 A. BGSOUND                      B. EMBED  
 C. MUSIC                          D. OBJECT
34. Which of the following is not an attribute of the OBJECT tag?  
 A. USEMAP                        B. STANDBY  
 C. DECLARE                      D. INDEX
35. .net domain is used for which of the following  
 A. Internet infrastructure and service providers  
 B. International organizations  
 C. Educational institution  
 D. None of these

**Section-F**  
**Reasoning and Aptitude**

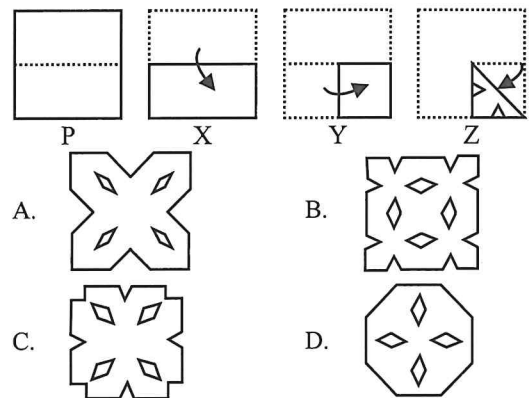
36. Find the missing term.  
 910, 903, 816, 679, 518, 347, ?  
 A. 159                              B. 176  
 C. 205                              D. 222
37. To establish the same relationship between two pair of terms on either side of ':' choose the option that will replace the question mark(?).  
 $\frac{T * O * M}{H} : 6 :: \frac{M * T * S}{D} : ?$   
 A. 0                                  B. 5  
 C. 9                                  D. 13
38. Read the following information carefully and answer the question given below:  
 • 'M × N' means 'M is mother of N'.  
 • 'M - N' means 'M is brother of N'.  
 • 'M + N' means 'M is sister of N'.  
 • 'M ÷ N' means 'M is father of N'  
 In the expression  $A \times B - D \div F + C$  which of the following is true?  
 A. F is son of A  
 B. D is daughter of A  
 C. F is granddaughter of A  
 D. B is mother of C

39. Find the missing term.
- 
- A. 32                                  B. 57  
 C. 65                                  D. 100

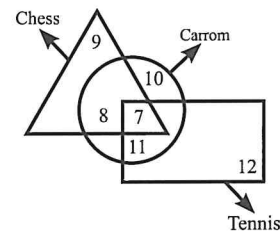
40. How many pairs of letters are there in the word 'EXCLUSIVE', each of which have as many letters between them in the word as they have between them in the English alphabet?  
 A. One                                B. Two  
 C. Three                              D. More than Three

41. In a certain code language,  
 • 'Metro boost image timing' is coded as 'mx fe fm so'  
 • 'Digital secure boost timing' is coded as 'fm xe kx so'  
 • 'Metro boost digital economy' is coded as 'xe fm fe rz'  
 • 'Image boost study icon' is coded as 'ht mx fm bu'  
 Which of the following may be coded as 'xe rz kx wp'?  
 A. Economy study icon image  
 B. Secure economy digital image  
 C. Secure image timing boost  
 D. Digital secure bank economy

42. The question consists of a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Fig. (Z) shows the manner in which the folded paper has been cut. These three figures are followed by four answer figures from which you have to choose a figure which would most closely resemble the unfolded form of fig. (Z).



43. An interview of 60 persons to know whether they play Tennis Chess or Carrom was conducted. The data so obtained has been summarized in a pictorial diagram as shown. Study the diagram and find out the number of persons do not play any game.



- A. 3                                  B. 4  
 C. 6                                  D. 8
44. If 18th February, 2005 falls on Friday then what will be the day on 18th February, 2009?  
 A. Sunday                          B. Monday  
 C. Tuesday                        D. Wednesday
45. If '-' stands for division '+' stands for multiplication, '÷' stands for subtraction, '×' stands for addition, then which one of the following equations is correct?  
 A.  $19 + 5 - 4 \times 2 \div 4 = 1$   
 B.  $19 \times 5 - 4 \div 2 + 4 = 16$   
 C.  $19 \div 5 + 4 - 2 \times 4 = 13$   
 D.  $19 \div 5 + 4 + 2 \div 4 = 20$



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 statement 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:

- $A \$ B$ ,
- $B \% E$ ,
- $G © E$

Conclusions:

- I.  $G © B$
- II.  $E @ A$
- III.  $A © G$

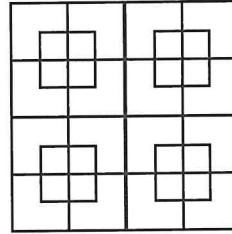
- A. Only I and III are true
- B. Only II and III are true
- C. Only I and II are true
- D. All are true

47. Find the missing term.

|    |    |    |    |
|----|----|----|----|
| 11 | 7  | 5  | 51 |
| 9  | 11 | 3  | 15 |
| 13 | 5  | 12 | 49 |
| 7  | 3  | 6  | ?  |

- A. 13
- B. 21
- C. 32
- D. 36

48. Find the number of squares in the given figure.



- A. 25
- B. 34
- C. 42
- D. 50

**Directions (49-50):** Study the following information and answer the given questions:

Nine people – P, Q, R, S, T, U, V, W, and X who live on separate floors of a 9-floor building such that ground floor is numbered 1, first floor is numbered 2 and so on until the topmost floor is numbered 9. Each one of them belongs to different city of India viz. Noida, Delhi, Agra, Kanpur, Meerut, Varanasi, Pune, Patna, and Mumbai but not necessarily in the same order. Only five people live above the floors on which P lives. Only one person lives between P and the one who belongs to Varanasi. U lives immediately below the one who belongs to Delhi. The one who belongs to Delhi lives on an even numbered floor. Only three people live between the one who belongs to Varanasi and the one who belongs to Agra. T lives immediately above R. T does not belong to Agra. Only two people live between Q and the one who belongs to Meerut. The one who belongs to Meerut lives below the floor on which Q lives. W, who belongs to Patna lives on floor no. 8. The one who belongs to Noida does not live immediately above or immediately below Q. S does not live immediately above or immediately below P. X belongs to Mumbai and lives immediately above W. V does not belong to Kanpur.

49. How many persons live between P and the one who belongs to Noida?

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

50. Who amongst the following lives immediately below the floor on which V lives?

- A. P
- B. Q
- C. T
- D. S

Space for Rough Work