1. If $f : R \rightarrow R$ and $g : R \rightarrow R$ are given by $f(x) = |x|$ and $g(x) = [x]$ for each $x \in R$, then $\{x \in R : g(f(x)) \leq f(g(x))\} = $ _____ .

   (A) $Z \cup (-\infty, 0)$
   (B) $(-\infty, 0)$
   (C) Z
   (D) R

2. If A is a square matrix of order n such that its elements are polynomials in x and its r-rows become identical for $x = \alpha$, then

   (A) $(x - \alpha)^r$ is a factor of $|A|$
   (B) $(x - \alpha)^{r-1}$ is a factor of $|A|$
   (C) $(x - \alpha)^{r+1}$ is a factor of $|A|$
   (D) $(x - \alpha)^r$ is a factor of A

3. Part of domain of the function $f(x) = \sqrt{\dfrac{\cos x - \dfrac{1}{2}}{6 + 35x - 6x^2}}$ lying in the interval $[-1, 6]$ is

   (A) $\left[-\dfrac{1}{6}, \dfrac{\pi}{3}\right] \cup \left[\dfrac{5\pi}{3}, 6\right]$
   (B) $\left[-\dfrac{1}{6}, \dfrac{\pi}{3}\right] \cup \left[\dfrac{5\pi}{3}, 6\right)$
   (C) $\left(-\dfrac{1}{6}, 6\right)$
   (D) None of these

4. Evaluate $\lim\limits_{x \to \infty} \left(\dfrac{x^2 \sin\dfrac{1}{x} - x}{1 - |x|}\right)$.

   (A) 0
   (B) 1
   (C) -1
   (D) 5

5. Consider the following statements S and R.

   S : Both $\sin x$ and $\cos x$ are decreasing functions in $\left(\dfrac{\pi}{2}, \pi\right)$.

   R : If a decreasing function decreases in (a, b) then its derivative also decreases in (a, b), which of the following is true?

   (A) Both S and R are wrong.
   (B) Both S and R are correct but R is not the correct explanation for S.
   (C) S is correct and R is the correct explanation for S.
   (D) S is correct and R is wrong.

6. If the equation of a curve passing through the point $(0, 1)$ is given by $y = \int x^2 \cdot e^{x^3} dx$ and the equation of the curve is written as $x = f(y)$ then $f(y) =$

    (A) $\sqrt{\log_e(3y - 2)}$ (B) $\sqrt[3]{\log_e(3y - 2)}$ (C) $\sqrt[3]{\log_e(2 - 3y)}$ (D) $\sqrt[3]{\log_e(2y - 3)}$

7. If the integers m and n are chosen at random between 1 and 100, then the probability that a number of the form $7^m + 7^n$ is divisible by 5 equals _____.

    (A) $\dfrac{1}{4}$ (B) $\dfrac{1}{7}$ (C) $\dfrac{1}{8}$ (D) $\dfrac{1}{49}$

8. The value of $\dfrac{1}{81^n} - \dfrac{10}{81^n} {}^{2n}C_1 + \dfrac{10^2}{81^n} {}^{2n}C_2 - \dfrac{10^3}{81^n} {}^{2n}C_3 + ... + \dfrac{10^{2n}}{81^n}$ is _____.

    (A) 2   (B) 0   (C) $\dfrac{1}{2}$ (D) 1

9. We are required to form different words with the help of letters of the word 'INTEGER'. Let m_1 be the number of words in which I and N are never together and m_2 be the number of words which begin with I and ends with R. Then $\dfrac{m_1}{m_2}$ is given by _____.

    (A) 30   (B) 1/30   (C) 6   (D) 42

10. $\displaystyle\sum_{r=1}^{n-1} \cos^2 \dfrac{r\pi}{n}$ is equal to _____.

    (A) $\dfrac{n}{2}$ (B) $\dfrac{n-1}{2}$ (C) $\dfrac{n}{2} - 1$ (D) $1 - \dfrac{n}{2}$

LOGICAL AND ANALYTICAL REASONING

11. A series of letters and numbers is given, the terms of which follow certain definite pattern in groups. However, some terms in the series are missing, which are given in the same order as one of the options below the series. Choose the correct option.

    X W C __ T S 20 __ P 12 __ L 15 K __ P __ G S 7
    (A) 17, F, I, S, T   (B) 19, E, L, R, H   (C) 21, G, L, N, F   (D) 23, H, K, O, H

12. The sets of numbers given in the alternatives are taken in given matrix. The columns and rows of matrix are numbered from 0 to 4. A letter from this matrix can be represented first by its row and then the column number e.g., in the matrix S can be represented by 03, 10, etc.; similarly you have to identify the correct set for the given word.

    FORM

	0	1	2	3	4
0	F	O	M	S	R
1	S	R	F	O	M
2	O	M	S	R	F
3	R	F	O	M	S
4	M	S	R	F	O

    (A) 24, 01, 33, 22   (B) 00, 01, 04, 33   (C) 12, 13, 67, 23   (D) 43, 22, 24, 33

13. A, B, C, D, E, F and G are playing cards sitting around a circular table. D is not neighbour of C or E. A is neighbour of B and C. G, who is second to the left of D, is the neighbour of E and F.
Which of the following will be D's position after E and D interchange their places?
(A) Neighbour of G and C
(B) To the immediate left of C
(C) To the immediate right of F
(D) Neighbour of C and A

14. A word arrangement machine when given an input line of words, rearranges them following a particular rule in each step. The following is an illustration of the input and the steps of rearrangement.
Input   : but going for crept te light sir
Step I   : crept but going for te light sir
Step II : crept going but for te light sir
Step III : crept going light but for te sir
Step IV : crept going light but for sir te
Step IV is the last step for this input.
As per the rules followed in the above steps, find out if the input is 'true se veto be nuke my like', which of the following will be Step IV?
(A) like nuke true veto be se my
(B) be my like se true veto nuke
(C) be my se like true veto nuke
(D) veto true nuke like so be my

15. If the 25ᵗʰ of August in a year is Thursday, the number of Mondays in that month is _____.
(A) 3
(B) 4
(C) 5
(D) 6

16. A matrix of certain characters is given. These characters follow a certain trend, row-wise or column-wise. Find out this trend and choose the missing character from the given options.

5	9	8	7
8	6	9	10
7	13	?	19
5	7	8	9

(A) 9
(B) 10
(C) 12
(D) 15

17. A direction pole was situated on the crossing. Due to an accident the pole turned in such a manner that the pointer which was showing East, started showing South. One traveller went to the wrong direction thinking it to be West. In what direction actually he was travelling?
(A) North
(B) South
(C) East
(D) West

18. In the given figures; Circle stands for Honest; Triangle stands for Tactful; Rectangle stands for Industrious; Square stands for Optimistic.

(A)   (B)   (C)   (D)

(E)   (F)   (G)   (H)
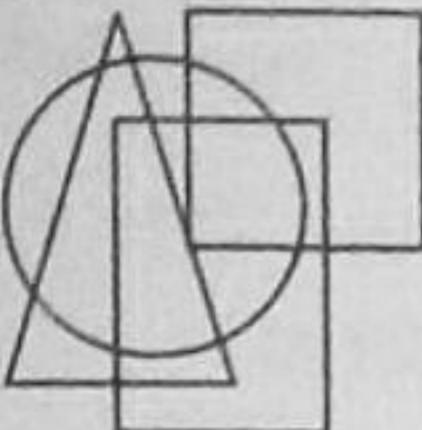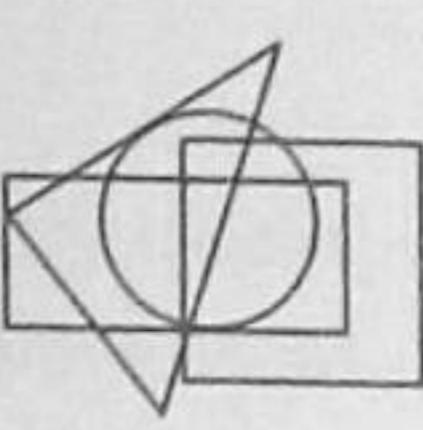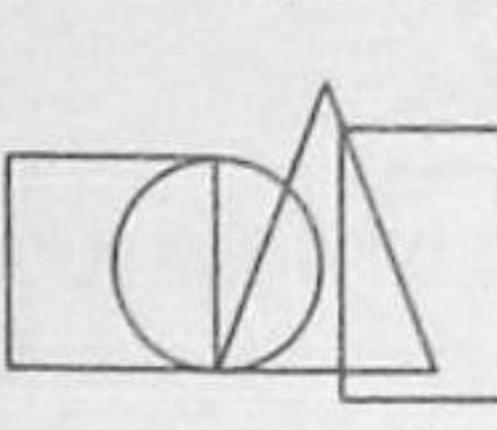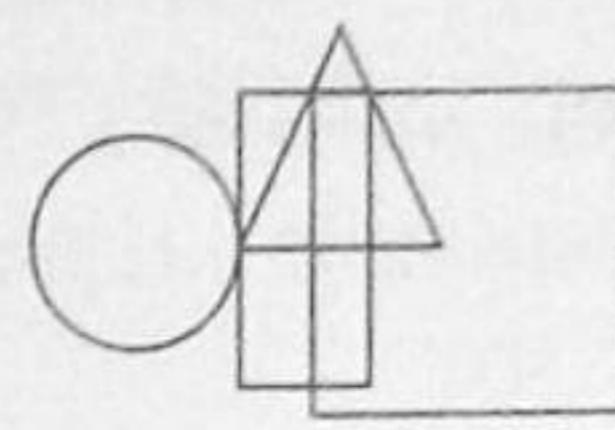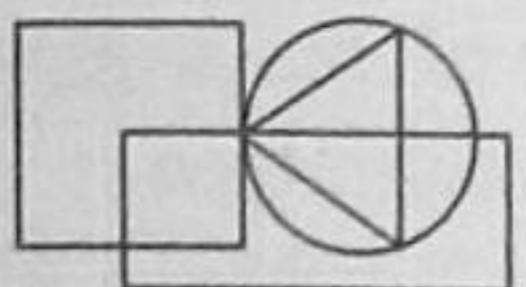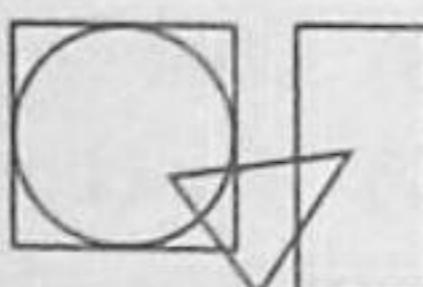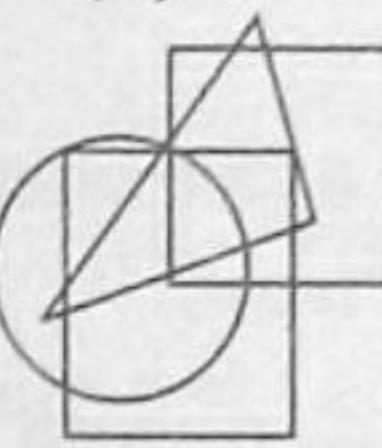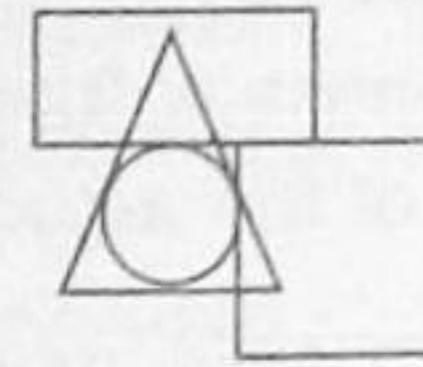
Given below, the traits of three persons X, Y and Z are registered. Based on these traits, you have to find out as to in which diagram(s) all the three persons can be accommodated. All such diagrams where they can find a place together in the same diagram will be the answer to the question. The correct answer in the question has been put as one of the four options given. Find the correct option.

X – tactful, honest, optimistic, Y – tactful, industrious, Z – optimistic, tactful

(A) A   (B) E   (C) F   (D) H

19. If every alternative letter of English alphabet from B onwards (including B) is written in lower case (small letters) and the remaining letters are capitalized, then how will the month in year 2012 is 'National Mathematics Day' celebrated be written ?

(A) SEptEMbEr   (B) dECEMbEr   (C) DeCeMbEr   (D) sEpTeMber

20. Answer the question referring to the symbol-letter-number sequences given below.

2 P J @ 8 $ L B 1 V # Q 6 δ G W 9 K C D 3 © ● £ 5 F R 7 A Y 4

In the given series if each symbol exchanges its position with its immediate right symbol/letter/number. Now, how many letters are there in the sequence which are immediately followed by a number and immediately preceded by a symbol?

(A) Nil   (B) One   (C) Two   (D) Three

COMPUTERS AND INFORMATION TECHNOLOGY

21. Which of the following Boolean Equation is INCORRECT?

(A) $(A + B)' = A' + B$

(B) $A + \bar{A}B = A + B$

(C) $X + YZ = (X + Y)(X + Z)$

(D) $A(A + B) = A$

22. The complement of the following Boolean Expression is

$$(B + D')(A + C')$$

(A) $A'D + B'C$ (B) $(B' + D)(A' + C)$ (C) $B'D + A'C$ (D) $B'D + AC'$

23. (101010101111101)$_2$ = (_____)$_8$
    (A) 54761   (B) 52575   (C) 52561   (D) 52755

24. 'Stoned' is the name of a _____.
    (A) Boot sector virus   (B) Trojan
    (C) Worm   (D) Multipartite virus

25. In C++, which of the following will the compiler NOT use to distinguish functions by their signatures?
    (A) The const-ness of function arguments   (B) The order of the argument number
    (C) The order of the argument types   (D) Function return type

26. If the input to this program is 500, then what would be the output of the program?

```
#include <iostream.h>
int main()
{
int val,res;
int n=1000;
cin>>val;
res=n+val>1750?700:70;
cout<<res;
return 0;
}
```

    (A) 1000   (B) 70   (C) 700   (D) 1500

27. In a relational database, the rows are referred to as _____ and columns are referred to as _____.
    (A) Tuple, Degree   (B) Degree, Attribute
    (C) Domain, Degree   (D) Tuples, Attributes

28. Which of the following activity is an unethical activity as per RFC 1087?
    (A) Any activity which seeks to gain unauthorized access to the resources of the Internet or disrupts the intended use of the Internet.
    (B) Any activity which waste resources (people, capacity, computer) through unauthorized access of resources.
    (C) Any activity which destroys the integrity of computer-based information, and/or compromises the privacy of users
    (D) All of these

29. What does XSL stand for ?
    (A) eXtensible Style Listing   (B) EXtensible Stylesheet Language
    (C) EXpandable Style Language   (D) eXtra Style Language

30. A Smart phone use "AMOLED" display screen, AM stands for _____.
    (A) Active-Matrix
    (B) Access-Matrix
    (C) Active-Machine
    (D) Access-Machine

31. Which of the following technologies is used to protect e-commerce pages?
    (A) HTTP
    (B) HTML
    (C) SSL
    (D) HTTPS

32. Where is a hub specified in the OSI Model ?
    (A) Session Layer
    (B) Physical Layer
    (C) Data Link Layer
    (D) Application Layer

33. Which of the following C++ operators cannot be overloaded?
    (A) [ ]
    (B) ->
    (C) ? :
    (D) *

34. Which of the following programs is NOT an antivirus program?
    (A) Kaspersky
    (B) Quick Heal
    (C) WinRaR
    (D) Norton

35. The ASCII code for an alphabet requires _____ bits.
    (A) 16
    (B) 15
    (C) 8
    (D) 7

36. Which of the following is not a database model available for a database system?
    (A) Class Model
    (B) Relational Model
    (C) Network Model
    (D) Hierarchical Model

37. Which of the following is used to login to a remote network ?
    (A) HTTPS
    (B) FTP
    (C) POP
    (D) TELNET

38. A non-key attribute, whose values are derived from the primary key of some other table, is known as the _____ of the current table.
    (A) Alternate key
    (B) Foreign key
    (C) Candidate key
    (D) Primary key

39. What does the HTTP status code 404 means ?
    (A) The syntax used in the URL is incorrect.
    (B) Server is looking for some encryption key from the client and not getting it.
    (C) The webserver is busy
    (D) Server cannot find the file you requested.

40. The _____ technology uses existing phone lines to provide internet access to home customers.
    (A) Cable internet
    (B) T1
    (C) DSL
    (D) ATM

41. What is the output of the given C++ program ?

```
#include<iostream.h>
class base
{int x,y;
public:
base(int xx=10,int yy=10)
{
x=xx;
y=yy;
}
void show()
{
cout<<x*y<<endl;
}
};
class derived
{
private:
base objbase;
public:
derived(int xx,int yy) : objbase (xx,yy)
{
objbase.show();
}
};
int main()
{derived objdev(10,20);
return 0;
}
```

(A) 10   (B) 20   (C) 100   (D) 200

42. Which of the following is NOT a firewall technique?

(A) Proxy server   (B) Data server

(C) Packet filter   (D) Application gateway

43. A software which is free as well as open-source belongs to _____ category.

(A) FOSS   (B) Commercial   (C) Proprietary   (D) Open Software

44. Which of the following is NOT a C++ reserved word?

(A) writable   (B) mutable   (C) default   (D) volatile

45. The given image illustrates the structure of _____.

	offset :	1	2	3	4	5	6
		6th bytes	5th byte	4th byte	3rd byte	2nd byte	1st byte
		1st octet	2nd octet	3nd octet	4th octet	5th octet	6th octet

Most significant ← 6 bytes → Least significant

← 3 bytes → or ← 3 bytes →

Organisationally Unique Identifier (OUI)	Network Interface Controller (NIC) Specific

← 8 bits →

b8	b7	b6	b5	b4	b3	b2	b1

0 : unicast
1 : multicast

0 : globally unique (OUI enforced)
1 : locally administered

(A) An IP address

(B) An e-mail address

(C) A web address

(D) A MAC address

46. It is a standard connector to connect 10Base2 coaxial cables. What is this connector called?

(A) RJ 45 Connector

(B) AUI Connector

(C) BNC Connector

(D) DIX Connector

47. Which of the following is a social networking site ?

(A) www.facebook.com

(B) zooppa.com

(C) www.stickam.com

(D) All of these

48. Identify the organisation based upon the information given below :

- It is a South Korean multinational conglomerate company.
- It was founded in 1938.
- It is associated with making of mobile phones & tablets.
- Founder of the company is Lee Byung-chull.

(A) Nokia   (B) Samsung   (C) Micromax   (D) Acer

49. _____ is the use of computing resources, that are delivered as a service over a network.

(A) Online Computing
(B) Realtime Computing
(C) Cloud Computing
(D) Distributive Computing

50. Touch enabled phone use either _____ or _____ touch technology to select a particular thing on the screen.

(A) Resistive, Xensation
(B) Resistive, Capacitive
(C) Capacitive, Xensation
(D) Surface acoustic, Capacitive