**01.** How many elements does the set $P\big(\{\varphi, a\{a\}, \{\{a\}\}\}\big)$ has; where a & b are distinct elements, P denotes power set.

(a) 2   (b) 4   (c) 16   (d) None of these

02. What is the cardinality of these sets in the order of their serial number

(i) {a}   (ii) {{a}}   (iii) {a, {a}}   (iv) {a, {a, {a}}}

(a) 1, 1, 3, 2   (b) 1, 1, 2, 3   (c) 1, 2, 2, 3   (d) 1, 2, 3, 4

03. Suppose that $A_i = \{1, 2, 3, ... i\}$ for i = 1, 2, 3 .... then find $\bigcup_{i=1}^{\infty} A_i = ?$. Here Z is set of Integers.

(a) Z+   (b) Z   (c) {1}   (d) None of these

04. Find $\bigcup_{i=1}^{\infty} A_i$ and $\bigcap_{i=1}^{\infty} A_i$ for every positive integer i where $A_i = \{-i, i\}$. Here Z denotes set of integers.

(a) Z – {0}, ϕ (b) Z, {–1, 0, 1}   (c) Z, ϕ (d) None of these

05. Which of the following relations are functions?

(i)   {(1, (a, b)), (2, (b, c)), (3, (c, a)) (4, (a, b))}

(ii)   {(1, (a, b)), (2, (b, a)), (3, (c, a)) (4, (a, c))}

(iii)   {(1, (a, b)), (2, (a, b)), (3, (a, b))

(iv)   {(1, (a, b)), (2, (b, c)), (1, (c, a))

(a) i, iii   (b) i, ii, iii   (c) i, iv   (d) i, ii

06. There is a flight from Trichy to New Delhi and 2 direct trains. There are 6 trains from Trichy to Chennai and 4 trains from Chennai to Delhi. Also, there are 2 trains from Trichy to Mumbai and 8 flights from Mumbai to New Delhi. In how many ways can a person travel from Trichy to New Delhi?

(a) 42   (b) 40   (c) 43   (d) 41

07. If P, Q, R have truth values, T, T and F, then the truth values of

$\big(P \rightarrow (Q \rightarrow R)\big) \rightarrow \big((P \rightarrow Q) \rightarrow (P \rightarrow R)\big) \& P \rightarrow Q V R$ are

(a) F, F   (b) T, T   (c) F, T   (d) T, F

08. $(A \cap B') \cup (A' \cap B) \cup (A' \cap B')$ is equal to

(a) $A \cup B$ (b) $A' \cup B'$ (c) $A' \cap B'$ (d) $A \cup B'$

09. The floor function [ ] is

(a) One – to one but no onto   (b) Onto but not one-to-one

(c) Neither one-to-one nor onto   (d) A bijection from R to Z

10. The domain of real – valued function $f(x) = \sqrt{x-3} + \sqrt{x-4}$ is the set of all values of x satisfying

(a) $3 < x < 4$　　　　(b) $3 \le x < \infty$　　　　(c) $3 \le x \le 4$　　　　(d) $4 \le x \le \infty$

11. The number of students who take both the subjects, mathematics and chemistry are 30. This represents 10% of the enrolment in mathematics and 12% of enrolment in chemistry. How many students take at least one of these two subjects?

(a) 500　　　　(b) 490　　　　(c) 560　　　　(d) 520

12. $\dfrac{1}{\sin 10^o} - \dfrac{\sqrt{3}}{\cos 10^o} =$

(a) 0　　　　(b) 4　　　　(c) 1　　　　(d) 2

13. The value of $\sin\dfrac{\pi}{16}\sin\dfrac{3\pi}{16}\sin\dfrac{5\pi}{16}\sin\dfrac{7\pi}{16}$ is

(a) $\dfrac{\sqrt{2}}{16}$　　　　(b) $\dfrac{\sqrt{2}}{32}$　　　　(c) $\dfrac{\sqrt{2}}{8}$　　　　(d) $\dfrac{\sqrt{2}}{64}$

14. Number of unimodular complex number which satisfies the locus $\arg\left(\dfrac{z-1}{z+i}\right) = \dfrac{\pi}{2}$ is

(a) 0　　　　(b) 1　　　　(c) 2　　　　(d) 3

15. The values of the parameter a such that the roots, α, β of the equation $2x^2 + 6x + a = 0$ satisfy the inequality $\dfrac{\alpha}{\beta}, \dfrac{\beta}{\alpha} < 2$ are

(a) $a > 0$　　　　(b) $a < 9/2$　　　　(c) $a < 0$ or $a > 9/2$　　　　(d) None of these

16. The 120 permutations of MAHES are arranged in dictionary order, as if each were an ordinary 5-letter word. The last letter of 86th word in the list is

(a) A　　　　(b) H　　　　(c) S　　　　(d) E

17. A person writes letters to 6 friends and addresses the corresponding envelops. Let 'x' be the number of ways so that at least 2 of letters are in wrong envelops and 'y' be the number of ways so that all letters are in wrong envelopes. Then x – y = ?

(a) 719　　　　(b) 265　　　　(c) 454　　　　(d) None of these

18. In how many ways can this diagram be colored subject to the following two conditions?

(i)　　　Each of the smallest triangle is to be painted with one of three colors: red, blue or green

(ii)　　No two adjacent regions have the same color.
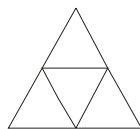
(a) 20　　　　(b) 24　　　　(c) 28　　　　(d) 30

---

19. The tens digits of $1! + 2! + 3! \ldots\ldots 49!$ is

(a) 1　　　　　　　(b) 2　　　　　　　(c) 3　　　　　　　(d) 4

20. The middle term in the expansion of $\left(1+\dfrac{1}{x^2}\right)\left(1+x^2\right)^n$ is

(a) $C_n^{2n}x^{2n}$　　　　(b) C_n^{2n}　　　　(c) C_{n-1}^{2n}　　　　(d) None of these

21. The sum of infinite series $\dfrac{2^2}{2!}+\dfrac{2^4}{4!}+\dfrac{2^6}{6!}+\dfrac{2^8}{8!}+\ldots..$ is equal to

(a) $\dfrac{e^2-1}{2e}$　　(b) $\dfrac{e^4+1}{2e^2}$　　(c) $\dfrac{\left(e^2-1\right)^2}{2e^2}$　　(d) $\dfrac{\left(e^2+1\right)^2}{2e^2}$

22. If 'a' is the arithmetic mean of 'b' and 'c' and G_1 and G_2 be the two geometric means between them, then $G_1^3+G_2^3$ is equal to

(a) abc　　　　　(b) 4abc　　　　　(c) 2abc　　　　　(d) abc/2

23. For $x \in R, \lim_{x\to\infty}\left(\dfrac{x-3}{x+2}\right)^x =$

(a) e　　　　　　(b) e^{-1}　　　　　(c) e^5　　　　　(d) e^{-5}

24. The contrapositive of $P \to (\sim q \to \sim r)$ is

(a) $(\sim q \wedge r) \to \sim p$　　(b) $(q \to r) \to \sim p$　　(c) $(q \vee \sim r) \to \sim p$　　(d) None of these

25. The mean of 100 observations is 50 and their standard deviation is 5. The sum of squares of all observations is:

(a) 50,000　　　　(b) 2,50,000　　　　(c) 2,52,500　　　　(d) 2,55,000

26. A card drawn from a pack of 52 cards. A gambler bets that it is a spade or an ace. What are odd against his winning this bet?

(a) 9 : 4　　　　　(b) 17 : 52　　　　　(c) 4 : 9　　　　　(d) 52 : 17

27. If Z is an idempotent matrix, then $(I+Z)^n$

(a) $I+2^nZ$　　(b) $I+\left(2^n-1\right)Z$　　(c) $I-\left(2^n-1\right)Z$　　(d) None of these

28. If $A^2 - A = 3I$ then A^{-1} is

(a) $A - I$　　(b) $\dfrac{1}{3}(A-I)$　　(c) $A + I$　　(d) $\dfrac{1}{3}(A+I)$

29. The system linear equations

$a + 2b + 3c = 7$
$2a + 4b + c = 12$
$3a + 6b + 4c = 20$

(a) has a unique solution　　　　　　(b) has no solution
(c) has infinite number of solutions　　(d) has two solutions

30. If the rank of matrix $\begin{bmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{bmatrix}$ is 2 then

(a) $abc \neq 0$ (b) $a \neq 0, bc = 0$ (c) $ab \neq 0, c = 0$ (d) $a \neq 0, b \neq 0, c \neq 0$

31. Solution of the differential equation $\dfrac{dx}{dy} - \dfrac{x \log x}{1 + \log x} = \dfrac{e^y}{1 + \log x}$, if $y(1) = 0$, is

(a) $x^x = e^{ye^y}$ (b) $x^x = ye^{e^y}$ (c) $e^y = x^{e^y}$ (d) None of these

32. The general solution of differential equation $\left(\tan^{-1} y - x\right) dy = \left(1 + y^2\right) dx$ is

(a) $x = \left(\tan^{-1} y + 1\right) + Ce^{-\tan^{-1} y}$ (b) $x = \left(\tan^{-1} y - 1\right) + Ce^{-\tan^{-1} y}$

(c) $x = \left(\tan^{-1} x - 1\right) + Ce^{-\tan^{-1} x}$ (d) $x = \left(\tan^{-1} x + 1\right) + Ce^{-\tan^{-1} x}$

33. A pair of fair dice is thrown independently 3 times. The probability of getting a score of exactly 9 twice is

(a) 8/729   (b) 8/9   (c) 1/729   (d) 8/243

34. Every gram of wheat provides 0.1 gram of proteins and 0.25 gram of carbohydrates. The corresponding values of rice are 0.05 gram respectively. The minimum daily requirements of proteins & carbohydrates for an average child are 50 gram & 200 gram respectively. The in what quantities wheat & rice be mixed in daily diet to provide minimum daily requirement of proteins & carbohydrates at minimum cost?

(a) 300, 400   (b) 200, 400   (c) 400, 300   (d) 400, 200

35. $Z = 7x + y$, subject to constraints:

$5x + y \geq 5,$

$x + y \geq 3$

$x \geq 0, y \geq 0 \cdot y$

Then minimum value of Z occurs at:

(a) (0, 5)   (b) (3, 0)   (c) (7, 0)   (d) $\left(\dfrac{1}{2}, \dfrac{5}{2}\right)$

36. The point of inflection for $f(x) = 3x^4 - 4x^3$ are

(a) $x = 1$ and $x = 2$ (b) $x = 0$ and $x = 2/3$ (c) $x = 3$ and $x = -1$ (d) $x = 4/5$ and $x = -1$

37. $\int_0^{1000} e^{x - [x]} dx$ is

(a) $e^{1000} - 1$ (b) $\dfrac{e^{1000} - 1}{e - 1}$ (c) $1000(e - 1)$ (d) $\dfrac{e - 1}{1000}$

38. Let the equation of a curve passing through point (0, 1) be given by $y = \int x^2 e^{x^3} dx$. If the equation of curve is written in the form $x = f(y)$, then $f(y)$ is?

(a) $\sqrt[3]{\log_e(3y-2)}$ (b) $\sqrt[2]{\log_e(3y-2)}$ (c) $\sqrt[3]{\log_e(2-3y)}$ (d) None of these

39. The value of $\int_0^\pi x\left(\sin^4 x \cos^4 x\right) dx$ is

(a) $\dfrac{3\pi^2}{64}$ (b) $\dfrac{3\pi^2}{128}$ (c) $\dfrac{3\pi^2}{256}$ (d) $\dfrac{5\pi}{256}$

40. If $49^n + 16n + \lambda$ is divisible by 64 for all $n \in N$, then the least negative value of λ is

(a) –2   (b) –1   (c) –3   (d) –4

41. Example of 5th generation language is

(a) ASP   (b) JavaScript   (c) SQL   (d) None of these

42. The output of following C language statement is:

printf("/nhello"+3);

(a) lo   (b) llo   (c) ello   (d) Run-time error

43. Give output of following C code:

```
in count (unsigned x)
{
int b;
for (b = θ, x!= θ, x>>=1)
if (x&θ1)
b++;
return b;
}
int main()
{
unsigned int a=3;
printf("%d",count(a));
return θ;
}
```

(a) 2   (b) 3   (c) 4   (d) None of these

44. What is the data type of following expression:

$expr_1$? $expr_2$: $expr_3$

if $expr_1$ as of type float & $expr_2$ is type int.

(a) int   (b) float   (c) double   (d) None of these

45. Which operator out of these has got highest precedence?

(a) , (b) < (c) ? : (d) [ ]

46. Which operator out of these has left to right associativity?

(a) ! (b) ++ (c) , (d) ? :

47. Consider the following code segment:

if (n > θ)

For (i = θ; i < 3; i++)

if (array[i]> θ)

{

printf("%d\n", array[i];)}

else

printf("\n n is negative\n");

Here, 'else' is paired with which 'if'?

(a) first (b) second (c) both (d) None of these

48. For this kind of declaration of main() function in a program 'copy.C'

int main(int argc, char *argv[ ]){-}

and this call of main function at command prompt:

C:\tc\bin>copy file1 file 2 file 3

What will be the value passed in parameter argc?

(a) 3 (b) 4 (c) 5 (d) None of these

49. What is the correct file mode that opens preexisting file in read and write mode:

(a) ab (b) r + b (c) w + b (d) None of these

50. Which C expression correctly represents this statement:

"It decrements pointer p before fetching the character that p points to."

(a) *p-- (b) --*p (c) *--p (d) None of these

51. How many times this statement will execute:

For (; *s = = *t&&*t! = '\θ'; s++,t++)

if both character pointers 's' and 't' point to the same string "abc".

(a) 4 (b) 3 (c) Run-time error (d) None of these

52. Which out of these statement is not true:

(a) The continue statement applies only to loops, not to switch

(b) The break statement provides an early exit from for, while, and do switch

(c) The continue statement causes the next iteration of the enclosing for, while, or do loop to begin

(d) None of these

53. Which out of these is not the keyword C99 has added in addition to 32 keyword defined by ANSI C:

    (a) _Bool   (b) inline   (c) register   (d) restrict

54. Which out of these is not a valid C version?

    (a) 2007 – another revised version of c programming language came with name CIX

    (b) 1989 – C89 standard (known as ANSI C or Standard C)

    (c) 1990 – ANSI C adopted by ISO, known as C 90

    (d) None of these

55. Who developed World Wide Web version 3 which is known as "Semantic Web"

    (a) Tim Berners Lee   (b) Taub Schilling   (c) Dennis Richie   (d) None of these

Direction (56 to 57): Choose the one which best expresses the meaning of italicized bold part of sentence from the option.

56. His speech was full of *affectation.*

    (a) boasting   (b) pretence   (c) pedantry   (d) euphemism

57. Reading of poetry is not congenial to her taste.

    (a) suited   (b) possible   (c) effective   (d) proper

58. Select phrase which means most nearly the same as this idiomatic phrase: "general act of forgiveness on a national occasion"

    (a) benediction   (b) emancipation   (c) investiture   (d) amnesty

59. Pick the antonym of vacillating

    (a) fascinating   (b) fanaticism   (c) indolence   (d) resolute

60. Pick the synonym of "patronage"

    (a) donation   (b) support   (c) espionage   (d) benefit

61. Select the closest meaning of idiom "stick to one's gungs"

    (a) maintain one's stand under stack   (b) suspect something

    (c) make something fail   (d) attach someone's faith

Direction (62 – 63): Supply the correct word/correct tense forms of the verb given in the bracket.

62. Did you think you …………. (see) me somewhere before?

    (a) have seen   (b) saw   (c) had seen   (d) would see

63. Having placed …………… proposal before you, I now ………………. Your decision.

    (a) alternate, waited for   (b) different, wait do

    (c) alternative await   (d) many, am waiting

64. Choose preposition: He was of charitable disposition, but did not like a number of his, relatives trying to live ………….. him without trying to earn their living.

    (a) off   (b) through   (c) with   (d) near

65. Select the sentence which best expresses the sentence "A stone stuck me one the head" in Passive voice.

(a) I was struck by a stone on the head

(b) I was struck on the head by a stone

(c) my head was struck by a stone

(d) I had been struck by a stone on the head.

Direction for 66 – 67 : Fill the missing terms marked by question mark "?"

66.

Z	?	S
R	O	?
?	G	C

(a) WJK   (b) KWT   (c) WKJ   (d) JKW

67.

72	24	6
96	16	12
108	?	18

(a) 12   (b) 16   (c) 18   (d) 20

68. In a row of men, Manoj is 30th from the right and Kiran is 20th from the left. When they interchainge their position, Manoj becomes 35th from the right. What is total number of men in the row?

(a) 45   (b) 44   (c) 54   (d) 34

69. If John celebrated his victory day on Tuesday, 5th January 1965, when will be celebrate his next victory day on the same day?

(a) 5th January 1970   (b) 5th January 1971   (c) 5th January 1973   (d) 5th January 1974

70. A child is looking for his father, he went 90 meters in the east before turning to his right. He went 20 meters before turning to his right again to look for his father at his uncle's place 30 meters from this point. His father was not there. From here he went 100 meters to his north before meeting his father in a street. How far did the son meet is father from the starting point?

(a) 80 m   (b) 100 m   (c) 260 m   (d) 140 m

71. Sunil is the son of Kesav. Simran, Kesav's sister, has a son Maruti & Daughter Sita. Prem is the maternal uncle of Maruti. How is sunil related to Maruti?

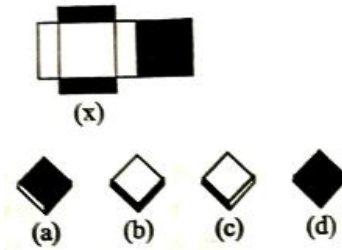(a) Uncle   (b) Brother   (c) Nephew   (d) Cousin B

72. Select a suitable figure from the four alternatives that would complete the figure matrix
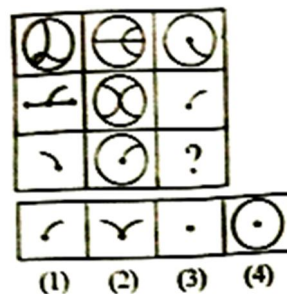
(a) 1   (b) 2   (c) 3   (d) 4

73. In the following question how does the figure look when folded into a cube along the marked lines?

(x)

(a)   (b)   (c)   (d)

(a) a, c, d   (b) b, c, d   (c) a, b, c   (d) None of these

74. Find the missing terms of this series: b, a, a, b, ?, a, b, a, ?, b, b, a, ?, ?,

(a) bbaa   (b) aaaa   (c) abab   (d) baba

75. Complete the series: Z, L, X, J, V, H, T, F, ….., ……,

(a) D, R   (b) R, D   (c) D, D   (d) R, R

76. A disk Defragmenter is an example of

(a) Application software   (b) System software

(c) Compiler   (d) Utility program

77. Convert the following decimal number to a number system with radix 3.

$$(106)_{10} = (?)_3$$

(a) 10221   (b) 10212   (c) 12201   (d) None of these

78. Which of the following is an encoding scheme created for Indian scripts:

(a) Unicode   (b) ISCII   (c) ESCII   (d) ASCII

79. Convert $(100.25)_{10} = (?)_{16}$

(a) 64.6   (b) 46.4   (c) 64.4   (d) None of these

80. Consider the following C language declarations & statements. Which statement is erroneous?

```
float f1 = 9.9;
float f2 = 66;
const float *ptrF1;
float*const ptrF2 = &f2;
ptrF1 = &f1;
ptrF2++;
ptrF1++;
```

(a) float*const ptrF2=&f2;   (b) ptrF1++;

(c) ptrF2++;   (d) None of these

81. What will be output of following statement?

char ch;

ch=13θ;

printf("\nvalue of ch=%d", ch);

(a) –126   (b) –127   (c) 127   (d) None of these

---

82. What will be output of following statements?

int n1 = 3, n2 = 6, a;

$\text{print}\,f\,("(n1 \wedge n2) + (a \wedge a) = \%d", (n1 \wedge n2) + (a \wedge a));$

(a) $(n1 \wedge n2) + (a \wedge a) = -6$ (b) Compilation error

(c) run-time error   (d) $(n1 \wedge n2) + (a \wedge a) = 5$

83. What is the output of following C code segment?

int i;

for(i= θ; i<=2; i++)

{switch(i)

{case 1: printf("%2d", i);

case 2: printf("%2d", i); continue;

default : printf("%2d", i);

}

}

(a) 0 1 1 1 2   (b) 0 1 1 2   (c) 0 1 1 2 1   (d) Syntax error

84. What is the output of following C program:

int main()
{   char ch = 'A';
int x = 97;
int y = sizeof(++x);
printf("\nx is %d", x);
while (ch<= 'F')
{
switch(ch)
{
case 'A':
case 'B':
case 'C':
case 'D': ch++; break
case 'E':
case 'F': ch++;
} putchar (ch);
}
return θ;
}

(a) x is 97 ABCDEF   (b) x is 98 BCDEFG   (c) x is 97 BCDEFG   (d) Run-time error

---

85. What is the output of following C program:

```c
void e(int x)
{
if(x> 0 )
{
e(- - x);
printf("%2d", x);
e(--x);
}
}
int main( )
{      e(3);
return 0 ;
}
```

(a) 0 1 2 0   (b) 0 2 2 0   (c) Compile-time error   (d) Run-time error

86. How this scanf("%i%c",&i,&c); will assign values to the variable i & c, when the input given by user is:

29 w

(a) i = 29 c = ' '   (b) i = 29 c = 'w'   (c) i = 29 c = garbage value   (d) Syntax error

87. Minimum & Maximum range of values for 'float' data type in C is:

(a) Unlimited   (b) $1.17*10^{-37}$ to $3.4*10^{38}$ (c) 10^{-37} to 10^{38} (d) 10^{-38} to 10^{38}

88. Which out of these is not value for C language?

(a) The value of external/global variable is unaffected by any manipulation of local variable.

(b) Local variable takes precedence over global variable

(c) Global variable takes precedence over local variable

(d) None of these

89. C was originally developed in the 1970s by Dessis Ritchie at Bell Telephone Laboratries, Inc. which is an outgrowth of two earlier languages, called:

(a) "K & R C" and B   (b) BCPL and B   (c) A & B   (d) ANSI C and B

90. Multiply 1101 by 1011

(a) 10001111   (b) 11001111   (c) 10000111   (d) 10101111

91. Subtract $(2761)_8$ from $(6357)_8$

(a) $(3076)_8$ (b) $(3276)_8$ (c) $(2376)_8$ (d) $(3376)_8$

92. Which out of these is not correct pairing?

(a) BCD-7 bit   (b) EBCDIC-8 bit   (c) ASCII-8 bit   (d) None of these

93. Which out of these does not support VoIP?

(a) Whatsapp   (b) Facetime   (c) IMO   (d) None of these

94. By using …………. addition or subtraction of signed numbers are performed.

(a) is complement   (b) 2s complement   (c) direct addition/subtraction   (d) None of these

95. Which statement out of these is not correct about multiprocessor systems:

(a) They provide fault-tolerance & high speed.

(b) Tightly coupled multiprocessor systems are much more energy-efficient than clusters.

(c) Loosely coupled multiprocessor system/clusters are interconnected via a high-speed communication system

(d) None of these

96. Which file format is not suitable for SD card in Android phone?

(a) FAT32   (b) NTFS   (c) exFAT   (d) None of these

97. Which out of these is not a type of ROM?

(a) Masked ROM   (b) EEPROM   (c) Flash BIO   (d) Flash drive

98. Select the next to smallest memory size from given below options:

(a) petabyte   (b) exabyte   (c) yottabyte   (d) zettabyte

99. When you simplify algebraically given below expression to a minimum sum of products, how many terms did you get?

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

(a) 7   (b) 4   (c) 5   (d) 6

100. The simplified form of given below expression is:

$$A'CD'E + A'B'D' + ABCE + ABD$$

(a) $A'B'D' + ABD + BCD'E$ (b) $A'B'D' + ABD + ACD'E$

(c) $A'B'D' + ABD + BAD'E$ (d) None of these