

Rewarding Career

Code: MTRO-I

Time: 3 Hrs.

Questions: 105

1. If $y = \tan^{-1} x$ then $y_{101}(0) - y_{100}(0)$ is

- (a) 20 (b) 20! (c) 100 (d) 100!

2. If $f(x, y) = \frac{xy(x^2 - y^2)}{x^2 + y^2}, (x, y) \neq (0, 0)$

$f(0, 0) = 0$, then

- (a) $f_{xy}(0, 0) > f_{yx}(0, 0)$ (b) $f_{xy}(0, 0) = f_{yx}(0, 0)$
(c) $f_{xy}(0, 0) < f_{yx}(0, 0)$ (d) none

3. The group $G = \{1, -1, i, -i\}$ with respect to multiplication is

- (a) non-abelian (b) Cyclic
(c) Cyclic with one generator
(d) Cyclic with two generation

4. One of the basis of the vector space $V(R)$ where $V =$ set of all polynomials of degree ≤ 2 over R is

- (a) $\{1, 2x\}$ (b) $\{3, 1+x^2\}$
(c) $\{2, 3x, 2+3x+x^2\}$ (d) $\{x^2, 1+x\}$

5. $\bar{a} \cdot (\bar{a} \times \bar{b}) =$

- (a) $\bar{a} \cdot \bar{b}$ (b) $\bar{a}^2 \bar{b}$ (c) 0 (d) $\bar{a}^2 + \bar{a} \cdot \bar{b}$

6. The L.P.P.

Maximize $Z = 20x_1 + 30x_2$

S.t. $2x_1 + x_2 \leq 40, 4x_1 - x_2 \leq 20, x_1 \geq 30, x_1, x_2 \geq 0$ has

- (a) optimal solution $x_1 = 10, x_2 = 20$
(b) optimal solution $x_1 = 30, x_2 = 20$
(c) has no feasible solution (d) has an unbounded solution

7. The dual of the above L.P.P. is

(a) Min $Z' = 40w_1 + 20w_2 + 30w_3$

S.t. $2w_1 + 4w_2 + w_3 \geq 20, w_1 - w_2 \geq 30, w_1 \geq 0, w_2 \geq 0$

(b) Min $Z' = 40w_1 + 20w_2 - 30w_3$

S.t. $2w_1 + 4w_2 + w_3 \geq 20, w_1 - w_2 \leq 30, w_j \geq 0, \forall j$

(c) Min $Z' = 40w_1 + 20w_2 - 30w_3$

S.t. $2w_1 + 4w_2 - w_3 \geq 20, w_1 - w_2 \geq 30, w_j \geq 0 \forall j$

(d) none of these

8. For maximum value of function

$f(x) = \sin^p x \cos^q x$, Value of x equals

- (a) $\tan^{-1}\left(\frac{p}{q}\right)$ (b) $\tan^{-1}\left(\sqrt{\frac{p}{q}}\right)$ (c) $\cot^{-1}\left(\frac{p}{q}\right)$ (d) none

9. If l denotes the least value of the integral

$$\int_{5\pi/4}^x [3\sin t + 4\cos t] dt \text{ in the interval } \left[\frac{5\pi}{4}, \frac{4\pi}{3}\right]$$

then $l + 2\sqrt{3} - \frac{1}{\sqrt{2}}$ is equal to

- (a) $\frac{3}{2}$ (b) $\frac{1}{\sqrt{2}}$ (c) $2\sqrt{3}$ (d) none

10. Let $f(x)$ be a function differential at $x = c$. Then

$\lim_{x \rightarrow c} f(x)$ equals

- (a) $f'(c)$ (b) $f''(c)$ (c) $f(c)$ (d) none

11. The value of $\int_0^{\pi/2} \frac{\sin x}{\sin x + \cos x} dx$ is

- (a) $\pi/2$ (b) $(\pi/2)^2$ (c) $\sqrt{\pi/4}$ (d) $\pi/4$

12. Suppose A is any $m \times n$ matrix over real numbers satisfying $X'AX = 0$ for each matrix X of the type $n \times 1$. Then which of the following conclusions can always be drawn?

- (a) $A = 0$ (b) A is symmetric
(c) A is skew symmetric (d) A is invertible.

13. $\int_0^{\pi/2} (2 \log \sin x - \log \sin 2x) dx$ is

- (a) 0 (b) $(\pi/2) \log 2$ (c) $(-\pi/2) \log 2$ (d) none

14. $\lim_{n \rightarrow \infty} \frac{1}{n} \left[\left(\frac{1}{n} \right)^m + \left(\frac{2}{n} \right)^m + \dots + \left(\frac{n-1}{n} \right)^m \right] =$

(a) $\frac{1}{m+1}$ (b) ∞

(c) $\frac{1}{m+1}$, if $m+1$ is positive (d) none

15. What is the above limit if $m+1$ is negative

(a) $\frac{1}{m+1}$ (b) ∞ (c) 0 (d) none

16. The area common to the two parabolas $x^2 = 4ay$ and $y^2 = 4ax$ is

(a) $\frac{16a^2}{3}$ (b) $\frac{4a^2}{3}$ (c) $\frac{a^2}{3}$ (d) none

17. $\int_0^\infty e^{-x^2} dx$ is

(a) does not exist (b) $\sqrt{\pi}$ (c) $\frac{\sqrt{\pi}}{2}$ (d) none

18. $\int_{-1}^2 \int_{x^2}^{x+2} dy dx$ is

(a) $\frac{9}{2}$ (b) $\frac{5}{2}$ (c) $\frac{3}{2}$ (d) none

19. $\int \int x^2 y^3 dx dy$ over the circle $x^2 + y^2 = a^2$ is

(a) 0 (b) πa^2 (c) πa (d) none

20. $\int \int_D x^2 y^2 dx dy$ where D is the region bounded by

$x=0$, $y=0$ and $x^2 + y^2 = 1$ is

(a) $\frac{\pi}{26}$ (b) $\frac{\pi}{46}$ (c) $\frac{\pi}{96}$ (d) none

21. Which of the following is correct?

(a) $\int \int_A dx dy$ gives the area of the region A.

(b) $\int \int \int_V dx dy dz$ gives the volume of the region V.

(c) If y is a function of x , then $\int_a^b y dx$ is approximately

$\frac{h}{3} [X + 2O + 4E]$ where $h = \frac{b-a}{2n}$, X = sum of extreme

ordinates (i.e. first and last), O = Sum of other odd ordinates (i.e. leaving the first and the last ordinates), E = Sum of even ordinates.

(d) all of the above

22. The Volume of the tetrahedron bounded by the co-ordinates planes and the plane $x + y + z = 1$ is

(a) $1/2$ (b) $1/3$ (c) $1/6$ (d) none

23. $\int \int (x^2 + y^2)^{7/2} dx dy$ over the circle $x^2 + y^2 = 1$ is

(a) $2\pi/3$ (b) $2\pi/5$ (c) $2\pi/9$ (d) none

24. $\int \int \int z(x^2 + y^2) dx dy dz$ is

$x^2 + y^2 \leq 1$

$2 \leq z \leq 3$

(a) $\frac{5\pi}{4}$ (b) $\frac{5\pi}{3}$ (c) $\frac{5\pi}{2}$ (d) none

25. If P and Q are intersecting sets and Q' is the complement of Q , then $(P \cap Q) \cup (P \cap Q') =$

(a) P' (b) Q' (c) Q (d) P

26. If a simple polyhedron has 9 vertices and 11 faces, how many edges does it have?

(A) 10 (b) 12 (c) 15 (d) 18

27. $[(A \cup B') \cap B'] =$

(a) $A' \cup B'$ (b) $A' \cap B'$ (c) $A \cap B$ (d) none

28. If $\frac{d}{dx} f(x) = g(x)$ for $a \leq x \leq b$, then

$\int_a^b f(x)g(x)dx =$

(a) $f(b) - f(a)$ (b) $\frac{f(b)g(b) - f(a)g(a)}{2}$

(c) $g(b) - g(a)$ (d) $\frac{(f(b))^2 - (f(a))^2}{2}$

29. If a set X consists of m elements and a set Y consists of n elements, then the total number of subsets of the Cartesian Product $X \times Y$ is

(a) mn (b) 2^{m+n} (c) $m+n$ (d) 2^{mn}

30. Which is a group?

(a) The set of non-negative integers under ordinary multiplication.

(b) The set of non-negative reals under ordinary addition

(c) The set of positive reals under ordinary multiplication

(d) The set consisting of the four complex fourth roots of unity under ordinary addition.

31. The general solution of the differential equation

$y'' + k^2 y = 0$ is

(a) $y = c_1 e^{ikx} + c_2 e^{-ikx}$ (b) $y = c_1 e^{kx} + c_2 e^{-kx}$

(c) $y = c_1 x e^{kx} + c_2 e^{-kx}$ (d) none

32. Find the approximate error in the volume of a right circular cylinder of radius 4 inches and altitude 8 inches, if

they are measured respectively as 4.02 inches and 7.99 inches.

- (a) 1.12π (b) π (c) 1.5π (d) 1.34π

33. Consider the system of linear equations

$$3x + 2y - 5z = 3$$

$$2x - 6y + kz = 9$$

$$5x - 4y - z = 5$$

If these equations are inconsistent, then k is

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

34. Express 0.1525252..... as a number in the form p/q , where $p, q \in I$

- (a) $\frac{52}{99}$ (b) $\frac{151}{990}$ (c) $\frac{51}{99}$ (d) $\frac{152}{999}$

35. To establish that a set $G = \{x, y, z, \dots\}$ and an operation indicated by $*$ form a group, certain properties are essential. Select the condition that is not necessary.

- (a) $\exists e \forall x (e * x = x)$ (b) $\forall x \exists x' (x * x' = e)$
(c) $\forall x \forall y (x * y = y * x)$ (d) $\forall x \forall y \exists z (z = x * y)$

36. If $M = \begin{bmatrix} 1 & 0 \\ 2 & 3 \end{bmatrix}$ then M^{-1} is

- (a) $\begin{bmatrix} 3 & 0 \\ -2 & 1 \end{bmatrix}$ (b) $\begin{bmatrix} 0 & 1 \\ 3 & 2 \end{bmatrix}$
(c) $\begin{bmatrix} 2 & 3 \\ 1 & 0 \end{bmatrix}$ (d) $\begin{bmatrix} 1 & 0 \\ -2/3 & 1/3 \end{bmatrix}$

37. A farmer estimates that if he digs his potatoes now he will have 100 bushels, which he can sell at Rs. 150 per bushel. If he expects his crop to increase 10 bushels per week, but the price to drop Rs. 5/- per bushel per week, in how many weeks should he sell to realize the maximum amount for his potato crop?

- (a) 2 (b) 5 (c) 8 (d) 10

38. According to the law of the mean, what values must the slope of $y = \frac{1}{x}$ assume at some point on the interval

$$2 < x < 5?$$

- (a) $\frac{-1}{4}$ (b) $\frac{-1}{25}$ (c) $\frac{-1}{10}$ (d) $\frac{1}{10}$

39. Using a Maclaurin series, approximate the value of $e^{-1/5}$ to the nearest 0.01.

- (a) 0.18 (b) 0.20 (c) 0.78 (d) 0.82

40. If $\phi(x, y, z) = \sin x + x \cos y + x \tan z$, which of the following is (are) identically equal to zero?

- I. $\frac{\partial^2 \phi}{\partial x \partial y}$ II. $\frac{\partial^2 \phi}{\partial y^2}$ III. $\frac{\partial^2 \phi}{\partial z^2}$ IV. $\frac{\partial^2 \phi}{\partial y \partial z}$

- (a) Only I (b) Only II (c) Only III (d) Only IV

41. $\int x^n \cos x dx = x^n \sin x - \int M dx$, M is

- (a) $(n-1)x^{n-1} \sin x$ (b) $nx^{n-1} \sin x$
(c) $x^{n-1} \cos x$ (d) none

42. If $y = \log_e x$ and n is any positive integer, then

$$\frac{d^n y}{dx^n} =$$

- (a) $(-1)^{n-1} x^{n-1}$ (b) $(-1)^{n-1} (n-1)x^{-n}$
(c) $(-1)^{n-1} (n-1)! x^{-n}$ (d) none

43. $\int_0^1 \frac{dx}{(x^2 + 1)^{3/2}}$ is

- (a) $\frac{1}{2}$ (b) $\frac{1}{2}\sqrt{2}$ (c) 1 (d) none

44. For what value of K , do the following equation have a solution other than $w = x = y = z = 0$?

$$w + x - y + kz = 0$$

$$w - x - 3y + 2z = 0$$

$$w + 2x - 2y - 4z = 0$$

$$w - 3x + 4y + 6z = 0$$

- (a) -2 (b) -1 (c) 0 (d) 1

45. Eigen values of $\begin{pmatrix} 1 & 2 & 3 \\ 0 & 4 & 5 \\ 0 & 0 & 6 \end{pmatrix}$ are

- (a) 1, 2, 6 (b) 1, 4, 6 (c) 0, 1, 2 (d) none

46. If an eigen value of a matrix A is λ , then that of $Adj A$ is

- (a) $\frac{|A|}{\lambda}$ (b) $\frac{\lambda}{|A|}$ (c) $\frac{|Adj A|}{\lambda}$ (d) none

47. If $\int_0^\infty \int_0^\infty e^{-(x^2+y^2)} dx dy$ is transformed by the equations $x = r \cos \theta$, $y = r \sin \theta$. What is the resultant integral?

- (a) $\int_0^\infty \int_0^\infty e^{-r^2} dr d\theta$ (b) $\int_0^\infty \int_0^\infty e^{-r^2} r dr d\theta$

- (c) $\int_0^{\pi/2} \int_0^\infty e^{-r^2} r dr d\theta$ (d) none

48. What is $\iint_R e^{-(x^2+y^2)} dy dx$, Where R is the region

$$\text{bounded by } x^2 + y^2 = a^2$$

- (a) $\int_0^{2\pi} \int_0^a e^{-r^2} r dr d\theta$ (b) $\int_0^{\pi/2} \int_0^\infty e^{-r^2} r dr d\theta$

(c) $\int_0^\pi \int_0^a e^{-r^2} r dr d\theta$ (d) none

49. Which of the following statements are necessarily true?

I. If a function is differentiable at x , then it is continuous at x .

II. If a function is continuous at x , then it is differentiable at x .

III. If a function is integrable on $(x-a, x+a)$, then it is continuous at x .

(a) I only (b) II only (c) I and II (d) I and III

50. Given two matrices

$$A = \begin{pmatrix} a & b \\ c & d \end{pmatrix} \text{ and } A' = \begin{pmatrix} e & f \\ g & h \end{pmatrix}$$

Whose elements are real numbers other than zero. If $A'A = I$, Where I is the identity matrix and D is the value of the determinant of A , then $D =$

(a) e/d (b) d/e (c) a/e (d) none

51. The directional derivatives of

$\phi = 4xz^3 - 3x^2y^2z$ at $(2, -1, 2)$ in the direction of $2i - 3j + 6k$ is

(a) $\frac{376}{49}$ (b) $\frac{376}{7}$ (c) $\sqrt{376}$ (d) 376

52. For the integral

$\int_{-1}^1 (a_0 + a_1x + a_2x^2 + a_3x^3 + a_4x^4) dx$, Which of the following is correct?

(a) Simpson's $\frac{1}{3}$ -rd rule gives exact value for arbitrary

values of a_i , $i = 0, 1, \dots, 4$

(b) Trapezoidal rule gives exact value for $a_4 = 0$

(c) Simpson's $\frac{1}{3}$ -rd rule gives exact value for $a_4 = 0$

(d) Simpson's $\frac{1}{3}$ -rd rule gives exact value for $a_3 = a_4 = 0$

53. Given that $e^0 = 1$, $e^1 = 2.72$, $e^2 = 7.39$, $e^3 = 20.09$

$e^4 = 54.60$, Obtain an approximate value of $\int_0^4 e^x dx$

using Simpson's rule.

(a) 53.60 (b) 53.87 (c) 53 (d) none

54. A person hits a target in 3 out of 4 shots where as another person is known to hit the same target in 2 out of 3 shots. The probability of the target being hit when both of them try independently

(a) 11/12 (b) 7/12 (c) 2/3 (d) 3/4

55. A fair coin is tossed 6 times. What is the probability of obtaining at least four heads?

(a) 11/33 (b) 11/32 (c) 11/34 (d) None

56. The mean and variance of a Binomial Distribution are 6 and 4 respectively. Then the parameter n is:

(a) 18 (b) 12 (c) 10 (d) 9

57. If x has a Poisson distribution such that $P(x=1) = P(x=2)$ then $P(x=4)$ is equal to :

(a) e^{-2} (b) $\frac{1}{2}e^{-2}$ (c) $\frac{1}{3}e^{-2}$ (d) $\frac{2}{3}e^{-2}$

58. A determinant is chosen from the set of second order with elements 0 or 1 only. The probability that the value of the chosen determinant is positive is:

(a) 11/18 (b) 3/16 (c) 13/16 (d) none

59. In a triangle test a tester is presented with three food samples, two of which are alike, and is asked to pick out the odd one by testing. If a tester has no well developed sense and can pick the odd one only, by chance, what is the probability that in five trials he will make four or more correct decisions?

(a) 11/243 (b) 1/243 (c) 10/243 (d) 233/243

60. Probability of person getting infected by some infection is 0.001. Find the probability that out of 3000 people 3 persons are infected.

(a) $9/2 e^{-3}$ (b) $3 e^{-3}$ (c) $3/2 e^{-3}$ (d) $9 e^{-3}$

61. Magnetic core memories were replaced by semiconductor memories in

(a) first generation (b) second generation

(c) third generation (d) fourth generation

62. If a hard disk rotates at 3600 rpm & surface recording density on it is 60000 bpi, what is the data transfer rate of the disk?

(a) 2 mb/sec (b) 109 mb/sec

(c) 5 mb/sec (d) none of these

63. What are the sizes of MAR and MDR of 512 k byte memory with 16 bit words?

(a) MAR = 19, MDR = 16 (b) MDR = 16, MAR = 19

(c) MAR = 20, MDR = 8 (d) MAR = 20, MDR = 20

64. If a computer has 12B operation codes & has a memory capacity of 512k addresses, how many bits would be required for a two address instruction

(a) 7 bits (b) 9 bits (c) 10 bits (d) 12 bits

65. Division of memory into fixed size contiguous areas is called

(a) pages (b) virtual memory

(c) page frames (d) none of these

66. Is assembly language to machine language translation

(a) one-to-many (b) many-to-one

(c) one-to-one (d) many-to-many

67. Cache memory works on the principle of

(a) temporal reference (b) locality of reference

(c) Destructive reference (d) none of these

68. Find the odd man out

(a) PASCAL

(b) FORTRAN

(c) BASIC

(d) PROLOG

69. Set of programs necessary to carry out operations for a specified application is

- (a) Application Software (b) System Software
(c) Hardware (d) none of these

70. The operating system of PCs consists of two parts namely

- (a) BIOS & System Programs
(b) System & Application Programs
(c) BIOS & MSDOS
(d) BIOS & Users

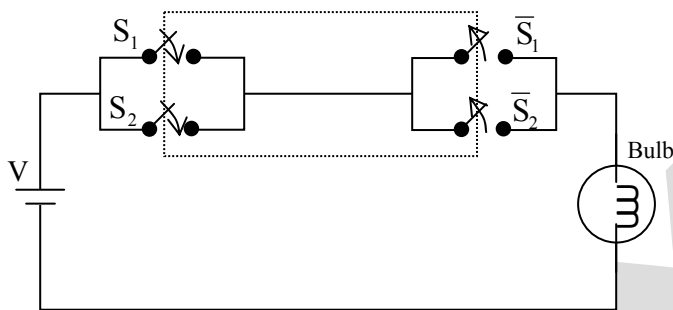
71. An electronic circuit with about 10,000 transistors fabricated on a silicon chip is

- (a) SSI (b) MSI (c) VLSI (d) LSI

72. What is the maximum size of memory which can be addressed with an address bus width of 20 bits

- (a) 1 MB (b) 2 MB (c) 512 KB (d) 1024 KB

73. The figure represents which gate



- (a) NOR (b) EX-OR (c) NAND (d) AND

74. $48 - 23$ using 2's complement gives

- (a) ①11101001 (b) ①00011001
carry ↑ carry ↑
(c) 10101101 (d) 00101101

75. $(247)_{10} = ()_8$

- (a) $(367)_8$ (b) $(265)_8$ (c) $(375)_8$ (d) $(420)_8$

76. $-(2^{n-1} - 1)$ to $(2^{n-1} - 1)$ is the range of

- (a) 1's complement (b) Sign magnitude representation
(c) 2's complement (d) (a) & (b) both

77. The input condition not allowed in S-R flip flop is

- (a) $S = R = 0$ (b) $S = R = 1$
(c) $S = 1, R = 0$ (d) $S = 0, R = 1$

78. The initial state of flip flops can be set or reset as desired by using inputs named

- (a) High & low (b) Positive & negative
(c) Preset & clear (d) none of these

79. The uncertainty in the state of an S-R flip flop, when $S_n = R_n = 1$ can be eliminated by converting it into a

- (a) T flip flop (b) D flip flop
(c) J-K flip flop (d) none of these

80. The Flip Flop used as a delay device or as a latch to store 1 bit of information is

- (a) T flip flop (b) R-S flip flop
(c) J-K flip flop (d) D flip flop

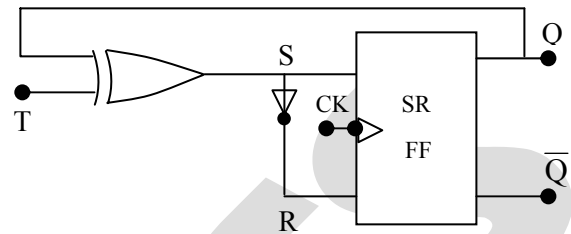
81. Add $x = 0.111010010E0101010$

$$y = 0.110101101E0100101$$

- (a) $0.101010110E0101011$ (b) $0.101010101E110010$

- (c) $0.111011111E0101010$ (d) $0.001010110E0101010$

82.



- (a) S-R To D

- (b) S-R To T

- (c) T To S-R

- (d) none of these

83. $F(A, B, C, D) = \bar{A}\bar{B}D + ABC\bar{D} + \bar{A}BD + ABC\bar{D}$ simplifies as

- (a) $\bar{A}B + \bar{A}B\bar{D}$

- (b) $\bar{A}C + \bar{A}B\bar{C}$

- (c) $\bar{A}D + \bar{A}B\bar{D}$

- (d) $\bar{A}B + \bar{A}B\bar{C}$

84. 2's complement of 01100100 is

- (a) 10011100

- (b) 01101011

- (c) 11100011

- (d) 01010111

85. What will be the output of the following program segment?

```
main ()
{
    int x=10, y=20;
    if (!(!x)&& x)
        printf("x=%d", x);
    else
        printf("y=%d", y);
}
```

- (a) $y = 20$ (b) $y = 0$ (c) $x = 10$ (d) $x = 1$

86. What will be value of count when the following program is executed?

```
main ()
{
    int count, digit = 0;
    count = 1;
    while (digit <= 9) {
        printf("%d\n", ++count);
        ++digit;
    }
```

- (a) 10 (b) 8 (c) 12 (d) 11

87. Consider the following statements in 'C'.

```
for (i=3; i<15; i+=3)
{ printf("%d", i);
  ++i; }
```

The execution of these statements results in printing of

- (a) 3 6 9 12

- (b) 3 6 9 12 15

- (c) 3 7 11

- (d) 3 7 11 15

88. What is the result of execution of the following 'C' program fragment?

```
int i=107, x=5;
printf((x>7)? "%d": "%c", i);
```

- (a) an execution error (b) a syntax error
(c) printing of k (d) printing of 107

89. What is the output of the following 'C' program?

```
main ( )
{
    int a[5]={2, 3};
    printf("\n%d %d %d", a[2], a[3], a[4]);
}
```

- (a) Garbage values (b) 2 3 3
(c) 3 2 2 (d) 0 0 0

90. The output of the following program will be

```
#include<stdio.h>
int x[ ]={0,1,2,4};
void s1(int *p1, int *p2)
{ int temp;
  temp=*p1;
  *p1=*p2; *p2=temp; }
main ( )
{ int i=1;
  x[i]=2;
  s1(&i, &x[i]);
  printf("%d%d\n", i, x[i]);
}
```

- (a) 2 1 (b) 1 2 (c) 2 2 (d) Error

91. Match the Dams and the States in which they are situated:

Dam	State
(A) Tungabhadra	(1) Kerala
(B) Lower Bhawani	(2) Andhra Pradesh
(C) Idukki	(3) Tamil Nadu
(D) Nagarjuna Sagar	(4) Karnataka

- | A | B | C | D |
|-------|---|---|---|
| (a) 3 | 2 | 4 | 1 |
| (b) 2 | 4 | 3 | 1 |
| (c) 4 | 3 | 1 | 2 |
| (d) 1 | 4 | 2 | 3 |

92. Which of the following is correctly matched?

- | | |
|------------------------------|--------------|
| A. World Consumer Rights Day | (i) Mar 15 |
| B. World Water Day | (ii) Mar 22 |
| C. World Meteorological Day | (iii) Mar 24 |
| D. World Health Day | (iv) Apr 7 |

A B C D

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

93. Who introduced 'MMX' technology?

- (a) IBM (b) Apple (c) Microsoft (d) Intel

94. Who is the author of the book *Making Peace With Partition*?

- (a) Radha Kumar (b) Rafique Zakaria
(c) MJ Akbar (d) Rajmohan Gandhi

95. Name the first European country to implement value-added tax (VAT) in 1954 on an extensive scale. It was not, however, at first a complete system of VAT, since it applied only to transactions entered into by manufacturers and wholesalers.

- (a) Britain (b) France (c) Germany (d) US

Directions (Q. 96 – Q. 102): A solid cube of each side 6 cms has been painted red, blue and green on pairs of opposite faces. It is then cut into cubical blocks of each side 2 cms.

96. How many cubes have no face painted?

- (a) 0 (b) 1 (c) 2 (d) 3

97. How many cubes having only one face painted?

- (a) 2 (b) 4 (c) 6 (d) none

98. How many cubes having 2 faces painted?

- (a) 3 (b) 6 (c) 8 (d) 12

99. How many cubes having only 3 faces painted?

- (a) 1 (b) 6 (c) 8 (d) 12

100. How many cubes having 2 faces painted red and green and all other faces unpainted?

- (a) 2 (b) 4 (c) 6 (d) none

101. How many cubes having 1 face painted red and 1 face painted blue and all other faces may be painted or unpainted?

- (a) 4 (b) 8 (c) 12 (d) 27

102. How many cubes having 3 faces painted with 3 different colors?

- (a) 2 (b) 8 (c) 12 (d) none

103. How many integers lie between 1001 and 3001 which are exactly divisible by 33 but not by 30?

- (a) 50 (b) 52 (c) 54 (d) 60

104. A_1 , A_2 and A_3 are three arithmetic series. The first term of each series is 1 and the respective common differences are 1, 2 and 3. S_1 , S_2 and S_3 are the sum of first n terms of the three series A_1 , A_2 and A_3 respectively. Which of the following is the correct relationship among S_1 , S_2 and S_3 ?

- (a) $S_1 + S_3 = 3S_2$ (b) $S_1 + S_3 = 2S_2$
(c) $S_1 + S_3 = S_2$ (d) $S_1 + S_2 = S_3$

105. Find the missing term:

- 2, 9, 30, 105, 436, _____
(a) 2185 (b) 1775
(c) 2165 (d) 2195