

KITEE – 2010

01. Suppose that $g(x) = 1 + \sqrt{x}$ and $f\{g(x)\} = 3 + 2\sqrt{x} + x$, then $f(x)$ is
 (a) $1 + 2x^2$ (b) $2 + x^2$ (c) $1 + x$ (d) $2 + x$
02. For real numbers x and y , we write $xRy \leftrightarrow x^2 + y^2 + \sqrt{3}$ is an irrational number. Then the relation R is
 (a) reflexive (b) symmetric (c) transitive (d) N.O.T.
03. If $X = \{4^n - 3n - 1 : n \in \mathbb{N}\}$ and $Y = \{9(n-1) : n \in \mathbb{N}\}$, $X \cup Y$ is equal to:
 (a) X (b) Y (c) Z (d) None of these
04. If $f(x) = \frac{\cos^2 x + \sin^4 x}{\sin^2 x + \cos^4 x}$ for $x \in \mathbb{R}$, then $f(2010)$ is
 (a) 1 (b) 2 (c) 3 (d) 4
05. The function $f(x) = \log(x + \sqrt{x^2 + 1})$ is
 (a) neither an even nor and odd function (b) an even function
 (c) an odd function (d) a periodic function
06. The domain of $\sin^{-1} \left[\log_3 \left(\frac{x}{3} \right) \right]$ is
 (a) $[1, 9]$ (b) $[-1, 9]$ (c) $[-9, 1]$ (d) $[-9, -1]$
07. If $\omega = \frac{z}{(z-1/3)}$ and $|\omega| = 1$, then z lies on
 (a) an ellipse (b) a circle (c) a straight line (d) a parabola
08. If z_1 and z_2 are two complex numbers such that $|z_1 + z_2| = |z_1| + |z_2|$ then $\arg z_1 = \arg z_2$ is equal to
 (a) $\frac{\pi}{2}$ (b) $-\pi$ (c) 0 (d) $\frac{-\pi}{2}$
09. If two sets A and B are having 99 elements in common, then the number of elements common to each of the sets $A \times B$ and $B \times A$ are:
 (a) 2^{99} (b) 99^2 (c) 100 (d) 18
10. If $|Z + 4| \leq 3$ then the maximum value of $|z + 1|$ is
 (a) 4 (b) 10 (c) 6 (d) 0
11. $49^n + 16n - 1$ is divisible by
 (a) 3 (b) 19 (c) 64 (d) 29
12. The system of equations
 $ax + y + z = \alpha - 1$
 $x + ay + y = \alpha - 1$
 $x + y + az = \alpha - 1$
 has no solution if α is:
 (a) 1 (b) Not-2 (c) either -2 or 1 (d) -2

13. Matrix $A = \begin{bmatrix} 1 & 0 & -k \\ 2 & 1 & 3 \\ k & 0 & 1 \end{bmatrix}$ is invertible for

- (a) $k = 1$ (b) $k = -1$ (c) all real k (d) none of these

14. A function f from the set of natural numbers to integers defined by

$$f(x) = \begin{cases} \frac{n-1}{2}, & \text{when } n \text{ is odd} \\ -\frac{n}{2} & \text{when } n \text{ is even} \end{cases}$$

is:

- (a) one-one but not onto (b) onto but not one-one
(c) one-one and onto both (d) neither one-one nor onto

15. The matrix $A = \begin{bmatrix} \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ -\frac{1}{\sqrt{2}} & -\frac{1}{\sqrt{2}} \end{bmatrix}$ is:

- (a) unitary (b) orthogonal (c) nilpotent (d) involutory

16. If the function $f: [1, \infty) \rightarrow [1, \infty)$ is defined by $f(x) = 2^{x(x-1)}$, then f^{-1} is

- (a) $\left(\frac{1}{2}\right)^{x(x-1)}$ (b) $\left(\frac{1}{2}\right)\{\sqrt{1+4\log_2 x}\}$ (c) $\left(\frac{1}{2}\right)\{1-\sqrt{(1-4\log_2 x)}\}$ (d) Does not exist

17. If $\tan A - \tan B = x$ and $\cot B - \cot A = y$, then $\cot(A - B)$ is equal to:

- (a) $\frac{1}{x} + y$ (b) $\frac{1}{xy}$ (c) $\frac{1}{x} - \frac{1}{y}$ (d) $\frac{1}{x} + \frac{1}{y}$

18. If $\cos(\theta - \alpha) = a$ and $\cos(\theta - \beta) = b$, then $\sin^2(\alpha - \beta) + 2ab \cos(\alpha - \beta)$ is equal to

- (a) $a^2 + b^2$ (b) $a^2 - b^2$ (c) $b^2 - a^2$ (d) $-a^2 - b^2$

19. The number of ordered pairs (a, b) where $\alpha, \beta \in (-\pi, \pi)$ satisfying $\cos(\alpha - \beta) = 1$ and $\cos(\alpha + \beta) = 1/e$ is:

- (a) 0 (b) 1 (c) 2 (d) 4

20. If $\tan \alpha = (1 + 2^{-x})^{-1}$, $\tan \beta = (1 + 2^{x+1})^{-1}$, then $\alpha + \beta$ equals:

- (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

21. If $\tan \alpha = (1 + 2^{-x})^{-1}$, $\tan \beta = (1 + 2^{x+1})^{-1}$, then $\alpha + \beta$ equals:

- (a) $\frac{\pi}{6}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{2}$

22. Solution of the equation $\cot^{-1} x + \sin^{-1} \frac{1}{\sqrt{5}} = \frac{\pi}{4}$ is
- (a) $x = 3$ (b) $x = \frac{1}{\sqrt{5}}$ (c) $x = 0$ (d) None of these
23. If the distance of any point (x, y) from origin is defined as $d(x, y) = |x| + |y|$, then the locus $d(x, y) = 1$ is a
- (a) circle of area π square units (b) square of area 1 square unit
(c) square of area 2 square units (d) none of the above
24. The number of integral values of m for which the x coordinate of the point of the lines $3x + 4y = 9$ and $y = mx + 1$ is also an integer is :
- (a) 2 (b) 0 (c) 4 (d) 1
25. The pair of straight lines joining the origin to the common point of $x^2 + y^2 = 4$ and $y = 3x + c$ perpendicular, if c^2 is equal to:
- (a) 20 (b) 13 (c) 1/5 (d) 5
26. Intercept on the line $y = x$ by the circle $x^2 + y^2 - 2x = 0$ is AB. Equation of the circle on AB as diameter is:
- (a) $x^2 + y^2 + x - y = 0$ (b) $x^2 + y^2 - x + y = 0$ (c) $x^2 + y^2 + x + y = 0$ (d) $x^2 + y^2 - x - y = 0$
27. The locus of a point which moves such that the tangents from to the two circles $x^2 + y^2 - 5x - 3 = 0$ and $3x^2 + 3y^2 + 2x + 4y - 6 = 0$ are equal to
- (a) $2x^2 + 2y^2 + 7x + 4y - 3 = 0$ (b) $17x + 4y + 3 = 0$
(c) $4x^2 + 4y^2 - 3x + 4y - 9 = 0$ (d) $13x - 4y + 15 = 0$
28. If $a \neq 0$ and the line $2bx + 3cy + 4d = 0$ passes through the points of intersection of the parabolas $y^2 = 4ax$ and $x^2 = 4ay$, then
- (a) $d^2 + (3b - 2c)^2 = 0$ (b) $d^2 + (3b + 2c)^2 = 0$ (c) $d^2 + (2b - 3c)^2 = 0$ (d) $d^2 + (2b + 3c)^2 = 0$
29. The distances from the foci of $P(a, b)$ on the ellipse $\frac{x^2}{9} + \frac{y^2}{25} = 1$ are
- (a) $4 \pm \frac{5}{4}b$ (b) $5 \pm \frac{4}{5}a$ (c) $5 \pm \frac{4}{5}b$ (d) None of these
30. The locus of a point $P(a, b)$ moving under the condition that the line $y = \alpha x + \beta$ is a tangent to the hyperbola $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ is:-
- (a) an ellipse (b) a circle (c) a parabola (d) a hyperbola
31. If the foci are ellipse $\frac{x^2}{25} + \frac{y^2}{b^2} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{81} = \frac{1}{25}$ coincide, then the value of b^2 is:
- (a) 3 (b) 16 (c) 9 (d) 12
32. The image of the point $(-1, 3, 4)$ in the plane $x - 2y = 0$ is:
- (a) $(-17/3, -19/3, 4)$ (b) $(15, 11, 4)$ (c) $(-9/5, -13/5, 4)$ (d) $8, 4, 4$

33. The length of the perpendicular from (1, 0, 2) on the line $\frac{x+1}{3} = \frac{y-2}{-2} = \frac{z+1}{-1}$ is:
- (a) $\frac{3\sqrt{6}}{2}$ (b) $\frac{6\sqrt{3}}{5}$ (c) $3\sqrt{2}$ (d) $2\sqrt{3}$
34. If $\vec{a}, \vec{b}, \vec{c}$ are non-coplanar unit vectors such that $\vec{a} \times (\vec{b} \times \vec{c}) = \frac{1}{\sqrt{2}}(\vec{b} \times \vec{c})$, then the angle between the vectors \vec{a} and \vec{b} is:
- (a) $\frac{3\pi}{4}$ (b) $\frac{\pi}{4}$ (c) $\frac{\pi}{8}$ (d) $\frac{\pi}{2}$
35. If $|\vec{a}| = |\vec{b}| = |\vec{c}| = 1$ and $\vec{a} \cdot \vec{b} = 0, \vec{a} \cdot \vec{c} = \vec{b} \cdot \vec{c}$, where $\vec{c} = \tau\vec{a} + \mu\vec{b} + \nu\vec{a} \times \vec{b}$, then:
- (a) $\nu^2 + 2\tau^2$ (b) $\tau = \mu + 1$ (c) $\tau = \mu = \nu$ (d) None of these
36. If 3P and 4P are the resultants of a force 5P, then the angle between 3P and 5P is:
- (a) $\sin^{-1}\left(\frac{3}{5}\right)$ (b) $\sin^{-1}\left(\frac{4}{5}\right)$ (c) 90° (d) None of these
37. If $f(1), f'(1) = 2$, then $\lim_{x \rightarrow 1} \frac{\sqrt{f(x)-1}}{\sqrt{x-1}}$ is:
- (a) 2 (b) 4 (c) 1 (d) 1/2
38. Let $f(a) = g(a) = k$ and their nth derivatives $f^n(a), g^n(a)$ exist and are not equal for some n. If $\lim_{x \rightarrow a} \frac{f(a)g(x) - f(x)g(a) + f(x)g(a) - f(a)g(x)}{g(x) - f(x)}$, then the value of k is:
- (a) 4 (b) 2 (c) 1 (d) 0
39. If $x = a \sin \theta, y = b \cos \theta$, then $\frac{d^2y}{dx^2}$ is:
- (a) $\frac{a}{b^2} \sec^2 \theta$ (b) $-\frac{a}{b} \sec^2 \theta$ (c) $\frac{b}{a^2} \sec^3 \theta$ (d) $-\frac{b}{a^2} \sec^3 \theta$
40. The derivative of $f(x) = 3|2+x|$ at the point $x_0 = -3$ is
- (a) 3 (b) -3 (c) 0 (d) Does not exist
41. If $f(x)$ satisfies the conditions of Roll's theorem in $[1, 2]$ and $f(x)$ is continuous in $[1, 2]$ then $\int_1^2 f'(x) dx$ is equal to:
- (a) 3 (b) 0 (c) 1 (d) 2
42. If $f(x) = x^n$, then the value of $f(1) - \frac{f'(1)}{1!} + \frac{f''(1)}{2!} - \frac{f'''(1)}{3!} + \dots + \frac{(-1)^n f^n(1)}{n!}$ is:
- (a) 2^n (b) 2^{n-1} (c) 0 (d) 1

43. The function $f(x) = \frac{x}{2} + \frac{2}{x}$ has a local minimum at
 (a) $x = -2$ (b) $x = 0$ (c) $x = 1$ (d) $x = 2$
44. Angle between the tangents to the curve $f = x^2 - 5x + 6$ at the point $(2, 0)$ and $(3, 0)$ is:
 (a) $\frac{\pi}{2}$ (b) $\frac{\pi}{6}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{3}$
45. The value of $\int_{-\pi/4}^{\pi/4} (x|x| + \sin^3 x + x \tan^2 x + 1) dx$ is
 (a) 0 (b) 1 (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{2}$
46. Area bounded by the curve $xy^2 = a^2(a - x)$ and y - axis is:
 (a) $\pi a^2 / 2$ (b) πa^2 (c) $3\pi a^2$ (d) None of these
47. $I_n = \int_0^{\pi/4} \tan^n x dx$, then $\lim_{n \rightarrow \infty} n[I_n + I_{n+2}]$ equals
 (a) $1/2$ (b) 1 (c) 0 (d) None of these
48. A dice is tossed 5 times. Getting an odd number is considered a success. Then the variance of distribution of success is :
 (a) $8/3$ (b) $3/8$ (c) $4/5$ (d) $5/4$
49. If A and B are events such that $P(A \cup B) = \frac{3}{4}$, $P(A \cap B) = \frac{1}{4}$, $P(\bar{A}) = \frac{2}{3}$, then $P(\bar{A} \cap B) =$
 (a) $5/12$ (b) $3/8$ (c) $5/8$ (d) $1/4$
50. A student is to answer 10 out of 13 questions in an examination such that he must choose at least 4 from the first five questions. The number of choices available to him is :
 (a) 346 (b) 140 (c) 196 (d) 280
51. The mean of the numbers a, b, 8, 5, 10 is 6 and the variance is 6.80. Then which one of the following gives the possible values of a and b :
 (a) $a = 0, b = 7$ (b) $a = 5, b = 2$ (c) $a = 1, b = 6$ (d) $a = 3, b = 4$
52. The conjugate of a complex number is $\frac{1}{i-1}$, then that complex number is:
 (a) $-\frac{1}{i-1}$ (b) $\frac{1}{i+1}$ (c) $-\frac{1}{i+1}$ (d) $\frac{1}{i-1}$
53. The solution of the differential equation $\frac{dy}{dx} = \frac{x+y}{x}$ satisfying the equation $y(1) = 1$ is:
 (a) $y = \ln x + x$ (b) $y = x \ln x + x^2$ (c) $y = xe^{(x-1)}$ (d) $y = x \ln x + x$
54. How many real solutions does the equation $x^7 + 14x^5 + 16x^3 + 30x - 560 = 0$ have?
 (a) 7 (b) 1 (c) 3 (d) 5
55. How many different words can be formed by jumbling the word MISSISSIPPI in which no two S are adjacent?
 (a) $8 \cdot 6 C_4 \cdot 7 C_4$ (b) $8 \cdot 7 \cdot 8 C_4$ (c) $6 \cdot 8 \cdot 7 C_4$ (d) $7 \cdot 6 C_4 \cdot 8 C_4$

56. The value of $\cot\left(\frac{\cos^{-1}5}{3} + \tan^{-1}\frac{2}{3}\right)$ is:
- (a) 6/17 (b) 3/17 (c) 4/17 (d) 5/17
57. If A, B and C are three sets such that $A \cap B = A \cap C$ and $A \cup B = A \cup C$, then,
- (a) $A = C$ (b) $B = C$ (c) $A \cap B = \phi$ (d) $A = B$
58. For real x, let $f(x) = x^3 + 5x + 1$, then
- (a) f is onto R but not one-one (b) f is one-one and onto R
(c) f is neither one-one nor onto R (d) f is one-one but not onto R
59. The sum to infinite terms of the series $1 + \frac{2}{3} + \frac{6}{3^2} + \frac{10}{3^3} + \frac{14}{3^4} + \dots$ is:
- (a) 3 (b) 4 (c) 6 (d) 2
60. Let y be an implicit function of x defined by $2^{2x} - 2x^x \cot y - 1 = 0$ then $y'(1)$ equals:
- (a) 1 (b) $\log 2$ (c) $-\log 2$ (d) -1
61. The medians of a triangle meet at $(0, -3)$ and two vertices are at $(-1, 4)$ and $(5, 2)$. Then the third vertex is at:
- (a) $(4, 15)$ (b) $(-4, -15)$ (c) $(-4, 15)$ (d) $(4, -15)$
62. If ω is a cube root of unity, then a root of the following equation $\begin{vmatrix} x+1 & \omega & \omega^2 \\ \omega & x+\omega^2 & 1 \\ \omega^2 & 1 & x+\omega \end{vmatrix} = 0$ is:
- (a) $x = 1$ (b) $x = \omega$ (c) $x = \omega^2$ (d) $x = 0$
63. In ΔABC , $a = 2$, $b = 3$ and $\sin A = 2/3$ then B is equal to:
- (a) 30° (b) 60° (c) 90° (d) 120°
64. In the binomial expansion of $(a - b)^n$, $n \geq 5$, the sum of 5th and 6th terms is zero, then a/b equals
- (a) $\frac{n-5}{6}$ (b) $\frac{n-4}{5}$ (c) $\frac{5}{n-4}$ (d) $\frac{6}{n-5}$
65. The number of ways in which 6 men and 5 women can dine at a round table. If no two women are to sit together is given by:
- (a) $6! \times 5!$ (b) 30 (c) $5! \times 4!$ (d) $7! \times 5!$
66. If $z^2 + z + 1 = 0$, where z is a complex number, then the value of $\left(z + \frac{1}{z}\right)^2 + \left(z^2 + \frac{1}{z^2}\right)^2 + \dots + \left(z^6 + \frac{1}{z^6}\right)^2$ is
- (a) 54 (b) 6 (c) 12 (d) 18
67. If the roots of the quadratic equation $x^2 + px + q = 0$ are $\tan 30^\circ$ and $\tan 15^\circ$, respectively, then the value of $2 + p - q$ is:
- (a) 3 (b) 0 (c) 1 (d) 2
68. The number of real solutions of the equation $x^2 - 3|x| + 2 = 0$ is:
- (a) 2 (b) 4 (c) 1 (d) 3

69. If the last term in the Binomial expansion of $\left(2^{\frac{1}{3}} - \frac{1}{\sqrt{2}}\right)^n$ is $\left(\frac{1}{2^{\frac{5}{3}}}\right)^{\log_3 8}$ then the 5th term from the beginning is:
- (a) 210 (b) 420 (c) 105 (d) None of these
70. If A is a singular matrix, then A.adj A is :
- (a) a scalar matrix (b) a zero matrix (c) an identity matrix (d) an orthogonal matrix
71. What does BIOS stand for ?
- (a) basic information organization system (b) basic input output system
(c) basic internet operating system (d) basic input operating system
72. The slowest form of computer language is called
- (a) BASIC (b) FORTRAN (c) Machine language (d) COBOL
73. Which of the following cannot be termed a computer memory ?
- (a) Cache memory (b) RAM (c) ROM (d) USB
74. The hardware unit which is used to monitor computer processing is the
- (a) Console (b) Dot matrix printer (c) Mouse (d) ROM
75. Which of the following does not describe one or more characteristics of a computer ?
- (a) Electronic (b) external storage (c) stored program (d) program modification at execution
76. Software instructions that are intended to satisfy a user's specific processing needs constitute
- (a) system software (b) control software (c) application software (d) real-time software
77. An application program that helps the user to change any number and immediately see the result of that change is :
- (a) Data base (b) Spread sheet (c) Desktop publishing program (d) E-mail editor
78. Ergonomics is study of
- (a) Cost relationship between computer hardware and software
(b) Different computer operating systems.
(c) Gradation of various computer professionals
(d) Human aspect of the environment around the computer system
79. The word processing task associated with changing the appearance of document is :
- (a) Writing (b) Formating (c) Editing (d) Storing
80. The system that provides digested and summarized information is known as
- (a) Database systems (b) Account processing system
(c) Account processing system (d) Word processing system
81. A program to detect overall system malfunction is
- (a) Utilities (b) System analysis (c) System software (d) System diagnosis
82. Which of the following is the internal memory of the computer?
- (a) CPU register (b) Cache (c) Main memory (d) All of the above
83. The first task in system analysis is :
- (a) Programming (b) Orientation and fact finding
(c) The study of the processing operation (d) environmentally dependent
84. Which of the following semiconductor memories is considered fast
- (a) Bipolar (b) Static MOS (c) Dynamic MOS (d) CMOS

85. A new technology which provides the ability to create an artificial world and have people interact with it is ?
(a) Tele virtuality (b) Virtual reality (c) Alternative reality (d) 3-D reality
86. Which of the following IC has only one input line?
(a) Multiplexer (b) Demultiplexer (c) AND gate (d) BCD to decimal decoder
87. The computer device primarily used to provide hardcopy is the
(a) CRT (b) Line printer (c) Computer console (d) Card reader
88. Most of the errors blamed on computers are actually due to
(a) Programming errors (b) Hardware fatigue (c) Defects in floppy disks (d) Data entry errors
89. Which of the following require large computer memory ?
(a) Imaging (b) Graphics (c) Voice (d) All of the above
90. The decimal equivalent of binary number 0.0111 is
(a) 4.375 (b) 0.4375 (c) 0.5375 (d) 5.4375
91. The pieces of equipment which are attached to the CPU of a computer and which it can access are called
(a) Output devices (b) Control units (c) Peripherals (d) ALU
92. In computer technology, what is meant by the phrase "state of the art" ?
(a) Up-to-date (b) Best (c) Latest (d) All of the above
93. Two's complement of 1011.01 is :
(a) 0100.10 (b) 0100.11 (c) 1011.10 (d) 0100.01
94. Multiprogramming was made possible by
(a) Input/output units that operate independently of the CPU
(b) Operating system (c) Both (A) and (B) (d) Neither (A) nor (B)
95. The most commonly used character codes for transmission is :
(a) EBCDIC (b) ASCII (c) Both (a) and (b) (d) none of these
96. Which of the following are often used to ensure that data has been accurately input to the computer ?
(a) Keyboards (b) Light pens (c) Digitizers (d) Input controls
97. Which of the following is used only for data entry and storage, and never for processing ?
(a) Mouse (b) Dumb terminal (c) Microcomputer (d) Dedicated data entry system
98. Which of the following storage and retrieval methods would be well suited to your processing requirements of you need to retrieve records one at a time and there is no fixed pattern to the request for data and records ?
(a) Direct (b) Sequential (c) Indexed sectors (d) Indexed direct
99. When the decimal number 16 is converted to binary number, how many binary digits are needed ?
(a) 4 (b) 3 (c) 5 (d) 7
100. Which of the following is the minimum error code ?
(a) Binary code (b) Gray code (c) Excess-3 code (d) Octal code
101. A temporary storage area, attached to the CPU, for I/O operation is
(a) Channel (b) Buffer (c) Register (d) Core
102. A logic gate is an electronic circuit which
(a) Makes logic decisions (b) Allows electron flow only in one direction
(c) Works on binary algebra (d) Alternate between 0 and 1 values
103. Truth table of a logic function
(a) Summarizes its output values (b) Tabulates all its input conditions
(c) Display all its input/output possibilities (d) Is not based on logic algebra

104. The output of a 2 input OR gate is 0 only when its
(a) Both inputs are 0 (b) Either input is 1 (c) Both inputs are 1 (d) Either input is 0
105. Half duplex transmission means that the transmission is possible in
(a) One direction only (b) In both directions
(c) In both directions, not simultaneously (d) In both directions simultaneously
106. What is the function of the 'home key' in a microcomputer qwerty keyboard ?
(a) To capitalize letters (b) To reposition the cursor
(c) To interrupt executions (d) to cancel the entry
107. Bar codes store information using
(a) Punch holes (b) Thick and thin lines (c) Magnetized spots (d) Bits
108. The secondary storage devices can only store data but they cannot perform
(a) Arithmetic operations (b) Logic operations (c) Fetch operations (d) Either of the above
109. Which of the following storage is volatile ?
(a) Floppy disk (b) Bubble memory (c) Semiconductor memory (d) Core memory
110. Execution of instructions from different and independent programs by a computer at the same instant in time is called
(a) Multiprogramming (b) Multiprocessing (c) Concurrent programming (d) Multitasking
111. How many positive integers are there whose square root is equal to the sum of the digits in the number ?
(a) 1 (b) 2 (c) 3 (d) 4
112. Due to stiff competition, a soft drink company decreased its price per bottle by 50% and started selling the drink in 200ml bottles instead of the previous 300ml bottles other things being constant (in percentage) for every 100 ml sold ?
(a) 25% (b) 20 (c) $33\frac{1}{3}\%$ (d) None of these
113. The difference between half of a number and one-third of the number is 1. Find $\frac{2}{3}$ re of that number.
(a) 2 (b) 3 (c) 4 (d) 6
114. The length of a rectangle is 6cm more than twice its breadth. If its perimeter is 54cm, find the length of the rectangular.
(a) 20cm (b) 18cm (c) 16 cm (d) 14 cm
115. In a division sum, the quotient is 120, the divisor 456 and the remainder 333, find the dividend
(a) 5533 (b) 50553 (c) 56053 (d) 55053
116. The sum of three numbers is 68. If the ratio between first and second is 2 : 3 and that between second and third is 5 : 3, then the second number is
(a) 30 (b) 20 (c) 58 (d) 48
117. The denominator of a rational number is 3 more than its numerator. If the number is increased by 7 and the denominator is decreased by 2, we obtain 2. The rational number is
(a) $\frac{1}{4}$ (b) $\frac{5}{8}$ (c) $\frac{7}{10}$ (d) $\frac{8}{11}$
118. A set P consists of all odd numbers from 1 to 55 and all even numbers from 56 to 150. What is the highest power of 3 in the product of all the elements of the set P ?
(a) 35 (b) 48 (c) 9 (d) 24
119. P, Q and R can do work in 10, 15 and 20 days respectively. P starts the work and R joins him after two days. Three days after R joined. P left and Q joined. In how many days Q and R complete the remaining work ?
(a) 3 days (b) 4 days (c) 5 days (d) 7 days

120. The average age of 8 persons in a committee is increased by 2 years when two men aged 35 years and 45 years are substituted by two women. Find the average of these two women
(a) 48 years (b) 56 years (c) 52 years (d) 44 years
121. The average of five consecutive even numbers is 38. The largest of these is :
(a) 40 (b) 38 (c) 44 (d) 42
122. The value of k that must be added to 7, 16, 43, 79 so that they are in proportion is :
(a) 7 (b) 5 (c) 9 (d) None of these
123. Two trains of length 300m and 200m travelling at 36 kmph and 54 kmph respectively, enter a two track tunnel 400 m long simultaneously on different tracks and from opposite directions. After they cross each other. In how much time will the tunnel be free of traffic?
(a) 20 seconds (b) 15 seconds (c) 30 seconds (d) 34 seconds
124. What is the minimum possible number of digits in a number which when multiplied by 13 has only 8's in the product ?
(a) 4 (b) 6 (c) 5 (d) None of these
125. Excluding stoppages, the speed of a bus is 54 km/hr and including stoppages. It is 45 km/hr. for how many minutes does the bus stop per hour ?
(a) 9 (b) 10 (c) 12 (d) 20
126. A man performs $\frac{1}{15}$ of the total journey by rail, $\frac{9}{20}$ by car and the remaining 10km on foot. The total journey is ?
(a) 15.6km (b) 12.8km (c) 16.4km (d) 24km
127. Pipe P fills an empty tank in 45 minutes and pipe Q empties it in one hour. If pipe P is opened at 8.00am and Q at 8.15am then at what time is the tank filled ?
(a) 10.30am (b) 10.15am (c) 11.00am (d) 11.30am
128. I bought two articles A and B and sold them. The cost price of A is equal to the selling price of B and cost price of B is equal to selling price of A. what is the net income from the transactions ?
(a) Gain (b) Loss (c) No loss, no gain (d) Can't be determined

Direction (129 – 131) : These questions are based on the data given below.

The number of lotus flowers in a pond on any morning is double the number of lotus flowers that was there the previous night. At sun set $\frac{1}{3}$ rd of what were there in the morning get spoiled and during the day time half the flowers that were there in the morning are plucked for sale.

129. What will be the number of flowers on the 4th day in the morning, if the number of flowers on the night of first day is 54?
(a) 24 (b) 12 (c) 18 (d) 48
130. If on the night of the 3rd day there are 27 lotus flowers, what will be the number of flowers for sale on the 6th day?
(a) 3 (b) 6 (c) 18 (d) 48
131. On which day time will there be only 2 flowers left, if on Monday morning there were 36 flowers ?
(a) Tuesday morning (b) Wednesday morning (c) Tuesday evening (d) Can't be determined
132. A number when divided by 11 leaves a remainder of 5, when divided by 15 leaves a remainder of 11 and is exactly divisible by 19. How many such number are there between 1000 and 10000 ?
(a) 3 (b) 4 (c) 5 (d) 6
133. How many different rectangles, each of 72 sq.cm. area, can be formed keeping the measurements of lengths as well as breadth in whole number of centimeters ?
(a) 6 (b) 12 (c) 18 (d) 26

134. Find the positive square root of x, if $\frac{x}{405} = \frac{225}{\sqrt{x}}$.
- (a) 2025 (b) 45 (c) 35 (d) none of these

135. In a certain language CHENNAI is coded as DIFOOBJ, how MUMBAI coded
- (a) NVNCBJ (b) OWODCK (c) NNVCJB (d) LTLABH

136. Court is related to justice in the same way as School is related to
- (a) Teacher (b) Student (c) Education (d) Class

Direction (137 – 140) : These questions are based on the data given below.

Seven boys CGMPQRT participated in a race. Q was behind T but ahead of M who was few spaces ahead of R. G and P were behind D who was behind R.

137. Who was the winner ?
- (a) M (b) R (c) D (d) None of these

138. Who was the fifth in the race ?
- (a) G (b) R (c) D (d) M

139. How many boys were there between Q and D ?
- (a) 1 (b) 2 (c) 3 (d) None

140. Who was the last ?
- (a) P (b) R (c) G (d) Either G or P

141. What should come in the place of the question mark (?) in the following letter series ?

BXJ ETL HPN KLP ?

- (a) NHR (b) MHQ (c) MIP (d) NIR

142. How many 3's are there in the following sequence which are neither preceded by 6 nor immediately followed by 9?

9 3 6 6 3 9 5 9 3 7 8 9 1 6 3 9 6 3 9

- (a) One (b) Two (c) Three (d) Four

143. Pointing to a boy in the photograph Madhu said, "His sister is the only daughter of my father", how is the boy related to madhu's father ?

- (a) Father (b) Brother (c) Son (d) Cousin

144. Uma ranked 8th from the top and 37th from the bottom in a class. How many students are there in the class ?
- (a) 47 (b) 46 (c) 45 (d) none of these

145. "Paddy" is related to "Field" in the same way as "Steel" is related to :

- (a) Factory (b) Iron (c) Ore (d) Wagon

Direction (146 – 148) : These questions are based on the data given below.

A cube painted white on all the faces, is cut into 125 cubes of equal size. Now answer the questions 146 to 148.

146. How many cubes are painted on one face only ?
- (a) 54 (b) 8 (c) 16 (d) 27

147. How many cubes are painted on two sides only ?
- (a) 64 (b) 12 (c) 36 (d) 48

148. How many cubes are not painted on one face only ?
- (a) 66 (b) 27 (c) 25 (d) 49

149. Kitu walks towards East and then towards South. After walking some distance he turns towards West and then turns to his left. In which direction is he walking now ?
(a) North (b) South (c) East (d) West
150. The minimum number of colours needed to paint all the sides of a cube such that no two adjacent sides have the same colour is :
(a) 2 (b) 4 (c) 3 (d) 6