1. If $A = \begin{bmatrix} \alpha & 0 \\ 1 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 1 & 0 \\ 5 & 1 \end{bmatrix}$ then the value of α for which $A^2 = B$ is

   (A) 1
   (B) 0
   (C) −1
   (D) No real values

2. The number of values of k for which the system of equations $(k + 1)x + 8y = 4k$, $kx + (k + 3)y = 3k − 1$ has infinitely many solutions is

   (A) 1
   (B) 2
   (C) −1
   (D) 0

3. Let $A = \begin{bmatrix} m & n \\ p & q \end{bmatrix}$, $d = |A| \neq 0$ and $|A - d(adj\ A)| = 0$, then

   (A) $1 + d^2 = m^2 + q^2$

   (B) $1 + d^2 = (m + q)^2$

   (C) $(1 + d)^2 = m^2 + q^2$

   (D) $(1 + d)^2 = (m + q)^2$

4. If $\begin{vmatrix} 6i & -3i & 1 \\ 4 & 3i & -1 \\ 20 & 3 & i \end{vmatrix} = x + iy$, then

   (A) $x = 3,\ y = 1$
   (B) $x = 0,\ y = 0$
   (C) $x = 0,\ y = 3$
   (D) $x = 1,\ y = 3$

5. What value must x have, so the matrix A does not have an inverse?

$$A = \begin{bmatrix} 1 & 2+x \\ x & -1 \end{bmatrix}$$

(A) 1
(B) 0
(C) −1
(D) I

6. If $g(x) = 1-x$ and $h(x) = \dfrac{x}{x-1}$, then $\dfrac{g(h(x))}{h(g(x))}$ is

(A) $\dfrac{h(x)}{g(x)}$

(B) $-\dfrac{1}{x}$

(C) $\dfrac{g(x)}{h(x)}$

(D) $\dfrac{x}{(1-x)^2}$

7. Necessary condition of Euler's theorem is

(A) z should be homogeneous and of order n
(B) z should not be homogeneous but of order n
(C) z should be implicit
(D) z should be the function of x and y only

8. Fit the straight line to the following data.

x	1	2	3	4	5
y	1	2	3	4	5

(A) $y = x$
(B) $y = x+1$
(C) $y = 2x$
(D) $y = 2x+1$

9. Let G be a group of 35 elements. Then the largest possible size of a subgroup of G other than G itself is

   (A) 1
   (B) 5
   (C) 7
   (D) 35

10. How many different non-isomorphic Abelian groups of order 4 are there?

   (A) 5
   (B) 7
   (C) 3
   (D) 2

11. The value of $\int\limits_{0}^{\frac{\pi}{4}} x\cos x^2 \, dx$ corrected to three decimal places (assuming that $\pi=3.14$) is

   (A) 0.3
   (B) 0.2
   (C) 0.7
   (D) 0.25

12. $\int\limits_{\frac{1}{\pi}}^{\frac{2}{\pi}} \dfrac{\cos\left(\frac{1}{x}\right)}{x^2} \, dx =$

   (A) 0
   (B) 1
   (C) −1
   (D) 0.5

13. $\int\limits_{0}^{2\pi} |x\sin x| \, dx = k\pi$, then what is the value of k ?

   (A) 2
   (B) 5
   (C) 1
   (D) 4

14. $\displaystyle\int_{0}^{2\pi} (x-\pi)^2 \sin x\, dx =$

(A) −1

(B) 0

(C) 1

(D) π

15. $\displaystyle\int_{0}^{\frac{\pi}{4}} \frac{1-\tan x}{1+\tan x}\, dx \ =$

(A) 0

(B) 1

(C) ln 2

(D) $\dfrac{1}{2}\ln 2$

16. Definite integrals of $\displaystyle\int_{-\infty}^{0} e^{-\frac{x^2}{30}}\, dx$ evaluates to

(A) 0.5

(B) 0.4

(C) 0.2

(D) 0.1

17. For the given function $f(x) = \sqrt{x^3 + x^7}$ the values of first and second derivative at $x = 1$ are assumed as 0 and 1 respectively. Then the value of the third derivative could be

(A) $54\sqrt{2}$

(B) $2\sqrt{2}$

(C) $\sqrt{2}$

(D) Indeterminate

18. Differentiate $y = e^x \cos x^2$

    (A) $-e^x \sin x^2$

    (B) $e^x \left(\cos x^2 - 2x \sin x^2 \right)$

    (C) $e^x \cos x^2 - 2x \sin x^2$

    (D) $2xe^x \sin x$

19. If $y = 4 \cos x + \sin 2x$, what is the slope of the curve when $x = 2$ radians?

    (A) -2.21

    (B) -4.94

    (C) -3.95

    (D) 2.21

20. If $f(a)$ is equals to $f(b)$ in Mean Value Theorem, then it becomes

    (A) Lebniz theorem

    (B) Rolle's theorem

    (C) Taylor series of a function

    (D) Leibnit'x theorem

21. Let $f : \mathbb{R}^2 \to \mathbb{E}$ be given by $f(x, y) = 4xy - 2x^2 - y^4$. Then f has

    (A) a point of local maximum and a saddle point

    (B) a point of local minimum and a saddle point

    (C) a point of local maximum and a point of local minimum

    (D) a point of local maximum and not a saddle point

22. Let $f_n : [0,10] \to \mathbb{R}$ be given by $f_n(x) = nx^3 e^{-nx}$ for $n = 1, 2, 3\ldots$ consider the following statements

    P: f_n is a equicontinuous on $[0,10]$

    Q: $\sum f_n$ does not converge uniformly on $[0,10]$

    (A) Both P and Q are True

    (B) P is True and Q is False

    (C) Q is True and P is False

    (D) Both are False

23. If g is continuous function, then which of the following is true for $g(x)$

    (A) $\langle \sin\theta, \cos\theta \rangle$
    (B) $\langle \sin\theta, -\cos\theta \rangle$
    (C) $\langle -\sin\theta, \cos\theta \rangle$
    (D) $\langle -\sin\theta, -\cos\theta \rangle$

24. Metric space [0, 1] is …………… for [0, 1] is a closed subset of R

    (A) Compact
    (B) Complete
    (C) Connect
    (D) Cyclic

25. Let g be a vector valued function defined by $g(t) = \sin \pi t - 2\cos \pi t$. Find the value of $g'(t)$.

    (A) $\pi \cos \pi t, 2\pi \sin \pi t$
    (B) $\cos \pi t + 2\pi \sin \pi t$
    (C) $-\sin \pi t, -2\sin \pi t$
    (D) $-\cos \pi t, 2\sin \pi t$

26. Out of all the 2-digit integers between 1 and 100, a 2-digit number has to be selected at random. What is the probability that the selected number is not divisible by 7?

    (A) $\dfrac{13}{90}$

    (B) $\dfrac{12}{90}$

    (C) $\dfrac{78}{90}$

    (D) $\dfrac{77}{90}$

27. Consider the set of all possible five-card poker hands dealt fairly from a standard deck of fifty-two cards. How many atomic events are there in the joint probability distribution?

    (A) 2, 598, 960
    (B) 3, 468, 960
    (C) 3, 958, 590
    (D) 2, 645, 590

28. Let R be the set of all binary relations on the set {1, 2, 3}. Suppose a relation is chosen from R at random. The probability that the chosen relation is reflexive (round off to 3 decimal places) is

   (A) 0.625
   (B) 0.5
   (C) 0.25
   (D) 0.125

29. For $n > 2$, let $a \in \{0, 1\}^n$ be a non-zero vector. Suppose that x is chosen uniformly at random from $\{0, 1\}^n$. Then, the probability that $\sum_{i=1}^{n} a_i x_i$ is an odd number is

   (A) 0.2
   (B) 0.3
   (C) 0.1
   (D) 0.5

30. There are five bags each containing identical sets of ten distinct chocolates. One chocolate is picked from each bag. The probability that at least two chocolates are identical is

   (A) 0.2034
   (B) 0.4235
   (C) 0.8125
   (D) 0.6976

31. A bag contains 19 red balls and 19 black balls. Two balls are removed at a time repeatedly and discarded if they are of the same colour, but if they are different, black ball is discarded and red ball is returned to the bag. The probability that this process will terminate with one red ball is

   (A) 0.665
   (B) 0.785
   (C) 1.000
   (D) 0.954

32. Given Set A = {2, 3, 4, 5} and Set B = {11, 12, 13, 14, 15}, two numbers are randomly selected, one from each set. What is the probability that the sum of the two numbers equals 16?

   (A) 0.20
   (B) 0.25
   (C) 0.35
   (D) 0.33

33. Let $P(E)$ denote the probability of the event E. Given $P(A)=1, P(B)=\dfrac{1}{2}$ the values of $P(A|B)$ and $P(B|A)$ respectively are

(A) $\dfrac{1}{4},\dfrac{1}{2}$

(B) $\dfrac{1}{2},\dfrac{1}{4}$

(C) $1,\dfrac{1}{2}$

(D) $\dfrac{1}{2},1$

34. Let X be a random variable with probability distribution function

$$f(x)=\begin{cases}0.2 & \text{for } |x|<1 \\ 0.1 & \text{for } 1<|x|<4 \\ 0 & \text{otherwise}\end{cases}$$

The probability $P(0.5<x<5)$ is

(A) 0.3
(B) 0.5
(C) 0.4
(D) 0.8

35. The mean of a distribution is 14 and the standard deviation is 5. What is the value of the coefficient of variation?

(A) 60.4%
(B) 48.3%
(C) 35.7%
(D) 27.8%

36. Find the Fourier transform of $F(x)=\begin{cases}1, & |x|<a \\ 0, & otherwise\end{cases}$

(A) 2 sin(*ap*)/*p*
(B) 2*a* sin(*ap*)/*p*
(C) 4 sin(*ap*)/*p*
(D) 4*a* sin(*ap*)/*p*

37. Which of the following functions is periodic?

   (A) sin(*x*)
   (B) cos(*x*)
   (C) exp(*x*)
   (D) None of the above

38. What is the Fourier transform of a rectangular pulse function?

   (A) A sinc function
   (B) A cosine function
   (C) A sine function
   (D) A constant function

39. Which of the following properties does the Fourier transform possess?

   (A) Linearity
   (B) Time shifting
   (C) Convolution
   (D) All of the above

40. Which of the following functions has an even Fourier transform?

   (A) sin(*x*)
   (B) cos(*x*)
   (C) exp(*x*)
   (D) None of the above

41. What is the inverse Fourier transform of a constant function?

   (A) A delta function
   (B) A cosine function
   (C) A sine function
   (D) A rectangular pulse function

42. What is the Gibbs phenomenon?

   (A) The ringing effect that occurs at the edges of a signal when using the Fourier series to approximate a function with discontinuities
   (B) The attenuation effect that occurs at the edges of a signal when using the Fourier series to approximate a function with discontinuities
   (C) The overshoot effect that occurs at the edges of a signal when using the Fourier transform to analyze a signal with discontinuities
   (D) The undershoot effect that occurs at the edges of a signal when using the Fourier transform to analyze a signal with discontinuities

43. The general solutions of the differential equation $\dfrac{dy}{dx} = \dfrac{1+\cos 2y}{1-\cos 2x}$ is

(A) $\tan y - \cot x = C$

(B) $\tan x - \cot y = C$

(C) $\tan y + \cot x = C$

(D) $\tan x + \cot y = C$

44. A curve passes through the point ($x = 1$, $y = 0$) and satisfies the differential equation $\dfrac{dy}{dx} = \dfrac{\left(x^2 + y^2\right)}{2y} + \dfrac{y}{x}$. The equation that describes the curve is

(A) $\ln\left(1 + \dfrac{y^2}{x^2}\right) = x - 1$

(B) $\dfrac{1}{2}\ln\left(1 + \dfrac{y^2}{x^2}\right) = x - 1$

(C) $\dfrac{1}{2}\ln\left(1 + \dfrac{y}{x}\right) = x - 1$

(D) $\ln\left(1 + \dfrac{y}{x}\right) = x - 1$

45. Which one of the following is the general solution of the first order differential equation $\dfrac{dy}{dx} = (x + y - 1)^2$, where x, y are real?

(A) $y = 1 + x + \tan^{-1}(x + c)$, where c is a constant

(B) $y = 1 + x + \tan(x + c)$, where c is a constant

(C) $y = 1 - x + \tan^{-1}(x + c)$, where c is a constant

(D) $y = 1 - x + \tan(x + c)$, where c is a constant

46. The particular solution of the initial value problem given below is

$$\frac{d^2 y}{dx^2} + 12\frac{dy}{dx} + 36y = 0 \text{ with } y(0) = 3 \text{ and } y'(x=0) = -36$$

(A) $(3 - 18x)e^{-6x}$

(B) $(3 + 25x)e^{-6x}$

(C) $(3 + 20x)e^{-6x}$

(D) $(3 - 12x)e^{-6x}$

47. The general solution of the differential equation $\frac{d^2 y}{dx^2} + 2\frac{dy}{dx} - 5y = 0$ in terms of arbitrary constant K_1 and K_2 is

(A) $K_1 e^{\left(-1+\sqrt{6}\right)x} + K_2 e^{\left(-1-\sqrt{6}\right)x}$

(B) $K_1 e^{\left(-1+\sqrt{8}\right)x} + K_2 e^{\left(-1-\sqrt{8}\right)x}$

(C) $K_1 e^{\left(-2+\sqrt{6}\right)x} + K_2 e^{\left(-2-\sqrt{6}\right)x}$

(D) $K_1 e^{\left(-2+\sqrt{8}\right)x} + K_2 e^{\left(-2-\sqrt{8}\right)x}$

48. While solving a partial differential equation using a variable separable method, we equate the ratio to a constant which

(A) can be positive or negative integer or zero
(B) can be positive or negative rational number or zero
(C) must be a positive integer
(D) must be a negative integer

49. A partial differential equation requires

(A) exactly one independent variable
(B) two or more independent variables
(C) more than one dependent variable
(D) equal number of dependent and independent variables

50. If $u = x + 3y^2 - z^3$, $v = 4x^2yz$, $w = 2z^2 - xy$ then $\dfrac{\partial(u,v,w)}{\partial(x,y,z)}$ at $(1,1,1)$.

    (A) −184
    (B) −90
    (C) 20
    (D) 40

51. Determine the order and degree of the differential equation,

$$2x\frac{d^4y}{dy^4} + 5x^2\left(\frac{dy}{dx}\right)^3 - xy = 0.$$

    (A) Fourth order, first degree
    (B) Third order, first degree
    (C) First order, fourth degree
    (D) First order, third degree

52. If $z = x^n f\left(\dfrac{y}{x}\right)$ then

    (A) $y\dfrac{\partial z}{\partial x} + x\dfrac{\partial z}{\partial y} = nz$

    (B) $\dfrac{1}{y}\dfrac{\partial z}{\partial x} + \dfrac{1}{x}\dfrac{\partial z}{\partial y} = nz$

    (C) $x\dfrac{\partial z}{\partial x} + y\dfrac{\partial z}{\partial y} = nz$

    (D) $\dfrac{1}{x}\dfrac{\partial z}{\partial x} + \dfrac{1}{y}\dfrac{\partial z}{\partial y} = nz$

53. Using Newton-Raphson method, a root corrects to 3 decimal places of
$x^3 - 3x - 5 = 0$

    (A) 2.279
    (B) 2.275
    (C) 2.222
    (D) 2.335

54. The Gauss-Seidal iterative method can be used to solve which of the following sets?

   (A) Linear algebraic equations
   (B) Linear non-algebraic equations
   (C) Linear differential equations
   (D) Linear non-differential equations

55. The Newton – Raphson iteration $x_{n+1} = \dfrac{1}{2}\left(x_n + \dfrac{R}{x_n} \right)$ can be used to compute

   (A) R^2

   (B) $\dfrac{1}{R}$

   (C) R

   (D) $\sqrt{R}$

56. Trapezoidal method is used to evaluate the integral obtained $\int_0^1 x^2 dx,$ then the value obtained is

   (A) always $> \dfrac{1}{3}$

   (B) always $< \dfrac{1}{3}$

   (C) always $= \dfrac{1}{3}$

   (D) always $= 0.5$

57. Approximate the definite integrals evaluates of $\int_1^2 e^{x^2} dx$ to three decimal places by using Simpson's rule where $n = 4$, n is the subdivisions of the function, ('n' being an even number)

   (A) 14.075
   (B) 15.075
   (C) 13.075
   (D) 15.500

58. The Newton - Raphson method is used to find the root of the equation $x^2 - 2 = 0$. If the iteration is starting from -1, the iterations will converge to

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

59. Find $f(5)$ using Newton's Forward interpolation formula from the following table.

x	0	2	4	6	8
$f(x)$	4	26	58	112	466

    (A)   71.109375
    (B)   61.103975
    (C)   70.103957
    (D)   71.103957

60. Which of the following numerical methods is used to approximate the definite integral of a function f(*x*) over an interval [a,b]?

    (A)   Bisection method
    (B)   Newton-Cotes formulas
    (C)   Runge-Kutta method
    (D)   Jacobi iteration

61. Which of the following methods is used to find the root of the equation f(x) = 0?

    (A)   Bisection method
    (B)   Simpson's rule
    (C)   Trapezoidal rule
    (D)   Forward difference method

62. Which of the following methods is used to solve the initial value problem y' = f(x,y), y(x0) = y0?

    (A)   Euler's method
    (B)   Runge-Kutta method
    (C)   Adams-Bashforth method
    (D)   Simpson's rule

63. Which of the following methods is used to interpolate a function f(x) at a point $x = xi$ using n+1 data points (xi, yi)?

   (A) Lagrange interpolation
   (B) Newton's divided difference interpolation
   (C) Forward difference interpolation
   (D) Backward difference interpolation

64. The value of $(1 + i)^{24}$ is

   (A) 2^{24}
   (B) 2^{12}
   (C) 2^8
   (D) 2^2

65. If z is a non-zero complex number, then for $n = 1, 2, 3, \ldots z^{1/n}$ is

   (A) $\exp(n \log z)$

   (B) $\exp\left(\dfrac{1}{n} \log z\right)$

   (C) $\exp\left(\dfrac{1}{n} \log \dfrac{1}{z}\right)$

   (D) $\exp\left(n \log \dfrac{1}{z}\right)$

66. The principal value of $(-i)^i$ is

   (A) $\exp\left(\dfrac{\pi}{4}\right)$

   (B) $\exp\left(\dfrac{-\pi}{4}\right)$

   (C) $\exp\left(\dfrac{\pi}{2}\right)$

   (D) $\exp\left(\dfrac{-\pi}{2}\right)$

67. $2\sin(z_1 + z_2)\sin(z_1 - z_2)$ is

   (A) $\cos 2z_2 + \sin 2z_1$
   (B) $\cos 2z_2 - \cos 2z_1$
   (C) $\cos 2z_1 + \sin 2z_2$
   (D) $\cos 2z_1 - \cos 2z_2$

68. The power series representation of $\dfrac{1}{1-z}$ in non-negative power of z is

   (A) $1 + z + z^2 + z^3 + ...$
   (B) $1 - z + z^2 - z^3 + ...$
   (C) $1 + z + z^3 + z^5 + ...$
   (D) $1 - z + z^3 - z^5 + ...$

69. Residue of the function $\cot z$ at the singular points is

   (A) 1
   (B) -1
   (C) -2
   (D) 0

70. The center of the power series $\displaystyle\sum_{n=0}^{\infty}(z + 4i)^n$ is

   (A) $4i$
   (B) $2i$
   (C) 4
   (D) $-4i$

71. $\sqrt{-1}$ is the imaginary unit and denoted by

   (A) iota
   (B) pi
   (C) micro
   (D) delta

72. Which of the following is a method for solving nonlinear programming problems?

   (A) The Simplex method
   (B) The Interior Point method
   (C) The Branch and Bound method
   (D) The Network Flow method

73. Which of the following is a type of optimization problem that involves finding the best way to allocate resources among different activities?

   (A) Integer programming
   (B) Network flow problems
   (C) Linear programming
   (D) Nonlinear programming

74. Which of the following is an optimization problem with no constraints?

   (A) Linear programming
   (B) Nonlinear programming
   (C) Unconstrained optimization
   (D) Integer programming

75. Which of the following is **NOT** a method for solving linear programming problems?

   (A) The Simplex method
   (B) The Interior Point method
   (C) The Gradient Descent method
   (D) The Network Flow method

76. Which of the following is the third letter of the meaningful English word which can be formed using (each letter once) first, third, fourth, sixth, eighth and ninth letters of "**ASTRONAUT**"?

   (A) T
   (B) U
   (C) R
   (D) N

77. If the letters in word **MISCOMMUNICATION** are arranged in the English alphabetical order, the position of how many letters will remain unchanged?

   (A) 1
   (B) 2
   (C) 3
   (D) 4

78. What should come in place of the question mark (?) in the following number series?

150,102, 70, 46, 26, ?

(A) 16
(B) 8
(C) 10
(D) 2

79. What should come in place of the question mark (?) in the following number series?

10, 1, 28, 52, 134, ?

(A) 302
(B) 268
(C) 300
(D) 304

80. What should come in place of the question mark (?) in the following number series?

24, 11, 10, 14, 27, ?

(A) 66
(B) 70.5
(C) 68
(D) 66.5

81. What should come in place of the question mark (?) in the following number series?

8, 7, 12, 33, 128, ?

(A) 528
(B) 365
(C) 635
(D) 825

82. The symmetric difference of A = {1, 2, 3} and B = {3, 4, 5} is

(A) {1, 2}
(B) {1, 2, 4, 5}
(C) {4, 3}
(D) {2, 5, 1, 4, 3}

83. The relation R defined on the set of natural numbers as $\{(a, b): a$ differs from b by 3$\}$ is given

   (A) $\{(1, 4), (2, 5), (3, 6), ...\}$
   (B) $\{(4, 1), (5, 2), (6, 3), ...\}$
   (C) $\{(3, 0), (4, 1), (5, 2), ...\}$
   (D) None of the above

84. If a mirror is placed on the line MN, then which of the answer figures is the correct image of the given question figure?
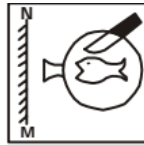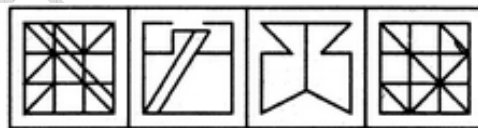

Answer Figures :
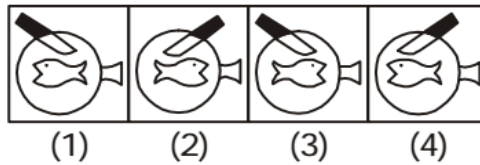
(1)   (2)   (3)   (4)

   (A) (1)
   (B) (2)
   (C) (3)
   (D) (4)

85. Find out the alternative figure which contains figure (X) as its part.
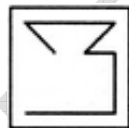
(**X**)   (1)   (2)   (3)   (4)

   (A) (1)
   (B) (2)
   (C) (3)
   (D) (4)

86.   If a mirror is placed on the line MN, then which of the answer figures is the Correct image of the given question figure?
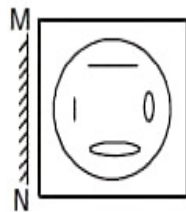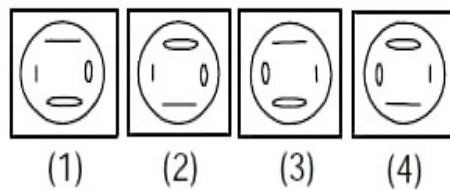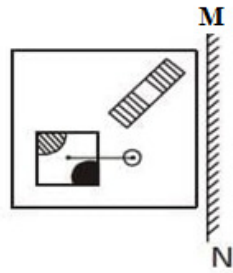

Answer Figures :

(1)   (2)   (3)   (4)
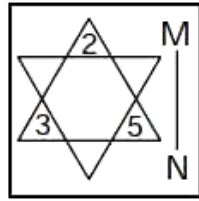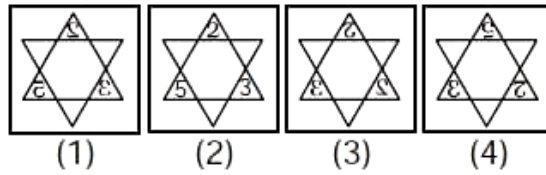
(A)   (1)
(B)   (2)
(C)   (3)
(D)   (4)

87.   If a mirror is placed on the line MN, then which of the answer figures is the correct image of the given question figure?
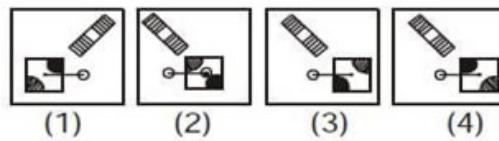

Answer Figures :

(1)   (2)   (3)   (4)

(A)   (1)
(B)   (2)
(C)   (3)
(D)   (4)

88. If a mirror is placed on the line MN, then which of the answer figures is the correct image of the given question figure?

Answer Figures :

(1) (2) (3) (4)

- (A) (1)
- (B) (2)
- (C) (3)
- (D) (4)

Direction (Question No. 89-92): A cube is coloured red on all faces. It is cut into 64 smaller cubes of equal size. Now, answer the following questions based on this statement

89. How many cubes has no face coloured?

- (A) 8
- (B) 0
- (C) 24
- (D) 16

90. How many cubes have three face coloured?

- (A) 8
- (B) 4
- (C) 24
- (D) 16

91. How many cubes are there which have only one face coloured?

- (A) 16
- (B) 24
- (C) 0
- (D) 8

92. How many cubes have two red opposite faces?

    (A) 16
    (B) 24
    (C) 0
    (D) 8

93. The base of a triangular field is three times its height. If the cost of cultivating the field at Rs. 36.72 per hectare is Rs. 495.72, find the height and base of the triangular field. (1 hectare = 10000 m^2)

    (A) 480 m, 1120 m
    (B) 400 m, 1200 m
    (C) 300 m, 900 m
    (D) 250 m, 650 m

94. The inner circumference of a circular path around a circular lawn is 440 m. What is the radius of the outer circumference of the path, if the path is 14 m wide?

    (A) 96 m
    (B) 84 m
    (C) 70 m
    (D) 88 m

95. The circumference of the front wheel of a cart is 30 ft long and that of the back wheel is 36 ft long. What is the distance travelled by the cart, when the front wheel has done five more revolutions than the rear wheel?

    (A) 20 ft
    (B) 25 ft
    (C) 750 ft
    (D) 900 ft

96. Water flows at the rate of 10 meters per minute from a cylindrical pipe of 5 mm in diameter. How long will it takes to fill up a conical vessel whose diameter at the base is 30 cm and depth 24 cm?

    (A) 28 minutes 48 seconds
    (B) 51 minutes 12 seconds
    (C) 51 minutes 24 seconds
    (D) 28 minutes 36 seconds

97.   Find the number of triangles in given figure

(A) 24
(B) 26
(C) 25
(D) 27

98.   Find the number of triangles and squares in the given figure
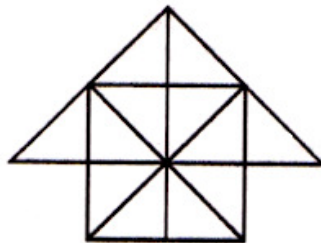
(A)   26 triangles, 5 squares
(B)   28 triangles, 5 squares
(C)   26 triangles, 6 squares
(D)   28 triangles, 6 squares

Direction: Study the data given below and answer the following questions:

'Royal Monarch Regal' is written as @ # *,

'Regal legacy Gold' is written as * % ?,

'Hope Gold Life' is written as % & $,

'Regal Monarch Morals' is written as *#∀

99.   What will be the code for "Regal"?

(A) %
(B) *
(C) $
(D) #

100. What will be the code for "Gold Legacy"?

    (A) #&

    (B) %#

    (C) ?%

    (D) &$

101. Which word is coded as "#"?

    (A) Moral

    (B) Life

    (C) Regal

    (D) Monarch

102. In the given coded language, which of the following words has been coded as "&"?

    (A) Gold

    (B) Life

    (C) Hope

    (D) Either Hope or Life

103. What is the code for "Royal"?

    (A) %

    (B) @

    (C) ?

    (D) *

Direction: Study the data given below and answer the questions based on the same information:

    'sky planets satellites stars' written as 'od lk sk jk'

    'sun moon space planets' written as 'mj jk dn ho'

    'rocket stars sun airplane' written as 'gt fa mj lk'

    'space earth sky rocket' written as 'sk mn ho gt'

104. What is "satellites" coded as?

    (A) jk

    (B) od

    (C) ho

    (D) dn

105. What will be the code for "rocket airplane"?

(A) fa gt
(B) jk gt
(C) mj dn
(D) sk od

106. Which word is coded as "jk"?

(A) sky
(B) moon
(C) planet
(D) space

107. What will be the code for "earth"?

(A) od
(B) mn
(C) mj
(D) ho

108. Which of the following words has been coded as 'ho'?

(A) rocket
(B) space
(C) sun
(D) sky

109. Which of the following combinations is **INCORRECT**?

(A) space-ho
(B) earth-mn
(C) rocket-gt
(D) satellites-mn

110. If in a certain language, MANIPULATION is written as NOITALUPINAM. Which word would be written as ERUTCURTS?

(A) STRUCTURE
(B) FRACTURE
(C) MANUFACTURE
(D) LECTURE

111. If in a certain language, TRIANGLE is written as SSHBMHKF. In the same language, COUNTRY is written as

   (A) BPVOSSX
   (B) DNVMUQZ
   (C) BPTOSSX
   (D) DNVNVQ

112. If DOG is coded as 4157, then how would MAT be coded?

   (A) 12120
   (B) 13120
   (C) 1312
   (D) 13219

113. Find the wrong number in series

   50, 51, 47, 56, 42, 65, 29

   (A) 51
   (B) 47
   (C) 56
   (D) 42

114. Find the wrong number in series

   1, 3, 6, 11, 20, 39, 70

   (A) 3
   (B) 39
   (C) 11
   (D) 20

115. Find the wrong number in series

   2, 13, 27, 113, 561, 3369, 23581

   (A) 27
   (B) 13
   (C) 113
   (D) 561

116. In the following four words, which will come at the third if all of them are arranged alphabetically as in a dictionary?

Dream, Drought, Discourage, Delight

(A) Dream
(B) Drought
(C) Discourage
(D) Delight

117. In the following four words, which will come at the third if all of them are arranged alphabetically as in a dictionary?

Trajectory, Traveller, Transverse, Translate

(A) Trajectory
(B) Traveller
(C) Transverse
(D) Translate

118. If each of the twelve digits on a watch is replaced by English vowels **a, e, i, o, u** in sequence (1 by a, 2 by e, and so on and so forth), the minute hand will be at which vowel at 9.30 a.m.?

(A) a
(B) o
(C) u
(D) i

119. 20 teachers of a school teach either Mathematics or Physics. 12 of them teach Mathematics while 4 teach both the subjects. Then number of teachers teaching only Physics is

(A) 12
(B) 8
(C) 6
(D) None of the above

120. Out of a group of 230 students, 80 play Football, 42 play Soccer and 12 play Rugby. 32 play exactly 2 sports and 4 play all three. How many students do not play any one of the sports?

(A) 132
(B) 136
(C) 140
(D) 94

(Direction Q121-Q125): Read the information given below and answer the following questions:

- There are 8 friends A, B, C, D, E, F, G, H seated in a circle facing the centre.

- AC, DG, HE and FB are seated adjacent to each other. A is also seated adjacent to H.

- B is 2nd to the right of H.

- E is 3rd to the right of C.

121. Who is 2nd to the left of A?

    (A) D
    (B) F
    (C) Cannot be determined
    (D) None of the above

122. Who is 3rd to the left of C?

    (A) G
    (B) D
    (C) Cannot be determined
    (D) None of the above

123. What is C's position with reference to E?

    (A) 5th to the right
    (B) 4th to the left
    (C) 4th to the right
    (D) 3rd to the right

124. Who is 2nd to the right of A?

    (A) B
    (B) E
    (C) F
    (D) Cannot be determined

125. Who among the following pairs may not be seated adjacent to each other?

    (A) AH
    (B) DC
    (C) EB
    (D) Cannot be determined

126. There are total 600 students in a school. Average age of boys is 12 years and of girls is 11 years while average age of all students is 11 years and 7 months. Find the number of girls in the school

(A) 230
(B) 240
(C) 250
(D) 260

127. Indolence is related to work in the same way taciturn is related to

(A) cheat
(B) act
(C) speak
(D) observe

128. **Direction**: In the following question find out the alternative which will replace the question mark (?)

Carbon : Diamond :: Corundum: ?

(A) Garnet
(B) Ruby
(C) Pearl
(D) Pukhraj

129. **Direction**: The given consist of a pair of words. Established the relationship among the given pair and identify the pair that illustrates a similar relationship from the given alternatives

Rectangle : Pentagon ::

(A) Side: Angle
(B) Diagonal : Perimeter
(C) Triangle : Rectangle
(D) Circle : Square

130. **Direction**: In the following question find out the alternative which will replace the question mark (?)

Basic, Pascal , Fortran , ?

(A) Cobol
(B) Computer
(C) Calculator
(D) Cyclotron

131. **Direction**: In the following question find out the alternative which will replace the question mark (?)

   $$144 : 10 :: 169 : ?$$

   (A) 14
   (B) 11
   (C) 13
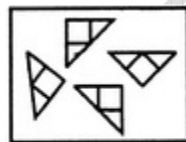   (D) 12

132. Find the odd one out?

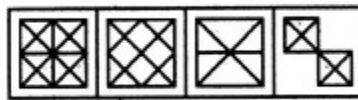   (A) 60:80
   (B) 54:72
   (C) 36:48
   (D) 24:30

133. Find the odd one out?

   (A) 64, 83
   (B) 100, 121
   (C) 16, 25
   (D) 36, 49

134. Find out which of the figures (1), (2), (3) and (4) can be formed from the pieces given in figure (X).
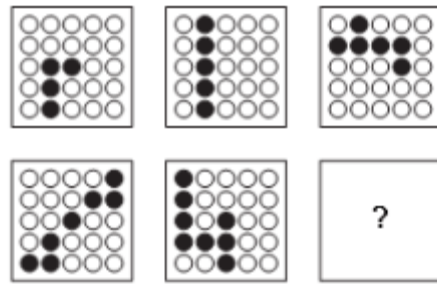

   (A) 1
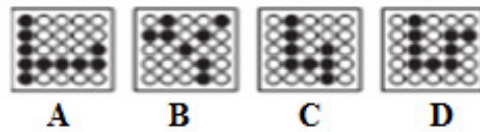   (B) 2
   (C) 3
   (D) 4

135. Which grid will replace the question mark (?)

Answer Figures :

A   B   C   D

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

136. Introducing a man to her husband, a woman said, "His brother's father is the only son of my grandfather." How is the woman related to this man?

(A) Mother
(B) Aunt
(C) Sister
(D) Daughter

137. Pointing to Manju, Raju said, "The son of her only brother is the brother of my wife". How is Manju related to Raju?

(A) Mother's sister
(B) Grandmother
(C) Mother-in-law
(D) Sister of father-in-law

138. From the four positions of a dice given below, find the color which is opposite to yellow?
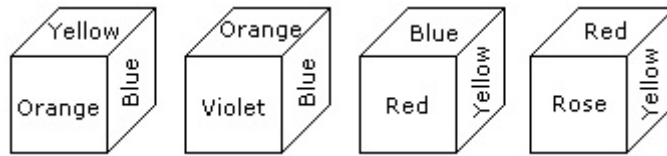
(A) Violet
(B) Red
(C) Rose
(D) Blue

139. Two positions of a dice are shown below. Which number will appear on the face opposite to the face with the number 5?
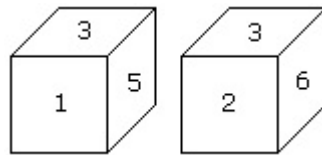

(A) 3
(B) 2
(C) 6
(D) 4

140. The last day of a century cannot be

(A) Monday
(B) Wednesday
(C) Friday
(D) Saturday

141. If 7th February of 2006 is Saturday, 24th April 2006 comes on which day?

(A) Thursday
(B) Wednesday
(C) Sunday
(D) Friday

142. 14th December 2004 is Monday, 25th November 2005 comes on which day?

(A) Thursday
(B) Wednesday
(C) Sunday
(D) Friday

143. Look carefully at the sequence of symbols to find the pattern. Select correct pattern that replaces the **?**.

Answer Figures :

(1)   (2)   (3)   (4)
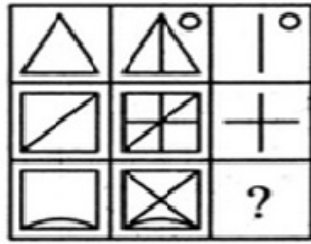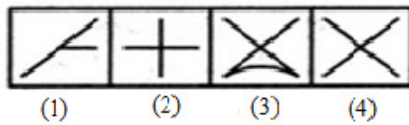
(A) 1
(B) 2
(C) 3
(D) 4

144. If '−' stands for '×', '×' stands for '+', '+' stands for '÷' and '÷' stands for '−', then what is the value of $9 \div 18 \times 15 + 3 - 6 \times 12$?

(A) 24
(B) 30
(C) 33
(D) 42

145. A monkey starts climbing up a tree 20ft. tall. Each hour, it hops 3ft. and slips back 2ft. How much time would it take the monkey to reach the top?

(A) 21 hours
(B) 12 hours
(C) 18 hours
(D) 15 hours

146. In a certain code, COMPUTER is written as RFUVQNPC. How is MEDICINE written in the same code?

(A) EOJDEJFM
(B) MFEJDJOE
(C) MFEDJJOE
(D) EOJDJEFM

147. In the following figure, circle shows Literate, triangle shows Unemployed, square Villagers. Study the diagram carefully and answer the following question.
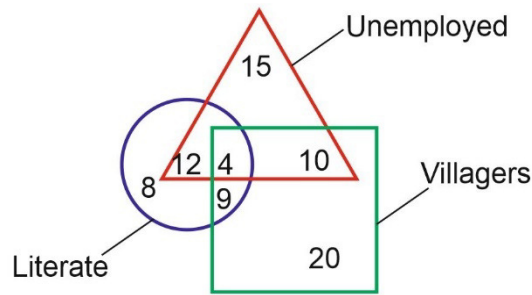
Total number of villagers is

(A) 20
(B) 43
(C) 30
(D) 24

Direction (148-150) . An electronic device rearranges numbers step by step in a particular order according to a set of rules. The device stops when the final result in obtained. In this case, the device stops at Step V.

Input: 85 16 36 04 19 97 63 09

Step I: 97 85 16 36 04 19 63 09

Step II: 97 85 63 16 36 04 19 09

Step III: 97 85 63 36 16 04 19 09

Step IV: 97 85 63 36 19 16 04 09

Step V: 97 85 63 36 19 16 09 04

Study the above arrangement carefully and then answer the following questions:

148. Which of the following will be Step III for the input below?

Input: 09 25 16 30 32 18 17 06

(A) 32 30 25 09 16 18 17 06
(B) 32 30 09 25 16 18 17 06
(C) 32 09 25 16 30 18 17 06
(D) 32 30 09 25 16 19 17 06

149. Which is the last step for the input below?

   Input: 16 09 25 27 06 05

   (A) Step II
   (B) Step III
   (C) Step IV
   (D) None of the above

150. What is the output of Step V for the input below?

   Input: 25 08 35 11 88 67 23

   (A) 08 11 23 25 35 67 88
   (B) 88 67 35 25 23 11 08
   (C) 88 67 35 25 23 08 11
   (D) None of the above

FINAL ANSWER KEY

Subject Name: MCA

SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key	SI No.	Key
1	D	31	C	61	A	91	B	121	C
2	A	32	A	62	B	92	C	122	D
3	D	33	C	63	B	93	C	123	A
4	B	34	C	64	B	94	B	124	B
5	C	35	C	65	B	95	D	125	B
6	A	36	A	66	C	96	A	126	C
7	A	37	D	67	B	97	D	127	C
8	A	38	A	68	A	98	D	128	B
9	C	39	D	69	A	99	B	129	C
10	D	40	B	70	D	100	C	130	A
11	A	41	A	71	A	101	D	131	B
12	C	42	A	72	B	102	D	132	D
13	D	43	C	73	B	103	B	133	A
14	B	44	A	74	C	104	B	134	B
15	D	45	D	75	C	105	A	135	D
16	A	46	A	76	B	106	C	136	C
17	A	47	A	77	A	107	B	137	D
18	B	48	B	78	B	108	B	138	A
19	B	49	B	79	D	109	D	139	C
20	B	50	A	80	D	110	A	140	D
21	A	51	A	81	C	111	A	141	D
22	B	52	C	82	B	112	B	142	A
23	A	53	A	83	B	113	D	143	D
24	B	54	A	84	C	114	B	144	C
25	A	55	D	85	A	115	B	145	C
26	D	56	A	86	A	116	A	146	D
27	A	57	B	87	C	117	A	147	B
28	D	58	D	88	C	118	A	148	A
29	D	59	A	89	A	119	B	149	A
30	D	60	B	90	A	120	A	150	B