MATHEMATICS

1. $6 + \log_{1/4 \sqrt{2}}\left[\sqrt{1 - \frac{1}{\sqrt{2}}\sqrt{1 - \frac{1}{\sqrt{2}}\sqrt{1 - \frac{1}{\sqrt{2}} \cdots}}}\right] =$

   A) 6   B) $\dfrac{13}{2}$ C) 4   D) $\dfrac{25}{4}$

2. The function $f(x) = \log\left(x + \sqrt{x^2 + 1}\right)$ is

   A) An even function
   B) An odd function
   C) A periodic function
   D) Neither an even nor an odd function

3. Two persons A and B agree to meet on 20th April 2018 between 6 P.M. and 7 P.M. with the understanding that they will wait no longer than 20 minutes for the other. What is the probability that they meet?

   A) 5/9
   B) 7/9
   C) 2/9
   D) 4/9

4. Three numbers a, b and c are chosen at random (without replacement) from among the numbers 1, 2, 3, ..., 99. The probability that $a^3 + b^3 + c^3 - 3abc$ is divisible by 3 is

   A) $\dfrac{3 \cdot {}^{33}C_3 + \left({}^{33}C_1\right)^3}{{}^{99}C_3}$

   B) $\dfrac{3 \cdot {}^{33}C_3 - \left({}^{33}C_1\right)^3}{{}^{99}C_3}$

   C) $\dfrac{2 \cdot {}^{33}C_3 + \left({}^{33}C_1\right)^3}{{}^{99}C_3}$

   D) $\dfrac{2 \cdot {}^{33}C_3 - \left({}^{33}C_1\right)^3}{{}^{99}C_3}$

5. A and B play a game where each is asked to select a number from 1 to 25. If the two numbers match, both of them win a prize. The probability that they will not win a prize in a single trial is

   A) $\dfrac{1}{25}$
   B) $\dfrac{24}{25}$
   C) $\dfrac{2}{25}$
   D) None of these

B

13. Let f : R → R be defined by $f(x) = \begin{cases} x+2, & \text{if } x < 0 \\ |x-2|, & \text{if } x \geq 0 \end{cases}$. Find $\int_{-2}^{3} f(x)\,dx$.

    A) 0.5   B) 2.5   C) 4.5   D) 6.5

14. Slope of two lines $6x^2 - 2xy - 2y^2 = 0$ differ by

    A) $\dfrac{5}{2}$ B) $\dfrac{7}{2}$ C) $\dfrac{7}{5}$ D) −1

15. If the radius of a circle changes at the rate of $\dfrac{-2}{\pi}$ m / sec, at what rate does the circle's area change when the radius is 10 m?

    A) 40 m²/sec.   B) 30 m²/sec.   C) − 30 m²/sec.   D) − 40 m²/sec.

16. The point of intersection of circle $x^2 + y^2 + 10x - 12y + 51 = 0$ and the line $3y + x = 3$ is

    A) (− 6, 3)   B) (3, − 6)   C) (6, − 3)   D) (−3, 6)

17. The number of solutions of the equation $\sin x + \sin 5x = \sin 3x$ lying in the interval $[0, \pi]$ is

    A) 4   B) 6   C) 5   D) 2

18. In an acute angled ΔABC the least value of secA + secB + secC is

    A) 6   B) 8   C) 3   D) 2

19. Let $P = \{\theta : \sin\theta - \cos\theta = \sqrt{2}\cos\theta\}$ and $Q = \{\theta : \sin\theta + \cos\theta = \sqrt{2}\sin\theta\}$ be two sets. Then

    A) $P \subset Q$ and $Q - P \neq \phi$ B) $P \not\subset Q$

    C) $Q \not\subset P$ D) $P = Q$

20. If $\dfrac{\tan x}{2} = \dfrac{\tan y}{3} = \dfrac{\tan z}{5}$ and $x + y + z = \pi$, then the value of $\tan^2 x + \tan^2 y + \tan^2 z$ is

    A) $\dfrac{38}{3}$ B) 38   C) 114   D) none of these

21. The circles whose equations are $x^2 + y^2 + c^2 = 2ax$ and $x^2 + y^2 + c^2 - 2by = 0$ will touch one another externally if
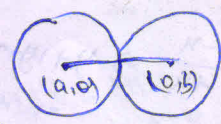
    A) $\dfrac{1}{b^2} + \dfrac{1}{c^2} = \dfrac{1}{a^2}$ B) $\dfrac{1}{c^2} + \dfrac{1}{a^2} = \dfrac{1}{b^2}$ C) $\dfrac{1}{a^2} + \dfrac{1}{b^2} = \dfrac{1}{c^2}$ D) none of these

B

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   A) $(-6, 3)$ B) $(3, -6)$ C) $(6, -3)$ D) $(-3, 6)$

17. The number of solutions of the equation $\sin x + \sin 5x = \sin 3x$ lying in the interval $[0, \pi]$ is

   A) 4   B) 6   C) 5   D) 2

18. In an acute angled $\triangle ABC$ the least value of $\sec A + \sec B + \sec C$ is

   A) 6   B) 8   C) 3   D) 2

19. Let $P = \{\theta : \sin\theta - \cos\theta = \sqrt{2}\cos\theta\}$ and $Q = \{\theta : \sin\theta + \cos\theta = \sqrt{2}\sin\theta\}$ be two sets. Then

   A) $P \subset Q$ and $Q - P \neq \phi$ B) $P \not\subset Q$

   C) $Q \not\subset P$ D) $P = Q$

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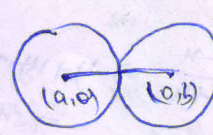
   A) $\dfrac{1}{b^2} + \dfrac{1}{c^2} = \dfrac{1}{a^2}$ B) $\dfrac{1}{c^2} + \dfrac{1}{a^2} = \dfrac{1}{b^2}$ C) $\dfrac{1}{a^2} + \dfrac{1}{b^2} = \dfrac{1}{c^2}$ D) none of these

B

22. The locus of the orthocenter of the triangle formed by the lines $(1 + p)x − py + p(1+p) = 0$, $(1 + q)(x − q) + q(1 + q) = 0$ and $y = 0$ where $p \neq q$, is

    A) a hyperbola
    B) a parabola
    C) an ellipse
    D) a straight line

23. Equation of a common tangent with positive slope to the circle $x^2 + y^2 − 8x = 0$ as well as to the hyperbola $\dfrac{x^2}{9} - \dfrac{y^2}{4} = 1$ is

    A) $2x − \sqrt{5}\,y − 20 = 0$
    B) $2x − \sqrt{5}\,y + 4 = 0$
    C) $3x − 4y + 8 = 0$
    D) $4x − 3y + 4 = 0$

24. The area enclosed between the curves $y^2 = x$ and $y = |x|$ is

    A) 2/3 sq.unit
    B) 1 sq. unit
    C) 1/6 sq.unit
    D) 1/3 sq.unit

25. Equation of the line perpendicular to $x − 2y = 1$ and passing through $(1, 1)$ is

    A) $x + 2y = 3$
    B) $x + y = 2$
    C) $y = 2x + 3$
    D) $y = − 2x + 3$

26. If $A = \begin{bmatrix} 0 & 5 \\ 0 & 0 \end{bmatrix}$ and $f(x) = 1 + x + x^2 + ... + x^{16}$, then $f(A) =$

    A) 0

    B) $\begin{bmatrix} 1 & 5 \\ 0 & 1 \end{bmatrix}$

    C) $\begin{bmatrix} 1 & 5 \\ 0 & 0 \end{bmatrix}$

    D) $\begin{bmatrix} 0 & 5 \\ 1 & 1 \end{bmatrix}$

27. 9 balls are to be placed in 9 boxes and 5 of the balls cannot fit into 3 small boxes. The number of ways of arranging one ball in each of the boxes is

    A) 18720
    B) 18270
    C) 17280
    D) 12780

28. Which of the following functions is inverse of itself ?

    A) $f(x) = \dfrac{1 − x}{1 + x}$
    B) $f(x) = 3^{\log x}$
    C) $f(x) = 3^{x(x+1)}$
    D) None of these

29. A student council has 10 members. From this one President, one Vice-President, one Secretary, one Joint-Secretary and two Executive Committe members have to be elected. In how many ways this can be done?

    A) 151200
    B) 75600
    C) 37800
    D) 18900

30. In a survey where 100 students reported which subjects they like, 32 students in total liked Mathematics, 38 students liked Business and 30 students liked Literature. Moreover 7 students liked both Mathematics and Literature, 10 students liked both Mathematics and Business, 8 students liked both Business and Literature, 5 students liked all three subjects.

Then the number of people who liked exactly one subject is

A) 60   B) 65   C) 70   D) 78

31. If A and B are two events and $P(A \cup B) = 5/6$, $P(A \cap B) = 1/3$, $P(B) = 1/2$, then A and B are two events which are

A) Dependent   B) Independent

C) Mutually exclusive   D) Equally likely

32. If $a_1, a_2, a_3, ..., a_n$ are positive real numbers whose product is a fixed number C, then the minimum value of $a_1 + a_2 + ... + 2a_n$ is

A) $n(2C)^{1/n}$ B) $(n+1)C^{1/n}$ C) $2nC^{1/n}$ D) $(n+1)(2C)^{1/n}$

33. If a, b, c are the roots of the equation $x^3 - 3x^2 + 3x + 7 = 0$, then the value of

$$\begin{vmatrix} 2bc - a^2 & c^2 & b^2 \\ c^2 & 2ac - b^2 & a^2 \\ b^2 & a^2 & 2ab - c^2 \end{vmatrix} \text{ is}$$

A) 9   B) 27   C) 81   D) 0

34. The coefficient of x^n in the expansion of $(1 - 2x + 3x^2 - 4x^3 + ...$ to $\infty)^{-n}$ is

A) $\dfrac{(2n)!}{n!(n-1)!}$ B) $\dfrac{(2n)!}{[(n-1)!]^2}$ C) $\dfrac{(2n)!}{(n!)^2}$ D) None of these

35. Let α, β be the roots of the equation $x^2 - px + r = 0$ and $\dfrac{\alpha}{2}, 2\beta$ be the roots of the equation $x^2 - qx + r = 0$. Then, the value of r is

A) $\dfrac{2}{9}(p - q)(2q - p)$ B) $\dfrac{2}{9}(q - p)(2q - p)$

C) $\dfrac{2}{9}(q - 2p)(2q - p)$ D) $\dfrac{2}{9}(2p - q)(2q - p)$

36. The number of natural numbers which are smaller than 2×10^8 and which contain only the digits 1 and 2 is

    A) 786   B) 666   C) 766   D) 1066

37. If $\lim\limits_{x \to \infty} \left(1 + \dfrac{a}{x} + \dfrac{b}{x^2}\right)^{2x} = e^2$, then the value of a and b are

    A) $a \in R, b = 2$ B) $a = 1, b \in R$ C) $a \in R, b \in R$ D) $a = 1, b = 2$

38. If $f(x) = \sin^5 x + \sin^3 x$ and $g(x) = \cos^6 x + \sin^3 x$, then the value of

    $$\int_0^{\pi/2} [f(x) + f(-x)][g(x) + g(-x)]\,dx \text{ is}$$

    A) 0   B) >1   C) 0 and 1   D) less than 0

39. $\dfrac{d^2x}{dy^2}$ equals

    A) $\left(\dfrac{d^2y}{dx^2}\right)^{-1}$

    B) $-\left(\dfrac{d^2y}{dx^2}\right)^{-1}\left(\dfrac{dy}{dx}\right)^{-3}$

    C) $\left(\dfrac{d^2y}{dx^2}\right)\left(\dfrac{dy}{dx}\right)^{-2}$

    D) $-\left(\dfrac{d^2y}{dx^2}\right)\left(\dfrac{dy}{dx}\right)^{-3}$

40. Differential co-efficient of $\log_{10} x$ w.r. to $\log_x 10$ is

    A) $-\dfrac{(\log x)^2}{(\log 10)^2}$ B) $\dfrac{(\log_{10} x)^2}{(\log 10)^2}$ C) $\dfrac{(\log_x 10)^2}{(\log 10)^2}$ D) $-\dfrac{(\log 10)^2}{(\log x)^2}$

41. $f(x) = x + |x|$ is continuous for

    A) $x \in (-\infty, \infty)$

    B) $x \in (-\infty, \infty) - \{0\}$

    C) Only $x > 0$

    D) No value of x

42. If a, b and c are unit vectors, then $|a - b|^2 + |b - c|^2 + |c - a|^2$ does not exceed

    A) 4   B) 9   C) 8   D) 6

43. The vector $\vec{a} = \alpha\hat{i} + 2\hat{j} + \beta\hat{k}$ lies in the plane of the vectors $\vec{b} = \hat{i} + \hat{j}$ and $\vec{c} = \hat{j} + \hat{k}$ and bisects the angle between $\vec{b}$ and $\vec{c}$. Then, which one of the following gives possible values of α and β?

   A) $\alpha = 2, \beta = 2$ B) $\alpha = 1, \beta = 2$ C) $\alpha = 2, \beta = 1$ D) $\alpha = 1, \beta = 1$

44. Forces $4i - 3j + 7k$ and $-2i + 2j - 8k$ are acting on a particle and displace it from the point $(5, 7, 1)$ to $(2, 5, -6)$, then the work done by the force is

   A) 25   B) 9   C) 15   D) 7

45. A bird is flying in a straight line with velocity vector $10\hat{i} + 6\hat{j} + \hat{k}$, measured in km/hr. If starting point is $(1, 2, 3)$, how much time does it take to reach a point in space that is 13 metre high from ground?

   A) 600 seconds   B) 360 seconds   C) 36 seconds   D) 60 seconds

46. The value of $\cot\left(\csc^{-1}\dfrac{5}{3} + \tan^{-1}\dfrac{2}{3}\right)$ is

   A) 6/17   B) 3/17   C) 4/17   D) 5/17

47. If $\sin\theta = 3\sin(\theta + 2\alpha)$, then the value of $\tan(\theta + \alpha) + 2\tan\alpha$ is

   A) 3   B) 2   C) -1   D) 0

48. In a triangle ABC, $\angle A = 90°$ and D is mid-point of AC. The value of $BC^2 - BD^2$ is equal to

   A) AD^2 B) $2AD^2$ C) $3AD^2$ D) $4AD^2$
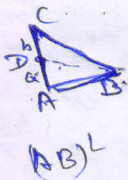
49. Through any point (x, y) of a curve which passes through the origin, lines are drawn parallel to the coordinate axes. The curve given that divides the rectangle formed by the two lines and the axes into two areas, one of which is twice the other, represents a family of

   A) circles   B) parabolas   C) hyperbolas   D) straight lines

50. A line through $(4, 2)$ meets the coordinate axes at P and Q. Then the locus of the circumcentre of $\triangle OPQ$ is

   A) $\dfrac{1}{x} + \dfrac{1}{y} = 2$ B) $\dfrac{2}{x} + \dfrac{1}{y} = 1$ C) $\dfrac{1}{x} + \dfrac{2}{y} = 1$ D) $\dfrac{1}{x} + \dfrac{1}{y} = \dfrac{1}{2}$

B

B

ANALYTICAL ABILITY AND LOGICAL REASONING

51. In a city, 40% of the adults are illiterate while 85% of the children are literate. If the ratio of the adults to that of the children is 2 : 3, then what percent of the population is literate?

   A) 20%   B) 25%   C) 50%   D) 75%

52. There are 50 students admitted to a nursery class. Some students can speak only English and some can speak only Hindi. 10 students can speak both English and Hindi. If the number of students who can speak English is 21, then how many students can speak Hindi, how many can speak only Hindi, and how many can speak only English?

   A) 21, 11 and 29 respectively

   B) 28, 18 and 22 respectively

   C) 37, 27 and 13 respectively

   D) 39, 29 and 11 respectively

53. The last digit of the number obtained by multiplying the numbers $81 \times 82 \times 83 \times 84 \times 85 \times 86 \times 87 \times 88 \times 89$ will be

   A) 0   B) 9

   C) 7   D) 2

54. It has been reported in recent years that a very large number of seats in the engineering colleges in the country remain vacant at the end of the admission session.
   Which of the following may be the probable cause of the above effect?

   A) There has been a considerable decrease in hiring of engineering graduates due to economic slowdown in the recent years.

   B) Students have always preferred to complete graduation in three years time instead of four years for engineering.

   C) The govt. has recently decided to provide post qualification professional training to all engineering graduates at its own cost.

   D) None of these

55. At what time, in minutes, between 3 o'clock and 4 o' clock, both the needles will coincide each other?

   A) $5\frac{1}{11}''$ B) $12\frac{4}{11}''$ C) $13\frac{4}{11}''$ D) $16\frac{4}{11}''$

B

56. If $\log_3 2$, $\log_3 (2^x - 5)$, $\log_3 \left(2^x - \frac{7}{2}\right)$ are in arithmetic progression, then the value of x is equal to

A) 5   B) 4   C) 3   D) 2

57. Let n be the number of different 5 digit numbers, divisible by 4 that can be formed with the digits 1, 2, 3, 4, 5 and 6, with no digit being repeated. What is the value of n?

A) 144   B) 168

C) 192   D) 222
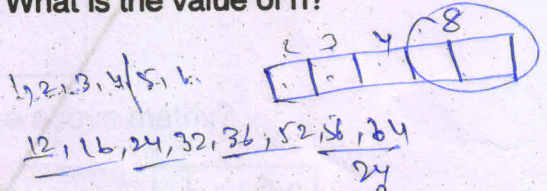
58. Let S be the set of integers x such that
   i. $100 \leq x \leq 200$
   ii. x is odd and
   iii. x is divisible by 3 but not by 7

How many elements does S contain ?

A) 16   B) 12   C) 11   D) 13

59. Two pipes A and B can fill a cistern in 37.5 minutes and 45 minutes respectively. Both pipes are opened. The cistern will be filled in just half an hour, if the B is turned off after

A) 5 minutes   B) 9 minutes

C) 10 minutes   D) 15 minutes

60. Three persons A, B and C wear shirts of Black, Blue and Orange colours (not necessarily in the order) and pants of green, yellow and orange (not necessarily in that order). No person wore shirt and pant of the same colour. Further, it is given that,

   1. A did not wear shirt of black colour.
   2. B did not wear shirt of blue colour.
   3. C did not wear shirt of orange colour.
   4. A did not wear the pant of green colour.
   5. B wore pant of orange colour.

   What were the colours of the pant and shirt worn by C respectively?

A) Orange and Black   B) Green and Blue

C) Yellow and Blue   D) Yellow and Black

B

61. In the figure given below, if the area of parallelogram ABCD is 208 cm², what is the height of the parallelogram ABEF?

13 cm
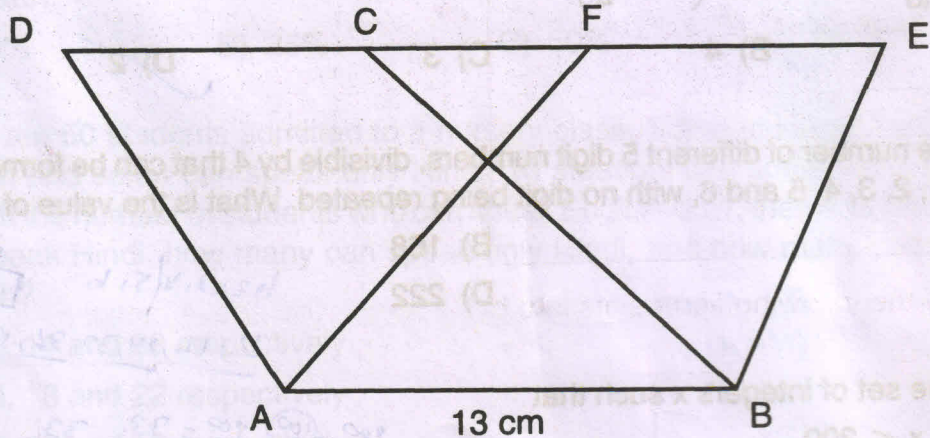
A) 15 cm   B) 15.5 cm   C) 16 cm   D) 16.5 cm

62. If the first and the third letters in the group DISTRIBUTION are interchanged and also the second and the fourth letter, the fifth and the seventh and so on, then which of the following would be the seventh letter from the left?

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

63. In the below series, you will be looking at the letter pattern, diagram pattern or number pattern. Fill the blank in the end of the series.

JAK, KBL, LCM, MDN, _____

A) OEP   B) NEO   C) MEN   D) PFQ

64. A caterpillar crawls up a pole of 75 inches high, starting from the ground. Each day, it crawls up 5 inches and each night it slides down 4 inches. When will it reach the top of the pole?

A) End of 70 days   B) End of 71 days

C) End of 72 days   D) End of 73 days

65. The time on the watch is quarter to three. If the minute hand points of North – East, in which direction does the hour hand point?

A) North – West   B) South – West

C) South – East   D) North – East

B
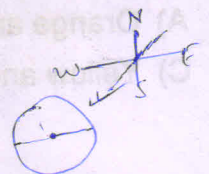
66.

Which one of the following figures fits into blank part of the above matrix?

A)

B)

C)

D)
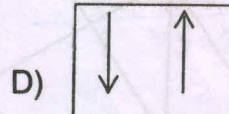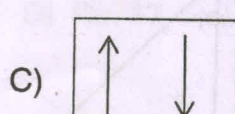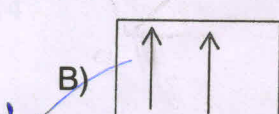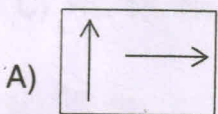
67. Choose the picture that would go in the empty box so that the two bottom pictures are related in the same way as the top two are related.

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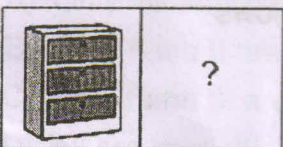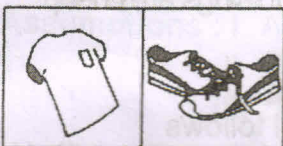
A) 1   B) 2   C) 3   D) 4

68. Decide which of the given conclusions logically follow from the given statement(s).

Statements : Some codes are secrets.

All secrets are puzzles.

Conclusions : I. All secrets being codes is a possibility.

II. Atleast some puzzles are codes.

A) Only conclusion I is true

B) Only conclusion II is true

C) Either conclusion I or II is true

D) Both conclusions I and II are true

B

69. Decide which of the given conclusions logically follow from the given statement(s).

    Statements : Some metals are alloys.

    No metal is a stone.

    Conclusions : I. No alloy is stone.

    II. Atleast some alloys are metals.

    A) Neither conclusion I nor II is true   B) Only conclusion II is true

    C) Only conclusion I is true   D) Both conclusions I and II are true

70. Find the number of triangles in the given picture.

    A) 10   B) 12   C) 14   D) 16

71. **Statements :** All mangoes are golden in colour. No golden-coloured things are cheap.

    Conclusions : I) All mangoes are cheap.

    II) Golden-coloured mangoes are not cheap.

    A) Only conclusion I follows   B) Only conclusion II follows

    C) Either I or II follows   D) Neither I nor II follows

72. By selling an article, what is the profit percent gained?

    I) 5% discount is given on list price.

    II) If discount is not given, 20% profit is gained.

    III) The cost price of the articles is Rs. 5,000.

    A) Only I and II   B) Only II and III

    C) Only I and III   D) All of I, II and III

73. Decide which of the given conclusions logically follows from the given statement(s).

    Statements : All politicians are honest. All honest are fair.

    Conclusions : I) Some honest are politicians

    II) No honest is politician

    III) Some fair are politicians

    IV) All fair are politicians

    A) None follows   B) Only I and IV follow

    C) Only I and II follow   D) Only I and III follow

B

74. Forty students watched films A, B and C over a week. Each student watched either only one film or all three. Thirteen students watched film A, sixteen students watched film B and nineteen students watched film C. How many students watched all three films?

A) 0

B) 2

C) 4

D) 8

75. Two bus tickets from city A to B and three tickets from city A to C cost Rs. 77, but three tickets from city A to B and two tickets from city A to C cost Rs. 73. What are the fares for cities B and C from A?

A) Rs. 4, Rs. 23

B) Rs. 13, Rs. 17

C) Rs. 15, Rs. 14

D) Rs. 17, Rs. 13

76. Decide which of the assumptions is implicit in the statement and choose your answer accordingly.

Statement : "Buy pure and natural honey of company X." – An advertisement in a newspaper.

Assumptions : I. Artificial honey can be prepared.

II. People do not mind paying more for pure and natural honey.

III. No other company supplies pure honey.

A) Only I is implicit

B) Only I and II are implicit

C) Only I and III are implicit

D) All are implicit

77. Choose the conclusion which logically follows from the given statement(s).

Statement : All scientists working in America are talented. Some Indian scientists are working in America.

Conclusions : 1. None of Indian scientists is talented.

2. Some talented Indian scientists have migrated to America.

3. All talented scientists are Indians.

4. Some Indian scientists are talented.

The conclusion(s) correctly drawn is/are

A) 1 only

B) 2 only

C) 2 and 3

D) 2 and 4

B

78. One New York publisher has estimated that 50,000 to 60,000 people in the United States want an anthology that includes the complete works of William Shakespeare. And what accounts for this renewed interest in Shakespeare ? As scholars point out, his psychological insights into both male and female characters are amazing even today.

This paragraph best supports the statement that

A) Shakespeare's characters are more interesting than fictional characters today

B) People even today are interested in Shakespeare's work because of the characters

C) Academic scholars are putting together an anthology of Shakespeare's work

D) New Yorkers have a renewed interested in the work of Shakespeare

79. A runs $1\frac{2}{3}$ times as fast as B. If A gives B a start of 80 m, how far must the winning post be so that A and B might reach it at the same time?

A) 200 m   B) 400 m   C) 300 m   D) 160 m

80. Two men and three boys can do a piece of work in ten days; while three men and two boys can do the same work in eight days. In how many days can two men and one boy do the work?

A) 12.5   B) 9   C) 9.5   D) 8.5

81. How many numbers between 1 and 1000 are divisible by all numbers 2, 3, 4, 5 and 6?

A) 16   B) 32   C) 17   D) 33

82. There are 8436 steel balls, each with a radius of 1 centimeter, stacked in a pile, with 1 ball on top, 3 balls in the second layer, 6 in the third layer, 10 in the fourth and so on. The number of horizontal layers in the pile is

A) 34   B) 38   C) 36   D) 32

83. A body travels from A to B in 10s with a speed of 50 km/h and returns with a speed of 100 km/h in 5s. The average speed and the average velocity for the whole journey is

A) 17.5 ms⁻¹, 0 km/h   B) 16.5 ms⁻¹, 0 km/h

C) 15.5 ms⁻¹, 0 km/h   D) 18.5 ms⁻¹, 0 km/h

84. Find the odd one out.

A) DEHG   B) RSVU   C) JKNM   D) LMQP

B

85. Find out the wrong number in the following series.

15, 16, 34, 105, 424, 2124, 12756

   A) 16   B) 34   C) 424   D) 2124

86. My mother is twice as old as my brother. I am five years younger to my brother but three years older to my sister. If my sister is twelve years of age, how old is my mother?

   A) 24   B) 30   C) 40   D) 50

87. Find the missing term in the series.

3, 20, 63, 144, 275, ____

   A) 354   B) 468   C) 548   D) 554

Questions 88 to 90 are based on the following passage :

Nine individuals Z, Y, X, W, V, U, T, S and R are the only candidates who can serve on three Committees A, B and C and each candidate should serve on exactly one of the Committees.

Committee A should consist of exactly one member more than Committee B. It is possible that there are no members of Committee C. Among Z, Y and X none can serve on Committee A. Among W, V and U none can serve on Committee B. Among T, S and R none can serve on Committee C.

88. In case T and Z are the individuals serving on Committee B, how many of the nine individuals should serve on Committee C ?

   A) 3   B) 4   C) 5   D) 6

89. In case T, S and X are the only individuals serving on Committee B, the membership of Committee C should be

   A) Z and Y   B) Z and W

   C) Y and V   D) X and V

90. In case R is the only individual serving on Committee B, which among the following should serve on Committee A?

   A) W and S   B) V and T

   C) U and S   D) T and S

B

COMPUTER AWARENESS

91. The output of the combinational circuit given below is
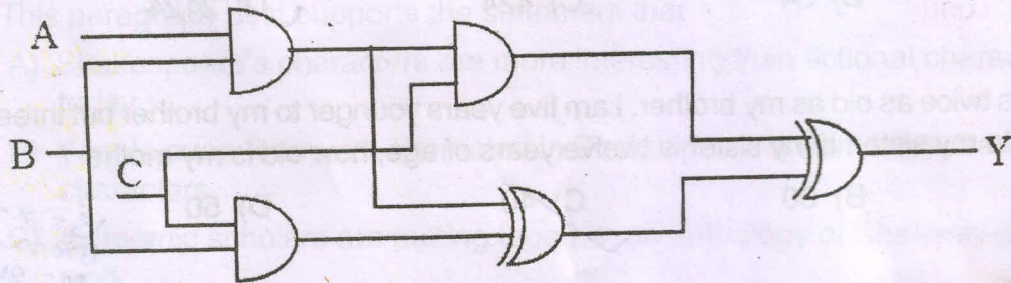
A) $A + B + C$ B) $A(B + C)$ C) $B(C + A)$ D) $C(A + B)$

92. Which one of the following expressions does NOT represent exclusive NOR of x and y?

A) $xy + \bar{x}\,\bar{y}$ B) $x \oplus \bar{y}$ C) $\bar{x} \oplus y$ D) $\bar{x} \oplus \bar{y}$

93. If a signal passing through a gate is inhibited by sending a low into one of the inputs and the output is high, the gate is

A) NOR   B) NAND

C) AND   D) OR

94. Given $\sqrt{(224)_r} = (13)_r$, the value of the radix is

A) 10   B) 8

C) 5   D) 6

95. What type of errors are not detected by assemblers?

A) Syntax error   B) Run time error   C) Logical error   D) All of these

96. Consider the equation $(43)_x = (y3)_8$ where x and y are unknown. The number of possible solutions is

A) 4   B) 5   C) 6   D) 7

B

97. Let the memory access time is 10 milliseconds and cache access time is 10 microseconds. Assume the cache hit ratio 15%. The effective memory access time is

    A) 2 milliseconds

    B) 1.5 milliseconds

    C) 1.85 microseconds

    D) 1.85 milliseconds

98. What are the values of R_1 and R_2 respectively in the expression

    $(235)_{R_1} = (565)_{10} = (1065)_{R_2}$?

    A) 8, 16   B) 16, 8

    C) 8, 12   D) 16, 12

99. What is the minimal form of Karnaugh map shown below ? (Assume that x denotes a don't care term)

cd \ ab	00	01	11	10
00	1	x	x	1
01	x			1
11				
10	1			x

    A) $\bar{b}\bar{d}$ B) $\bar{b}\bar{d}+\bar{b}\bar{c}$ C) $\bar{b}\bar{d}+\bar{a}d\bar{c}\bar{d}$ D) $\bar{b}\bar{d}+\bar{b}\bar{c}+\bar{c}\bar{d}$

100. In order to store floating numbers in computers using the normalized representation and 32-bit single precision, the number of bits used for exponent and fraction are _____, _____ respectively.

    A) 11, 21   B) 16, 15

    C) 16, 16   D) 8, 23

B

GENERAL ENGLISH

101. Change the speech : "If you don't keep quite I shall shoot you", he said to her in a calm voice.

    A) He warned her to shoot if she didn't keep quite calmly

    B) He said calmly that I shall shoot you if you don't be quite

    C) He warned her calmly that he would shoot her if she didn't keep quite

    D) Calmly he warned her that be quite or else he will have to shoot her

102. Choose the correct spelling for the word given below.

    A) Cieling   B) Cealing   C) Ceiling   D) Ceeling

103. Select the pair of words, which are related in the same way as the capitalized words are related to each other.

    BUTTERFLY : FREEDOM

    A) Frog : Tadpole   B) Self reliant : Buoyant

    C) Alga : Lichens   D) Chicken : Rooster

104. Which of the following is the closest in meaning to the word, CLOWN?

    A) Idiot   B) Dunce   C) Don   D) Jester

105. Fill in the blank choosing the correct word.

    The vote will have to be laid _____ until next week.

    A) on   B) in   C) over   D) from

106. Fill in the blank choosing the correct question tag.

    He has done his duty, _____

    A) Shouldn't he?   B) Hasn't he?   C) Won't he?   D) Has he?

107. Choose one of the options that is most nearly same as meaning of the word **Epitome**.

    A) Final verdict   B) Climax

    C) Essence   D) Tombstone

108. Which collocation goes with the word AWARE?

    A) rightly   B) fully   C) nearly   D) exactly

B

109. Identify the underlined part which has an error.
He <u>couldn't</u> <u>cope up</u> with the hot <u>climate</u> of the place <u>any longer</u>.

    A) couldn't   B) cope up

    C) climate   D) any longer

110. The _____ pittance the widow receives from the government cannot keep her from poverty.

    A) Meagre   B) Indulgent

    C) Meticulous   D) Magnanimous

111. The other boys or Henry _____ to blame.

    A) is   B) are

    C) were   D) will

112. In the question, the word "Echo" is usual in four different ways, numbered A to D. Choose the option in which the usage of the word is inappropriate.

    A) The crowd cheered to the echo in the foot ball match

    B) I started to feel nostalgic as I stood in the old neighbourhood that echoed with my childhood

    C) A loud thunder echo hit the tallest building

    D) My thoughts echoed with the sounds of spring

113. The sentences given below when properly sequenced, form a coherent paragraph. Each sentence is labeled with a letter. Choose the most logical order of sentences from the given choices to construct a coherent paragraph.

P : It refers to those times when there is no war or fight among nations.

Q : Many people argue that war is a necessary evil and the only process of solving international disputes.

R : Peace means complete freedom from disturbance.

S : Once the world starts believing that wars are unnecessary, they decide to abolish war completely.

T : But in reality, war happens only because people are not ready to settle disputes in a peaceful manner.

    A) TSRQP   B) RTQPS

    C) SPTQR   D) QTRPS

B

Read the following passage and answer the questions **114** to **116** based on it.

I do not wish to cast aspersions on the corporate takeover. On the contrary, it is a key facilitator of creative destruction and doubtless the most effective remaining means by which shareholder voices can mold a corporation. But while change in management is often necessary, you cannot effectively run a corporation with differing authoritative voices espousing opposing corporate goals. It has to be one or the other. If the board is riven with conflicting interests, corporate governance will suffer. If directors cannot agree with the CEO's strategy, they should replace him. Corporate dissonance, of course, is unavoidable in periods of transition. But it is not a value to be pursued for its own sake. A cacophony produces only red ink.

114. What according to the author facilitates creative destruction?
    A) Corporatism   B) Modernism   C) Terrorism   D) Cosmopolitanism

115. Which of the following words used in the passage reinforces the idea contained in the word, 'DISSONANCE'?
    A) Aspersions   B) Cacophony   C) Strategy   D) Transition

116. What according to the author makes corporate governance suffer?
    A) Conflicting strategies of executives
    B) Conflicting interests of customers
    C) Conflicting interests of statesmen
    D) Conflicting interests of the board of directors

117. Find the synonym that is most nearly similar in meaning to the word : DEBACLE.
    A) Catastrophe   B) Dandy   C) Corker   D) Opulence

118. Choose the phrasal verb that means "To spend time doing unimportant things instead of doing necessary things".
    A) fake out   B) faff about   C) fade out   D) fall apart

119. Which of the following is close to the meaning of the word, IMPOLITIC?
    A) Impolite   B) Intolerant   C) Incongruous   D) Injudicious

120. Choose an option to replace the phrase given in bold.

    The bank has hired a consultant who **will look into** any issues which arise during the merger.
    A) is looking over
    B) will be looked over
    C) will look out
    D) no correction required

B

73) d
74) d
75) b
76) a
77) d
78) b
79) a
80) a
81) a
82) c
83) d
84) d
85) d
86) c
87) b
88) b
89) a
90) d
91) c
92) d

93) b.
94) c
95) b
96) b
97) none
98) b
99) d
100) d
101) c
102) c
103) b
104) d
105) c
106) b
107) c
108) b
109) b
110) a
111) a
112) c

113) d
114) a
115) b
116) d
117) a
118) b
119) d
120) d.

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1) b	19) d	37) b	55) d
2) b	20) a	38) a	56) c
3) a	21) c	39) d	57) c
4) a	22) none	40) a	58) d
5) b	23) b	41) a	59) b
6) a	24) c	42) b	60) b
7) a	25) d	43) d	61) c
8) b	26) b	44) none	62) b
9) b	27) c	45) c	63) b
10) c	28) a	46) a	64) b
11) b	29) b	47) d	65) b
12) c	30) b	48) c	66) b
13) c	31) b	49) b	67) b
14) b	32) a	50) b	68) d
15) d	33) d	51) d	69) b
16) a	34) c	52) d	70) c
17) b	35) d	53) a	71) b
18) a	36) c	54) a.	72) d