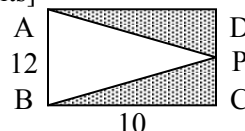
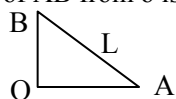


1. The arithmetic mean of 10 entries is 25. The arithmetic mean of the first five entries to the arithmetic mean of the next five entries is as 2:3. Therefore, the arithmetic mean of the first five entries will be
(a) 18 (b) 20 (c) 30 (d) 40
2. The standard deviation of a, b, c, d is σ . The standard deviation of $a+k, b+k, c+k, d+k$ will be
(a) σ (b) $\sigma+k$ (c) $k\sigma$ (d) σ/k
3. If the roots of $x^2 + kx + (k+1) = 0$ are in the ratio 1:2 then
(a) $k^2 = ak$ (b) $k^2 = k+1$
(c) $2k^2 = 9(k+1)$ (d) $k^2 = 3(k+1)$
4. The equations of the asymptotes of a hyperbola are $x+y=5$ and $x-y=3$. Its center is at
(a) (0, 0) (b) (3, 2) (c) (0, 3) (d) none
5. The L.C.M of $n!$ and $(n+1)!$ is
(a) $n!$ (b) $(n+1)!$ (c) $n! + (n+1)!$ (d) none
6. A man bought a horse and sold it at a gain of 10%. If he had bought at a price 20% less and sold it at a price Rs. 10 more than his earlier selling price, he would have got a profit of 40%. What is the cost price of horse?
(a) Rs. 200 (b) Rs. 500 (c) Rs. 800 (d) Rs. 1000
7. The product of two consecutive integers is 20% more than their sum. Therefore the sum of the numbers is
(a) 5 (b) 6 (c) 8 (d) 9
8. Given $a+b\sqrt{3} = (2+\sqrt{3})^3$ Then the value of $a+b$ is
(a) 31 (b) 26 (c) 41 (d) 17
9. The value of $\int_3^4 \frac{1}{x(x+1)} dx$ is
(a) $\log 4$ (b) $\log 5$ (c) $2 \log 5$ (d) $\log 16/15$
10. A ladder AB of length L is placed against a wall as in the figure. The distance of the midpoint of AB from O is
(a) A variable (b) $L/2$
(c) $> L/2$ (d) $< L/2$
11. The total number of all possible one-one onto functions that we could define from $A = \{1, 2, 3, 4\}$ to $B = \{a, b, c, d\}$
- (a) 4 (b) 8 (c) 16 (d) 24
12. The number of zeros in $23!$ is
(a) 8 (b) 12 (c) 4 (d) 5
13. The sum of 10% of a number (integer) and 20% of the square of the number is 21. Find the sum of 20% of the number and 10% of the square of the number.
(a) 12 (b) 20 (c) 25 (d) 41
14. The value of $\frac{1}{1+1} + \frac{1}{2^2+2} + \frac{1}{3^2+3} + \dots + \infty$
(a) $1/2$ (b) 1 (c) $1/3$ (d) $3/4$
15. The value of a for which $2x+ay=0$ and $ax+8y=0$ may have many solutions are
(a) 2, -2 (b) 3, -2 (c) 1, -1 (d) 4, -4
16. The number of parallelograms formed by lines in the figure is
(a) 9 (b) 18
(c) 36 (d) 42
17. Given $\vec{a} + 2\vec{b} = 0$, identify the correct statement
(a) The direction ratios of \vec{a}, \vec{b} are same
(b) The direction ratios of \vec{a}, \vec{b} are not same
(c) The direction ratios of \vec{a} are those of \vec{b} multiplied by 2
(d) The direction ratios of \vec{a} are the negative of those of \vec{b}
18. The total number of single, double, three, four digit numbers, that could be formed using 1,2,3,4,5,6 allowing repetition is
(a) 6^4 (b) 6P_4
(c) 1554 (d) ${}^6P_1 + {}^6P_2 + {}^6P_3 + {}^6P_4$
19. The maximum number of coins from which faulty one weighing less than all others can be found in three weighings on a balance
(a) 24 (b) 25 (c) 26 (d) 27
20. The area of the shaded region is [Given ABCD is a rectangle of sides 12 units and 10 units]
(a) 90 square units
(b) 70 square units
(c) 65 square units



(d) 60 square units

21. The range of $3 \sin x + 4 \cos x$, $0 \leq x \leq 2\pi$ is

- (a)
- $(-4, 4)$
- (b)
- $(0, 1)$
- (c)
- $(0, 4)$
- (d)
- $(-5, 5)$

22. The point on the line $x + y = 5$ equidistant from the points $(0, 0, 0)$ and $(6, 6)$ is

- (a)
- $(2, 3)$
- (b)
- $(3, 2)$
- (c)
- $(4, 1)$
- (d) none

23. Given $3+i$ is a root of $x^3 + ax^2 + x + 20 = 0$, then the value of a is

- (a)
- -4
- (b)
- 3
- (c)
- 4
- (d)
- 10

24. A set A has 11 elements. The number of subsets of A having 6 elements is n and number of subsets of A having 4 elements is m . Then

- (a)
- $n > m$
- (b)
- $n < m$
- (c)
- $n = m$
- (d)
- $n = 2m$

25. The number of mappings that could be defined from A to B given $A = \{1, 2, 3, 4\}$ and $B = \{1\}$ is

- (a)
- 1
- (b)
- 2^4
- (c)
- 15
- (d)
- 16

26. If $f(x)$ denotes the integer part of the real number x then the function $f(x) = x - [x]$ is

- (a) an odd function (b) a periodic function
-
- (c) an even function (d) a constant

27. The day of 19th February of a certain leap year y is Monday. Therefore the day of 28th June of y will

- (a) Monday (b) Tuesday (c) Wednesday (d) Friday

28. A packer could pack 4 boxes of 110 packets of biscuits containing 12 biscuits each in 12 hours. Find the time he may require to pack 3 boxes of 120 packets containing 11 biscuits each.

- (a) 12 hours (b) 20 hours (c) 16 hours (d) 22 hours

29. A computer is an electronic device that can perform

- (a) Arithmetic calculations
-
- (b) Accept and process data by implementing sequentially a set of stored instructions
-
- (c) Logical operations (d) Complicates calculations easily

30. The value of $\int_0^{\pi/2} \frac{\sin^3 \theta - \cos^3 \theta}{\sin^5 \theta + \cos^5 \theta} d\theta$ is

- (a) zero (b)
- $\pi/4$
- (c)
- $\pi/2$
- (d)
- 1

31. The value of $(1 + \log_3 2)(1 + \log_6 5)$ is equal to

- (a)
- $\log_{18} 10$
- (b)
- $1 + \log_3 10$
-
- (c)
- $1 + \log_6 10$
- (d)
- $\log_6 30$

32. Which of the following classes does the diagrams best depict?



- (a) Biology, Sciences, Humanities
-
- (b) Animals, Living Beings, Books
-
- (c) Chair, Table, Furniture (d) Father, mother, Child

33. The value of $\lim_{n \rightarrow \infty} \frac{1^2 + 3^2 + 5^2 + \dots + (2n-1)^2}{n^3}$ is

- (a)
- $4/3$
- (b)
- 4
- (c)
- ∞
- (d)
- 0

34. Given x takes the value $-5, -4, \dots, 4, 5$ evaluate $\{x|x\}$

- (a)
- 42
- (b)
- 110
- (c)
- 0
- (d)
- 55

35. Find the domain of $\sqrt{\frac{x-1}{x-2}}$

- (a)
- $(1, \infty)$
- (b)
- $(1, 2)$
-
- (c)
- $(2, \infty)$
- (d)
- $(-\infty, 1) \cup (2, \infty)$

36. In an election 301 votes were cast. One of the five contestants won the election by getting the minimum number of votes possible. What is the number of votes that the winner got?

- (a) 60 (b) 61 (c) 91 (d) 151

37. Given $a^2 + b^2 = 1$, $c^2 + d^2 = 1$, $p^2 + q^2 = 1$, where the numbers considered are all real, then

- (a)
- $ab + cd + pq \geq 1$
- (b)
- $ab + cd + pq \leq 3$
-
- (c)
- $ab + cd + pq \geq 3$
- (d)
- $ab + cd + pq \leq 3/2$

38. Given $1 \leq x \leq 2$ and $3 \leq y \leq 5$, the bounds of $2x + 3y$ are

- (a) 11 and 19 (b) 10 and 18
-
- (c) 12 and 19 (d) none of these

39. Given $x + y = 60^\circ$, the value of $\sin x + \sin y$ will not exceed

- (a) 2 (b)
- $\sqrt{2}$
- (c) 1 (d)
- $1/2$

40. The value of x satisfying $|x-2| \leq 4$ and $x^2 \leq 16$ are from

- (a)
- -2
- to
- 6
- (b)
- -21
- to
- 4
- (c)
- 2
- to
- 4
- (d)
- -4
- to
- 4

41. The radius of the circumcircle of a right angles triangle of sides 3cm, 4cm, 5cm is

- (a) 5 cm. (b) 10 cm. (c) 2.5 cm. (d) 4 cm.

42. Complete the series: 3 5 8 8 18 14 38 _____ 78

- (a) 23 (b) 26 (c) 28 (d) 30

43. If the roots of $x^3 - 9x^2 + ax + b = 0$ are in A.P., Then

- (a)
- $3a + b = 54$
- (b)
- $3a = b$
-
- (c)
- $a^2 = b$
- (d)
- $3a + b = 27$

44. The number of natural number N satisfying $\frac{1}{2} + \frac{1}{3} + \frac{1}{N} < 1$ is

- (a) two (b) three (c) one (d) many

45. The position vectors of three collinear points A, B, C are $\vec{a}, \vec{b}, \vec{c}$ and they satisfy $\vec{a} + 2\vec{b} + t\vec{c} = 0$. Therefore the value of t is

- (a)
- -1
- (b)
- -4
- (c)
- -3
- (d) none

46. The greatest number which when added to 7 divides exactly 48, 72, 240. Then the number is divisible by

- (a) 8 (b) 9 (c) 11 (d) none

47. Given α, β, γ are the roots of $x^3 - 1 = 0$, what is the value of $\alpha^5 + \beta^5 + \gamma^5$

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

48. Given $u = f(x^2 + y^2)$ then $x \frac{\partial u}{\partial x} + y \frac{\partial u}{\partial y}$

- (a)
- $2u$
- (b)
- $2(x^2 + y^2)f'(x^2 + y^2)$
-
- (c)
- $2f'(x^2 + y^2)$
- (d)
- $2u(x^2 + y^2)$

49. The series $1 + x - \frac{x^2}{2!} - \frac{x^3}{3!} + \frac{x^4}{4!} - \dots$ (x is small) is

- (a) $e^x - e^{-x}$ (b) $e^x + e^{-x}$
 (c) $\sin x + \cos x$ (d) $\sin x - \cos x$

50. The area of a square is increased by 44%. Therefore its side is increased by

- (a) 20% (b) 11% (c) 4% (d) 2%

Directions (51 – 52): Contains Analogies

51. TELEPHONE : LETTER : : ----- : -----

- (a) LOUD SPEAKER : MICROPHONE
 (b) PNOGRAPH : MANUSCRIPT
 (c) SOUND : SIGHT
 (d) TELEGRAPH : MAIL

52. NOISE : FACE : : ----- : -----

- (a) RING : FINGER (b) STEM : ROOT
 (c) KNOB : DOOR (d) SHOE : FOOT

53. An equilateral triangle, a square and a circle are of the same perimeter. If E, S, C are the areas of the equilateral triangle, square and circle respectively, then

- (a) $E > S > C$ (b) $E < S < C$ (c) $E < C < S$ (d) $S < E < C$

54. In a beauty contest, half the number of experts votes Ms. A and two thirds voted Ms. B Ten of them voted for both and six did not for either. How many experts were there in all

- (a) 32 (b) 24 (c) 30 (d) 36

55. OABC is a square of side 'a' units. The unit vectors along $\vec{OA} + \vec{OC}$ are \vec{i}, \vec{j} . The position vectors \vec{r} of any point on AB w.r. to is given by

- (a) $\vec{r} = t(a\vec{i} + \vec{j})$ (b) $\vec{r} = a\vec{i} + t\vec{j}$
 (c) $\vec{r} = t\vec{i} + a\vec{j}$ (d) $\vec{r} = a\vec{i} + t(\vec{i} + \vec{j})$

56. The coefficients of x^2 and x^3 in the expansion of $(a+bx)^n$ will be equal if

- (a) $nb = a + 2b$ (b) $nb = 3b + 2a$
 (c) $nb = 3a + 2b$ (d) $nb = (n+a)a$

Directions (57 – 60): The letters A,B,C,D,E,F,G stand for seven consecutive integers among {1, 2, ..., 10} but not necessarily in an increasing or decreasing order.

- (A) D is 3 less than A
 (B) B is the middle term
 (C) F is as much less than B as C is greater than D
 (D) G is greater than F

57. Which of the following integers is as much less than G as A is greater than F?

- (a) A (b) B (c) C (d) D

58. $A - F = ?$

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

59. The fifth integer is

- (a) A (b) C (c) D (d) E

60. If $A = 7$, Then the sum of E and G is

- (a) 8 (b) 12 (c) 10 (d) 121

61. The region defines by is $0 < x^2 + y^2 - 9 < 16$ is

- (a) an annulus between two concentric circles of radii 3 and 4 units.
 (b) an annulus between two concentric circles of radii 4 and 5 units

(c) an annulus between two concentric circles of radii 3 and 5 units

(d) the region enclosed two concentric circle $x^2 + y^2 = 25$

62. Which among the following contains strings of binary numbers?

- (a) Machine language (b) High level language
 (c) Assembly language (d) ALGOL

63. Evaluate $\lim_{x \rightarrow 2} \frac{e^x - e^2}{x - 2}$

- (a) e (b) e^2 (c) 1 (d) e^3

64. Given $x^2 = 4 + 2\sqrt{3}$, x^3 is equal to ($x > 0$)

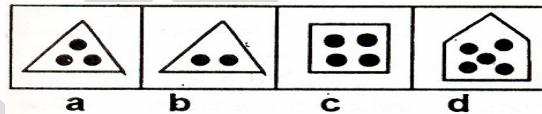
- (a) 10 (b) $10 + 8\sqrt{3}$ (c) $10 + 6\sqrt{3}$ (d) $8 + 6\sqrt{3}$

65. Three dice are thrown. What is the probability that the sum of numbers shown on the dice is neither 3 or nor 18?

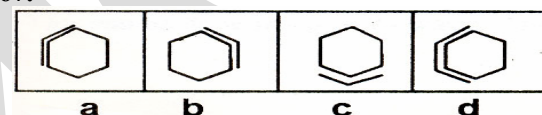
- (a) $1/36$ (b) $5/36$ (c) $1/108$ (d) $107/108$

Directors: (66 – 69): Find odd man

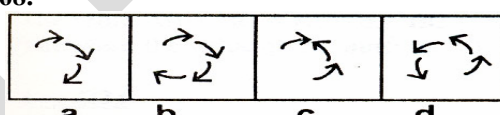
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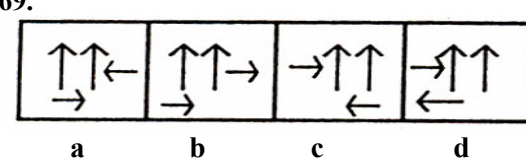
67.



68.



69.



Directions (70 – 71): choose the word which is most opposite in meaning to the word given.

70. DISINTEGRATION

- (a) unity (b) viability (c) uniformity (d) diversity

71. NEGLIGIBLE

- (a) possible (b) affirmative (c) immense (d) worrying

72. MANIFESTATIONS

- (a) accusations (b) indications (c) menace (d) summations

73. ERADICATION

- (a) lowering (b) uprooting (c) limitation (d) curbing

Directions (74 – 78): Below is a passage followed by four questions. Students are advised to read questions before reading the passage. So that idea of what to answer is easily be built up.

At the core of the problem in the drought affected regions is the collapse of traditional system of rain harvesting. The specifics of each traditional system varied substantially across the country, but they invariably failed to stand up to the on

slough of commercialism, technology change and even land reform.

For instance, in part of Karnataka the village tank was attached to the temple. The priests in charge of the temple were also expected to ensure the maintenance of the tank, in return for which they were given a few acres of land to cultivate. Their task of maintenance was not too difficult as other farmers in the village used the silt from the tanks on their lands. But with the coming of green revolution technology, silt was no longer favored. Land reforms also allowed the priests to claim the land they cultivated as their own, without their having to take the responsibility of maintaining the tank. With no one directly responsible for the maintenance of the tanks and the labour no longer available to desilt it, the tanks have silted up.

74. Which of the following is / are responsible for the collapse of rain harvesting

- (i) rivalry among different communities
- (ii) modern option for rain harvesting
- (iii) land reforms
- (iv) graving commercialism and technology
- (a) All the above
- (b) only (iii) and (iv)
- (c) only (i), (iii) and (iv)
- (d) only (ii), (iii) and (iv)

75. What is the true about rain harvesting in context of the passage?

- (a) Rain harvesting is a modern phenomenon
- (b) Rain harvesting can only be done in villages
- (c) In ancient times rain harvesting was the duty of priests.
- (d) Rain harvesting has been an age-old practice in our society

76. During Green Revolution Period

- (a) Some farmers became priests in greed of occupying more land.
- (b) the use of mud brought by rain water on agricultural lands became more
- (c) traditional method of agriculture was affected
- (d) rain harvesting got a boost

77. In parts of Karnataka how were the village tanks maintained?

- (a) The tanks were regularly desilted and farmers used the silt on their lands.
- (b) The incharge of tanks (priests) used to desilt it
- (c) The tanks were never kept empty
- (d) Maintenance charges were beared by farmers.

78. What is the synonym of the word core as given in the passage?

- (a) optional part
- (b) central part
- (c) basic focus
- (d) consequence

Directions (79 – 81): In each of the following sentences there are two blank spaces. Below each sentences there are four pair of words, find out which of them can be filled up in the blanks in the sentences to make it meaningfully complete.

79. Among the renewable energy sources wind is the ____ and most ____ one

- (a) viable, optional
- (b) tested, secure
- (c) oldest, proven
- (d) traditional, practical

80. Neither Indices nor the Indian people can remain ____ from the crisis ____ in our neighboring countries

- (a) aloof, persisting
- (b) alarmed, on going
- (c) untouched, burning
- (d) aghast, deepening

81. Mutual fund is a collective ____ scheme in which a large number of ____ pool their money.

- (a) investing, debtors
- (b) investment, investors
- (c) bargaining, people
- (d) derivative, share holders

Directions (82 – 86): Study the following table and answer the questions given below:

Marks obtained by 5 candidates in 5 different subjects out of 100 marks

Subjects	Candidates				
	A	B	C	D	E
History	74	53	60	58	75
Economics	56	68	61	68	69
Maths	91	47	80	53	59
Sociology	71	56	69	63	81
Geology	88	65	58	49	63

82. Which candidate secured marks in history and maths in the ratio of 3:4?

- (a) A
- (b) B
- (c) C
- (d) D

83. Which candidates have secured highest marks in maximum subjects?

- (a) E
- (b) D
- (c) C
- (d) A

84. In which subjects the average marks obtained by different candidates is highest?

- (a) History
- (b) Economics
- (c) Maths
- (d) Sociology

85. Marks obtained by C in Maths is what percent more / less the marks obtained E in history

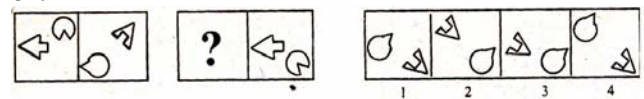
- (a) 5% (more)
- (b) 6.25% (more)
- (c) 6% (less)
- (d) none of these

86. What is the difference between the highest average marks and lowest average marks obtained by different candidates is highest?

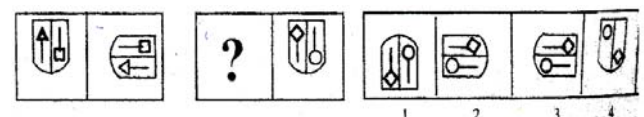
- (a) 18.2
- (b) 17.8
- (c) 10.4
- (d) 6.6

Directions (87 – 89): The second figure in the first unit of the problem figures bears a certain relationship to the first figure. Similarly, one of the figures in the answer figures bears the same relationship to the first figure in the second unit of the problem figures. Locate the figure which would replace the question mark.

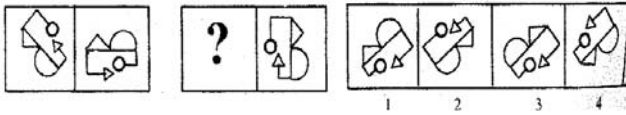
87.



88.



89.



90. Meena is 24. She is twice as old as Bala was, when she was as old as Bala's now. What is Bala's present age?

- (a) 14 years (b) 16 years (c) 18 years (d) 20 years

91. The integrating factors of $\frac{dy}{dx} + \frac{y}{x} = x$ is

- (a) x (b) ex (c) x^2 (d) $\log x$

92. $y = e^{3x} + e^{2x}$ is a solution of

- (a) $(D^2 - 5D + 6)y = 0$ (b) $(D^2 - 6D + 5)y = 0$
 (c) $(D^2 - D - 6)y = 0$ (d) $(D^2 - a)y = 0$

93. The product of two positive real numbers is 1. Therefore their sum is

- (a) > 2 (b) ≥ 2 (c) ≤ 2 (d) $0 < x \leq 2$

94. The interval in which $1 + (2x - 1) + (2x - 1)^2 + (2x - 1)^3 + \dots$ will converge is

- (a) $0 < x < 1$ (b) $-1 < x < 1$ (c) $-2 < x < 2$ (d) none

95. The differential equation got by eliminating λ given

$y = e^{\lambda x}$ is

- (a) $\frac{dy}{dx} = y$ (b) $x \left(\frac{dy}{dx} \right) = y \log y$
 (c) $\frac{dy}{dx} = x$ (d) $\frac{dy}{dx} = \lambda e^{\lambda x}$

Directions (96 – 97): Two statements and two conclusions are given.

- (A) If only conclusion I follow, mark (a)
 (B) If only conclusion II follows, mark (b)
 (C) If both conclusions I and II follow, mark (c)
 (D) If neither conclusion I nor II follows, mark (d)

96. Statements:

- I. Every road is dusty
 II. No road is dirty

Conclusions:

- I. No dirty thing is dusty,
 II. No dusty thing is dirty

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

97. Statements:

- I. Some animals are trees.
 II. Some trees are orange

Conclusions:

- I. Some animals are orange
 II. Some orange things are animals.

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

98. Find out man out:

- (a) Geometry (b) Pathology (c) Calculus (d) Algebra

99. There are cars of four wheels and motor cycle in a place. The number of wheels of all vehicles. Is 30 more than twice the number of vehicle. Then the number of cars at the place is

- (a) 15 (b) 16 (c) 12 (d) 10