



50115

APTITUDE TEST FOR M.C.A.

1. When a parabola represented by the equation $y - 2x^2 = 8x + 5$ is translated 3 units to the left and 2 units up, the new parabola has its vertex at

- (A) (-5, -1)
- (B) (-5, -5)
- (C) (-1, -3)
- (D) (-2, -3)

$(y-3) - 2(x-2)^2 =$
 $8(x-2) + 5$

2. The graphs of the two linear equations $ax + by = c$ and $bx - ay = c$, where a, b and c are all not equal to zero,

- (A) are parallel
- (B) intersect at one point
- (C) intersect at two points
- (D) perpendicular

3. The three solutions of the equation $f(x) = 0$ are 2, 0, and 3. Therefore, the three solutions of the equation $f(x-2) = 0$ are

- (A) -4, -2 and 1
- (B) -2, 0 and 3
- (C) 4, 2 and 5
- (D) 0, 2 and 5

$x-2=0$
 $x=2$
 $x-2=0$
 $x=2$
 $x-2=0$
 $x=2$

4. The reflection of (4, 5) in the second quadrant is

- (A) (-4, -5)
- (B) (-4, 5)
- (C) (5, 4)
- (D) (-5, 4)

5. In a triangle, angles are in the ratio 1 : 1 : 2. Then the sides are in the ratio

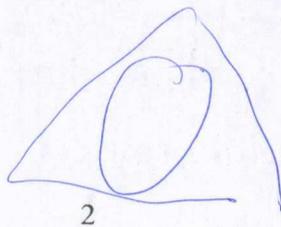
- (A) 1 : 1 : 3
- (B) 1 : 1 : 2
- (C) 1 : 1 : $\sqrt{3}$
- (D) 1 : 1 : $\sqrt{2}$

$4k = \pi$
 $k = \frac{\pi}{4}$

6. How many metres of cloth 5m wide will be required to make a conical tent, the radius of whose base is 7m and height 24m?

- (A) 110
- (B) 55
- (C) 240
- (D) 96

$4k = \pi$
 $A : B : C = 1 : 1 : 2 = k \quad k = k$
 $a : b : c = \frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
 $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$
 $\frac{a}{\frac{1}{\sqrt{2}}} = \frac{b}{\frac{1}{\sqrt{2}}} = \frac{c}{1}$
 $A : B : C = 1 : 1 : 2$
 $\frac{a}{\sin A} = \frac{b}{\sin B}$



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7. The diameter of the circle circumscribing an equilateral triangle of side 10 cms is

- (A) $10\sqrt{3}$ cms (B) $10\sqrt{2}$ cms
 (C) 20 cms (D) $\frac{10}{\sqrt{3}}$ cms



8. The gradient of the curve $y = x^2$ at the point (3, 9) is

- (A) 6 (B) 9
 (C) 18 (D) 36

$\frac{dy}{dx} = 2x$

9. $\text{div curl } \vec{F}$ is

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

$\vec{r} = x\hat{i} + y\hat{j} + z\hat{k}$
 $\frac{1}{\sqrt{5}}$

10. A unit normal to $x^2 + y^2 + z^2 = 5$ at (0, 1, 2) is

- (A) $\hat{j} + 2\hat{k}$ (B) $2\hat{i} + 2\hat{j} + 2\hat{k}$
 (C) $\hat{i} + \hat{j} + 2\hat{k}$ (D) $\frac{\hat{j} + 2\hat{k}}{\sqrt{5}}$

$\vec{r} = a$
 $\vec{r} =$

11. If the graph of $y = f(x)$ is transformed into the graph of $2y - 6 = -4f(x - 3)$, the point (a, b) on the graph of $y = f(x)$ becomes point (A, B) on the graph of $2y - 6 = -4f(x - 3)$ where A and B are given by

- (A) $A = a - 3, B = b$ (B) $A = a - 3, B = -b$
 (C) $A = a + 3, B = -2b$ (D) $A = a + 3, B = -2b + 3$

$\frac{10 + 10 + 10}{2} = 15$
 $15(5) + 5 \cdot 5$

$\vec{r} = a\hat{k}$
 $\frac{10 \cdot 10 \cdot 10}{4 \cdot 25 \sqrt{3}}$
 20

$\frac{20\sqrt{3}}{\sqrt{3}}$

15
 $\sqrt{10}$
 s"



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3

12. f is a function such that $f(x) < 0$. The graph of the new function g defined by $g(x) = 1|f(x)|$ is a reflection of the graph of f

(A) on the y axis
(B) on the x axis
(C) on the line $y = x$
(D) on the line $y = -x$

13. f is a quadratic function whose graph is a parabola opening upward and has a vertex on the x -axis. The graph of the new function g defined by $g(x) = 2 - f(x - 5)$ has a range defined by the interval

(A) $[-5, +\infty)$
(B) $[2, +\infty)$
(C) $(-\infty, 2]$
(D) $(-\infty, 0]$

14. $\int_C \frac{z}{z-3} dz$ where C is the circle $|z| = 2$ is

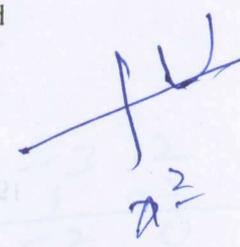
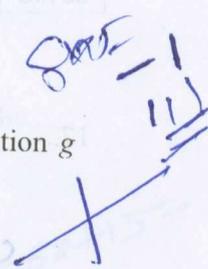
(A) 0
(B) 3
(C) 2
(D) 1

15. The residue of $\frac{z}{(z-1)(z-2)}$ at $z = 1$ is

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

16. If $f(z) = u + iv$ is analytic at a point, then which of the following is not true?

(A) $u_x = v_y$ at that point
(B) $u_y = v_x$ at that point
(C) $u_{xx} + u_{yy} = 0$ at that point
(D) u_x, u_y, v_x, v_y are continuous at that point



$z^2 = \text{may}$

$2 - 5$

Handwritten notes on the left margin: 5, 3, 2, 105, 15, 5, 10, 5.



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17. $1 + (\log x) + \frac{(\log x)^2}{2!} + \dots$ is

- (A) x
- (B) 1
- (C) e
- (D) $\frac{1}{x}$

$\frac{1}{3} + \frac{1}{3} e$

18. The series $\sum \frac{1}{2n+1}$ and $\sum \frac{1}{2n}$ are

- (A) both convergent
- (B) both divergent
- (C) convergent and divergent
- (D) divergent and convergent

X

19. The function $f(x) = |x|$ is

- (A) continuous for $x \geq 0$
- (B) discontinuous for all x
- (C) continuous for $x < 0$
- (D) continuous for all x

20. The graphs of the two equations $y = ax^2 + bx + c$ and $y = Ax^2 + Bx + C$, such that a and A have different signs and that the quantities $b^2 - 4ac$ and $B^2 - 4AC$ are both negative,

- (A) intersect at two points
- (B) intersect at one point
- (C) do not intersect
- (D) None of the above

21. The roots of the equations $x/(x+2) + 3/(x-4) = (4x+2)/(x^2-2x-8)$ are

- (A) $x = -4$ and $x = 1$
- (B) $x = 4$ only
- (C) $x = 1$ only
- (D) $x = -4$ only

$\frac{1}{3} + \frac{3}{-3} = \frac{6}{-9}$

$\frac{1}{3} - 1 = -\frac{2}{3}$

$-\frac{2}{3} = \frac{x_1}{4}$

$\frac{A}{x+2} + \frac{B}{x-4} = \frac{4x+2}{x^2-2x-8}$

$\frac{A}{x+2} + \frac{B}{x-4} = \frac{4x+2}{(x+2)(x-4)}$

$\frac{A}{x+2} + \frac{B}{x-4} = \frac{4x+2}{(x+2)(x-4)}$



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22. The quadratic equation whose roots are at $x = 3$ and $x = 5$ is given by

- (A) $(x-3)(x-5) = 1$
- (B) $(x+3)(x+5) - 9 = (x+3)(x+5) - 25$
- (C) $(x+3)(x+5) = 0$
- (D) $x^2 - 8x = -15$

$x^2 = 8x + 15$
 $x^2 - 8x + 15 = 0$

23. One root of the equation $x^3 - 3x + 2 = 0$ is 1. The other roots are

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

24. If $2^{3x-1} = 16$, then $x =$

- (A) $3/5$
- (B) $5/3$
- (C) 1
- (D) 4

$2^{3x-1} = 16$
 $2^{3x-1} = 2^4$
 $3x - 1 = 4$
 $3x = 5$
 $x = 5/3$

25. Which point is on the graph of the inverse of the function $f(x) = 10^{x+2}$?

- (A) (100, 0)
- (B) (0, 100)
- (C) (10, 0)
- (D) (0, 10)

$f(x) = 10^{x+2}$
 $f^{-1}(x) = 10^{x+2} = y$
 $10^{x+2} = y$
 $10^{x+2} - y = 0$
 $10^{x+2} - 100 = 0$
 $10^{x+2} = 100$
 $x+2 = 2$
 $x = 0$
 $f^{-1}(100) = 0$

26. If the hypotenuse of a right triangle is 10 inches long and one of its legs is 5 inches long, how long is the other leg?

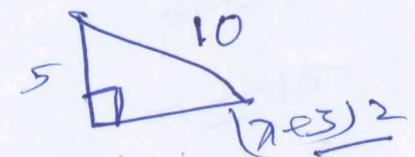
- (A) 5
- (B) $5\sqrt{3}$
- (C) $5\sqrt{5}$
- (D) 75

$10^2 = 5^2 + b^2$
 $100 = 25 + b^2$
 $75 = b^2$
 $b = \sqrt{75} = 5\sqrt{3}$

27. For all $x > 2$, $(2x^2 + 2x - 12)/(x - 2)$ simplifies to

- (A) $2(x-2)$
- (B) $x+3$
- (C) $2(x+3)(x-2)$
- (D) $2(x+3)$

$\frac{2x^2 + 2x - 12}{x - 2}$
 $\frac{2x^2 + 6x - 4x - 12}{x - 2}$
 $\frac{2x(x+3) - 4(x+3)}{x - 2}$
 $\frac{2x(x+3) - 4(x+3)}{x - 2}$
 $\frac{2x(x+3) - 4(x+3)}{x - 2}$
 $\frac{2x(x+3) - 4(x+3)}{x - 2}$



2-B
 2-y
 (2-x)



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28. If x and y are any real numbers such that $0 < x < 2 < y$, which of these must be true?

- (A) $x < (xy)/2 < y$ (B) $0 < xy < 2x$
(C) $x < xy < 2$ (D) $0 < xy < 2$

29. The period of the function $f(x) = \sin\left(x\frac{\pi}{6} + \frac{\pi}{4}\right)$ is equal to

- (A) 2π (B) 12
(C) $\frac{\pi}{6}$ (D) 6π

30. Which of the following is not an identity?

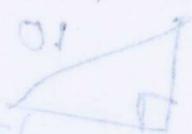
- (A) $\cot(x+y) = [1 + \cot(x)\cot(y)] / [\cot(x) + \cot(y)]$
(B) $\tan(x+y) = [\tan(x) + \tan(y)] / [1 - \tan(x)\tan(y)]$
(C) $\sin(x-y) = \sin(x)\cos(y) - \cos(x)\sin(y)$
(D) $\cos(2x) = 2\cos^2(x) - 1$

31. In a shipment of televisions, $1/50$ of the televisions are defective. What is the ratio of defective to non-defective televisions?

- (A) $1/200$ (B) $1/50$
(C) $1/49$ (D) $49/1$

32. The population of a country increased by an average of 2% per year from 2000 to 2003. If the population of this country was 2 000 000 on 31st December 2003, then the population of this country on 1st January 2000, to the nearest thousand would have been

- (A) 1 846 000 (B) 1 852 000
(C) 1 000 000 (D) 1 500 000





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33. There are 12 boys and 8 girls in a class, including a brother and sister. If two pupils are chosen at random from the class, then the probability that neither the brother nor sister are chosen is

(A) $\frac{14}{19}$ (B) $\frac{153}{190}$
(C) $\frac{189}{190}$ (D) $\frac{379}{380}$

12 B, 8 M

34. 10 percent of a large batch of light bulbs was defective. If a man bought three of the bulbs, then the probability that at least one was defective is

(A) $\frac{1}{1000}$ (B) $\frac{271}{1000}$
(C) $\frac{729}{1000}$ (D) $\frac{999}{1000}$

35. A school committee consists of 2 teachers and 4 students. The number of different committees that can be formed from 5 teachers and 10 students is

(A) 10 (B) 15
(C) 2100 (D) 8

2 T 4 S

$5C_2 \cdot 10C_4$

36. The mean of a data set is equal to 10 and its standard deviation is equal to 1. If we add 5 to each data value, then the mean and standard deviation become

(A) mean = 15, standard deviation = 6
(B) mean = 10, standard deviation = 6
(C) mean = 15, standard deviation = 1
(D) mean = 10, standard deviation = 1

$5C_2 \cdot 10C_4$

~~10~~

mean = 10

SD = 1

mean = 15

SD = 1

Handwritten notes on the left side of the page, including "1 + 1000" and "1000" with arrows pointing to the right.



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37. Five different books (A, B, C, D and E) are to be arranged on a shelf. Books C and D are to be arranged first and second starting from the right of the shelf. The number of different orders in which books A, B and E may be arranged is

- (A) 5!
- (B) 3!
- (C) 2!
- (D) 3! * 2!

3!

38. $\left[\frac{d}{dx}(\sin^2 x) \right]_{x=\frac{\pi}{2}}$ is

- (A) 0
- (B) $\frac{\pi}{2}$
- (C) 2
- (D) $\frac{1}{2}$

2 sin 2x
sin 2x

39. Determine $\lim_{x \rightarrow \infty} \left(\frac{-2x^3 + x}{-4x^5 + 2x^2 + 2} \right)$

- (A) ∞
- (B) 0
- (C) $\frac{1}{2}$
- (D) $\frac{3}{10}$

$\frac{-2x^3 + x}{-4x^5 + 2x^2 + 2}$

40. The inverse of $\begin{bmatrix} 1 & 1 \\ 2 & 3 \end{bmatrix}$ is

- (A) $\begin{bmatrix} 3 & 2 \\ 1 & 1 \end{bmatrix}$
- (B) $\begin{bmatrix} 3 & 1 \\ -2 & 1 \end{bmatrix}$
- (C) $\begin{bmatrix} 1 & -2 \\ -1 & 3 \end{bmatrix}$
- (D) $\begin{bmatrix} 1 & -1 \\ -3 & 2 \end{bmatrix}$

$\frac{-6A^2}{-40}$
 $\frac{-12A}{-160}$



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41. If f , g , h are functions from \mathbb{R} to \mathbb{R} defined by $f(x) = x+1$, $g(x) = x^2$, $h(x) = 2x+1$, then $(h \circ g \circ f)(2)$ is

- (A) 20
(C) 21
- (B) 19
(D) 22

$$(x+1)^2$$

$$2(2+1)^2 + 1$$

42. If $f(x)$ is an odd function, then $|f(x)|$ is

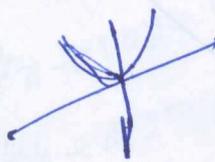
- (A) an odd function
(C) neither odd nor even
- (B) an even function
(D) even and odd

$$-2 + \frac{2}{25}$$

$$-40x^2$$

43. If α and β are roots of $x^2 + x + 2 = 0$, then $\alpha^3 + \beta^3$ is

- (A) 6
 (C) 5
- (B) -5
(D) 8



44. The equation $x^3 + 8 = 0$ has

- (A) no real roots
 (B) one real root and two complex roots
(C) all real roots
(D) None of the above



45. If 10% of Indians are rich, 30% of the rich are happy and 60% of the poor are unhappy, then the percentage of Indians who are poor and happy is

- (A) 36
(C) 44
- (B) 40
(D) 48

46. The number of integers between 1 and 98 that are relatively prime to 98 is

- (A) 56
(C) 49
- (B) 63
(D) 42

$$a^2 + a + 2$$

38

$$\alpha + \beta = -1$$

$$\alpha\beta = 2$$

$$-1(1-6)$$

$$\alpha + \beta = -1$$

$$\alpha^2 + \alpha\beta + \beta^2 = 1 - 2 = -1$$

$$(\alpha + \beta)(\alpha^2 + \beta^2 - \alpha\beta)$$

$$(\alpha + \beta)(\alpha + \beta)^2 - 3\alpha\beta$$

47. The set $A - (B \cup C)$ is equal to

(A) $(A - B) \cup C$

(B) $A \cap (B \cup C)$

(C) $(A - B) \cap (A - C)$

(D) $(A \cap B) - (A \cap C)$

48. If $f(x)$ is any function and $f^{-1}(x)$ is the inverse of $f(x)$, then

$f^{-1}(x)$ for $f(x) = \frac{1}{x} + 1$ is

(A) $\frac{1}{x+1}$

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

(C) $\frac{1}{x} - 1$

(D) $\frac{1}{1-x}$

49. Let $f(x) = x^3$

A region is bounded between the graphs of $y = -1$ and $y = f(x)$ for x between -1 and 0 , and between the graphs of $y = 1$ and $y = f(x)$ for x between 0 and 1 . Give an integral that corresponds to the area of this region.

(A) $\int_{-1}^1 (1 - x^3) dx$

(B) $\int_{-1}^1 2(1 - x^3) dx$

(C) $\int_{-1}^1 2(1 + x^3) dx$

(D) $\int_{-1}^1 (1 + x^3) dx$

50. Given that $5x^3 - 4xy - 2y^2 = 1$

Determine the change in y with respect to x .

(A) $\frac{15x^2 - 4}{-4 - 4y}$

(B) $\frac{15x^2 - 4y}{-4 - 4y}$

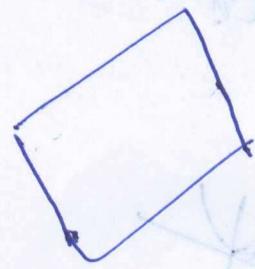
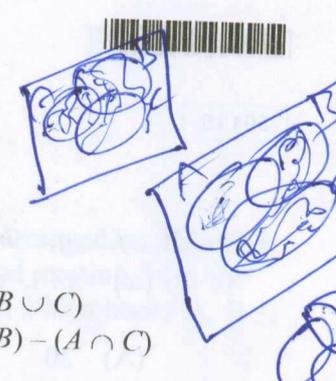
(C) $\frac{15x^2 - 4}{-4x - 4y}$

(D) $\frac{15x^2 - 4y}{-4x - 4y}$

Handwritten notes for question 50: $5x^3 = 1 + 4xy + 2y^2$, $\frac{d}{dx}(5x^3) = \frac{d}{dx}(1 + 4xy + 2y^2)$, $15x^2 = 4y + 4x \frac{dy}{dx} + 4y \frac{dy}{dx}$, $15x^2 = 4y + 4x \frac{dy}{dx} + 4y \frac{dy}{dx}$, $15x^2 - 4y = 4x \frac{dy}{dx} + 4y \frac{dy}{dx}$, $15x^2 - 4y = \frac{dy}{dx}(4x + 4y)$, $\frac{dy}{dx} = \frac{15x^2 - 4y}{4x + 4y}$

Handwritten note: $5x^3 - 4xy - 2y^2 = 1$

Handwritten notes for question 50: $y = 1$, $\int_{-1}^1 x^3 + \int_0^1 x^3$, $\int_{-1}^1 x^3 + \int_0^1 x^3$





51. For all real numbers x , the minimum value of $1+2\cos(4x)$ is

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

$-2+1$

52. If $x+4y=5$ and $5x+6y=7$, then $3x+5y$ is equal to

- (A) 12
- (B) 6
- (C) 4
- (D) 2

$1+2\cos 4x$

53. $\int_0^1 \int_0^1 xy \, dx \, dy$ is

- (A) $\frac{1}{2}$
- (B) 1
- (C) $\frac{1}{4}$
- (D) 2

$6x+10y=12$
 $3x+5y=6$

54. $\int_0^\infty xe^{-x^2} \, dx$ is

- (A) $\frac{1}{2}$
- (B) 2
- (C) 1
- (D) 0

$2(2\cos^2 2x - 1) + 1$

55. $L\{e^{-at} \cos bt\}$ is

- (A) $\frac{s-a}{(s-a)^2+b^2}$
- (B) $\frac{s+a}{(s+a)^2+b^2}$
- (C) $\frac{s+b}{(s+b)^2+a^2}$
- (D) $\frac{s-b}{(s-b)^2+a^2}$

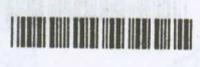
e^{-at}
 $-a^2 = t$

$dt = -2a dx$

$\frac{-dt}{2}$

$\frac{a^2}{2} \cdot e^{-a^2} - \int \frac{a^2}{2} \cdot e^{-a^2} / 2a$
[et]

$\frac{1}{2} \int_0^\infty -2a e^{-a^2}$
[e^{-a^2}]



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56. $L^{-1}\left\{\frac{s+2}{s^2+4s+13}\right\}$ is

- (A) $e^{2t} \sin 3t$
- (B) $e^{-2t} \sin 3t$
- (C) $e^{3t} \cos 2t$
- (D) $e^{-2t} \cos 2t$

57. $D^n(e^{ax})$ is

- (A) $\frac{e^{ax}}{a^n}$
- (B) $a^n e^{ax}$
- (C) ne^{ax}
- (D) e^{ax}

58. The mode of the data set {8, 9, 0, 9, 1, 4, 3, 7} is

- (A) 0
- (B) 9
- (C) 7
- (D) 4

59. If $10^{x/y} = A/B$, then

- (A) $x/y = \log A / \log B$
- (B) $y = x / (\log A - \log B)$
- (C) $x = y / (\log A + \log B)$
- (D) $y = x \log(A/B)$

60. The set of all multiples of 5 is closed under

- (A) addition, multiplication but not subtraction
- (B) addition, subtraction but not multiplication
- (C) multiplication and division but not addition
- (D) addition, subtraction and multiplication

61. The real solutions to the equation $\cos^2(x) - 1.5 \cos(x) = 1$ are given by the solutions to the equation

- (A) $\cos(x) = 1$
- (B) $\cos(x) = 2$
- (C) $\cos(x) = 1/2$
- (D) $\cos(x) = -1/2$

Handwritten notes:
 $x+y+z=15$
 $x+y+z=20$
 $(5, 10, 15)$
 $(5, 10, 15, 20)$
 $(5, 10, 15)$
 $(5, 10, 15, 20)$

Handwritten notes:
 $10^{xy} = A/B$
 $y \cdot 10 =$
 $y =$

Handwritten notes:
 $\cos^2 x - 3/2 \cos x - 1 =$
 $2 \cos^2 x - 3 \cos x - 2 =$
 $2 \cos^2 x - 4 \cos x + 2 =$
 $2 \cos x (\cos x - 2) +$



62. The remainder when $(2x^2 - 5x + 1)$ is divided by $(x - 1)$ is
- (A) -2 (B) 0
(C) 2 (D) 8
63. Angle A is an acute angle and $\sin(A) = 11/14$. What is the value of $\cos(A)$?
- (A) $3/14$ (B) $\sqrt{3}/14$
(C) $5\sqrt{3}/14$ (D) $\sqrt{3/14}$
64. The centroid of triangle with vertices $(2, 4)$, $(6, 4)$ and $(2, 0)$ is
- (A) $(\frac{10}{3}, \frac{8}{3})$ (B) $(5, 4)$
(C) $(\frac{5}{3}, \frac{4}{3})$ (D) $(5, \frac{2}{3})$
65. $\lim_{x \rightarrow 0} \frac{\sin 5x}{5x}$ is $\frac{1}{5}$.
- (A) 1 (B) $\frac{1}{5}$
(C) 5 (D) 0
66. Anil brought an article at Rs.200/- and sold it at a profit of 10%. If it was sold for Rs.230/-, then the increase in the percentage of profit is
- (A) 5 (B) 30
(C) 15 (D) 3
67. The three solutions of the equation $f(x) = 0$ are -4, 8 and 11. Therefore, the three solutions of the equation $f(2x) = 0$ are
- (A) -2, 4 and $11/2$ (B) -8, 16 and 22
(C) -4, 8 and 11 (D) 2, $19/2$ and $7/2$

$$\sqrt{1 - \frac{121}{196}}$$

$$\frac{196}{121}$$

$$\frac{4}{5}$$

$$\frac{513}{19}$$

$$\frac{110}{3}, \frac{81}{3}$$

$$\frac{230}{200} = 1.15$$

$$\frac{230}{200} = 1.15$$

$$\frac{230}{200} = 1.15$$

$$-8, 16, 22$$



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68. Which statement is not true?

- (A) $\cos(-x) = \cos(x)$
- (B) $\tan(-x) = \tan(x)$
- (C) the range of $y = 2\cos x$ is $[-2, 2]$
- (D) the range of $y = -5\sin(t)$ is given by $[-5, 5]$

69. The circumference of $(x+3)^2 + (y+5)^2 = 16$ is

- (A) 4π
- (B) 5π
- (C) 3π
- (D) 8π

70. If you drove at an average speed of 66 miles per hour, what distance, in miles, did you drive in 99 minutes?

- (A) 1.5
- (B) 0.7
- (C) 65.34
- (D) 108.9

71. A group of 7 friends are having lunch together. Each person eats at least $\frac{3}{4}$ of a pizza. What is the smallest number of whole pizzas needed for lunch?

- (A) 7
- (B) 5
- (C) 6
- (D) 28

72. The angle subtended by a diameter of a circle at a point on the circumference is

- (A) acute
- (B) a right angle
- (C) obtuse
- (D) reflex

73. Give $f(g(1))$, given that $f(x) = 2x + 2$, $g(x) = \frac{x}{2+x^2}$

- (A) $\frac{8}{9}$
- (B) $\frac{7}{3}$
- (C) 2
- (D) $\frac{4}{3}$

Handwritten notes and calculations:

For Q69: $2\pi \cdot 4$

For Q71: $7 \cdot \frac{3}{4} = \frac{21}{4} = 5 \frac{1}{4}$

For Q73: $g(1) = \frac{1}{2+1} = \frac{1}{3}$
 $f(\frac{1}{3}) = 2(\frac{1}{3}) + 2 = \frac{2}{3} + 2 = \frac{2}{3} + \frac{6}{3} = \frac{8}{3}$

Other scribbles include $\frac{2}{3} + 2$, $\frac{2}{3} + 2$, and $\frac{2}{4} + 2$.



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74. The value of x for which makes a minimum $3x^2 + 6x - 4$ is

- (A) -7
- (B) -4
- (C) -1
- (D) 5

Handwritten notes for Q74:

$$3(x^2 + 2x - 4/3)$$

$$3((x+1)^2 - 1 - 4/3)$$

75. If y varies directly as x and $y = 40$ when $x = 16$, then the value of y when $x = 6$ is

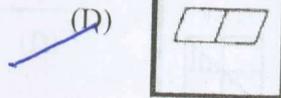
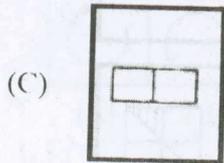
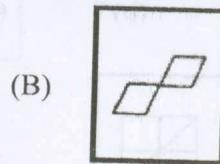
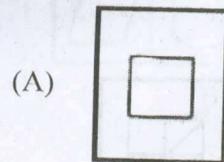
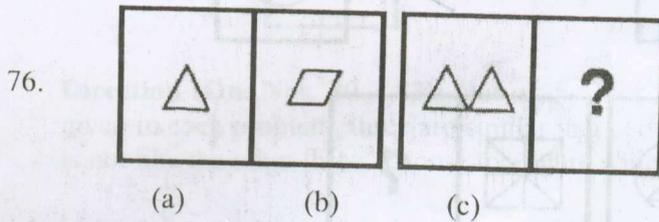
- (A) 2.5
- (B) 4
- (C) 15
- (D) 16

Handwritten notes for Q75:

$$y = kx$$

$$40 = k \cdot 16$$

Direction (Qn. Nos. 76 - 79): In each of the following questions, there is some relationship between the figures (a) and (b). The same relationship exists between the figure (c) and one of the four alternatives (A), (B), (C) and (D). Choose that figure alternative.



Handwritten notes for Q76:

$$k = \frac{40}{16} = \frac{5}{2}$$

$$= \frac{5}{2}$$

Handwritten notes for Q76:

$$y = \frac{5}{2} \cdot 6$$

$$=$$

Handwritten notes on the left margin:

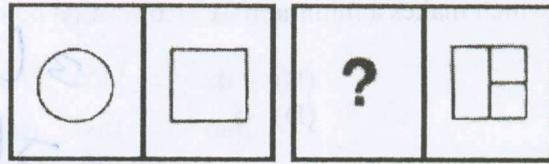
$$+2$$

$$-1$$



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77.

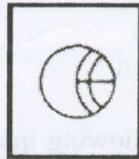


(a)

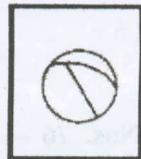
(b)

(c)

(A)



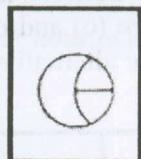
(B)



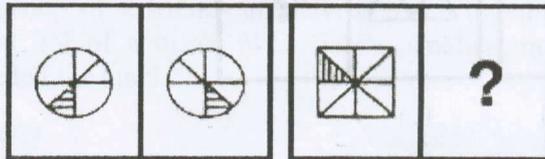
(C)



(D)



78.

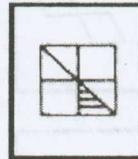


(a)

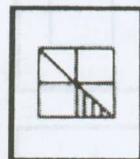
(b)

(c)

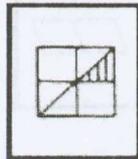
(A)



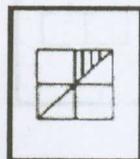
(B)



(C)



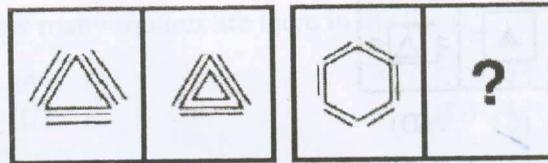
(D)



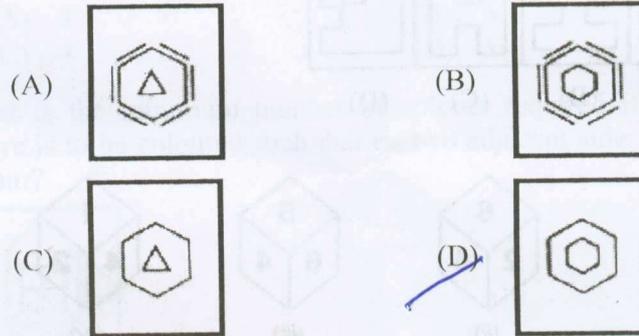


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79.

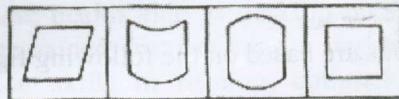


(a) (b) (c)



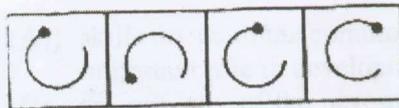
Direction (Qn. Nos. 80 – 83): Out of the four figures (A), (B), (C) and (D), given in each problem, three are similar in a certain way. However, one figure is not like the other three. Choose the figure which is different from the rest.

80.



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

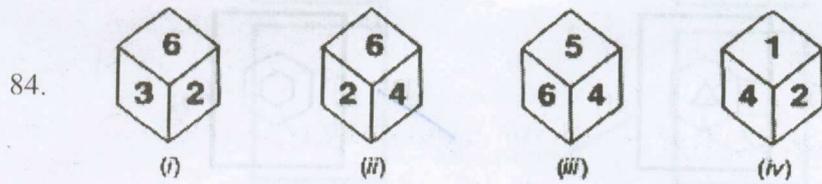
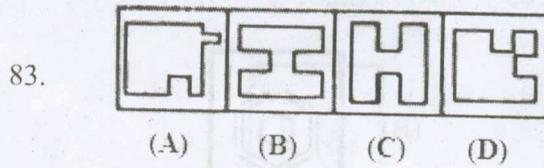
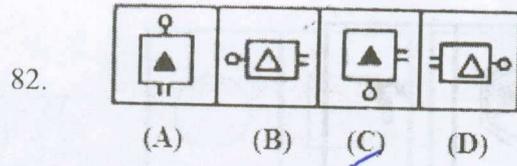
81.



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



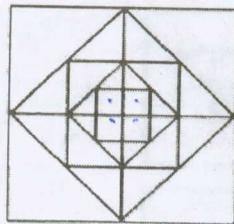
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Which number is on the face opposite to 6?

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

Direction (Qn. Nos. 85 – 87): Questions are based on the following figure.



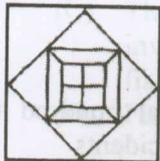
85. How many triangles are there in the figure?

- (A) 32 (B) 40
(C) 48 (D) 60



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86. How many squares are there in the figure?
(A) 13 (B) 15
(C) 16 (D) 17
87. How many minimum colours are required if the figure is to be coloured such that no two adjacent sides have the same colour?
(A) 2 (B) 3
(C) 4 (D) 5
88. What is the minimum number of colours required if the following figure is to be coloured such that no two adjacent sides have the same colour?



- (A) 2 (B) 3
(C) 4 (D) 5
89. Although most of the fastest growing jobs in today's economy will require a college degree, many of the new jobs being created—from home health aide to desktop publisher—require knowledge other than that gained from earning a degree. For workers in those jobs, good basic skills in reading, communication, and mathematics play an important role in getting a job and developing a career. From the information given above it can be validly concluded that, in today's economy,
- (A) skills in reading, communication, and mathematics play an important role in developing a career as a desktop publisher
(B) the majority of the new jobs being created require knowledge other than that gained from earning a college degree
(C) a job as a home health aide will rely more on communication skills than on basic skills in reading and mathematics
(D) if a job is one of the fastest growing jobs, it will require a college degree



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90. Sally has never received a violation from the Federal Aviation Administration during her 16-year flying career. Sally must be a great pilot.
Which of the following can be said about the reasoning above?
- (A) The definitions of the terms create ambiguity
 - (B) The argument uses circular reasoning
 - (C) The argument works by analogy
 - (D) The argument is built upon hidden assumptions
91. Cars are safer than planes. Fifty percent of plane accidents result in death, while only one percent of car accidents result in death.
Which of the following, if true, would most seriously weaken the argument above?
- (A) Planes are inspected more often than cars
 - (B) The number of car accidents is several hundred thousand times higher than the number of plane accidents
 - (C) Pilots never fly under the influence of alcohol, while car drivers often do
 - (D) Plane accidents are usually the fault of air traffic controllers, not pilots
92. Dear Editor: I feel obliged to comment on the unfair review you published last week written by Mr. Robert Duxbury. Your readers should know that Mr. Duxbury recently published his own book that covered the same topic as my book, which you asked him to review. It is regrettable that Mr. Duxbury should feel the need to belittle a competing work in the hope of elevating his own book.
The author of the letter above makes her point by employing which method of argument?
- (A) Attacking the motives of the author of the unfavorable review
 - (B) Attacking the book on the same topic written by the author of the review
 - (C) Contrasting her own book with that written by the author of the review
 - (D) Questioning the judgment of the author of the unfavorable review



93. Russia's aggressive fishing in the prime fishing grounds of the Northern Pacific has led to a sharp decline in the populations of many fish and a general increase in the retail price of fish. This same pattern has occurred with far too many of our scarce vital natural resources, resulting in high prices for many products. It is likely then, that fish prices will continue to rise in the near future.

In making the argument above, the author relies on all of the following assumptions except

- (A) The scarcity of fish is a determining factor in its price
- (B) Fishing practices can substantially influence the demand for fish
- (C) There will not be any substantial decrease in other costs involved in the fishing process that could keep the price of fish from increasing
- (D) Fish populations will not recover in the near future

94. There has been a sharp increase in the subscription prices of many professional and scholarly journals in the past seven years. Many publishers ascribe the necessity for these increases to the easy availability of photocopying facilities, which enable people simply to copy the articles they want rather than buying the journal.

Which of the following, if it is true, would make this explanation more plausible?

- (A) The great majority of professional and scholarly journals have a massive backlog of papers awaiting publication
- (B) Over the past five years there has been a substantial decline in the number of individual subscriptions to professional and scholarly journals, while library subscriptions have remained fairly stable
- (C) In the five years immediately preceding the price surge, there was a substantial decline in the number of individual subscriptions to professional and scholarly journals, while library subscriptions remained fairly stable
- (D) Many libraries have recently begun cutting back on subscriptions to professional and scholarly journals



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Direction (Qn. Nos. 95 – 97): The following questions consist of two words each that have a certain relationship to each other, followed by four pairs of words. Select the pair that has the same relationship as the original pair of words.

95. Read : Legible

- (A) Hear : Audible (B) Qualify : Eligible
(C) See : Illegible (D) Require : Admissible

96. Preamble : Constitution

- (A) Word : Dictionary (B) Contents : Magazine
(C) Explanation : Poetry (D) Preface : Book

97. Sailor : Pirate

- (A) Police : Robbers (B) Lion : Lamb
(C) Plant : Fungus (D) Major : Sepoy

Direction (Qn. Nos. 98 – 103): Each of the analogy questions below consists of two words that have a certain relationship to each other, followed by four pairs of related words. Select the pair of words which has the same relationship.

98. ANGLE : DEGREE

- (A) Area : Square inch (B) Milk : Quart
(C) Society : Classes (D) Letter : Alphabet

99. ZOOLOGY : ANIMALS

- (A) Ecology : Pollution (B) Botany : Plants
(C) Chemistry : Atoms (D) History : People

100. SAW : CARPENTER

- (A) Scissors : Tailor (B) Wagon : Farmer
(C) Brush : Painter (D) Typewriter : Author



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101. LURK : WAIT

- (A) Boost : Elevate (B) Deplete : Drain
(C) Abscond : Depart (D) Bilk : Cheat

102. ALCHEMY : SCIENCE

- (A) Nostrum : Remedy (B) Sideshow : Carnival
(C) Ploy : Tactic (D) Forgery : Imitation

103. NEEDLE : KNIT

- (A) Bait : Fish (B) Match : Fire
(C) Loom : Weave (D) Soap : Wash

Direction (Qn. Nos. 104 – 106): Find the odd one out in the following:

104.

- (A) Chennai (B) Thiruvananthapuram
(C) Kolkata (D) Pune

105.

- (A) 121 (B) 100
(C) 64 (D) 48

106.

- (A) Pitch (B) Umpire
(C) Golf (D) Run

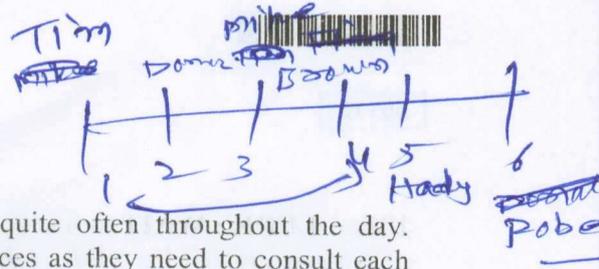
Direction (Qn. Nos. 107 – 110): Answer the questions based on the following information.

An employee has been assigned the task of allotting offices to six of the staff members. The offices are numbered 1 – 6. The offices are arranged in a row and they are separated from each other by six foot high dividers. Hence voices, sounds and cigarette smoke flow easily from one office to another.

Miss Roberts needs to use the telephone quite often throughout the day. Mr. Mike and Mr. Brown need adjacent offices as they need to consult each other often while working. Miss Hardy is a senior employee and has to be allotted the office number 5, having the biggest window. Mr. Donald requires silence in the offices next to his. Mr. Tim, Mr. Mike and Mr. Donald are all smokers. Miss Hardy finds tobacco smoke allergic and consecutively the offices next to hers to be occupied by non-smokers. Unless specifically stated all the employees maintain an atmosphere of silence during office hours.

107. The ideal candidate to occupy the office furthest from Mr. Brown would be
- (A) Miss Hardy (B) Mr. Mike
(C) Mr. Tim (D) Mr. Donald
108. The three employees who are smokers should be seated in the offices
- (A) 1, 2 and 4 (B) 2, 3 and 6
(C) 1, 3 and 4 (D) 1, 2 and 3
109. The ideal office for Mr. Mike would be
- (A) 2 (B) 6
(C) 1 (D) 3
110. In the event of what occurrence, within a period of one month since the assignment of the offices, would a request for a change in office be put forth by one or more employees?
- (A) Mr. Tim taking over the duties formerly taken care of by Miss Roberts
(B) The installation of a noisy teletype machine by Miss Hardy in her office
(C) Miss Roberts needing silence in the office(s) next to her own
(D) Mr. Brown suffering from laryngitis

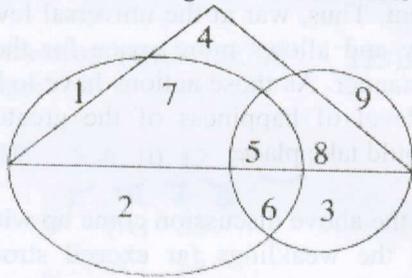
Tim Mike & Brown





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Direction (Qn. Nos. 111 – 115): The following five questions are based on the following diagram in which the triangle represents female graduates, small circle represents self-employed females and the big circle represents self-employed females with bank loan facility. Numbers are shown in the different sections of the diagram. On the basis of these numbers, answer the following.



111. How many female graduates are self-employed?
(A) 12 (B) 13
(C) 15 (D) 20
112. How many female graduates are not self-employed?
(A) 4 (B) 10
(C) 12 (D) 15
113. How many non-graduate females are self-employed?
(A) 9 (B) 11
(C) 12 (D) 21
114. How many self-employed female graduates are with bank loan facility?
(A) 5 (B) 7
(C) 12 (D) 20
115. How many non-graduate self-employed females are with bank loan facility?
(A) 3 (B) 8
(C) 9 (D) 12



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Direction (Qn. Nos. 116 and 117): Answer the following based on the paragraphs given.

116. Successfully adjusting to one's environment leads to happiness. War at a universal level war destroys the weaker people, who are the most unable to adjust to their environment. Thus, war at the universal level puts weaklings out of their misery and allows more space for their predators to enjoy life in a better manner. As those actions have to be performed, which maximize the level of happiness of the greatest number, war at a universal level should take place.

What response would the author of the above discussion come up with, in the case of the objection that the weaklings far exceed strong people?

- I. He would respond with the statement that the person making the objection is a weakling.
- II. He would respond by saying that weaklings will be miserable no matter what happens.
- III. He would respond with the statement that the strong would be frustrated if the weaklings are destroyed.

- (A) II and III only (B) III only
(C) I and II only (D) I only

117. Come back with us to the real America leaving behind the turmoil of civilisation. The real America is still inhabited by the eagle, the buffalo, the mountain lion and elk; it is still spacious, sprawling and majestic. Experience the freedom and serenity still to be found in.....

Choose the best option to complete the above statement

- (A) the natural beauty of our land
(B) the fascinating urban centers
(C) the wild terrain of Africa
(D) one's own subconscious



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118. Look at this series: 65, 50, 37, 26, __, 10. What number should fill the blank?

$\frac{15}{13} \frac{11}{9}$

- (A) 15
- (B) 17
- (C) 19
- (D) 11

Direction (Qn. Nos. 119 – 123): Which number can replace the question mark?

119. 5, 6, 10, 12, 20, ?

$\frac{1}{2} \frac{2}{3} \frac{2}{5}$

- (A) 22
- (C) 26

- (B) 24
- (D) 28

$\frac{1}{2} \frac{2}{3} \frac{2}{5}$
5, 6, 10, 12, 20, 65.

120. 1, 2, 9, 28, 65, ?

$\frac{1}{1} \frac{2}{4} \frac{9}{8} \frac{28}{16}$

- (A) 108
- (C) 116

- (B) 124
- (D) 126

121. 2, 3, 10, 15, 26, 35, ?

$\frac{1}{1} \frac{2}{4} \frac{9}{8} \frac{28}{16} \frac{32}{16}$

- (A) 50
- (C) 48

- (B) 49
- (D) 45

1, 7, 5, 11, 9
 $0^2+1, 1^2+1, 2^2+1$

122. 3, 5, 7, 9, 11, 13, 15, 17, ?

- (A) 14
- (C) 15

- (B) 19
- (D) 21

$0^2+1, 1^2+1, 2^2+1, 3^2+1, 4^2+1$

123. 14, 316, 536, 764, ?

- (A) 9100
- (C) 8100

- (B) 98
- (D) 1048

14, 316, 536, 764

$\frac{196}{14}$
3021
 $\frac{36}{316}$
 $\frac{220}{220}$



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Direction (Qn. Nos. 124 – 129): Complete the last two terms.

124. 64, 32, 16, 8, ?, ?

- (A) 0, 1/8
- (B) 1, 4
- (C) 4, 2
- (D) 4, 1

125. A, B, D, ?, ?

- (A) H, P
- (B) F, H
- (C) H, Z
- (D) O, P

126. 2, 5, 4, 9, 8, 15, ?, ?

- (A) 13, 22
- (B) 14, 23
- (C) 13, 23
- (D) 14, 22

127. 15, 9, 22, 18, 29, 27, ?, ?

- (A) 36, 37
- (B) 37, 37
- (C) 35, 36
- (D) 36, 36

128. $\frac{2}{3}, 1\frac{1}{3}, 2, 2\frac{2}{3}, 3\frac{1}{3}, ?, ?$

- (A) $3, 3\frac{2}{3}$
- (B) $4, 4\frac{2}{3}$
- (C) $3, 4\frac{2}{3}$
- (D) $4, 3\frac{2}{3}$

129. $2, 1/2, 5, 1/5, 8, ?, ?$

- (A) 1/8, 8
- (B) 1/9, 12
- (C) 1/8, 11
- (D) 1/2, 12

A, B, D, E, F

$\frac{2}{3}, \frac{3}{3}, 2, \frac{4}{3}$

$\frac{2}{3}, 1\frac{1}{3}, 2, 2\frac{2}{3}$

$\frac{2}{3}, \frac{4}{3}, \frac{8}{3}, \frac{10}{3}$
 $\frac{12}{3}, \frac{14}{3}$

4,



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130. If BANK is coded as DCPM, then BOOK is coded as
 (A) MPGK (B) DQQM
 (C) DQQN (D) CQQL
131. If PUNJ is coded as NSLH, then SINDH is coded as
 (A) BLGOF (B) QGLBF
 (C) FBLGO (D) GQFLB
132. If ZXGLI and YLLP stand for ACTOR and BOOK, respectively, then PENCIL will be written as
 (A) KUMXRO (B) IGTWXX
 (C) KUMRXO (D) KUMXOR
133. If BAD is coded as EDG, how is the word WHITE coded?
 (A) NPLKJ (B) GRSUV
 (C) KEMPP (D) ZKLWH
134. If A = 1, BAN = 17, then INDIA = ?
 (A) 37 (B) 39
 (C) 36 (D) 35
135. If ROME = 7248, then MORE = ?
 (A) 2748 (B) 4278
 (C) 4178 (D) 4872

ZXGLI - ACTOR
YLLP - BOOK

KUMXRO

WHITE
24

201-14

9 + 14 + 4 + 3 + 1

136. Everything that a person does, which is dictated by reason of ignorance is not voluntary. Involuntary actions are those which produce pain and repentance. In case a man has done something in his ignorance and he does not feel vexed due to his action, he has not acted voluntarily as he was not aware of what he was doing, nor yet involuntarily since he is not pained.



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After reading this passage we can arrive at the conclusion that

- (A) a person is not a voluntary agent, if he acts by reason of ignorance and repents
- (B) if an action is done by reason of ignorance and is not voluntary, then it was repented
- (C) a man is an involuntary agent, if he acts by reason of ignorance
- (D) if a man is not a voluntary agent, then he acted by reason of ignorance and repents

137. Oar is to rowboat as foot is to

- (A) running
- (B) sneaker
- (C) skateboard
- (D) jumping

138. Window is to pane as book is to

- (A) novel
- (B) glass
- (C) cover
- (D) page

139. Artist is to painting as senator is to

- (A) attorney
- (B) law
- (C) politician
- (D) constituents

140. Play is to actor as concert is to

- (A) symphony
- (B) musician
- (C) piano
- (D) percussion

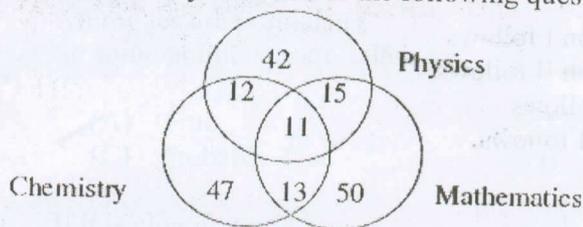
141. Elated is to despondent as enlightened is to

- (A) aware
- (B) ignorant
- (C) miserable
- (D) tolerant



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Direction (Qn. Nos. 142 - 144): The diagram given below shows the number of students who got distinction in three subjects out of 500 students. Study the diagram carefully and answer the following questions.



142. What is the percentage of students who got distinction in two subjects?
- (A) 8% (B) 9%
(C) 10% (D) 12%
143. What is the percentage of students who got distinction?
- (A) 28% (B) 35%
(C) 38% (D) 40%
144. The percentage of students with distinction marks in Mathematics is
- (A) 17.8% (B) 18.6%
(C) 19.2% (D) 20.6%

Direction (Qn. Nos. 145 - 147): Two statements 1 and 2 are given. Two conclusions I and II are given. You have to take the given two statements to be true even if they seem to be at variance from commonly known facts. Read the following conclusions and then decide which of the given conclusions logically follows from the two given statements, disregarding commonly known facts. Give answer (A) if only conclusion I follows (B) if only conclusion II follows (C) if either I or II follows (D) if neither I nor II follows.

145. Statements:
- 1) All apples are oranges
 - 2) Some oranges are papayas



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Conclusions:

- I. Some apples are papayas
- II. Some papayas are apples

- (A) Only conclusion I follows
- (B) Only conclusion II follows
- (C) Either I or II follows
- (D) Neither I nor II follows

146. Statements:

- 1) All windows are needles
- 2) Some trees are windows

Conclusions:

- I. Some trees are needles ✓
- II. Some trees are not needles

- (A) Only conclusion I follows
- (B) Only conclusion II follows
- (C) Either I or II follows
- (D) Neither I nor II follows

147. Statements:

- 1) Some nurses are nuns
- 2) Madhu is a nun

Conclusions:

- I. Some nuns are nurses ✓
- II. Some nurses are not nuns

- (A) Only conclusion I follows
- (B) Only conclusion II follows
- (C) Either I or II follows
- (D) Neither I nor II follows



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Direction (Qn. Nos. 148 and 149): Determine whether in each of the following arguments, the inference is True, False, Probably True or Probably False.

148. All saints are rogues.
All rogues are politicians.
So some politicians are saints.

- (A) True
- (B) False
- (C) Probably True
- (D) Probably False

149. If it is cloudy it will rain.
But it is not cloudy.
So it will not rain.

- (A) True
- (B) False
- (C) Probably True
- (D) Probably False

Direction (Qn. No. 150): In the following question, find out which of the figures (A), (B), (C) and (D) can be formed from the pieces given in (X).

