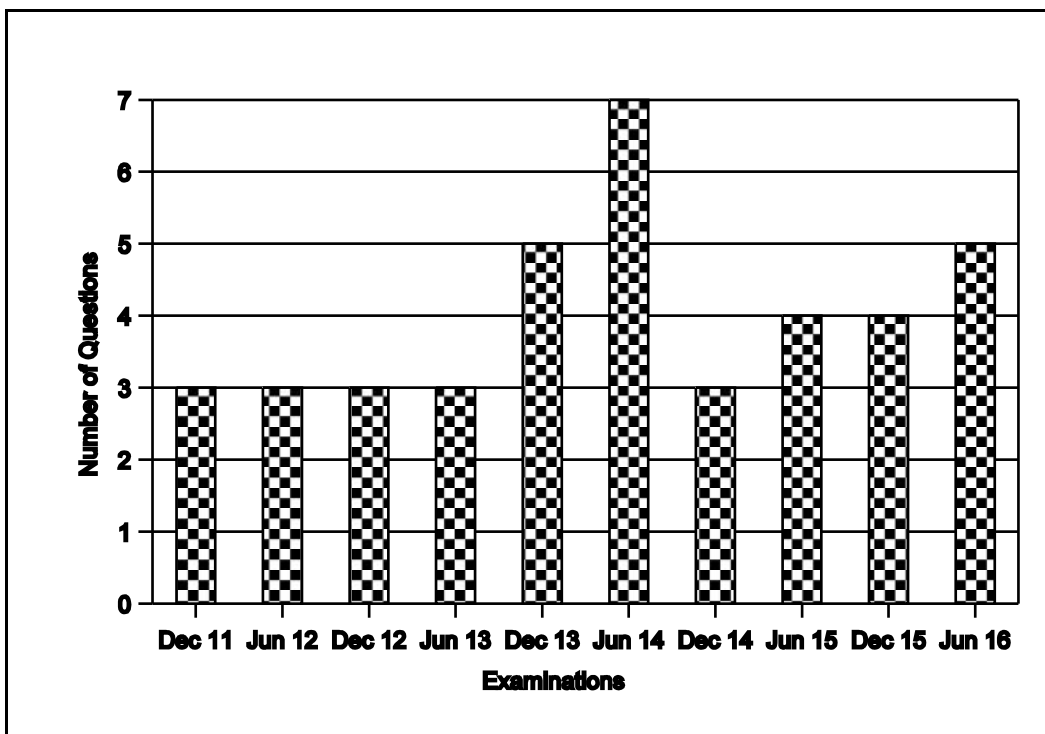


CHAPTER	<h1 style="margin: 0;">1</h1> <h2 style="margin: 0;">Ratio and Proportion, Indices and Logarithm</h2>
1	



2006 – November

- [1] Two numbers are in the ratio 2 : 3 and the difference of their squares is 320. The numbers are :
- (a) 12, 18
 - (b) 16, 24
 - (c) 14, 21
 - (d) None.

[2] If $p : q$ is the sub-duplicate ratio of $p - x^2 : q - x^2$, then x^2 is :

- (a) $\frac{p}{p + q}$
- (b) $\frac{q}{p + q}$
- (c) $\frac{qp}{p - q}$
- (d) None.

- [3] An alloy is to contain copper and zinc in the ratio 9 : 4. The zinc required to melt with 24 kg of copper is :
- (a) $10\frac{2}{3}$ kg
 (b) $10\frac{1}{3}$ kg
 (c) $9\frac{2}{3}$ kg
 (d) 9 kg
- [4] $7 \log \left(\frac{16}{15} \right) + 5 \log \left(\frac{25}{24} \right) + 3 \log \left(\frac{81}{80} \right)$ is equal to :
- (a) 0
 (b) 1
 (c) $\log 2$
 (d) $\log 3$
- [5] Two numbers are in the ratio 7 : 8. If 3 is added to each of them, their ratio becomes 8 : 9. The numbers are :
- (a) 14, 16
 (b) 24, 27
 (c) 21, 24
 (d) 16, 18
- [6] A box contains ₹ 56 in the form of coins of one rupee, 50 paise and 25 paise. The number of 50 paise coin is double the number of 25 paise coins and four times the numbers of one rupee coins. The numbers of 50 paise coins in the box is :
- (a) 64
 (b) 32
 (c) 16
 (d) 14
- [7] Value of $(a^{1/8} + a^{-1/8})(a^{1/8} - a^{-1/8})(a^{1/4} + a^{-1/4})(a^{1/2} + a^{-1/2})$ is :
- (a) $a + \frac{1}{a}$
 (b) $a - \frac{1}{a}$
 (c) $a^2 + \frac{1}{a^2}$
 (d) $a^2 - \frac{1}{a^2}$
- [8] The value of the expression :
 $a^{\log_b b} \cdot \log_c^c \cdot \log_d^d \cdot \log_4 t$
- (a) t
 (b) abcdt
 (c) (a + b + c + d + t)
 (d) None.
- [9] If $\log_{10000} x = \frac{-1}{4}$, then x is given by:
- (a) $\frac{1}{100}$
 (b) $\frac{1}{10}$
 (c) $\frac{1}{20}$
 (d) None of these.

2007 – February

2007 – May

[10] Eight people are planning to share equally the cost of a rental car. If one person withdraws from the arrangement and the others share equally entire cost of the car, then the share of each of the remaining persons increased by :

- (a) 1/9
 (b) 1/8
 (c) 1/7
 (d) 7/8

[11] A bag contains ₹ 187 in the form of 1 rupee, 50 paise and 10 paise coins in the ratio 3:4:5. Find the number of each type of coins :

- (a) 102, 136, 170
 (b) 136, 102, 170
 (c) 170, 102, 136
 (d) None

[12] Simplification of $\frac{x^{m+3n} \cdot x^{4m-6n}}{x^{6m-6n}}$ is :

- (a) x^m
 (b) x^{-m}
 (c) x^n
 (d) x^{-n}

[13] If $\log(2a - 3b) = \log a - \log b$, then $a =$:

- (a) $\frac{3b^2}{2b-1}$
 (b) $\frac{3b}{2b-1}$
 (c) $\frac{b^2}{2b+1}$
 (d) $\frac{3b^2}{2b+1}$

2007 – August

[14] On simplification

$$\frac{1}{1+z^{a-b}+z^{a-0}} + \frac{1}{1+z^{b-0}+z^{b-a}} + \frac{1}{1+z^{0-a}+z^{0-b}}$$

reduces to :

- (a) $\frac{1}{z^{2(a+b+c)}}$
 (b) $\frac{1}{z^{(a+b+c)}}$
 (c) 1
 (d) 0

[15] Ratio of earnings of A and B is 4 : 7.

If the earnings of A increase by 50% and those of B decrease by 25%, the new ratio of their earning becomes 8 : 7. What is A's earning ?

- (a) ₹ 21,000
 (b) ₹ 26,000
 (c) ₹ 28,000
 (d) Data inadequate

[16] P, Q and R are three cities. The ratio of average temperature between P and Q is 11 : 12 and that between P and R is 9 : 8. The ratio between the average temperature of Q and R is :

- (a) 22 : 27
 (b) 27 : 22
 (c) 32 : 33
 (d) None.

[17] $\frac{1}{\log_{ab}(abc)} + \frac{1}{\log_{bc}(abc)} + \frac{1}{\log_{ca}(abc)}$ is

equal to :

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

[18] Number of digits in the numeral for 2^{64} . [Given $\log 2 = 0.30103$]:

- (a) 18 digits
- (b) 19 digits
- (c) 20 digits
- (d) 21 digits

2007 – November

[19] ₹ 407 are to be divided among A, B and C so that their shares are in the ratio $\frac{1}{4} : \frac{1}{5} : \frac{1}{6}$. The respective

shares of A, B, C are :

- (a) ₹ 165, ₹ 132, ₹ 110
- (b) ₹ 165, ₹ 110, ₹ 132
- (c) ₹ 132, ₹ 110, ₹ 165
- (d) ₹ 110, ₹ 132, ₹ 165.

[20] The incomes of A and B are in the ratio 3 : 2 and their expenditures in the ratio 5 : 3. If each saves ₹ 1,500, then B's income is :

- (a) ₹ 6,000
- (b) ₹ 4,500
- (c) ₹ 3,000
- (d) ₹ 7,500

[21] If $4^x = 5^y = 20^z$ then z is equal to :

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

[22] $\left(\frac{\sqrt{3}}{9}\right)^{62} \left(\frac{9}{3\sqrt{3}}\right)^{72} \times 9$ is equal to :

- (a) 1
- (b) $\sqrt{3}$
- (c) $3\sqrt{3}$
- (d) $\frac{3}{9\sqrt{3}}$

[23] The value $\frac{\log_3 8}{\log_3 16 \cdot \log_4 10}$ is :

- (a) $3 \log_{10} 2$
- (b) $7 \log_{10} 3$
- (c) $3 \log_e z$
- (d) None.

2008 – February

[24] In 40 litres mixture of glycerine and water, the ratio of glycerine and water is 3:1. The quantity of water added in the mixture in order to make this ratio 2:1 is:

- (a) 15 litres
- (b) 10 litres
- (c) 8 litres
- (d) 5 litres

[25] The third proportional between $(a^2 - b^2)$ and $(a+b)^2$ is :

- (a) $\frac{a+b}{a-b}$
- (b) $\frac{a-b}{a+b}$
- (c) $\frac{(a-b)^2}{a+b}$
- (d) $\frac{(a+b)^3}{a-b}$

[26] If $2^x - 2^{x-1} = 4$ then x^x is equal to :

- (a) 7
(b) 3
(c) 27
(d) 9

[27] If $x = \frac{e^n - e^{-n}}{e^n + e^{-n}}$, then the value of n is:

- (a) $\frac{1}{2} \log_e \frac{1+x}{1-x}$
(b) $\log_e \frac{1+x}{1-x}$
(c) $\log_e \frac{1-x}{1+x}$
(d) $\log_e \frac{1-x}{1+x}$

[28] $\log 144$ is equal to :

- (a) $2 \log 4 + 2 \log 2$
(b) $4 \log 2 + 2 \log 3$
(c) $3 \log 2 + 4 \log 3$
(d) $3 \log 2 - 4 \log 3$

2008 – June

[29] In what ratio should tea worth ₹ 10 per kg be mixed with tea worth ₹ 14 per kg, so that the average price of the mixture may be ₹ 11 per kg?

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

[30] The ages of two persons are in the ratio 5:7. Eighteen years ago their ages were in the ratio of 8:13, their present ages (in years) are :

- (a) 50, 70
(b) 70, 50
(c) 40, 56
(d) None

[31] If $x = y^a$, $y = z^b$ and $z = x^c$ then abc is:

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

[32] If $\log_2 [\log_3 (\log_2 x)] = 1$, then x equals :

- (a) 128
(b) 256
(c) 512
(d) None

2008 – December

[33] If $\log \left(\frac{a+b}{4} \right) = \frac{1}{2} (\log a + \log b)$

then:

$$\frac{a}{b} + \frac{b}{a}$$

- (a) 12
(b) 14
(c) 16
(d) 8

[34] If A, B and C started a business by investing ₹ 1,26,000, ₹ 84,000 and ₹ 2,10,000. If at the end of the year profit is ₹ 2,42,000 then the share of each is :

- (a) 72,600, 48,400, 1,21,000
(b) 48,400, 1,21,000, 72,600
(c) 72,000, 49,000, 1,21,000
(d) 48,000, 1,21,400, 72,600

2009 – June

[35] If $\frac{p}{q} = -\frac{2}{3}$ then the value of $\frac{2p+q}{2p-q}$

is :

- (a) 1
- (b) -1/7
- (c) 1/7
- (d) 7

[36] Fourth proportional to x, 2x, (x+1) is:

- (a) (x+2)
- (b) (x-2)
- (c) (2x+2)
- (d) (2x-2)

[37] If $x = 3^{1/3} + 3^{-1/3}$ then find value of

$$3x^3 - 9x$$

- (a) 3
- (b) 9
- (c) 12
- (d) 10

[38] Find the value of :

$$[1 - \{1 - (1 - x^2)^{-1}\}^{-1}]^{-1/2}$$

- (a) 1/x
- (b) x
- (c) 1
- (d) None of these

[39] $\log(m+n) = \log m + \log n$, m can be expressed as :

- (a) $m = \frac{n}{n-1}$
- (b) $m = \frac{n}{n+1}$
- (c) $m = \frac{n+1}{n}$
- (d) $m = \frac{n+1}{n-1}$

[40] $\log_4(x^2 + x) - \log_4(x+1) = 2$.

Find x

- (a) 16
- (b) 0
- (c) -1
- (d) None of these

2009 – December

[41] $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$

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

[42] If $2^x \times 3^y \times 5^z = 360$ Then what is the value of x, y, z.?

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

[43] Find the value of

$$[\log_{10}\sqrt{25} - \log_{10}(2^3) + \log_{10}(4)^2]^x$$

- (a) x
- (b) 10
- (c) 1
- (d) None

2010 – June

[44] Same as Q 26 Feb. 2008

[45] If $\log_a b + \log_a c = 0$ then

- (a) $b = c$
- (b) $b = -c$
- (c) $b = c = 1$
- (d) b and c are reciprocals.

[46] What must be added to each term of the ratio 49 : 68, so that it becomes 3 : 4 ?

- (a) 3
(b) 5
(c) 8
(d) 9

[47] The students of two classes are in the ratio 5 : 7, if 10 students left from each class, the remaining students are in the ratio of 4 : 6 then the number of students in each class is:

- (a) 30, 40
(b) 25, 24
(c) 40, 60
(d) 50, 70

2010 – December

[48] The value of $2 \log x + 2 \log x^2 + 2 \log x^3 + \dots + 2 \log x^n$ will be :-

- (a) $\frac{n(n+1) \log x}{2}$
(b) $n(n+1) \log x$
(c) $n^2 \log x$
(d) None of these

[49] The recurring decimal 2.7777..... can be expressed as

- (a) 24/9
(b) 22/9
(c) 26/9
(d) 25/9

[50] Solve :

$$\left(\frac{\log_{10} x - 3}{2} \right) + \left(\frac{11 - \log_{10} x}{3} \right) = 2$$

- (a) 10^{-1}
(b) 10^2
(c) 10
(d) 10^3

[51] If A:B= 2:5, then (10A + 3B):(5A+2B) is equal to

- (a) 7:4
(b) 7:3
(c) 6:5
(d) 7:9

2011 – June

[52] If $n = m!$ where ('m' is a positive integer > 2) then the value of :

$$\frac{1}{\log_2 n} + \frac{1}{\log_3 n} + \frac{1}{\log_4 n} + \dots + \frac{1}{\log_m n}$$

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

[53] In a film shooting, A and B received money in a certain ratio and B and C also received the money in the same ratio. If A gets ₹ 1,60,000 and C gets ₹ 2,50,000. Find the amount received by B ?

- (a) ₹ 2,00,000
(b) ₹ 2,50,000
(c) ₹ 1,00,000
(d) ₹ 1,50,000

2011 – December

[54] The ratio Compounded of 4:5 and sub-duplicate of "a":9 is 8:15. Then Value of "a" is

- (a) 2
(b) 3
(c) 4
(d) 5

[55] If $\log_2 x + \log_4 x = 6$, then the Value of x is

- (a) 16
- (b) 32
- (c) 64
- (d) 128

[56] If X Varies inversely as square of Y and given that Y = 2 for X = 1, then the Value of X for Y = 6 will be

- (a) 3
- (b) 9
- (c) 1/3
- (d) 1/9

2012 – June

[57] The value of $\frac{(3^{n+1} + 3^n)}{(3^{n+3} - 3^{n+1})}$ is equal to

- (a) 1/5
- (b) 1/6
- (c) 1/4
- (d) 1/9

[58] If $\log_x y = 100$ and $\log_2 x = 10$, then the value of 'y' is :

- (a) 2^{10}
- (b) 2^{100}
- (c) $2^{1,000}$
- (d) $2^{10,000}$

[59] Which of the numbers are not in proportion ?

- (a) 6, 8, 5, 7
- (b) 7, 14, 6
- (c) 18, 27, 12, 18
- (d) 8, 6, 12, 9

2012 – December

[60] Find the value of x, if $x(x)^{1/5} = (x^{1/5})^x$

- (a) 3
- (b) 4
- (c) 2
- (d) 6

[61] Which of the following is true.

$$\text{If } \frac{1}{ab} + \frac{1}{bc} + \frac{1}{ca} = \frac{1}{abc}$$

- (a) $\log(ab + bc + ca) = abc$
- (b) $\log\left(\frac{1}{a} + \frac{1}{b} + \frac{1}{c}\right) = abc$
- (c) $\log(abc) = 0$
- (d) $\log(a + b + c) = 0$

[62] Find two numbers such that mean proportional between them is 18 and third proportional between them is 144

- (a) 9, 36
- (b) 8, 32
- (c) 7, 28
- (d) 6, 24

2013 – June

[63] For what value of x, the equation

$$(\log_{\sqrt{x}} 2)^2 = \log_x^2 \text{ is true?}$$

- (a) 16
- (b) 32
- (c) 8
- (d) 4

[64] The mean proportional between 24 and 54 is :

- (a) 33
- (b) 34
- (c) 35
- (d) 36

- [65] The triplicate ratio of 4 : 5 is:
- (a) 125 : 64
 (b) 16 : 25
 (c) 64 : 125
 (d) 120 : 46
- (a) 25, 55
 (b) 35, 45
 (c) 40, 40
 (d) 15, 65

2013 – December

- [66] If $\sqrt[3]{a} + \sqrt[3]{b} + \sqrt[3]{c} = 0$, then the value

$$\text{of } \left(\frac{a+b+c}{3} \right)^3$$

- (a) abc
 (b) 9abc
 (c) $\frac{1}{abc}$
 (d) $\frac{1}{9abc}$
- [67] Find three numbers in the ratio 1 : 2 : 3, so that the sum of their squares is equal to 504
- (a) 6, 12, 18
 (b) 3, 6, 9
 (c) 4, 8, 12
 (d) 5, 10, 15
- [68] The value of $\log_4 9 \cdot \log_3 2$ is
- (a) 3
 (b) 9
 (c) 2
 (d) 1
- [69] The value of $(\log_y x \cdot \log_z y \cdot \log_x z)^3$ is
- (a) 0
 (b) -1
 (c) 1
 (d) 3
- [70] Divide 80 into two parts so that their product is maximum, then the numbers are

2014 – June

- [71] If $x : y = 2:3$, then $(5x+2y):(3x-y)=$

- (a) 19 : 3
 (b) 16 : 3
 (c) 7 : 2
 (d) 7 : 3

- [72] If $(25)^{150} = (25x)^{50}$; then the value of x will be :

- (a) 5^3
 (b) 5^4
 (c) 5^2
 (d) 5

- [73] The value of $\left(\frac{y^a}{y^b} \right)^{a^2+ab+b^2}$

$$\times \left(\frac{y^b}{y^c} \right)^{b^2+bc+c^2} \times \left(\frac{y^c}{y^a} \right)^{c^2+ac+a^2}$$

is equal to ____ .

- (a) y
 (b) -1
 (c) 1
 (d) None of these

- [74] If the salary of P is 25% lower than that of Q and the salary of R is 20% higher than that of Q, the ratio of the salary of R and P will be:

- (a) 5 : 8
 (b) 8 : 5
 (c) 5 : 3
 (d) 3 : 5

[75] If $x^2 + y^2 = 7xy$, then $\log \frac{1}{3}(x+y) = \underline{\hspace{2cm}}$

- (a) $(\log x + \log y)$
- (b) $\frac{1}{2}(\log x + \log y)$
- (c) $\frac{1}{3}(\log x / \log y)$
- (d) $\frac{1}{3}(\log x + \log y)$

[76] A person has assets worth ₹ 1,48,200. He wish to divide it amongst his wife, son and daughter in the ratio 3 : 2 : 1 respectively. From this assets, the share of his son will be:

- (a) ₹ 24,700
- (b) ₹ 49,400
- (c) ₹ 74,100
- (d) ₹ 37,050

[77] If $x = \log_{24} 12$, $y = \log_{36} 24$ and $z = \log_{48} 36$, then $xyz + 1 = \underline{\hspace{2cm}}$

- (a) $2xy$
- (b) $2xz$
- (c) $2yz$
- (d) 2

2014 – December

[78] If $\log x = a + b$, $\log y = a - b$ then the value of $\log \frac{10x}{y^2} = \underline{\hspace{2cm}}$.

- (a) $1 - a + 3b$
- (b) $a - 1 + 3b$
- (c) $a + 3b + 1$
- (d) $1 - b + 3a$

[79] If $x = 1 + \log_p qr$, $y = 1 + \log_q rp$ and $z = 1 + \log_r pq$ then the value of $\frac{1}{x} +$

$$\frac{1}{y} + \frac{1}{z} = \underline{\hspace{2cm}}$$

- (a) 0
- (b) 1
- (c) -1
- (d) 3

[80] For three months, the salary of a person are in the ratio 2 : 4 : 5. If the difference between the product of salaries of the first two months and last two months is ₹ 4,80,00,000; then the salary of the person for the second month will be:

- (a) ₹ 4,000
- (b) ₹ 6,000
- (c) ₹ 8,000
- (d) ₹ 12,000

2015 – June

[81] A dealer mixes rice costing ₹ 13.84 per Kg. with rice costing ₹ 15.54 and sells the mixture at ₹ 17.60 per Kg. So, he earns a profit of 14.6% on his sale price. The proportion in which he mixes the two qualities of rice is

- (a) 3 : 7
- (b) 5 : 7
- (c) 7 : 9
- (d) 9 : 11

[82] If $p^x = q$, $q^y = r$ and $r^z = p^6$, then the value of xyz will be:

- (a) 0
- (b) 1
- (c) 3
- (d) 6

[83] If $\log x = m + n$ and $\log y = m - n$, then $\log (10x/y^2) =$

- (a) $3n - m + 1$
- (b) $3m - n + 1$
- (c) $3n + n + 1$
- (d) $3m + n + 1$

[84] If $15(2p^2 - q^2) = 7pq$, where p and q are positive, then $p : q$ will be:

- (a) 5 : 6
- (b) 5 : 7
- (c) 3 : 5
- (d) 8 : 3

2015 – December

[85] The ratio of third proportion of 12, 30 to the mean proportion of 9, 25 is:

- (a) 2:1
- (b) 5:1
- (c) 7:15
- (d) 3:5

[86] The value of $\log_5 3 \times \log_3 4 \times \log_2 5$.

- (a) 0
- (b) 1
- (c) 2
- (d) $\frac{1}{2}$

[87] What number must be added to each of the numbers 10, 18, 22, 38 to make the numbers in proportion?

- (a) 2
- (b) 4
- (c) 8
- (d) None of these:

[88] The value of $\frac{2^n + 2^{n-1}}{2^{n+1} - 2^n}$ is:

- (a) $\frac{1}{2}$
- (b) $\frac{3}{2}$
- (c) $\frac{2}{3}$
- (d) 2

2016 – June

[89] The integral part of a logarithm is called _____ and the decimal part of a logarithm is called _____

- (a) Mantissa, Characteristic
- (b) Characteristic, Mantissa
- (c) Whole, Decimal
- (d) None of these.

[90] The value of

$$\left[\frac{x^2 - (y-z)^2}{(x+z)^2 - y^2} + \frac{y^2 - (x-z)^2}{(x+y)^2 - z^2} + \frac{z^2 - (x-y)^2}{(y+z)^2 - x^2} \right]$$

is

- (a) 0
- (b) 1
- (c) -1
- (d) ∞

[91] X, Y, Z together starts a business. If X invests 3 times as much as Y invests and Y invests two third of what Z invests, then the ratio of capitals of X, Y, Z is

- (a) 3:9:2
- (b) 6:3:2
- (c) 3:6:2
- (d) 6:2:3

[92] If $\log_4(x^2 + x) - \log_4(x+1) = 2$, then
the value of X is

- (a) 2
- (b) 3
- (c) 16
- (d) 8

[93] Value of $\frac{1}{\log_3^{60}} + \frac{1}{\log_4^{60}} + \frac{1}{\log_5^{60}}$ is :

- (a) 0
- (b) 1
- (c) 5
- (d) 60

Answer

- | | | | |
|---------|---------|---------|---------|
| 1. (b) | 2. (d) | 3. (a) | 4. (c) |
| 5. (c) | 6. (a) | 7. (b) | 8. (a) |
| 9. (b) | 10. (c) | 11. (a) | 12. (b) |
| 13. (a) | 14. (c) | 15. (d) | 16. (b) |
| 17. (c) | 18. (c) | 19. (a) | 20. (a) |
| 21. (d) | 22. (a) | 23. (a) | 24. (d) |
| 25. (d) | 26. (c) | 27. (a) | 28. (b) |
| 29. (b) | 30. (a) | 31. (b) | 32. (c) |
| 33. (b) | 34. (a) | 35. (c) | 36. (c) |
| 37. (d) | 38. (b) | 39. (a) | 40. (a) |
| 41. (b) | 42. (a) | 43. (c) | 44. (c) |
| 45. (d) | 46. (c) | 47. (c) | 48. (b) |
| 49. (d) | 50. (a) | 51. (a) | 52. (a) |
| 53. (a) | 54. (c) | 55. (a) | 56. (d) |
| 57. (b) | 58. (c) | 59. (a) | 60. (b) |
| 61. (d) | 62. (a) | 63. (a) | 64. (d) |
| 65. (c) | 66. (a) | 67. (a) | 68. (d) |
| 69. (c) | 70. (c) | 71. (b) | 72. (b) |
| 73. (c) | 74. (b) | 75. (b) | 76. (b) |
| 77. (c) | 78. (a) | 79. (b) | 80. (c) |
| 81. (a) | 82. (d) | 83. (a) | 84. (a) |
| 85. (b) | 86. (c) | 87. (a) | 88. (b) |
| 89. (b) | 90. (b) | 91. (d) | 92. (c) |
| 93. (b) | | | |

