Practice Test-7

Number of questions: 25 **Time Allowed: 25 mins.**

1. If the sales turnover of a company increases from Rs. 100 crore to Rs. 300 crore in 3 years, what is the compounded annual growth rate of sales (approximately) for the company?
   (a) 42% (b) 44%
   (c) 48% (d) None of these
2. If the slope of the line joining (– 8, 11) and (2, y) is $-\frac{4}{3}$, then what is the value of y?
   (a) $\frac{3}{4}$ (b) $-\frac{3}{8}$
   (c) $-\frac{4}{7}$ (d) $-\frac{7}{3}$
3. A T-shirt marked at Rs. 80 is sold for Rs. 68. The rate of discount is:
   (a) 15% (b) 12%
   (c) $17\frac{11}{17}\%$ (d) 20%
4. The 15th term of an arithmetic progression is 5. If the total number of terms of the progression is 29, find the sum of all the terms of the progression.
   (a) 135 (b) 195
   (c) 155 (d) 145
5. Twenty litres of a milk solution contains milk and water in 3 : 1 ratio. How much milk must be added to this solution to change the milk and water ratio to 4 : 1?
   (a) 3 liters (b) 5 liters
   (c) 7 liters (d) 2 liters
6. Three years ago, the average age of Amin and Beena was 18 years. With Chetan joining them, the average age is 22 years now. How old is Chetan now?
   (a) 30 years (b) 25 years
   (c) 20 years (d) None of these
7. A can do a piece of work in 80 days. He works at it for 10 days and then B alone finishes the work in 42 days. How many days would A and B together take to complete the work?
   (a) $45\frac{1}{3}$ days (b) 48 days
   (c) $32\frac{2}{3}$ days (d) 30 days
8. A house-owner was having his house painted. He was advised that he would require 25 kg of paint. Allowing for 15% wastage and assuming that the paint is available in 2 kg cane, what will be the cost of paint purchased, if one cane cost Rs. 16?
   (a) Rs. 240 (b) Rs. 180
   (c) Rs. 160 (d) Rs. 360
9. If $\sin\theta$ and $\cos\theta$ are the roots of the equation $ax^2 + x + 1 = 0$ and $\sin\theta = p, \cos\theta = q$, then
   (a) $1 + 2pq = p^2 q^2$ (b) $p + q = p^2 q^2$
   (c) $(p + q)^2 = p^2 + q^2$ (d) None of these
10. The value of a diamond is directly proportional to the square of its weight. If a diamond weighing 4 kg breaks into two pieces, its total value decreases by 37.5%. Find the weights of the two pieces.
    (a) 2 kg, 2 kg (b) $2\frac{1}{2}$ kg, $1\frac{1}{2}$ kg
    (c) 3 kg, 1 kg (d) None of these
11. 'A' distributes Rs. 180 equally amongst a certain number of people. 'B' distributes the same sum but gives to each person Rs. 6 more than 'A' does, and gives to 40 persons less than 'A' does. How much does 'A' give to each person?
    (a) Rs. 2 (b) Rs. 3
    (c) Rs. 4 (d) Rs. 5
12. P, Q and R are three partners in a venture. Twice the investment of P is equal to thrice the capital of Q and the capital of Q is four times the capital of R. What is the share of R out of a total profit of Rs. 5,940?
    (a) Rs. 690 (b) Rs. 720
    (c) Rs. 540 (d) Rs. 940
13. A person has a total of Rs. 210 in Re. 1, 50 paise and 25 paise coins. They were in the ratio 2.5 : 3 : 4. How many Re. 1 coins were there?
    (a) 89 (b) 103
    (c) 92 (d) 105
14. If you throw 5 fair coins, what is the probability of getting at least 3 heads?
    (a) $\frac{5}{16}$ (b) $\frac{1}{2}$
    (c) $\frac{1}{3}$ (d) $\frac{11}{16}$

15. If 'N' is a natural number, how many values of 'N' are possible such that $\frac{\left(17N^2 + 6N + 9\right)}{N}$ is also a natural number?
    (a) 3 (b) Infinite
    (c) 2 (d) 1
16. There would be 10% loss if a toy is sold at Rs.10.80 per piece. At what price should it be sold in order to earn a profit of 20%?
    (a) Rs. 12 (b) Rs. 12.96
    (c) Rs. 14.40 (d) None of these
17. Some quantity of tea worth Rs. 30.20 per kg is to be mixed with some quantity of tea worth Rs. 20.50 per kg so that the mixture may be worth Rs. 25.40 per kg. The ratio of the quantity of tea of the first kind to that of the second kind in the mixture should be
    (a) 48 : 49 (b) 49 : 18
    (c) 49 : 24 (d) 49 : 48
18. If the selling price of 8 items is equal to cost price of 7 items, then what is the profit or loss percentage? (You have to assume that CP or SP of all the items are same)
    (a) 12.5% profit (b) 14.2% loss
    (c) 12.5% loss (d) None of these
19. There are 3 numbers in the ratio 3 : 4 : 5 and the sum of their squares is 1250. Find the biggest of 3 numbers.
    (a) 20 (b) 25
    (c) 30 (d) 40
20. One root of $x^2 + kx - 8 = 0$ is square of the other. Find the value of 'k'.
    (a) – 4 (b) – 2
    (c) 2 (d) 4
21. Five distinct pairs of shoes are displayed. In how many different ways can 3 shoes be selected containing a matched pair?
    (a) 20 (b) 60
    (c) 30 (d) 40
22. The sum of the squares of two numbers is 68 and the square of their difference is 36. Find the product of the two numbers.
    (a) 32 (b) 58
    (c) 104 (d) 16
23. 1250 mangoes were distributed among a group of boys. Each boy got twice as many mangoes as the number of boys in the group. The number of boys in the group was:
    (a) 25 (b) 45
    (c) 50 (d) 625
24. If a, b, c be in A.P., then $\frac{1}{c}, \frac{b}{ac}, \frac{1}{a}$ are in
    (a) A.P (b) G.P
    (c) H.P (d) None of these
25. A certain distance is covered at a certain speed. If half of this distance is covered in double the time, the ratio of the two speeds is:
    (a) 4 : 1 (b) 1 : 4
    (c) 2 : 1 (d) 1 : 2

Answer Key

1. (b)	**2.** (d)	**3.** (a)	**4.** (d)	**5.** (b)	**6.** (d)	**7.** (d)	**8.** (a)	**9.** (a)	**10.** (c)
11. (b)	**12.** (c)	**13.** (d)	**14.** (b)	**15.** (a)	**16.** (c)	**17.** (d)	**18.** (c)	**19.** (b)	**20.** (b)
21. (d)	**22.** (d)	**23.** (a)	**24.** (a)	**25.** (a)					

Explanations

1. b Suppose the initial turnover is x and the compounded annual growth rate is r, then we have

$3x = x\left(1+\frac{r}{100}\right)^3$ or $\left(1+\frac{r}{100}\right) = \sqrt[3]{3} = 1.4422$

or r = 44.22%.

2. d $m = \frac{y_2 - y_1}{x_2 - x_1}$

where m : slope

$\therefore -\frac{4}{3} = \frac{y-11}{2+8}$

$\Rightarrow -40 = 3y - 33$

$\Rightarrow 3y = -40 + 33$

$\Rightarrow y = -\frac{7}{3}$.

3. a By applying the formula of M.P.

$\therefore$ M.P. = $\frac{\text{Selling price} \times 100}{(100 - d\%)}$

$80 = \frac{68 \times 100}{(100 - d\%)}$

$8000 - 80d = 6800$

$1200 = 80d\ \%$

$\frac{1200}{80} = d\%$

d = 15%

4. d Let a denote the first term and d denote the common difference.

$\therefore a + 14d = 5.$

Lety S_n be the sum of n terms, then

$S_n = \frac{n}{2}\left[2a + \overline{n-1}d\right]$

$= \frac{29}{2}[2a + 28d]$

$= \frac{29}{2} \times 2[a + 14d] = 29 \times 5 = 145$

5. b Quantity of milk in the the given mixture = $\left(\frac{20 \times 3}{4}\right)$

= 15 litres.

Quantity of water in this mixture = (20 – 15) = 5 litres

Let X litres of milk be added to given mixture to have the requisite ratio of milk and water.

Then, $\left(\frac{15+X}{5}\right) = \frac{4}{1}$ or 15 + X = 20 or X = 5

$\therefore$ Milk to be added = 5 litres.

6. d Let A denotes Amin, B denotes Beena and C denotes Chetn, then according to the question

$\frac{A+B}{2} = 18 + 3 = 21 \Rightarrow A + B = 42$ … (i)

$\frac{A+B+C}{3} = 22 \Rightarrow A + B + C = 66$ … (ii)

Using (i) in (ii), we get

42 + C = 66

$\Rightarrow$ C = 66 – 42 = 24 years.

7. d A's 10 day's work = $\frac{10}{80} = \frac{1}{8}$.

Remaining work = $\left(1 - \frac{1}{8}\right)$ is done by B in 42 days.

Therefore, B alone can finish the work in $\left(\frac{42 \times 8}{7}\right)$

= 48 days.

$\therefore$ B's 1 day's work = $\frac{1}{48}$

(A + B)'s 1 day's work = $\left(\frac{1}{80} + \frac{1}{48}\right) = \frac{1}{30}$.

$\therefore$ A and B together can finish the work in 30 days.

8. a Let the quantity of paint purchased be x kg

then (x – 15% of x) = 25 kg

x = 29.41 or 30 kg

So, he must purchase 15 cans

Total cost = 16 × 15 = Rs. 240

9. a $\sin\theta + \cos\theta = \frac{-1}{a}$

$\sin\theta \cos\theta = \frac{1}{a}$

$\therefore \sin\theta + \cos\theta = -\sin\theta \cos\theta$

or $(\sin\theta + \cos\theta)^2 = (-\sin\theta\cos\theta)^2$

or $\sin^2\theta + \cos^2\theta + 2\sin\theta\ \cos\theta = \sin^2\theta\ \cos^2\theta$

or $1 + 2pq = p^2q^2$

10. c Here, initial value $v_1 = k \cdot 4^2 = 16\,k$

Where k is a proportionality constant.

Suppose the diamond breaks into two pieces of weights x kg and 4 – x kg and their values are v_2 and v_3 respectively.

$v_2 = kx^2$ and $v_3 = k(4 - x)^2$

Total value = $v_2 + v_3 = k\{x^2 + (4 - x)^2\}$

$= k\{2x^2 - 8x + 16\}$

Given that $k(2x^2 - 8x + 16) = 62.5\%$ of $16k$

or $2k(x^2 - 4x + 8) = \frac{5}{8} \times 16k$

or $x^2 - 4x + 3 = 0$

or $x = 1$ or 3

$\therefore$ Weights of the parts are 1 kg and 3 kg.

11. b Let A distributes Rs. 180 among n persons.

Then, each person will have Rs. $\frac{180}{n}$.

B distributes Rs. 180 among n – 40 persons.

He gives Rs. 6 more than what A gives to every person

$\therefore \left(\frac{180}{n} + 6\right)(n - 40) = 180$

$\Rightarrow \frac{180}{n} + 6 = \frac{180}{n - 40}$

$\Rightarrow \frac{180}{n - 40} - \frac{180}{n} = 6$

$\Rightarrow 7200 = 6n(n - 40)$

$\Rightarrow n^2 - 40n - 1200 = 0$

$\Rightarrow n = 60, -20$ but $n = -20$ is not possible.

Clearly, A distributes Rs. $\frac{180}{n} = \frac{180}{60} = \text{Rs. } 3$ to every person.

12. c Let p, q and r denote the investments made by P, Q and R respectively. Then,

$2p = 3q$ and $q = 4r$

$\Rightarrow 2p = 3q = 12r$

Dividing the above equation by 12, we get

$\frac{p}{6} = \frac{q}{4} = \frac{r}{1}$ $\therefore$ p : q : r = 6 : 4 : 1

Total profit = Rs. 5,940

R's share $\frac{1}{6 + 4 + 1} \times 5940 = \frac{1}{11} \times 5940$ = Rs. 540

13. d Assume Re. 1 coins = 2.5x

Assume 50-paisa coins = 3x

Assume 25-paisa coins = 4x

Total amount = 210 = $1 \times 2.5x + \frac{1}{2} \times 3x + \frac{1}{4} \times 4x$

or x = 42 or Re. 1 coins = 105

14. b The total number of ways in which 5 coins can appear

$= 2^5 = 32$

Number of ways in which you can get 3 heads = ${}^5C_3 = 10$

Number of ways in which you can get 4 heads = ${}^5C_4 = 5$

Number of ways in which you can get all 5 heads = ${}^5C_5 = 1$

$\therefore$ The required probability = $\frac{10 + 5 + 1}{32} = \frac{1}{2}$

15. a Given expression is $\frac{17N^2 + 6N + 9}{N}$,

which can be written as $17N + 6 + \frac{9}{N}$.

An expression $17N + 6 + \frac{9}{N}$ is a natural number when N = 9 or N = 3 or N = 1

Thus only three values of N make an expression a natural number.

16. c Cost price = $\frac{10.80}{0.9}$ = Rs.12

Selling price = $12 \times \frac{120}{100}$ = Rs.14.40

17. d Working conventionally, you would try the alligation method, but if you take a look at the problem, you find that both the additive mixtures are more or less equally separated from the resultant mixture, i.e. (30.20 – 25.40) is almost equal to (25.40 – 20.50). But the resultant is marginally closer to the costlier additive (the difference is smaller), which implies that there is more quantity of that additive. Hence, the answer is (d).

18. c Suppose the cost price of 1 item be Re. 1

Now SP of 8 items = CP of 7 items = Rs. 7

CP of 8 items = Rs. 8

$\therefore$ There is a loss of Re. 1 on Rs. 8

$\therefore$ 12.5% loss

19. b Let the numbers be 3x, 4x and 5x respectively.

$9x^2 + 16x^2 + 25x^2 = 1250$

$\Rightarrow 50x^2 = 1250$ or $x = 5$

The numbers are 15, 20 and 25.

$\therefore$ The biggest number is 25.

20. b Let α and β be the roots of the equation

$x^2 + kx - 8 = 0$

Given that $\alpha = \beta^2$

Now sum of the roots

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

and product of the roots = $\alpha\beta = \beta^3 = -8$

$\Rightarrow \beta = -2$

$\therefore (-2)^2 + (-2) = -k$

$4 - 2 = -k$ $\therefore 2 = -k$

$\Rightarrow k = -2$

21. d One pair can be selected out of five pairs in five ways. Now we have 4 pairs of shoes, i.e. 8 distinct shoes, out of which one can be selected in

$^8C_1 = 8$ ways.

$\therefore$ Total number of ways = 5 × 8 = 40

22. d Let the two numbers be x and y

Then $x^2 + y^2 = 68$ … (i)

and $(x - y)^2 = 36$

$\Rightarrow x^2 + y^2 - 2 \times y = 36$

$\Rightarrow 68 - 2xy = 36$ [Using (i)]

$\Rightarrow 2xy = 68 - 36 = 32$

$\Rightarrow xy = \frac{32}{2} = 16$

23. a Let the number of boys be x

Number of mangoes each child gets = 2x

$2x \times x = 1250 \Rightarrow x^2 = 625 \Rightarrow x = 25$

24. a a, b, c are in A.P

$\frac{a}{ac}, \frac{b}{ac}, \frac{c}{ac}$ are in A.P

$\Rightarrow \frac{1}{c}, \frac{b}{ac}, \frac{1}{a}$ are in A.P

25. a Clearly, the speed is inversely proportional to time taken.

Hence, ratio of speed is 4 : 1.