



The Career Signature

# QUANTITATIVE APTITUDE

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## Handouts



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# Number System

1. Which of the following fraction is the smallest?  $\frac{7}{6}, \frac{7}{9}, \frac{4}{5}, \frac{5}{7}$

- (a)  $\frac{7}{6}$       (b)  $\frac{7}{9}$       (c)  $\frac{4}{5}$       (d)  $\frac{5}{7}$

2. A student was asked to multiply a number by  $\frac{3}{2}$  but he divided that number by  $\frac{3}{2}$ . His result was 10 less than the correct answer. The number was :

- (a) 10      (b) 12      (c) 15      (d) 20

3. Find the unit digit of  $(23758)^{6149}$

- (a) 2      (b) 4      (c) 6      (d) 8

4. Find the unit digit of  $(3217)^{163}$

- (a) 3      (b) 7      (c) 9      (d) 1

5. The value of  $2.42\overline{7}$  in the form of fraction is:

- (a)  $2\frac{136}{280}$       (b)  $2\frac{73}{280}$       (c)  $2\frac{77}{180}$       (d)  $2\frac{161}{3}$

6. The value of  $0.\overline{2} + 0.\overline{3} + 0.\overline{32}$  is :

- (a)  $0.\overline{87}$       (b)  $0.\overline{77}$       (c)  $0.\overline{82}$       (d)  $0.\overline{86}$

7.  $999\frac{1}{7} + 999\frac{2}{7} + 999\frac{3}{7} + 999\frac{4}{7} + 999\frac{5}{7} + 999\frac{6}{7}$  is simplified to :

- (a) 5997      (b) 5979      (c) 5994      (d) 2997

8. If a number is represented  $N = 84 \times 192 \times 217 \times 301$ . What will be remainder when N is divided by 27?

- (a) 7                      (b) 6                      (c) 5                      (d) 9

9. The remainder when  $6^{100}$  is divided by 7, is :

- (a) 3                      (b) 0                      (c) 1                      (d) 2

10. The remainder when  $7^{23}$  is divided by 6, is :

- (a) 1                      (b) 2                      (c) 5                      (d) 2

11. The total number of factors of 462 are :

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

12. Which of the following is the smallest?  $\sqrt[3]{12}, \sqrt{6}, \sqrt[6]{126}$

- (a)  $\sqrt[3]{12}$                       (b)  $\sqrt{6}$                       (c)  $\sqrt[6]{126}$                       (d) NONE

13. A number when divided by 117 leaves 17 as remainder. If the same number is divided by 13, the remainder obtained is :

- (a) 2                      (b) 1                      (c) 11                      (d) 4

14. 380 mangoes are distributed among some boys and girls who are 85 in number. Each boy gets four mangoes and each girl gets five. The number of boys is :

- (a) 15                      (b) 38                      (c) 40                      (d) 45

15. P and Q are two-digit positive integers having the same digits, but in reverse order. Which of the following is a possible value of their sum?

(a) 123

(b) 98

(c) 156

(d) 132

16. The product of two positive integers is 100. The minimum value of their sum is :

(a) 20

(b) 25

(c) 52

(d) 16

17. The product of two positive integers is  $p$ . If each of the numbers is increased by 2, the new product is how much greater than twice the sum of the two original numbers?

(a)  $p - 2$

(b)  $p$

(c)  $p + 2$

(d)  $p + 4$

18. A printer numbered the pages of a book consecutively, starting with 1 on the first page. He had to print a total of 250 digits. Find the number of pages in the book.

(a) 120

(b) 125

(c) 119

(d) 113

19. Four prime numbers are written in ascending order. The product of the first 3 numbers is 105. The product of the last 3 is 385. Find the second number.

(a) 13

(b) 7

(c) 5

(d) 3

20. Shreya writes first 100 whole numbers. Let A and B be the number of times she writes 0 and 9 respectively. Find the value of  $A + B$ .

(a) 30

(b) 31

(c) 20

(d) 21

Answer:

1.d	2.b	3.d	4.a	5.c	6.a	7.a	8.d	9.c	10.a
11.c	12.c	13.d	14.c	15.d	16.a	17.d	18.c	19.c	20.a

Solution :

1.  $\frac{7}{6}$  will surely give value greater than 1.

Rest of the fractions you can convert into decimals :

$$\frac{7}{9} = 7 * \frac{1}{9} = 7 * 0.11 = 0.77$$

$$\frac{4}{5} = 0.80$$

$$\frac{5}{7} = 5 * \frac{1}{7} = 5 * 0.1428 = 0.714$$

∴ Smallest fraction is  $\frac{5}{7}$ .

So option (d) is correct.

2. Let the number be x.

$$\text{Desired answer} = \frac{3x}{2}$$

$$\text{Actual answer} = \frac{x}{\frac{3}{2}} = \frac{2x}{3}$$

As per the given condition, we get,

$$\frac{2x}{3} = \frac{3x}{2} - 10$$

$$\therefore \frac{2x}{3} = \frac{3x-20}{2}$$

$$\therefore 4x = 9x - 60$$

$$\therefore 9x - 4x = 60$$

$$\therefore 5x = 60$$

$$\therefore x = 12$$

So option (b) is correct.

3. Finding unit digit of  $(23758)^{6149}$ , is the same thing as finding unit digit of  $8^{49}$ .

∴ Cyclicity of 8 is 4,

∴  $\frac{49}{4}$ , will give you remainder 1.

∴ Unit's digit of  $8^1 = 8$

So option (d) is correct.

4. Finding unit digit of  $(3217)^{163}$ , is the same thing as finding unit digit of  $7^{63}$ .

∴ Cyclicity of 7 is 4,

$\therefore \frac{63}{4}$ , will give you remainder 3.

$\therefore$  Unit's digit of  $7^3 = 3$

So option (a) is correct.

5.  $2.\overline{427} = 2 + 0.\overline{427}$

$$\therefore = 2 + \frac{427-42}{900}$$

$$\therefore = 2 + \frac{385}{900}$$

$$\therefore = 2 + \frac{77}{180}$$

$$\therefore = 2\frac{77}{180}$$

So option (c) is correct.

6.  $0.\overline{2} + 0.\overline{3} + 0.\overline{32} = \frac{2}{9} + \frac{3}{9} + \frac{32}{99}$

$$\therefore = \frac{22+33+32}{99}$$

$$\therefore = \frac{87}{99}$$

$$\therefore = 0.\overline{87}$$

So option (a) is correct.

7.  $999\frac{1}{7} + 999\frac{2}{7} + 999\frac{3}{7} + 999\frac{4}{7} + 999\frac{5}{7} + 999\frac{6}{7}$

$$= 999 + \frac{1}{7} + 999 + \frac{2}{7} + 999 + \frac{3}{7} + 999 + \frac{4}{7} + 999 + \frac{5}{7} + 999 + \frac{6}{7}$$

$$= 999 * 6 + \left( \frac{1}{7} + \frac{2}{7} + \frac{3}{7} + \frac{4}{7} + \frac{5}{7} + \frac{6}{7} \right)$$

$$= 5994 + \frac{21}{7}$$

$$= 5994 + 3$$

$$= 5997$$

So option (a) is correct.

8.  $N = 84 \times 192 \times 217 \times 301$

$$\therefore N \bmod 27 = (84 \times 192 \times 217 \times 301) \bmod 27$$

$$\therefore = 84 \bmod 27 \times 192 \bmod 27 \times 217 \bmod 27 \times 301 \bmod 27$$

$$\therefore = (3 \times 3 \times 1 \times 4) \bmod 27$$

$$\therefore = 36 \bmod 27$$

$$\therefore = 9$$

So option (d) is correct.

9.  $6 \bmod 7 = -1$  or 6

$$\therefore \text{Let's take, } 6 \bmod 7 = -1$$

$$\therefore 6^{100} \bmod 7 = (-1)^{100}$$

$$\therefore = 1$$

$$\therefore \text{The remainder} = 1$$

So option (c) is correct.

10.  $7 \bmod 6 = 1$

$$\therefore 7^{23} \bmod 6 = 1^{23}$$

$$\therefore = 1$$

$$\therefore \text{The remainder} = 1$$

So option (a) is correct.

11.  $462 = 2^1 \times 3^1 \times 7^1 \times 11^1$

$$\text{If } N = P^a \times Q^b \times R^c$$

$$\text{Then Total number of factors, } d(N) = (a + 1)(b + 1)(c + 1)$$

$$\therefore d(462) = (1 + 1)(1 + 1)(1 + 1)(1 + 1)$$

$$\therefore = 2 \times 2 \times 2 \times 2$$

$$\therefore = 16$$

So option (c) is correct.



12.  $\sqrt[3]{12}, \sqrt{6}, \sqrt[6]{126}$

i.e.  $12^{1/3}, 6^{1/2}, 126^{1/6}$

LCM of 3, 2 & 6 is 6.

∴ Taking 6<sup>th</sup> power of all the numbers, we get,

$(12^{1/3})^6, (6^{1/2})^6, (126^{1/6})^6$

i.e.  $12^2, 6^3, 126$

i.e. 144, 216, 126

Hence, smallest number is 126 i.e.  $\sqrt[6]{126}$

So option (c) is correct.

13. Let that number be N.

∴  $N = \text{Divisor} \times \text{Quotient} + \text{Remainder}$

∴  $= 117 \times Q + 17$

∴  $= 9 \times 13 \times Q + 13 + 4$

∴  $= 13 \times (9Q + 1) + 4$

∴ Remainder = 4

So option (d) is correct.

14. Let number of boys be x and number of girls be y.

∴ As per 1<sup>st</sup> given condition, we get,

$x + y = 85$  -----(1)

As per 2<sup>nd</sup> given condition, we get,

$4x + 5y = 385$  -----(2)

Solving (1) & (2), we get,

$x = 40$  &  $y = 45$

∴ Number of boys are 40.



So option (c) is correct.

15. If  $P = 10x + y$  &  $Q = 10y + x$

Then  $P + Q = 11x + 11y = 11(x + y)$

i.e. the sum should be divisible by 11.

Only 132 is divisible by 11.

So option (d) is correct.

16. 100 can be expressed as  $100 * 1$ ,  $50 * 2$ ,  $25 * 4$ ,  $20 * 5$ ,  $10 * 10$

$\therefore$  Minimum value of their sum is  $10 + 10 = 20$

So option (a) is correct.

17. Let  $x$  and  $y$  be the two positive integers, such that  $p = xy$

$$\therefore (x+2)(y+2) = xy + 2(x+y) + 4$$

$$\therefore = xy + 4 + 2(x+y)$$

$$\therefore = p + 4 + 2(x+y)$$

$\therefore$  The product is  $p + 4$  more than twice the sum of the original numbers.

So option (d) is correct.

18. Numbers 1 to 9 have 1 digit each.

$$10 * 1 = 10$$

Numbers 10 to 99 have 2 digits each.

$$90 * 2 = 180$$

$\therefore$  Number of digits printed upto 99 pages = 190

$$250 - 190 = 60 = 20 * 3$$

i.e. 20 three digit numbers have been printed.

i.e. from 100 to 119

$\therefore$  The book has 119 pages.

So option (c) is correct.

19. Let the numbers be a, b, c and d.

$$abc = 105 \text{ \& \; } bcd = 385$$

$$\text{HCF}(abc, bcd) = bc$$

$\because$  a and d are prime numbers,

$$\therefore \text{HCF}(105, 385) = 35 = 5 * 7$$

$\therefore$  The second number is 5.

So option (c) is correct.

20. The first 100 whole numbers are 0 to 99.

$$A = \text{Number of 0's in } (0, 10, 20, 30, 40, 50, 60, 70, 80, 90) = 10$$

$$B = \text{Number of 9's in } (9, 19, 29, 39, 49, 59, 69, 79, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99) = 20$$

$$\therefore A + B = 30$$

So option (a) is correct.

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