

**MAA OMWATI DEGREE COLLEGE
HASSANPUR**

NOTES

**CLASS:- BCA 1ST SEM & B.SC 1ST
SUBJECT: INTRODUCTORY
MATHEMATICS (MDC)**

Unit -1

Number System

* Topic Covered

1. Unit digit
2. Number of zeroes
3. Sum of factors
4. Divisibility Rule
5. Remainder Theorem.

Questions Based On Unit digit :-

1. Find the last digit of the Number
 $1^3 + 2^3 + 3^3 + \dots + 99^3$.

- (a) 0 (b) 1 (c) 2 (d) 5.

2. Find last digit of $32^{32^{32}}$

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

3. The unit digit of $(12345k)^{72}$ is 6, find value of k

- (a) 8 (b) 6 (c) 2 (d) All of these.

4. The unit digit of the expression
 $(1!)^{1!} + (2!)^{2!} + (3!)^{3!} + \dots + (100!)^{100!}$

- (a) 0 (b) 1 (c) 2 (d) 7.

5. The unit digit of $2^3 \times 3^4 \times 4^5 \times 5^6 \times 6^7 \times 7^8 \times 8^9$ is:

- (a) 0 (b) 5 (c) Cannot determine (d) Not.

6. Find last digit of $(222)^{888} + (888)^{222}$

- (a) 2 (b) 6 (c) 0 (d) 8.

* 2. Number of Zeros :-

Zero will be formed by 2 and 5.

$$\text{Ex - } 10 = 2 \times 5$$

$$100 = 2^2 \times 5^2$$

$$1000 = 2^3 \times 5^3$$

We can say that for 'n' number of zeros at the end of the Product we need exactly 'n' combinations of 5 and 2.

Ex- Find the number of zeros at the end of the Product:

$$5 \times 7 \times 9 \times 2 \times 11$$

$$\hookrightarrow \text{Number of } 2\text{'s} = 1$$

$$\text{Number of } 5\text{'s} = 1$$

$$\text{Pair of } 2\text{'s and } 5\text{'s} = 1$$

$$\therefore \text{Number of Zeros} = 1.$$

Ex- Find number of zeros at end of product

$$1 \times 3 \times 5 \times 7 \times 9 \times \dots \times 97 \times 99$$

→ Since, In above series there is no even number present in this series.

$$\text{So, Number of Zeros} = \underline{0}.$$

Important Questions :-

1. Find the largest power of 5 contained in $124!$.

$$\begin{array}{r} 5 \overline{) 124} \\ 5 \overline{) 24} \\ 4 \end{array} \left. \vphantom{\begin{array}{r} 5 \overline{) 124} \\ 5 \overline{) 24} \\ 4 \end{array}} \right\} 28 \text{ (add up all the quotients)}$$

Divide successive quotients till we get zero as the last quotient.

2. Find largest power of 3 that can divide $270!$.

$$\begin{array}{r} 3 \overline{) 270} \\ 3 \overline{) 90} \\ 3 \overline{) 30} \\ 3 \overline{) 10} \\ 3 \overline{) 3} \\ 1 \end{array} \left. \vphantom{\begin{array}{r} 3 \overline{) 270} \\ 3 \overline{) 90} \\ 3 \overline{) 30} \\ 3 \overline{) 10} \\ 3 \overline{) 3} \\ 1 \end{array}} \right] 134$$

3. Find number of zeroes at the end of product:
 $10 \times 20 \times 30 \times \dots \times 1000$.

$\rightarrow 10^{100} [1 \times 2 \times 3 \times \dots \times 100]$
from 1 to 100 numbers of 0's

$$\begin{array}{r} 5 \overline{) 100} \\ 5 \overline{) 20} \\ 5 \overline{) 4} \\ 0 \end{array} \left. \vphantom{\begin{array}{r} 5 \overline{) 100} \\ 5 \overline{) 20} \\ 5 \overline{) 4} \\ 0 \end{array}} \right] 24$$

And No. of zeroes in $10^{100} = 100$

$$\begin{aligned} \text{Total no. of zeroes} &= 100 + 24 \\ &= \underline{\underline{124}}. \end{aligned}$$

* 2. Factors :-

A number which divides a given number exactly is called factor (or divisor) of that given number and given number is called a Multiple of that Number.

Ex → Factors of 24 = 1, 2, 3, 4, 6, 8, 12, 24
Multiple of 24 = 24, 48, 72, 96, 120, ...

Note:

1 is a factor of Every number.

$$\Rightarrow \text{If } N = a^p \cdot b^q \cdot c^r$$

$$\text{Total number of factors} = (p+1) \times (q+1) \times (r+1)$$

$$\text{The number of Even factors} = p \times (q+1) \times (r+1)$$

$$\text{The number of odd factors} = 1 \times (q+1) \times (r+1)$$

Ex → Find the number of Even factors of 60.

$$\begin{aligned} \rightarrow 60 &= 2 \times 2 \times 3 \times 5 \\ &= 2^2 \times 3^1 \times 5^1 \end{aligned}$$

$$\begin{aligned} \text{No. of Even factors} &= 2 \times (1+1) \times (1+1) \\ &= \underline{8}. \end{aligned}$$

Ex → Find number of odd factors of 40.

$$\begin{aligned} \rightarrow 40 &= 2 \times 2 \times 2 \times 5 \\ &= 2^3 \times 5^1 \end{aligned}$$

$$\begin{aligned} \text{No. of odd factors} &= 1 \times (1+1) \\ &= \underline{2}. \end{aligned}$$

Sum of factors :-

$$\text{If } N = a^p \cdot b^q \cdot c^r$$

then Sum of factor =

$$(a^0 + a^1 + a^2 + \dots + a^p) \times (b^0 + b^1 + \dots + b^q) \times (c^0 + c^1 + \dots + c^r)$$

→ Sum of Even factors =

$$(a^1 + a^2 + \dots + a^p) \times (b^0 + b^1 + \dots + b^q) \times (c^0 + c^1 + \dots + c^r)$$

→ Sum of odd factors =

$$(a^0) \times (b^0 + b^1 + \dots + b^q) \times (c^0 + c^1 + \dots + c^r)$$

Q. For the Number 96

$$(i) \text{ Sum of factors} = 96 = 2^5 \times 3^1$$
$$= (2^0 + 2^1 + 2^2 + 2^3 + 2^4 + 2^5) \times (3^0 + 3^1)$$
$$= 63 \times 4 \Rightarrow \underline{252}$$

$$(ii) \text{ Sum of Even factors} =$$
$$(2^1 + 2^2 + 2^3 + 2^4 + 2^5) \times (3^0 + 3^1)$$
$$\Rightarrow 62 \times 4 \Rightarrow 248$$

(iii) Sum of odd factors =

$$1 \times (1 + 3)$$

$$(2^0) \times (3^0 + 3^1)$$

$$\Rightarrow 1 \times 4 = \boxed{4}$$

* 4. Divisibility :-

Divisibility

1. By 2

→ If last digit of Number is divisible by 2.

2. By 4

→ If last two digits of Number is divisible by 4.

3. By 8

→ If last three digits of Number is divisible by 8.

4. By 3

→ Sum of digits of given number is divisible by 3.

5. By 9

→ Sum of digits of given number is divisible by 9.

6. By 6

→ A number is divisible by 6 if it is simultaneously divisible by 2 and 3.

7. By 5

→ If last digit of given number is divisible by 5.

8. By 25

→ If last two digit of given number is divisible by 25.

9. By 11

→ The difference of the sum of the digits at even places and digits at odd places is Zero or multiple of 11.

*:

If any number is made by repeating a digit 6 times the number will be divisible by 3, 7, 11, 13, 21, 37 and 101.

→ Divisibility by 7:

Double the last digit and subtract it from the remaining leading truncated number. If the result is divisible by 7 then so was the original number.

Ex- check 203 is divisible by 7.

$$\begin{array}{r} 203 \\ 1 \quad 3 \times 2 \\ 20 - 6 = 14 \end{array} \quad \underline{\text{Yes.}}$$

Ex- check if 68734 is divisible by 7.

$$\begin{array}{r} 6873 \\ - 8 \quad 4 \times 2 \\ \hline 6865 \\ - 10 \quad 5 \times 2 \\ \hline 676 \\ - 12 \quad 6 \times 2 \\ \hline 55 \end{array}$$

∴ 55 is not divisible by 7

So, 68734 is not divisible by 7.

Q. $2^7 + 2^7 + 2^7 + 2^7$ is divisible by:

→ $2^7 (1 + 2 + 4 + 8)$

$\Rightarrow 2^7 \times 15$

$\Rightarrow 2^7 \times 3 \times 5$

Which is exactly divisible by 10.

(a) 9 (b) 10

(c) 11 (d) 12.

Note:

$$\begin{array}{r} \text{Dividend} \\ \downarrow \\ \begin{array}{r} \rightarrow 6 \text{ Divisor } \overline{) 27} \quad (4 \rightarrow \text{Quotient} \\ \underline{24} \\ 3 \rightarrow \text{Remainder} \end{array} \end{array}$$

$$\text{Dividend} = \text{divisor} \times \text{quotient} + \text{Remainder}$$

* Remainder Questions :-

1. A number when divided by 4 and 5 the leaves remainder 3 and 4. Then, Number is:

$$\rightarrow \text{Required Number} = \text{LCM}(4, 5) + 1.$$

$$\Rightarrow 20 + 1 \Rightarrow \underline{21} \star$$

2. $(29)^{37} + (17)^{37}$ is always divisible by:

$\rightarrow (a^n + b^n)$ is always divisible by $(a+b)$ if $n \rightarrow$ odd power

$\therefore (29)^{37} + (17)^{37}$ is divisible by $(29+17) = 46$
or By 1, 2, 23 & 46.

3. $(49)^{15} - 1$ is divisible by:

$\rightarrow x^n - a^n$ is always divisible by $(x-a)$ if $n = \text{odd}$.

$\therefore (49)^{15} - (1)^{15}$ is divisible by $49-1 = \underline{48}$ ✓

Note:

$(a^n + b^n)$ is not determined divisibility
if $n = \text{Even Power}$.

* LCM & HCF *

* LCM : (Lowest Common Multiple)

LCM of two or more numbers is the smallest positive integer that's divisible by all of them.

Ex- LCM $8 = 8, 16, 24, 32, 40, 48$
 $12 = 12, 24, 36, 48, 60$

$$\text{LCM}(8, 12) = 24.$$

→ LCM of fraction :-

$$\text{LCM}\left(\frac{a}{b}, \frac{c}{d}, \frac{e}{f}\right) = \frac{\text{LCM}(a, c, e)}{\text{HCF}(b, d, f)}.$$

Q. Find the smallest number which can be completely divided by 12, 15, 20, 54?

Solⁿ:

$$\text{LCM}(12, 15, 20, 54) = \underline{540}.$$

Q. Find the least number which when divided by 14, 21, 28, 35 leaves a remainder 2 in each case.

Solⁿ:

$$\begin{aligned}\text{Required number} &= \text{LCM}(14, 21, 28, 35) + 2 \\ &= 420 + 2 \\ &\Rightarrow \underline{\underline{422}}.\end{aligned}$$

Q. Find the smallest number which when divided by 20, 25 and 30 leaves remainder 8, 13 and 18 in each case.

Solⁿ: $(20-8) = (25-13) = (30-18) = 12$

Required Number = $\text{LCM}(20, 25, 30) - 12$

$$\Rightarrow 300 - 12$$

$$\Rightarrow \underline{288} \text{ ✓}$$

Q. Five bells started ringing simultaneously. If these bells ring at an interval of 4, 6, 8, 12, 15 seconds respectively, then how many times will they ring together in 30 minutes?

Solⁿ: $\text{LCM}(4, 6, 8, 12, 15) = \underline{120} \text{ seconds}$
i.e. 2 minutes.

$$\frac{30}{2} = 15 + 1 = \underline{16} \text{ times Ringing.}$$

Q. Tell LCM of $P = 2^4 \times 5^3 \times 7^2$ and $Q = 2^3 \times 3^2 \times 7^4$.

Solⁿ:

$$\text{LCM}(P, Q) = 2^4 \times 3^2 \times 5^3 \times 7^4$$

Hcf :-

(Highest Common Factor)

Hcf of two numbers is the highest factor that can divide the numbers.

Ex:-

$$\begin{aligned} \text{Hcf } 8 &= 1, 2, 4, \textcircled{8} \\ 16 &= 1, 2, 4, \textcircled{8}, 16 \end{aligned}$$

$$\text{Hcf}(8, 16) = \underline{8}.$$

* Hcf of fraction :-

$$\text{Hcf}\left(\frac{a}{b}, \frac{c}{d}, \frac{e}{f}\right) = \frac{\text{Hcf}(a, c, e)}{\text{LCM}(b, d, f)}.$$

Q. Find Hcf of $P = 2^3 \times 5^4 \times 7^3$ and $Q = 3^2 \times 5^2 \times 7^2 \times 11^3$

Soln: $\text{Hcf}(P, Q) = 5^2 \times 7^2.$

Q. Find the largest number which when divided by 1356, 1868 and 2764 leaves a remainder 12 in each case.

Soln:

1356	1868	2764
- 12	- 12	- 12
1344	1856	2752

$$\text{Hcf}(1344, 1856, 2752) = \underline{512} \quad \checkmark$$

★ First Number $\times$ Second Number = LCM $\times$ HCF

Q. HCF of two numbers is 12 and their LCM is 72. First Number is 36 then find second?

Solⁿ: $LCM \times HCF = I \times II$

$$12 \times \frac{72}{2} = 36 \times II$$

$$\boxed{II = 24} \quad \checkmark$$

Q. The Ratio of two numbers is 4:5. Their LCM is 120, find Numbers.

Solⁿ: 4:5

$$4x \quad 5x$$

$$LCM = H \times b$$

$$LCM = 4 \times 5 \times x = 120$$

$$\boxed{x = 6}$$

$$\begin{aligned} \text{Then, Numbers} &= 4 \times 6, 5 \times 6 \\ &= 24, 30 \quad \checkmark \end{aligned}$$

★ Ratio and Proportion ★

: → Sign of Ratio

:: → Sign of Proportion

$$a:b = \frac{a}{b} \quad \neq \quad b:a = \frac{b}{a}$$

$$a:b :: c:d$$

$$\frac{a}{b} = \frac{c}{d}$$

⇒ Mean Proportion of Two Numbers a & $b = \sqrt{ab}$.

⇒ Third Proportion of two Numbers = $\frac{b^2}{a}$.

⇒ fourth Proportion of three Numbers = $\frac{bc}{a}$.

Q1. The ratio of income of A and B is 3:5 whereas the ratio of their expenditure is 4:7 respectively. If A and B saves Rs. 16,000 and Rs. 26,000 respectively, then what is the difference between their expenditure?

Solⁿ:

	A	B
Income	3	5
Expenditure	4	7
Saving	16,000	26,000

$$8,000, 14,000$$

$$\boxed{6000} \text{ ₹}$$

$$3x - 4y = 16,000 \quad \text{--- (1)}$$

$$5x - 7y = 26,000 \quad \text{--- (2)}$$

Multiply Eq (1) by 5 and
Eq (2) by 3

$$15x - 20y = 80,000$$

$$15x - 21y = 78,000$$

$$y = 2000$$

Q2. The ratio of the ages of A and B, 8 years ago was $2:3$. Four years ago, the ratio of their ages was $5:7$. What will be the ratio of their ages 8 years from now?

Solⁿ: Let present age of A = x years
 Let present age of B = y years
 Acc. to Ist Condition

$$\frac{x-8}{y-8} = \frac{2}{3} \Rightarrow 3x-24 = 2y-16$$

$$3x-2y = 8 \quad \text{--- (1)}$$

Acc. to IInd Condition

$$\frac{x-4}{y-4} = \frac{5}{7} \Rightarrow 7x-28 = 5y-20$$

$$7x-5y = 8 \quad \text{--- (2)}$$

Multiply Eq (1) by 5 and (II) by 2

$$\begin{array}{r} 15x - 10y = 40 \\ 14x - 10y = 16 \\ \hline x = 24 \end{array}$$

$$3 \times 24 - 2y = 8$$

$$\boxed{y = 32}$$

Hence, Present age of A = 24 years

Present age of B = 32 years

Now,

$$\frac{24+8}{32+8} = \frac{32}{40} = \boxed{4:5}$$

Ratio of their ages
 after 8 years.

3 If x is the Mean proportional between 12.8 and 64.8 and y is the third proportional to 38.4 and 57.6, then $2x:y$ is equal to -

$$x = \sqrt{12.8 \times 64.8}$$

$$\left\{ \begin{array}{l} \because \text{Mean proportion} \\ = \sqrt{ab} \end{array} \right.$$

$$x = \sqrt{\frac{128}{10} \times \frac{648}{10}}$$

$$x = \frac{576}{10} = \frac{8 \times 2 \times 18}{10}$$

$$y = \frac{57.6 \times 57.6}{38.4}$$

$$y = \frac{576 \times 9}{10}$$

$$\therefore 2x:y = \frac{2 \times 8 \times 2 \times 18}{10} : \frac{576 \times 9}{10}$$

$$\Rightarrow \boxed{2:3} \downarrow$$

Q4. When x is added to each of 9, 15, 21 & 31 the numbers so obtained are in proportion. What is the Mean proportion between the numbers $(3x-2)$ and $(5x+4)$.

$$\text{Sol: } \frac{9+x}{15+x} = \frac{3}{4} \Rightarrow 36 + 4x = 45 + 3x$$

$$x = 9$$

$$\frac{9+x}{15+x} = \frac{21+x}{31+x}$$

$$(3x-2) \quad (5x+4)$$

$$25$$

$$49$$

$$\Rightarrow \sqrt{25 \times 49} = 5 \times 7 = \boxed{35} \downarrow$$

Unit - 2nd

★ Topic - Partnership ★

⇒ Capital - The Money which is invested.

Time - The time for which Investment Money is invested.

Profit - Money profit at the end.

$$\boxed{\text{Profit} = \text{Capital} \times \text{Money}} \star$$

Q1. Ram started a business investing a sum of Rs. 40,000. Six Months later, Vivek joined by investing Rs. 20,000. If they make a profit of Rs. 10,000 at the end of the year, how much share is of Vivek?

Soln:

Ram : Vivek

$$40,000 \times 12 : 20,000 \times 6$$

$$4 : 1$$

$$\text{Profit of Vivek} = \frac{1}{5} \times 10,000 = \underline{2000 \text{ Rs.}} \star$$

Q2 The ratio of Investment by A to that by B in a business is 14:15 and the ratio of their respective profits at the end of a year is 2:5.

Q3. If A invested the Money for 3 Months then for how much time (in Months) B invested his Money.

Sol ⁿ :	A	:	B
Capital	14	:	15
Time	3	:	T
Profit	2	:	5

$$\frac{42}{15T} = \frac{2}{5} \Rightarrow T = 7 \text{ Months}$$

$\therefore$ B invested his Money for 7 Months. $\$$.

Q3 A, B and C started a business. Thrice the investment of A is equal to twice the investment of B and also equal to four Times the Investment of C. If C's share out of the total profit is Rs. 4863, then the share of A in the profit is:

Sol ⁿ :	Capital	a : b
	Time	1 : 1
	Profit	a : b

$$3A = 2B = 4C$$

$\swarrow \quad \downarrow \quad \swarrow$
 12

$$A : B : C$$

$$4 : 6 : 3$$

$$\begin{array}{rcl} \times 1621 & \downarrow & \rightarrow 4863 \\ \hline 6484 & & 1 = 1621 \end{array}$$

$\therefore$ Share of A in Profit = 6484 Rs. $\$$.

Unit - 2nd

* Topic - Percentage *

$$\begin{array}{ccc} a\% & = & \frac{a}{100} \\ \downarrow & & \downarrow \\ \text{Percent} & & \text{fraction} \end{array}$$

$$\text{Ex: } 20\% = \frac{20}{100} = \frac{1}{5}$$

#

Increases by 10%.

$$\begin{array}{ccc} 100 & \longrightarrow & 110 \\ 10 & \longrightarrow & 11 \end{array} \quad 10\% = \frac{1}{10}$$

Decreases by 20%.

$$\begin{array}{ccc} 20\% & = & \frac{20}{100} = \frac{1}{5} \\ 100 & \longrightarrow & 80 \\ 5 & \longrightarrow & 4 \end{array}$$

Q1. If Income of A is 40% less than income of B, then find how much Income of B is greater than A?

Soln:

$$\begin{array}{cc} A & : & B \\ 60 & & 100 \end{array}$$

$$\begin{array}{c} 3 : 5 \\ \frac{2}{3} \times 100 = 66.66\% \end{array}$$

Q2. Ram's Income was reduced by 10%. By what percentage should the income be increased to bring it back to the previous level?

Soln:

$$10 : 9$$

$$9 : 10$$

$$\frac{1}{9} \times 100 = 11 \frac{1}{9} \%$$

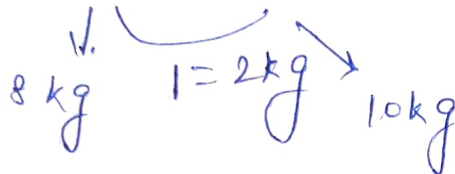
Q3 If the price of rice decreases by 20%, a person can buy 2 kg more rice for Rs. 800. Tell the new price of Rice.

Solⁿ:

Before After

R 5 : 4

C 4 : 5

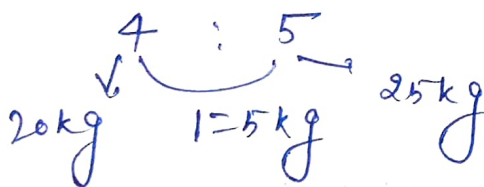


$$\frac{800}{10} = 80 \text{ Rs.} \rightarrow$$

Q4. Due to 20% reduction in the price of wheat 5 kg more wheat can be purchased for Rs. 320. Tell the initial price of wheat.

Solⁿ:

100 80
5 4



$$\frac{320}{20} = 16 \text{ Rs.}$$

$\therefore$ Initial Price of Price = 16 Rs. $\rightarrow$

Q5. A person saves 15% of his Monthly income. If his Monthly expenditure is Rs. 17000 What is his Monthly income.

Solⁿ:

I = 100%

85% = 17000

100% = 20,000 *

Q. 6. A number was first reduced by 30% and then increased by 20%. Tell the percentage increases or decreases in the number.

Solⁿ:

$$\frac{100 \times 70}{100} \times \frac{120}{100} = 84\%$$

Decrease by 16%. *

Q7. The Price of Sugar increases by 20%. By how many kilograms must a family reduce consumption so as to increase total expenditure by 5%, where the initial consumption was 280 kg.

Solⁿ:

	Before	After
R	100	120
C	120	100

↓ 5%

$$120 : 105$$

$$\begin{array}{r} 8 : 7 \\ \hline 1 \end{array}$$

$$\begin{array}{l} 8 = 280 \\ \boxed{1 = 35} \text{ kg. } * \end{array}$$

Unit - 3

★ Time and Work ★

$$\text{Time} \propto \frac{1}{\text{Efficiency}}$$

Efficiency $\rightarrow$ Work done in a particular time.

Q1. A can do a work in 30 days and B can do the same work in 60 days. In how many days will both of them together do this work?

Solⁿ:

	T	E
A	30 D	2
B	60 D	1
		<u>3 = Total</u>

$$\frac{60}{3} = \frac{\text{Total work}}{\text{Efficiency}}$$

$$= 20 \text{ days.}$$

Q2. A can do a work in 4 hours, B and C can do the same work in 3 hours and A and C can do the same work in 2 hours. In how many hours will B alone do the work?

Solⁿ:

	T	IN	E
A	4		3
B+C	3	(12)	4
A+C	2		6

$$\frac{12}{1} = (12)$$

So, B alone do work in 12 hours.

Q3 A does $\frac{7}{10}$ th of the work in 15 days. After that he completes the remaining work with the help of B in 4 days. In how many days will A and B together finish the work?

Solⁿ:

$$\text{Remaining work} = 1 - \frac{7}{10} = \frac{3}{10}$$

$$A+B = \frac{3}{10} \text{ Work} = 4 \text{ days}$$

$$1 \text{ Work} = 4 \times \frac{10}{3} = \frac{40}{3} \text{ days.}$$

Q4. A does 3 times the work of B. If A completes a work in 12 days, then in how many days will both of them together complete the work?

Solⁿ:

$$A \rightarrow 12 \text{ days}$$

Two workers A and B can complete a work in 5 days. If A works twice as fast, the work will be completed in 3 days. In how much time will A alone complete the work?

Solⁿ:

$$W = (A+B) \times 5 = (2A+B) \times 3$$

$$5A + 5B = 6A + 3B$$

$$\frac{A}{B} = \frac{2}{1}$$

$$W = (2+1) \times 5 = 15$$

$$\frac{15}{2} = 7\frac{1}{2} \text{ days.}$$

Q6. The ratio of capacities of A, B and C is 3:4:5. What will be the ratio of time taken by them to complete a work?

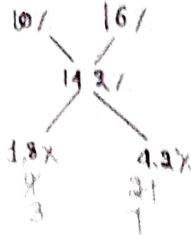
Solⁿ:

	A	:	B	:	C
E	3	:	4	:	5
T	20	:	15	:	12

$$LCM = 60$$

11. A trader had 2000 kgs of rice. He sold a part of it at 10% profit and the rest at 16% profit, so that he made a total profit of 14.2%. How much rice (in kg) did he sell at 10% profit?

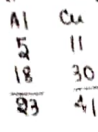
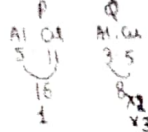
किरी विक्रेता के पास 2000 किग्रा चावल हैं। इसके एक भाग को वह 10% लाभ पर तथा बचे हुए भाग को 16% लाभ पर बेचता है ताकि उसे कुल लाभ 14.2% हो। उसने कितने किग्रा चावल 10% लाभ पर बेचा?



- A. 1400
B. 600
C. 800
D. 1000

12. P and Q are two alloys of aluminium and copper. The ratios of aluminium and copper in P and Q are 5 : 11 and 3 : 5, respectively. If a third alloy is formed by mixing alloys P and Q in the ratio of 1 : 3, then aluminium is what percentage (rounded off to the nearest integer) of the copper in the third alloy?

P और Q एल्युमिनियम और कॉपर की दो मिश्रधातु हैं। P और Q में एल्युमिनियम और कॉपर का अनुपात क्रमशः 5 : 11 और 3 : 5 है। यदि मिश्र धातु P और Q को 1 : 3 के अनुपात में मिलाकर एक तीसरी मिश्र धातु बनाई जाती है, तो एल्युमिनियम तीसरी मिश्र धातु में कॉपर का कितना प्रतिशत (निकटतम पूर्णांक तक पूर्णांकित है)?



$$\frac{23 \times 104}{40} = 56\%$$

- A. 63%
B. 52%
C. 48%
D. 56%

13. An alloy contains 40% of silver, 30% of copper and 30% of nickel. How much silver (in kg) should be added to 25 kg of the alloy so that the new alloy contains 50% of silver?

एक मिश्र धातु में 40% चांदी, 30% तांबा और 30% निकेल है। 25 किग्रा मिश्र धातु में कितनी चांदी (किग्रा में) मिश्रित की जानी चाहिए ताकि नए मिश्र धातु में 50% चांदी हो जाए?

$$25 \text{ kg} \times \frac{40}{100} = 10 \text{ kg}$$

$$\frac{(25+x) \times 50}{100} = 10+x$$

$$25+x = 20+2x$$

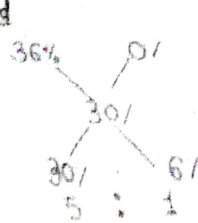
$$x = 5 \text{ kg}$$

- A. 5
B. 10
C. 12
D. 20

14. A vessel contained a solution of acid and water, in which water was 64%. Four litres of the solution was taken out of the vessel and the same quantity of water was added. If the resulting solution contains 30% acid, the quantity (in litres) of the water in the solution, at the beginning in the vessel, was?

एक पात्र में अम्ल और पानी का विलयन था, जिसमें पानी 64% था। पात्र से चार लीटर विलयन निकाल लिया गया और उतनी ही मात्रा में पानी मिला दिया गया। यदि परिणामी विलयन में 30% अम्ल है, तो आरम्भ में पात्र के विलयन में पानी की कितनी मात्रा (लीटर में) थी?

Ans



$$\frac{34 \times 64}{100} = 21.76$$

- A. 11.36
B. 15.36
C. 8.64
D. 12.64



17. A drink of chocolate and milk contains 8% pure chocolate by volume. If 10 litres of pure milk are added to 50 litres of this drink, the percentage of chocolate in the new drink is :

चॉकलेट और दूध के पेय पदार्थ में चॉकलेट के हिस्से से 8% शुद्ध चॉकलेट है। यदि इस पेय पदार्थ की 50 लीटर मात्रा में 10 लीटर शुद्ध दूध मिलाया जाता है, तो नए पेय पदार्थ में चॉकलेट का प्रतिशत ज्ञात कीजिए।

$$\frac{8}{100} \times 50 = 4$$

$$\frac{4}{60} \times 100$$

- A. 6%
B. 5%
C. 5%
D. 6%



18. The ratio of milk to water in a 100 litres mixture is 2 : 3. 10 litres of this mixture is withdrawn and replaced with milk. This process is repeated 2 more times. What is the percentage of milk in final mixture?

100 लीटर के एक मिश्रण में दूध और पानी का अनुपात 2 : 3 है। इस मिश्रण में से 10 लीटर निकाल लिया जाता है तथा उतना ही दूध डाल दिया जाता है। यह प्रक्रिया 2 बार और दोहराई जाती है। अंतिम मिश्रण में दूध का प्रतिशत क्या है?

$$\frac{10}{100} = \frac{1}{10}$$

$$\frac{10}{100} = \frac{1}{10}$$

$$\frac{10}{100} = \frac{1}{10}$$

$$\frac{40}{100} = \frac{2}{5}$$

$$\frac{60}{100} = \frac{3}{5}$$

Water Content Same 20%

- A. 58.28% Milk
B. 54.27%
C. 58.21%
D. 51.24%

Water 60L (40%)

43.14 (Water)



19. A mixture of milk and water measures 60 litres. It contains 10% water. How much water should be added to it, so that the water may be 25%?

दूध और पानी के मिश्रण का परिमाण 60 लीटर है। इसमें 10% पानी है। इसमें और कितना पानी मिलाया जाना चाहिए ताकि पानी 25% हो जाए।

$$\frac{60 \times 10}{100} = \frac{x \times 75}{100}$$

72L

- A. 18 litres
B. 14 litres
C. 16 litres
D. 12 litres



20. A beaker contains acid and water in the ratio 1 : x. When 300 ml of the mixture and 50 ml of water are mixed, the ratio of acid and water becomes 2 : 5. What is the value of x?

एक बीकर में एसिड और पानी का अनुपात 1 : x है। जब 300 ml मिश्रण और 50 ml पानी को मिलाया जाता है तो एसिड और पानी के मिश्रण का अनुपात 2 : 5 हो जाता है। x का मान क्या होगा?

$$\frac{300}{100} = \frac{2}{5}$$

$$\frac{300}{100} = \frac{2}{5}$$

$$\frac{300}{100} = \frac{2}{5}$$

- A. 2
B. 1
C. 3
D. 4