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REDEFINING

CAMPUS PLACEMENTS

APTITUDE

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A1

LCM, HCF, Operations and Problems on Numbers

Important Results

For two numbers, a*b = LCM (a, b) * HCF (a, b).

HCF of $(\frac{a}{b}, \frac{c}{d}, \frac{e}{f})$ = $HCF\ of$ (a, c, e)/ $LCM\ of$ (b, d, f)

LCM of $(\frac{a}{b}, \frac{c}{d}, \frac{e}{f})$ = $LCM\ of$ (a, c, e)/$HCF\ of$ (b, d, f)

Relatively Prime or Co-Prime Numbers: Two positive integers are said to be relatively prime to each other if their highest common factor is 1.

Factors

If $N = p^a \times q^b \times r^c \ldots$, where p, q and r are the prime factors. Then,

Number of factors of N = (a + 1)(b + 1)(c + 1). . ,

Sum of factors of N = $\frac{p^{a+1}-1}{p-1} \times \frac{p^{b+1}-1}{q-1} \times \frac{r^{c+1}-1}{r-1} \times \ldots$,

Product of factors of N = $\mathbf{N^{n(f)/2}}$

Number of Square factors Of N = $\{Q(\frac{a}{2})+1\} \times \{Q(\frac{b}{2})+1\} \times \{Q(\frac{c}{2})+1\} \times \ldots$,

Number of Cube factors Of N = $\{Q(\frac{a}{3})+1\} \times \{Q(\frac{b}{3})+1\} \times \{Q(\frac{c}{3})+1\} \times \ldots$,

Finding the Unit's Digit or Right most digit

a^n	1	2	3	4	Cyclicity
1	1	1	1	1	1
2	2	4	8	6	4
3	3	9	7	1	4
4	4	6	4	6	2
5	5	5	5	5	1
6	6	6	6	6	1
7	7	9	3	1	4
8	8	4	2	6	4
9	9	1	9	1	2

$1^n=1$ (n= 1,2 3,4,....k)

$4^{Odd}=4$, $4^{Even}=6$

$5^n=5$, $6^n=6$

$9^{Odd}=9$, $9^{Even}=1$

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When the power of 2, 3, 7 and 8 is multiple of 4 then the unit's digit will be as follows

2^{4k} -> Ending with 6	3^{4k} -> Ending with 1.	7^{4k} -> Ending with 1.	8^{4k} -> Ending with 6.

Remainder Theorem

1.) $\frac{(a+1)^n}{a}$ =R(1)

2.) $a^n/(a+1)$ ={R(1) if n= Even, R(a) if n=odd}

3.) x^n+y^n is divisible by x+y when n= odd

4.) x^n-y^n is divisible by x+y when n= even

5.) $a^{m-1} \equiv 1 \pmod m$

[Ex: $5^{71-1}/71=R(1)$*]*

Consecutive or Trailing Zeros

$$\sum_{i=1}^{k} n/5^i = \left[\frac{n}{5}\right] + \left[\frac{n}{5^2}\right] + \left[\frac{n}{5^3}\right] + \cdots + \left[\frac{n}{5^k}\right]$$

Practice

1.) Find the smallest number that leaves a remainder of 4 on division by 5, 5 on division by 6, 6 on division by 7, 7 on division by 8 and 8 on division by 9?

A)2519 B)5039 C)1079 D)979

2.) What is the greatest number that will divide 964, 1238, and 1400 leaving remainder of 41, 31, and 51 respectively?

A) 58 B) 64 C) 69 D) 71

3.) Find the greatest number which divides 96,134 and 229 leaving the same remainder.

A) 19 B) 17 C) 9 D) 13

4.) A red light flashes three times per minute and a green light flashes five times in 2 minutes at regular intervals. If both lights start flashing at the same time, how many times do they flash together in each hour?

A) 30 B) 24 C) 20 D) 60

5.) While teaching theory of numbers, a professor mentioned three numbers to his students. The numbers were 720, 16 and 144. The teacher then said, "The first two numbers are the LCM and HCF of two numbers and the third is one of the two numbers. What is the other number?

A) 96 B) 80 C) 64 D) Cannot be determined

6.) Find the L.C.M. of $\frac{108}{375}, 1\frac{17}{25}, \frac{54}{55}$ =?

A)678/5 B)289/5 C)$151\frac{1}{5}$ D)$238\frac{3}{5}$

7.) The 6 digit number 2x45x2 is divisible by 18. How many different values can be substituted in the place of x?

A) 1 B) 2 C) 3 D) None

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8.) If the 9-digit number 807x6y9z8 is divisible by 99, the value of $\sqrt{x+y+z}$

A) 6 B)$\sqrt{5}$ C) 4 D) $3\sqrt{3}$

9.) How many pairs of positive integers x, y exist such that HCF of x and y = 35 and sum of x and y = 1085?

a) 12 B) 8 C) 15 D) 30

10.) What is the remainder of 32^{32} when it is divided by 17?

A) 3 B) 5 C)2 D) 1

11.) What is the remainder of 1!+2!+3!+4!+.....+50! when it is divided by 30?

A)3 B) 5 C)2 D)1

12.) What is the remainder of 7^{101} when it is divided by 25?

A) 20 B) 16 C)18 D) 15

13.) How many consecutive zeros or trailing zeros are there at the end of 125!?

A) 30 B)31 C) 32 D)25

14.) Find the unit digit of the expression $1^{481}+2^{481}+3^{481}+.....+9^{481}$

A) 0 B)5 C)3 D)4

15.) All even numbers from 2 to 98 inclusive, except those ending in 0, are multiplied together what is the right most digit of the product?

A) 0 B)2 C)4 D)6

16.) Which of the following will completely divide 26^{80} -19^{80} ?

A) 45 B) 7 C) 315 D) A, B And C E) None of These

A2

Module-2

1.) Simplification 2.) Decimal & Fractions 3.) Square Root and Cube Root

Important Results

1. $a^3 - b^3 = (a-b)(a^2+b^2+ab)$ 2. $a^3 + b^3 = (a+b)(a^2+b^2-ab)$

3. $(a+b+c)^2 = a^2+b^2+c^2+2(ab+bc+ca)$ 4. $a^m . a^n = a^{m+n}$ 5. $\frac{a^m}{a^n} = a^{m-n}$

6. $(a^m)^n = a^{mn}$ 7. $a^n = 1/a^{-n}$ 8. $a^{p/q} = \sqrt[q]{a^p}$ 9. $\sqrt{a\sqrt{a\sqrt{a} \dots \dots . . n\ times}} = a^{1-\left(\frac{1}{2}\right)n}$

10. $(a * b)^n = a^n * b^n$

Exercise

1.) Find the value of (0.75 * 0.75 * 0.75 + 0.001) / (0.75 * 0.75 - 0.075 + 0.01)

A) 0.85 B) 1.908 C) 2.312 D) 0.001

2.) If $x^2 + y^2 + 2x + 1 = 0$, then the value of $x^{31} + y^{35}$ is?

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

3.) Find the value of $\sqrt{30+\sqrt{30+\sqrt{30+\cdots+}}}$ .....+∞=

A)5 B) -5 C) 4 D) 6

4.) $\sqrt{400\sqrt{400\sqrt{400\ldots}}}\infty$= ?

A)20 B)40 C)400 D) None of these

5.) If $x=2+\sqrt{3}$ then what is the value of x^2+x^{-2}

A)15 B)14 C)16 D)18

6.) What is the value of $(1.87-1.13)^2+(1.87+1.13)^2/(1.87*1.87+1.13*1.13)$?

A)2 B)3 B)4 C)0.74

7.) If $25\sqrt{5}\times25^3\div5^{-3/2}=5^{a+2}$, the value of a is:

A)4 B)5 C)6 D)8

8.) 1. $\overline{85}$ Convert the decimal into the improper fraction?

A)84/99 B)85/90 C)184/99 D)185.99

9.) $0.2\overline{85}$ convert the decimal into the proper fraction.

A)283/990 B)283/999 C)280/999 D)None of these

10.) $(0.000729)^{-3/4} X (0.09)^{-3/4}$= .....

a)$10^3/3^3$ b)$10^5/3^5$ c)$10^2/3^2$ d)$10^6/3^6$

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11.) simplify $4+\cfrac{12}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{1+\cfrac{1}{\ldots\infty}}}}}$ a)8 b)6 c) 10 d) 12/5

12.) What is the value of $\sqrt{25+10\sqrt{6}}+\sqrt{25-10\sqrt{6}}$ =?

a) $2\sqrt{5}$ b) $\sqrt{55}$ c) $2\sqrt{15}$ d) 50 e) 60

13.) The square root of 16641 is

A. 129 B. 121 C. 211 D. 229

14.) $\sqrt{0.0576}$ ×?=0.24

A)10 B) 1 C) 0.1 D) None of these

15.) $\sqrt{0.000256}$ × ?=1.6

A) 0.1 B)10 C)10000 D)100

16.) A group of students decided to collect as many paise from each member of group as is the number of members. If the total collection amounts to Rs. 9801, the number of the members in the group is

A)101 B) 98 C) 99 D) 88

17.) The square root of 123454321 is =?

A)111111 B)12341 C)11111 D) 11211

18.) The number of digits in the square root of 625685746009 equals to

A)4 B)5 C)6 D)7

19.) Which of the following is not a perfect square?

A)1336336 B)361201 C)622521 D)4344481 E) None of these

20.) Find the value of $\sqrt[3]{\sqrt{0.000729}}$ =

A) 0.027 B) 0.009 C) 0.09 D)0.003

Module-3

1. Problems on Ages 2. Partnership 3. Ratio and Proportion

Problems on Ages

1.) The present age of Stalin's father is four times Stalin's present age. Five years back, Stalin's father was seven times as old as Stalin was at that time. What is the present age of Stalin's father?

A) 84 years B) 70 years C) 40 years D) 35 years

2.) A man said to his son, "I was two-third of your present age when you were born". If the present age of the man is 60 years, find the present age of the son.

A) 24 years B) 28 years C) 30 years D) 36 years

3.) Ronith was born two years after his father's marriage. His mother is five years younger than his father but 20 years older than Ronith who is 10 years old. At what age did the father get married?

A) 25 years B) 24 years C) 23 years D) 22 years

4.) Revathi told her friends that if she added ten times her age ten years from now to five times her age five years ago is same as the 20 times of her current age. How old Revathi will be ten years from now?

A)15 years B) 20 years C) 23 years D) 25 years

5.) Mourya told Arthi, "I am four times as old as you were when I was your present age and also I am 9 years older than you" What is Mourya's age?

A) 12 B)18 C)21 D) Data Insufficient

6.) The number of seats in a row is equal to the total number of rows in a hall. The total number of seats in the hall will increase by 375 if the number of rows is doubled and the number of seats in each row is reduced by 5. Find the number of rows in the hall at the beginning.

A) 27 B) 32 C)25 B) 30

7.) When an amount was distributed among 14 boys, each of them got Rs. 80 more than the amount received by each boy when the same amount is distributed equally among 18 boys. What was the amount?

A) Rs. 5040 B) Rs. 5820 C) Rs. 5802 D) Rs. 3920

8.) Vimala, her father and her grandfather have an average age of 53. One-half of her grandfather's age plus one-third of her father's age plus one fourth of Vimala's age is 65. If 4 years ago Vimala's grandfather was four times as old as Vimala then how old are Vimala, Father and her grandfather respectively?

A) 24,51,84 B) 24, 49,86 C)21, 54, 84 D) 22, 54, 84

9.) The sum of two numbers is 15. If the sum of their reciprocals is 3/10, find the greatest number.

A)9 B)10 C)8 D)12

10.) Radha told Krishna "12 times the date and 31 times the month on which I was born sums up to 376". What is the date and month of her birth?

A) June 24 B) April 21 C) March 30 D) March 27

11.) The number of seats in a row is equal to the total number of rows in a hall. The total number of seats in the hall will increase by 375 if the number of rows is doubled and the number of seats in each row is reduced by 5. Find the number of rows in the hall at the beginning.

A) 27 B) 32 C)25 B) 30

12.) An apple seller is having some apples. He is selling half of the apple what he has plus half the apple to the first customer. In the same way he sells the remaining apple to 7 customers. After selling to 7 customers, he has no apples with him

A) 128 B) 63 C) 127 D) 124

13.) A father given Rs.100 to his son and asked him to buy 100 apples for 100 Rs. The boy saw 3 type of apples, best kind which cost 10 Rs, average kind cost Rs. 5 & worst kind of Rs. 0.5 How much apples of average kind did he buy?

A)10 B) 21 C) 32 D)9

Ratio and Proportion

1.) If 1300 bananas are distributed among three monkeys in the ratio 1/2 : 1/3 :1/4. How many bananas did the first monkey get?

A) 650 B) 300 C) 400 D) 600

2.) The costs of a cow and a horse are in the ratio of 9:5. If the cost of a cow is Rs. 4200 more than a horse. Find the cost of the horse.

A) Rs. 9450 B) Rs. 5250 C) Rs.4500 D) Rs.4250

3.) A cat takes 5 leaps for every 4 leaps of a rat, but 3 leaps of the rat equal to 4 leaps of the cat. What is the ratio of the speed of the cat to that of the rat?

A) 11:15 B) 15:11 C) 16:15 D) 15:16

4.) In a 100 m race, A beats B by 20 m and B beats C by 30 m. By what distance does A beat C in 300 m race?

A) 132 m B) 142 m C) 72 m D) 60 m

5.) Rs. 5783 is divided among A, B, and C in such a way that if Rs. 28, Rs. 37 and Rs. 18 are deducted from their respective shares, then their share of money would be in the ratio 4: 6: 9. What is the share of A (in Rs.)?

A) Rs.1256 B) Rs.1259 C) Rs.1228 D) Rs.1456

6.) In a forest reserve, the ratio of the number of deers, bear and fox is 3:7:5. If the difference between the number of deers and bears is a multiple of 3 as well as 7, what is the minimum number animal in the park?

A) 315 B)310 C)45 D) Cannot be determined

7.) A sum of Rs. 540 is divided among three friends A, B and C. A got 1/2 of what the other two got together, B got 1/3 of what the other two got. Find the difference of amounts received by A and B.

A) 30 B) 45 C) 90 D) 135

8.) The number of students in three sections A, B and C are in the ratio 7 : 8 : 5. If 5 students are shifted from B to A, the ratio of the students in their two sections interchange. Find the number of students in section A initially.

A) 45 B) 40 C) 30 D) 35

9.) A fires 5 shots to B's 3 but A kills only once in 3 shots while B kills once in 2 shots. When B has missed 27 times, A has killed:

A) 30 Birds B) 60 Birds C) 72 Birds D) 90 Birds

10.) A and B have incomes in the ratio 5: 3. The expenses of A, B and C are in the ratio 8: 5: 2. If C spends Rs. 2000 and B saves Rs. 700, A's saving (in Rs.) is:

A) 2500 B)1000 C)1500 D) 500

Partnership

1.) If A invests Rs. 3000 for 6 months and B invests Rs. 5000 for 8 months in a business, and they share the profit in the ratio 3:5, what is A's share of the profit if the total profit earned is Rs. 4000?

A) Rs. 1200 B) Rs. 1500 C) Rs. 1600 D) Rs. 1800

Muni & Arasu invested Rs.15000 and Rs.18000 respectively in a business. If the total profit at the end of the year is Rs.8800 and Muni being an active partner gets an additional 12.5% of the profit. Find the total profit of Muni.

A) 3,500 B) 1,110 C) 4,500 D) 4,600

A and B entered into partnership with capitals in the ratio 4 : 5. After 3 months, A withdrew 1/4 of his capital and B withdrew 1/5 of his capital. The gain at the end of 10 months was Rs. 760. A's share in this profit is?

A) Rs 330 B) Rs 360 C) Rs 380 D) Rs 430

A4

Module-4

1.Time and Work 2. Pipes and Cistern 3. Chain Rule 4. Number Series

Time and Work

Important Results

1. $Man\ power\ \alpha\ \frac{1}{Time}$ 2. $Time\ \alpha\ \frac{1}{Efficient}$

3.) ***Man power α Amount of work*** if Time is constant.

4.) ***Days α Amount of work*** if man power is constant.

5.) If N men can do a task in T days, then, M+N men can do the same task in $\frac{NT}{M+N}$ days

6) If M_1 men can do W_1 work in D_1 days working H_1 hours per day and M_2 men can do W_2 work in D_2 days working H_2 hours per day, then,

$$\frac{N1*D1*H1}{W1} = \frac{N2*D2*H2}{W2}$$

Exercise

1.) A can complete a piece of work in 40 days. He worked for 8 days and left. The remaining work was then completed by B in 24 days. In how many days will the work be done by B alone?

A) 32days B) 30 days C)35 days D)40 days

2.) A, B and C can complete a job working individually in 24, 32 and 48 days respectively. If they work together, in how many days will they complete the work?

A) 15 1/3 B) 11 2/3 C) 10 2/3 D) 16 1/3

3.) A and B together can do a piece of work in 24 days, B and C together in 30 days, while C and A together in 40 days, if they all work together the work will be completed in ?

A) 10 B)12 C)20 D)25

4.) A, B and C can do a certain task in 20, 15 and 12 days respectively. A keeps working continuously but B and C are working with A on alternative days (A&B on first day, A&C on second day and so on) . In how many days the work will be completed?

A)6 B)5 C)8 D)4

5.) A can complete a work in 10 days, B in 12 days and C in 15 days. All of them began to work together, but A had to leave after 2 days and B 3 days before the completion of the work. How long did the work last?

A)6 B)7 C) 8 D)10

6.) Working alone, three persons Muni, Sanjay, and Rajesh can do a certain job in 10, 12, and 15 days respectively. What is the ratio of the maximum and minimum days taken to complete the job, if least 1 person must work at every hour?

A) 1:3 B) 12:5 C) 15:4 D) 9:4

7.) B is 20% more efficient than A. If A can complete a piece of work in 30 days, then in how many days can both A and B complete the work?

A) 11 5/11 B) 13 7/11 C) 15 5/11 D) 17 5/11

A4

8.) A completed 20% of the work in 4 days and then B and C joined A. A is twice as efficient as B and B is twice as efficient as C. How many days will all the three persons take to complete the remaining work?

A) 6 days B) 10 days C) 11 3/7 days D) 8 days E)9 1/7

9.) 10 men can complete a work in 7 days and 10 boys take 14 days to complete the work. How many days will 5 men and 10 boys take to complete the work?

A)3 B) 5 C) 7 D) 14 E) None of these

10.) If 42 men completed 2/5th of a work in 12 days working 8 hours a day. How many more man should be engaged to finish the rest of the work in 14 days working 6 hours a day?

A) 54 B) 45 C) 18 D) 28 E) None of these

11.) 40 men can complete a piece of work in 15 days. 20 more men joined them after 5 days they start doing work. How many days will be required by them to finish the remaining work?

A) 7 2/3 Days B) 6 1/5 Days C) 8 1/4 Days D) 6 2/3 Days

12.) If 8 men or 12 women can do a piece of work in 30 days, then how many men should join 6 women to complete the work in 20 days?

A) 6 B) 5 C) 4 D) 8

13.) Two pipes A and B can fill a tank in 20 minutes and 30 minutes respectively. Both the pipes are opened together but after 6 minutes, pipe A is turned off. What is the total time required to fill the tank?

A)20 Minutes B)30 Minutes C) 21 Minutes D) 25 Minutes

14.) Three taps A, B and C can fill a tank in 12, 20 and 30 hours respectively. If A is open all the time and B and C are open for one hour each alternately, the tank will be full in:

A) 6 hours B) 5 ½ hours C) 7 ½ hours D) 8 hours

15.) Two pipes can fill a tank in 30 and 24 minutes respectively and a waste pipe can empty 3 litres per minute. All the three pipes working together can fill the tank in 20 minutes. The capacity of the tank is:

A) 60 litres B) 100 litres C)120 litres D)180 litres

16.) Two pipes A and B can fill the cistern in 36 minutes and 48 minutes respectively. After how long pipe B should be closed so that the cistern can be filled in 27 minutes

A) 8 B) 12 C) 20 D)30

Number Series

What will come in place of the question marks in the following number series?

1.) 11, 20, 38, 74, ?

a) 146 b)154 c)128 d)132

2.) 24, 28, 19, 35, 10, ?

a)26 b)36 c)16 d)46

3.) 4, 7, 11, 18, 29, 47, ?, 123, 199

a) 76 b)70 c)84 d)102

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4.) 4, 18, ?, 100, 180,294

a)32 b)36 c)48 d)40

5.) 1,2,5,13,34,89, ?

a)123 b)144 c)110 d)124

6.) 3, 6, 9, 15, 24, 39, 63, ?

a)100 b)87 c)102 d)99

7.)2, 3, 7, 25, ? , 721

a)120 b) 361 c)121 d)36

8.) 2, 3, 5, 7, 11, 101, 131, ?

a) 141 b)151 c)149 d)None of these

9.)6, 24, 60, 120, 210, ?

a)336 b) 436 c)286 d)316

10.) 1→11→21→ 1211→ 111221→ ??????

a)112221 b)312211 c)212211 d)311221

11.) 9, 13, 21, 25, 33, 37, ?

a)41 b)43 c)45 d)39

12.) Find the one that does not belong to the group. 10, 11, 15, 24, 40, 67

a) 40 b) 24 c)15 d)67

1. Percentages **2. Profit and Loss** **3. Simple and Compound Interest**

Percentage

Important Results

1.) A is what percentage of B? $\Rightarrow \frac{A}{B} * 100$

2.) A is how much percent greater than B? $\Rightarrow \frac{A-B}{B} * 100$

3.) A is how much percent less than B? $\Rightarrow \frac{B-A}{B} * 100$

If the present population is P and it increases/decreases at a rate of R% per annum, then

Population after n years = $P*(1 \pm R/100)^n$

Population n years ago = $P/(1 + R/100)^n$

A successive increase of a% and b% is equivalent to a net increase of: a+b+$(\frac{ab}{100})$%.

Product Constancy

P∝ 1/Q --------→ P*Q=Product

Increase/ Decrease in P	Increase/ Decrease in Q
25% or ¼ ↑	20% or 1/5 ↓
20% ↑	16.66% ↓
33.33% ↓	50% ↑
1/n ↑	1/n+1 ↓
X% ↑	(x/100+x) ↓
X% ↓	(x/100-x) ↑

Fraction ->Percentage

$\frac{1}{2} * 100 = 50\%$ $\frac{1}{3} * 100 = 33.33\%$ $\frac{1}{4} * 100 = 25\%$ $\frac{1}{5} * 100 = 20\%$

$\frac{1}{6} * 100 = 16.66\%$ $\frac{1}{7} * 100 = 14.28\%$ $\frac{1}{8} * 100 = 12.5\%$ $\frac{1}{9} * 100 = 11.11\%$

$\frac{1}{11} * 100 = 9.09\%$ $\frac{2}{11} * 100 = 18.18\%$ $\frac{2}{9} * 100 = 22.22\%$ $\frac{2}{7} * 100 = 28.56\%$

1.) 15% of 648 _____ 2.) 8% of 875_____ 3.) 11.11% of 1080_____

1.) What % of 540 is 189?_____

2.) 0.009 is what percent of 0.03_____?

3.) 1/59 is ____%? A) 1.25% B) 1.6% C) 1.69% D) 1.5%

4.) 45% of a number is 468, then the number is:

A5

Exercise

1.) Two numbers are respectively 20% and 50% more than a third number. What percentage is the first of the second?

A)30% B) 40% C) 80% D) 60%

2.) If the price of a sugar is increased by 20% then, how much percent must a householder reduce his consumption so as not to increase his expenditure?

A) 33.33 B) 16.66% C) 20% D) None

3.) In an election between two candidates, a person who got 58% of total votes won the election by a majority of 960. Find the total number of votes.

A) 6,000 B) 7,500 C) 8,000 D) 9600

4.) In a town, 20% of the total population speak Tamil, 50% of the remaining speak English and 30% of the remaining speak Kannada. The remaining 6300 people speak Malayalam. Find the total number of people in the town.

A) 20,000 B)22,500 C)25,000 D) None of these

5.) The population of a village is increased by 36% in the first year and then decreased by 25% in the second year. If the population after 2 years is 7650, what was the initial population?

A) Rs.8500 B) Rs.7500 C) Rs.8000 D) Rs.6000

6.) The price of an article is first increased by 25% and the by 20%. How much percent should be discounted to sell the product at original price?

A) 45% B) 50% C) 40% D) 48%

7.) The population of a town increases at 5% every year. If the present population is 8000 then, in how many years it will become 9261?

A)5 B)3 C)2 D)4

8.) The population of a Town is 500000 and 42% of males and 28% of females are married to the same town. Find the total number of males in the town.

A) 300000 B) 200000 C) 250000 D) None of these

9.) A student who secures 20% marks in an examination fails by 30 marks. Another student who secures 32% marks gets 42 marks more than those required to pass. The percentage of marks required to pass is

A)20 B)25 C)28 D)30

10.) A city has population of 3,00,000 out of which 1,80,000 are males. 50% of the population is literate. If 70% of the males are literate, then what percent of females are literate?

A)20% B)30% C)15% D) 25%

Profit and Loss

1) P% = $\frac{Profit}{Cp}$ * 100 **2) L% = $\frac{Loss}{Cp}$ * 100** **{ P= SP-CP, L=CP-SP}**

3.) CP= 5000 P% =12% SP= ? SP= 112% CP SP= 5600	4.) CP= 5000 L%= 8% SP= ? SP=92% CP SP= 4600	5.) SP= 7200 P%=20% CP= ? 120%=7200 Then 100%=	5.) SP= 6800 P%=15% CP= ? 85%=6800 Then 100%=

When the weight is reduced and an article is sold at CP, the profit percent will be

P%= $\frac{Reduction}{False\ Weight}$ * 100 [Reduction= True Weight – False Weight]

Exercise

1.) A merchant sold articles for Rs. 2400 and made a profit of 25% in the transaction. Find his profit percent if he had sold his articles for Rs. 2040.

A) 6.25% B) 7% C)6.20% D) 6.5%

2.) If the prices of a cow and a calf are integers and the price of a calf is 10 percent more than 50 percent of cow, what can be the value of cow?

A) 70 B) 50 C) 110 D) 120

3.) A shopkeeper sold a cow at a loss of 7%. But if he had sold at a profit of 9% then he would have fetched Rs. 64 more than it. What was the cost price?

A) Rs.380 B) Rs. 400 C) Rs. 450 D) None of these

4.) A horse and cow were sold for Rs.12000 each. The horse was sold at a loss of 20% and the cow at a gain of 20%. The entire transaction resulted in:

A) No loss or gain B) Loss of Rs.1000 C)Gain of Rs.1000 D) Gain of Rs.2000

5.) The total cost price of two articles is Rs.10000. On one article 20% profit is made and the other article is sold at 15% loss. If the total gain is 6%, then the cost price of an article sold at 20% profit.

A) 5000 B)4000 C)6000 D) 5500

6.) A person buys a horse for 15 pounds. After one year, he sells it for 20 pounds. After one year, again he buys the same horse at 30 pounds and sells it for 40 pounds. What is the overall profit percent for that person over both the transactions?

A) 15% B) 33.33% C) 45% D) 60%

7.) Munirasu bought 100kg of chrysanthemum flowers for Rs. 1200 and sold it to at loss as much money as he received for 20kg flowers. What is the percentage loss?

A)10.33% B)9% C)20% D)16.66%

A5

8.) When a discount of 25% is given on a marked price, a seller gains 25%. What percent of profit would have been made if 10% was given?

A) 30% B) 35% C) 36% D)50%

9.) By selling 50 meters of cloth, a merchant gains the cost of 10 meters. Find the gain percentage.

A) 25 % B) 33.33% C) 20 % D) 15 %

10.) By selling an item at 75% of its actual selling price, a trader incurs a loss of 10%. What will be the profit % if he sells the item at actual selling price?

A) 15% B) 20% C) 35% D) 16.66%

11.) A got 30% discount on the marked price of an article and sold for Rs. 8750 with 25% profit on the price he bought. Find the marked price.

A) Rs. 13000 B) Rs. 10000 C) Rs. 12000 D) Rs. 16000

12) A shopkeeper marks up his goods by 40% and gives a discount of 10%. Apart from this, he uses a faulty balance also, which reads 1000 gm for 800 gm. What is his net profit percentage?

A) 37.5% B) 57.5% C) 8% D) None

13.) After allowing a discount of 11.11%, trader still makes a gain of 14.28%. At how much percent above the cost price does he mark his goods?

A) 28.56% B)35% C)22.22% D) 25%

Simple and Compound Interest

Important Results

Let P=Principal, r=rate per annum and Time=n years.

Then S.I= p*n*r/100

Note: At S.I, Interest on 10% for 3years equals to the interest on 30% for one year

But same thing cannot be done true for C.I.

Let P=Principal, r=rate per annum and Time=n years.

C.I=p $(1+\frac{r)}{100})^n$ –p (Annually)

C.I=p $(1+\frac{r/2}{100})^{2n}$ –p (Bi-annually)

C.I=p $(1+\frac{r/4}{100})^{4n}$ –p (Quarterly) ; Total Amount= p $(1+r/100)^n$

Exercise

1.) Mohan borrowed Rs. 6000 from a money lender at a certain rate of interest for 4 years. He paid Rs. 1600 as an interest after 4 years. Find the rate of interest.

A) 6.66% B) 6.5% C) 8% D) 9%

2.) A certain amount at SI and CI becomes doubled in 4 years each. Find the difference in number of years when the same amount becomes 8 times respectively at S.I and C.I.

A5

A) 12 years B)16 years C)15years D) 10years

3.) Praveen invested certain amount at simple interest for 3 years at certain rate of interest. Had it been put at 1% higher rate, it would have fetched him Rs. 5100 more. The sum is:

A) Rs. 170000 B) Rs. 150000 C) Rs. 125000 D) Rs. 120000

4.) A sum becomes 1400 in 4 years and 1700 in 6 years. Find the rate of interest per annum.

A) 12.5% B)10% C)25% D) None of these

5.) A sum of Rs. 10,000 is lent under simple interest partly @7 % p.a. and the remaining @ 9% p.a. for one year. If the total interest earned is Rs.800 then find the sum invested @ 9% p.a.?

A) Rs. 5,500 B) Rs.5,000 C) Rs.4,000 D) Rs.4,500

6.) Sindhu invested some amount under simple interest @ 4% p.a. for the first two years, @ 5% p.a. for the next three years and @ 6% p.a. for the remaining years. If the total interest earned for the 6 years is Rs 1160 then find the sum.

A) Rs.3,500 B) Rs.3,750 B) Rs.4,500 D) Rs.4000

7.) What will be the difference in the compound interest on Rs. 50,000 at 12% for 1 year, when the interest is paid annually and bi-annually?

A) Rs. 500 B) Rs. 600 C) Rs. 180 D) Rs. 360

8.) At what rate of interest will a person earn an interest of Rs.4,641 on a sum of Rs. 10,000 for four years, interest being compounded annually?

A) 10% B) 8% C) 11% D) 9%

9.) Nirmala invested a sum of Rs. 12000 at 5% per annum compound interest. After how many years will she receive the amount Rs.13230?

A) 3 Years B)2 Years C) 4 Years D)2 ½ Years

10.) What will be the compound interest at the rate of 5% per annum for 3 years on that principal which in 3 years at the rate of 5% per annum gives Rs. 1200 as simple interest?

A) 1261 B)1240 C)1361 D) None of these

11.) Rs. 6000 amounts to 7200 in 4 years at a certain rate of compound interest. What will be the amount in 12 years?

A) 9375 B) 9500 C)10368 D) None of these

12.) Adithya bought a cow under the following scheme: Down payment of Rs. 15,000 and the rest amount at 8% per annum for 2 years. In this way, he paid Rs. 28,920 in total. Find the actual price of the cow (Assume simple interest).

A) Rs.26,000 B) Rs. 27,000 C) Rs. 27,000 D) Rs. 26,500

1. TSD 2. Problems on Trains 3. Boats and Streams 4. Race and Games

Time, Speed and Distance

Important Results

1. $Speed\ \alpha\ \frac{1}{Time}$

3.) $Speed\ \alpha\ Distance$ Where Time is constant.

4.) $Time\ \alpha\ Distance$ Where Speed is constant.

Unit Conversion

1) x km/hr = $(x * \frac{5}{18})$ m/s. 2) x m/s = $(x * \frac{18}{5})$ km/hr

3) 20min = 1/3 hr 4) 1/12 hr = 5 min

Average Speed = $\frac{Total\ Distance}{Total\ Time}$

1.) |_____**D1**_____| _____**D2**_____|____**D3**____|
t_1 **t_2** **t_3**

A.S = $\frac{D1+D2+D3}{t1+t2+t3}$

2.) |_____**D_1**_____| _____**D_2**_____|____**D_3**____|
S_1 **s_2** **s_3**

A.S = $\frac{D1+D2+D3}{\frac{D1}{s1}+\frac{D2}{s2}+\frac{D3}{s3}}$

3.) |_____**D**_____| _____**D**_____|
S_1 **s_2**

A.S= $\frac{2*s1*s2}{s1+s2}$

Relative Speed

S_1 km/hr→ *D km* *←S_2 km/hr|*

Meeting Time = $\frac{Initial\ Distance}{S1+S2}$

A=S_1 km/hr *D km* *B=**S_2**km/hr*

Crossing Time = $\frac{Initial\ Distance}{S1\sim S2}$

Exercise

1.) A person covers the distance of 4800m in 4 minutes. How much distance can he cover in 15 minutes?

A) 16km B)18km C)20km D)15.4km

2.) If a person walks at 16km/hr instead of 12km/hr, he would have walked 20km more. The actual distance travelled by him is

A) 50km B) 60km C) 48km D)80km

3.) Walking 4/5th of his usual speed, a man is 12 minutes too late. The usual time taken by him to cover that distance is

A) 60min B) 50min C)48min D) None of these

4.) Walking 6/7th of his usual speed, a man is 12 minutes too late. Then the time taken by him to cover the same distance with 3/2th of the speed is:

A) 1 hour B)1 hour 12 min C)1 hour 15 min D) None of these

5.) A person covers the distance of 160km at the speed of 40km/hr , next 150km at the speed of 50km/hr and the last 180km at the speed of 60km/hr, then what is his average speed in the whole journey?

A) 50km/h B) 55km/h C) 49km/h D) 52km/h

6.) A person travels each quarter of the distance at speeds of 10kmph, 20kmph, 30kmph and 40kmph respectively. What is the average speed of the journey?

A) 20kmph B) 19.2kmph C) 25kmph D) 30kmph

7.) Two stations A and B are 110km apart on a straight line. One train starts from A at 8 a.m. and travels towards B at 40kmph. Another train starts from B at 10 a.m. and travels towards A at 50kmph. At what time will they meet?

A) 12.20pm B)10.00 A.M C)10.20 A.M D) 10.30 A.M

8.) Two cars left, at 8 am, from the same point, one traveling East at 30 kmph and the other travelling North at 40 kmph. At what time will they be 200 km apart?

A)11 A.M B)11.30 A.M C)12P.M D)4 P.M

9.) Two buses start at the same time from Bangalore and Chennai and proceed towards each other at the rate of 45 kmph and 50 kmph respectively. When they meet, it is found that one of the buses has travelled 120 kms more than the other. Find the distance between the 2 stations.

A) 2,820km B) 4,280km C)1,200km D) 2,160 Km E) 2, 280km

10.) TVC mail leaves Chennai central for Trivandrum at 17:30 hrs and reaches Trivandrum at 21:30 hrs. While Chennai Express, which leaves Trivandrum at 17:00 hrs reaches Chennai at 20:30 hrs. At what time do they pass each other?

A) 19:06 B) 16:04 C) 19:16 D) 17:36

Trains

1.) The ratio between the speeds of two trains is 2:3. If the second train runs 540 km in 6 hours, then what is the speed of the first train?

A)60 km/hr B) 54 km/hr C) 65 km/hr D) 81 km/hr

2.) A train running at the speed of 90 km/hr crosses a man standing on the platform in 16 seconds. What is the length of the train?

A)380 meters B)300 meters C)400 meters D)450 meters

3.) A train running at the speed of 90 km/hr crosses a man standing on the platform in 16 seconds. How long will the train take to cross the bridge having the length of 250m?

A) 28sec B)26sec C) 20sec D) 18sec

4.) A train 150 metres long and travelling at 72 km/hr can cross the bridge in 20 seconds, What will be length of the bridge?

A)200 m B)250 m C)245 m D) 230 m

5.) Two trains 220 m and 200 m long run at the speed of 54 km/hr and 72 km/hr respectively in opposite directions on parallel tracks. The time (in seconds) which they take to cross each other, is:

A) 11 sec B) 9 sec C) 10 sec D) 12 sec

6.) How many seconds will a 560metre long train take to cross a man walking with a speed of 9 km/hr in the direction of the moving train if the speed of the train is 72 km/hr?

A) 32sec B) 35sec C) 40sec D) 36sec

Boats and Streams

1.) A boat running downstream covers a distance of 16 km in 2 hours while for covering the same distance upstream, it takes 4 hours. What is the speed of the boat in still water?

A) 4 kmph B) 6 kmph C) 8 kmph D) Data inadequate

2.) A man can row a boat at a speed of 20 km/hr in still water. If the speed of the stream is 5 km/hr, in what time he can row a distance of 75 km upstream?

A)3.5 hours B)2.5 hours C)3 hours D)5 hours

3.) The speed of a boat in still water in 12 km/hr and the rate of current is 3 km/hr. The distance travelled downstream in 40 minutes is:

A)8 km B)4 km C) 6 km D) 10km

4.) A motorboat travels 16 km in 2 hours against the stream and travels the next 8 km along with the stream in 40 minutes. How long will it take a motorboat to travel 40 km in still water?

A) 4 hours B)3 hours C)3.5 hours D)4.5 hours

5.) Ratio of the speeds of downstream and upstream is 5 : 2. If 140 km is travelled by downstream in 4 hours then find the difference between speed of boat in still water and speed of stream?

A)15 km/hr B)14 km/hr C)20 km/hr D)25 km/hr

6.) A boat travels 24 km upstream in 6 hours and 20 km downstream in 4 hours. Then the speed of boat in still water and the speed of current are respectively.

A)4 kmph and 3 kmph B) 4.5 kmph and 0.5 kmph C) 4 kmph and 2 kmph D) 5 kmph and 2 kmph

Race and Games

11.) In a race of 200 m, A can beat B by 31 m and C by 18 m. In a race of 350 m, C will beat B by:

A)22.75 M B) 25 M C)19.5 M D)28m

12.) In a 100m race, A beats B by 4 seconds. But if A gives B to start 16m ahead of A, then A and B reach the finishing point at the same time. How long does A take to run the 100m race?

A) 4 Seconds B)25 Seconds C)29 Seconds D)21 Seconds

A7

Averages, Mixture and Alligations

Averages

1.) Average = $\frac{Sum\ of\ observations}{No\ of\ observations}$

2.) If a car covers a certain distance at x kmph and an equal distance at y kmph. Then, the average speed of the whole journey = $\frac{2xy}{x+y}$ kmph

3.) Average of 1+2+3+---------+n = (n+1)/2 4.) Average of Arithmetic Progression = (F.T + L.T)/ 2

Exercise

1.) A man paid 5 workers at the rate of Rs.200 each, 6 workers at the rate of Rs.250 each and 9 workers at the rate of Rs.300 each. What is the average pay of each worker?

A) Rs.250 B) Rs.255 C) Rs.260 D) Rs.265

2.) The average set of numbers is 48, if 5 numbers whose average is 54 are added to this set, the average becomes 49.2. How many numbers were there in the set initially?

A)20 B)25 C)22 D)24

3.) Average cost of 5 apples and 4 mangoes is Rs. 36. The average cost of 7 apples and 8 mangoes is Rs. 48. Find the total cost of 24 apples and 24 mangoes.

A) 1044 B) 2088 C) 720 D) 3244

4.) Nine persons went to a hotel for taking their meals. Eight of them spent Rs.12 each on their meals and the ninth spent Rs.8 more than the average expenditure of all the nine. What was the total money spent by them?

A) Rs. 115 B) Rs. 116 C) Rs. 117 D) Rs. 118

5.) The average of cubes of consecutive even numbers from 2 to 10 ($2^3+4^3+....+10^3$)

A) 1512 B)3024 C)360 D)380

6.) A batsman has a certain average of runs for 12 innings. In the 13th inning he scores 96 runs there by increasing his average by 5 runs. What will be his average after 13^{th} inning?

A) 28 B) 32 C) 36 D) 42

7.) The average set of numbers is 46, if 4 numbers whose average is 52 are subtracted from this set, the average becomes 44.5. How many numbers are there in the set?

A)22 B)20 C)18 D)16

8.) It rained as much as on Wednesday as on all the other days of the week combined. If the average rainfall for the whole week was 3 cms; how much did it rain on Wednesday?

A) 3 cm B) 8.5 cm C) 10.5 cm D) 11.8 cm

9.) A movie ticket cost for an adult at Sathyam Cinema is Rs.16 and Rs. 8 for a child. A total of 634 tickets worth Rs.8432 were sold. How many adult and Child tickets were sold?

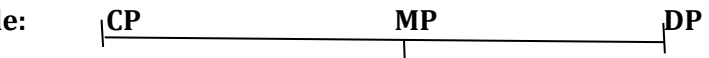
A) 420,214 B) 214, 420 C) 300,334 D) 500,134

10.) In June a baseball team that played 60 games had won 30% of its games played. After phenomenal winning streak this team raised its average to 50%. How many games must the team have won in a row to attain this average?

A)12 B)20 C)24 D) 30

Mixture and Alligation

Alligation Rule:



Quantity of CP Quantity of DP

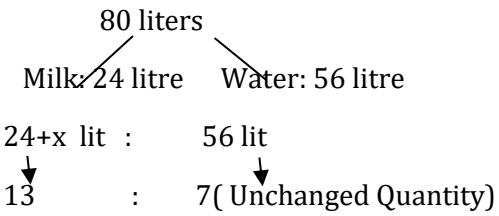
$$\frac{QCP}{QDP} = \frac{DP-MP}{MP--CP}$$

Note : When the mixture is sold at R% profit , the price will be considered as Selling Price which is (100+R)% of Mean Price.

Example: The mixture is sold for Rs. 33 at 10% profit , the selling price is 110% which is 33 Rs.

So, 110%=33 then 100% = 30Rs

Mixture: A solution of 80 litres contains 30% milk. How many litres of pure milk must be added to this mixture so that the concentration of milk becomes 65%?



So 7 parts =56 lit water , then 13 parts =104 milk , 24+ x= 104 , x=80

Removal and Replacement

1) When the vessel contains '*x*' unit of ingredient A. From this '*y*' unit of ingredient is taken out and replaced by an equal amount of ingredient B.

If the process is repeated 'n' times,

$$\textbf{\textit{Final Quantity}} = x\left(1-\frac{y}{x}\right)^n$$

2.) When the vessel contains '*x*' unit of ingredient A and B. From this '*y*' unit of ingredient is taken out and replaced by an equal amount of ingredient B.

If the process is repeated 'n' times,

$$\frac{\textit{Final Quantity of A}}{\textit{Initial Quantity of A}} = \left(1-\frac{y}{x}\right)^n \qquad \textit{[Quantity of B= x- Quantity of A]}$$

Exercise

1.) In what ratio must rice at Rs. 20 per kg be mixed with rice at Rs. 35 per kg so that the mixture be worth Rs. 28 per kg ?

A) 8:7 B) 7:8 C) 2:3 D) 4:5

2.) Tea worth Rs. 120 per kg and Rs. 150 per kg are mixed in the ratio 2:3. In order to make 5% profit , at what price the mixture should be sold ?

A)138Rs B) 144 C)144.9 C)140

3.) 84 Kg of Tea worth Rs. 120 per kg should be mixed with how much Kg of Rs. 150 per kg so that the mixture can be sold for Rs.136 per kg?

A) 80Kg B)96 Kg C)82 Kg D)90Kg

4.) How many kgs. of rice samba costing Rs. 8 per kg must be mixed with 86 kg of ponni costing Rs. 6.40 per kg so that 20% gain may be obtained by selling the mixture at Rs. 7.20 per kg ?

A) 10 kg B) 12 kg C) 10.8 kg D) None of these

5.) The sun flower oil and groundnut oil in two vessels A and B are in the ratio 4 : 3 and 2: 3 respectively. In what ratio, the liquids in both the vessels be mixed to obtain a new mixture in vessel C containing half sun flower oil and half groundnut oil?

A) 7:5 B) 5:7 C) 11:12 D) 7:8

6.) Sindhu travelled a distance of 80 km in 7 hours partly on bicycle at the rate of 8 km per hour and partly on car at 16 km per hour. Find the distance travelled on bicycle.

A) 32 km B) 24 km C) 36 km D)40 km

7.) A sum of Rs. 45 was divided among 60boys and girls. Each boy gets 90 paise and a girl 65 paise. Find the number of boys and girls.

A) 20, 40 B) 25, 35 C)36, 24 D) 24, 36

8.) 729 ml of a mixture contains milk and water in ratio 7:2. How much of the water is to be added to get a new mixture containing half milk and half water?

A) 729ml B) 81ml C) 405ml D) 550ml

9.) In 90 litres mixture of milk and water, the ratio of milk and water is in the ratio of 7 : 3. In order to make this ratio 3 : 2, how many litres of water should be added ?

A)10litres B) 12 litres C)18 litres D)15 litres

10.) Two solutions of 90% and 97% purity are mixed resulting in 21liters of mixture of 94% purity. How much is the quantity of the first solution in the resulting mixture?

A) 10 B) 9 C) 12 D) 11

11.) A and B are two alloys of gold and copper prepared by mixing metals in the ratio 5:7 and 7:8 respectively. If equal quantities of alloys are melted to form a third alloy C, the ratio of gold to copper in C is

A) 53 : 67 B) 51 : 69 C) 67 : 53 D) 69: 51

12.) Milk and water in two vessels A and B are in the ratio 4 : 3 and 2 : 3. In what ratio should the liquid in both the vessels be mixed to obtain a new mixture in vessel C containing half milk and half water ?

A) 7 : 5 B) 5 : 7 C) 7 : 3 D) 5 : 3

13.) A 20 litre mixture of milk and water contains milk and water in the ratio 3 : 2. 10 litres of the mixture is removed and replaced with pure milk. At the end of the removal and replacement, what is the ratio of milk and water in the resultant mixture?

A) 9:1 B) 5 : 3 C) 4 :1 D) 1:9

A7

14.) A container contains 90 kg. of Groundnut oil. From the container, 9kg. of oil was taken out and replaced by refined oil. This process was repeated two more times. How much groundnut oil is now contained by the container?

A) 72.9kg B) 65.61 kg C)79.2 kg D) None of these

1. Permutation and Combination **2. Probability**

Combination(Selection)
nCr= n!/(n-r)! * r!
nCr= nCn-r => $100C_{98}$= $100C_2$
nCn=1
There are 'm' collinear points out of 'n 'then 1. Number of triangles is given by : nC_3-mC_3
2.Number of straight lines is : nC_2-mC_2+1 3. If a polygon has 'n' sides then Number of diagonals : nC_2-n
4.Maximum points of intersection using 'n' straight lines: nC_2*1
5. Maximum points of intersection using 'm' circles: mC_2*2
6. Maximum points of intersection using 'n' straight lines and 'm' circles : nC_1*mC_1*2

Permutation(Selection *arrangement)
nPr= nCr * r! => n!/(n-r)!
nPn=n!
Linear :There are 'n' elements then
Arrangement is n!..
Circular: (n-1)!
Distribution of distinct objects into unequal sized groups
1. A set of 'm+n' objects can be divided into two groups containing 'm' and 'n' objects : (m+n)!/m!n!
Distribution of distinct objects into equal sized groups
'mn' objects can be equally divided into 'm' groups with 'n' objects : [mn!/$(n!)^m$] 1/m!

Exercise

1.) How many different words can be formed with the letters of the word 'CAPTAIN' such that all the vowels should be together?

A) 360 B)2520 C)1210 D)720

2.) How many different words can be formed with the letters of the word 'FESTIVAL' such that vowels occupy the ODD places?

A) 4P3 * 5! B)4!*4! C) 5!*3! D) 5!*4!/2

3.) How many 4 digit numbers divisible by 5 can be arranged by using the digits 0,1,2,3,4 and 5? Repetition of a digit is not allowed.

A) 120 B) 108 C) 96 D)60

4.) Using the digits 2,3,4,5 and 0 , how many 4 digit numbers which are divisible by 4 can be formed (Repetition of digits is allowed)?

A) 150 B) 120 C) 140 D)160

5.) How many numbers are there from 101 to 1000 such that at least one of their digits is 6?

A)200 B)225 C)252 D)120

6.) In how many ways can 7 boys and 6 girls can be seated in a row so that no two girls sit together?

A) 6!X6! B)7! X 7! C) 6!X7! D) 7! X8P6

7.) Four married couples are to be seated in a row having 8 chairs. In how many ways they can be seated such that each couple will sit next to each other?

A) 72 B) 186 C) 384 D) 516

8.) Find the sum of all the four-digit numbers that can be formed with distinct integers of 1,2,5,8?

A)102656 B)112657 C)115833 D)106656

9.) The letters of the word MOTHER when arranged as per a dictionary, find the rank of the word 'MOTHER'.

A) 288th B) 309th C)280th D)300th

10.) We wish to select 6 persons from 8 but, if the person A is chosen, then B must be chosen. In how many ways can selections be made?

A) 28 B) 21 C)22 D) 27

11.) In a party every person shakes hands with every other person. If there are 120 hands shakes, find the number of persons in the party.

A)16 B) 14 C) 21 D) 15

12.) There are 4 married couples, out of which, 3 people in a group is needed. But there should not be his or her spouse in the group. How many groups are possible?

A)56 B)28 C)32 D)52

13.) Ten points are marked on a straight line and 11 points are marked on another straight line. How many triangles can be constructed with vertices from among the above points?

A) 495 B) 550 C) 1045 D) 2475

14.) There are 15 points in a plane out of which 6 are collinear. Find the number of triangles formed by the points as vertices.

A) 455 B) 435 C) 400 D) 420

15.) There are 15 points in a plane out of which 6 are collinear. Find the number of straight lines formed by the points as vertices.

A) 90 B) 105 C) 91 D) 87

Probability

P(E)=$\frac{n(A)}{n(S)}$

= $\frac{No\ of\ favourable\ cases}{No\ of\ total\ events}$

1) The probability of every event is non-negative i.e) P(A)>0

2) The probability of a certain event is 1.

3) The probability of an impossible event is zero i.e)P(φ)=0

4) P(A ∩B) = P(A) + P(B) - P(A U B)

5) P(neither A nor B) = $P(\overline{A}\cap\overline{B})$ = 1 - P(A U B

6) $P(\overline{A}\cup\overline{B})$ = 1 - $P(A\cap B)$

7) $P(A\cup B\cup C)=P(A)+P(B)+P(C)-P(A\cap B)-P(B\cap C)-P(A\cap C)+P(A\cap B\cap C)$

Exercise

1.) When 3 dices are tossed randomly, what is the possibility for getting at least one dice should show event 6?

A) 125/216 B) 91/216 C)25/216 D) None of these

2.) If two cards are selected at random from a pack of 52 cards, what is the probability that the cards are both honours or both diamonds?

A) 125/221 B) 1/21 C) 55/221 D) 32/221

3.) The probability that a given problem will be solved by A, B and C are 2/3, 5/7, 4/5 respectively. Find the probability that at least one of them can solve the problem?

A)40/105 B)101/105 C) 103/105 D) None of the above

4.) Two numbers are selected from the divisors of 64. What is the probability that the sum is less than or equal to 24?

A) 10/21 B)2/7 C) 11/21 D) 5/21

5.) A room has 3 bulb holders. From a collection of 10 light bulbs of which 6 are defective, a person selects 3 at random and put them in a socket. The probability that he will have light is

A)5/6 B)1/2 C)1/6 D) None of these

6.) A computer lab consists of 5 bulb holders. The lab assistant has 25 bulbs, out of which 4 are defective. What is the probability that the room is light when all the holders are inserted with bulbs and switched on?

A) 21/25 B) 1/5 C)1 D) 4/5

7.) The key for a door is in a bunch of 10 keys. A girl attempts to open the door by trying keys at random discarding the wrong key. The probability that the door is opened in fifth trial is

A) 1/10 B)5/10 C)2/10 D)4/10

A8

8.) A bag contains 6 red balls and 3 black balls. Four balls are drawn successively without replacement. What is the probability that they are alternatively of different colours?

A)5/84 B)5/42 C) 4/81 D) 8/81

9.) If the letters of the word "MOTHER' are arranged at random, what is the probability that both the vowels are always together?

A) 2/3 B) 1/3 C) 3/5 D)1/5

10.) Find the probability that a 3 digit number formed by using the digits 1, 3, 6, 9 without repetition, is divisible by 4.

A) ½ B) 1/3 C) ¼ D)1/5

11.) Box I contains 3 red and 4 black balls while another Box 2 contains 5 red and 2 black balls. One ball is drawn at random from one of the bags and it is found to be red. Find the probability that it was drawn from Box1

A) 3/8 B) 5/8 C)3/5 D) None of these

12.) From a deck of 52 cards one card is dropped out, two cards are taken and are found to be diamonds. Find the probability that the dropped one is a diamond card?

A)11/49 B) 1/5 C)10/49 D) 11/50

1. Data Sufficiency 2. Data Interpretation 3. Area, Surface and Volume

Data Sufficiency

Directions for questions: Each Question Given Below has a problem and two statements numbered I and II giving certain Information. You have to decide if the information given in the statements is sufficient for answering the problem. Indicate your answer as

A. I alone is sufficient while II alone is not sufficient

B. II alone is sufficient while I alone is not sufficient

C. Either I or II is sufficient D. Both I and II are sufficient E. Neither I nor II is sufficient

1.) **The age of a person lies between 50 to 60. What is the exact age of the person?**

Statements: 1. If the age is counted by three, there will be one left over.

Statements: 2. If the age is counted by six, there will be one left over.

2.) **If a, b, c, and d are each integers greater than 3 and less than 10, is the product of abcd divisible by 6?**

Statements: 1. acd is even. Statements: 2. abd is odd.

3.) **The last Sunday of March, 2006 fell on which date?**

Statements: 1.The first Sunday of that month fell on 5th.

Statements: 1.The last day of that month was Friday.

4.) **The total weight of 50 employees in an organization is calculated. How many of them are having the weight less than 72 kg?**

Statements: 1. The average weight is 72 kg. 2. The median weight is 72 kg.

5.) **If a represents the number of positive factors of integer b, is a odd?**

Statements: 1. b = x! Where x is a positive integer greater than 1

Statements: 2. b = y2 − 1 where y is a positive integer greater than 1

6.) **Is xy < 0?**

Statements: 1. x2y3 <0 2. xy2 >0

Given below is a question followed by 2 statements, I and II each containing some information decide which of the statement(s) is suitable

7.) How is Seema related to Ram?

Statements

I Ram has a brother, Mohan. Mohan is the son of Rahul. Seema is Rahul's sister

II Rahul is the father of ram and brother of seema

a) Either the statement I and II are sufficient b) Statement II alone is sufficient

c) Statement I alone is sufficient d) Both the statement I and II are necessary

8.) What is the value of x?

I. |x − 10| = 5 II. |x − 5 | = 0

a)I alone is sufficient b)II alone is sufficient c) Either I or II

d)Neither I nor II e) Both I and II

9.) How many workers are required for completing the construction work in 10 days?

Statements: 1. 20% of the work can be completed by 8 workers in 8 days.

Statements: 2. 20 workers can complete the work in 16 days.

10.) 17.) Is p + q = zero?

I. pq < 0 II. p2 = q2.

a)I alone is sufficient b)II alone is sufficient c) Either I or II d)Neither I nor II e) Both I and II

11.) What is the rate of interest on a certain sum?

I. The interest earned on the sum at the same rate of simple interest after 3 years is Rs.4500.

II. If the rate of interest is 2.5% more, the simple interest earned will be Rs.900 more.

III. The amount received on the sum at the end of the 2 years at simple interest is Rs.15,000.

a) I and II only b) II and III only c) I and III only d) Any two statements together

12.) What is the distance between city P and city Q?

15.) Two persons A and B started simultaneously from P to Q, with their speeds in the ratio 4 : 5.

II. B reached P one hour earlier than A to Q. III. The difference between speeds of A and B is 20 kmph

a) I and III only b) II and III only c) I and II only d) All I, II and III together

Data Interpretation

	January	February	March	April	May	June
A	3000	4500	6000	8000	9000	10500
B	4000	6000	8500	9000	10000	12000

1. A's salary in April is how much % more than the previous month?

2. B's salary in march is how much % less than the next month?

3. In which month increment in A's salary is maximum?

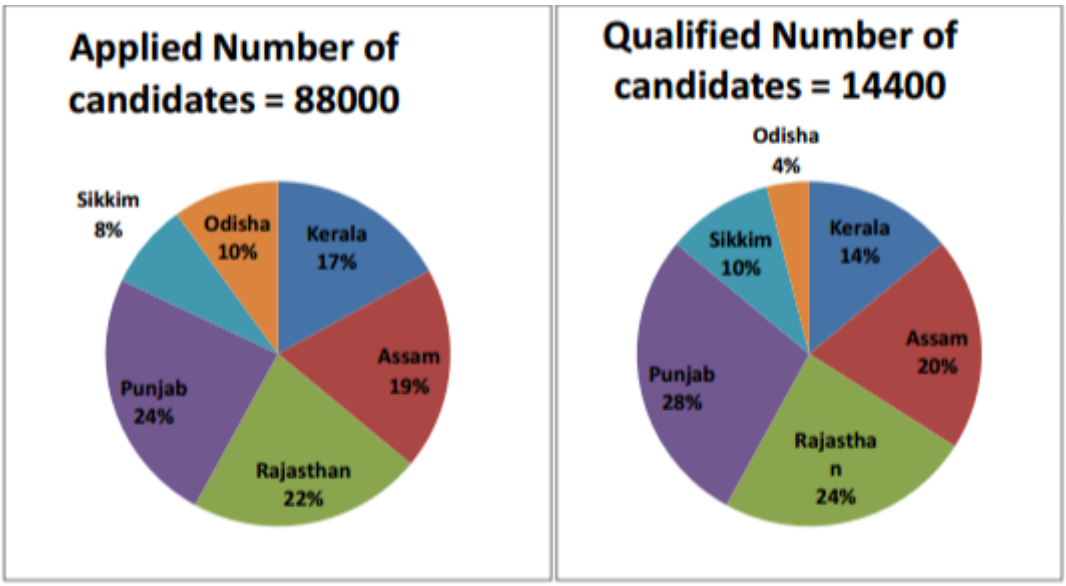
4. In which month increment % in A's salary is maximum?

5. How much % the salary of A is increased from January to June?

6. What is the average percentage increment in A's salary for all the months?

A9

Directions (1-5): In the following pie-charts, the percentage wise distribution of candidates who have applied for different states in a exam and that of selected candidates has been given. Read the following piecharts to answer the questions.



1.) What is the ratio between the number of candidates who qualified in Kerala and Assam together and the number of candidates who qualified in Punjab and Rajasthan?

a) 26 : 17 b) 17 : 21 c) 17 : 26 d) 21 : 17 e) 25 : 27

2.) Find the average number of candidates who got selected for Punjab, Rajasthan and Kerala.

a) 3298 b) 3618 c) 3368 d) 3578 e) 3168

3.) What is the sum of the total number of candidates who applied for Kerala and the number of candidates who got selected in Sikkim and Punjab both?

a) 21562 b) 20432 c) 20234 d) 18752 e) 20256

4.) What is the difference between the total number of candidates who got selected in Rajasthan and the number of candidates who applied for the same?

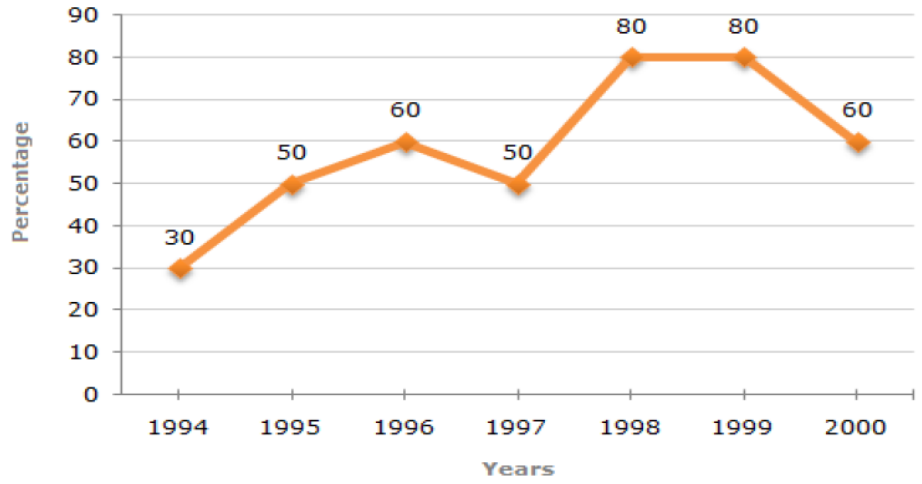
a) 15904 b) 16904 c) 14854 d) 17904 e) 18904

5.) What percent of candidates qualified in Punjab of the total candidates applied for the same?

a) 13 b) 14 c) 22 d) 19 e) 15

Directions(6 to 10): The following line graph gives the percentage of the number of candidates who qualified an examination out of the total number of candidates who appeared for the examination over a period of seven years from 1994 to 2000. Percentage of Candidates Qualified to Appeared in an Examination over the Years.

A9



6.) The difference between the percentages of candidates qualified to appear was maximum in which of the following pairs of years?

a) 1994 and 1995 b) 1997 and 1998 c) 1998 and 1999 d) 1999 and 2000

7.) In which pair of years was the number of candidates qualified the same?

a) 1995 and 1997 b) 1995 and 2000 c) 1998 and 1999 d) Data inadequate

8.) If the number of candidates qualified in 1998 was 21200, what was the number of candidates appeared in 1998?

a) 32, 000 b) 28, 500 c) 26, 500 d) 25, 000

9.) If the total number of candidates appeared in 1996 and 1997 together was 47400, then the total number of candidates qualified in these two years together was?

a) 34, 700 b) 32, 100 c) 31, 500 d) Data inadequate

10.) The total number of candidates qualified in 1999 and 2000 together was 33500 and the number of candidates appeared in 1999 was 26500. What was the number of candidates in 2000?

a) 24, 500 b) 22, 000 c) 20, 500 d) 19, 000

Area, Volume and Surface

Important Results

Name	Volume	Curved Surface Area	Total Surface Area
Cylinder	πr^2h unit^3	$2\pi rh$	$2\pi rh+2\pi r^2$
Cone	$(1/3)\ \pi r^2h$ unit^3	πrl, l=slant height	$\pi rl+\pi r^2$
Sphere	$4/3\ \pi r^3$ unit^3	$4\pi r^2$	$4\pi r^2$
Hemi-sphere	$(2/3)\ \pi r^3$ unit^3	$2\pi r^2$	$3\pi r2$
Cube	a^3	$4a^2$	$6a^2$
Cuboid	l x b x h unit^3	$2h(l+b)$	$2(lb+bh+hl)$

Area of an Equilateral Triangle : $\frac{\sqrt{3}}{4}a^2$

A9

1.) A rectangular block 6 cm by 12 cm by 15 cm is cut up into an exact number of equal cubes. Find the least possible number of cubes.

a) 30 b) 40 c) 10 d) 20

2.) A hall is 15 m long and 12 m broad. If the sum of the areas of the floor and the ceiling is equal to the sum of the areas of four walls, the volume of the hall is:

a) 720m^3 b) 900m^3 c) 1200m^3 d) 1800m^3

3.) 11 persons live in a conical tent. If each person requires 6m^2 of the floor area and 30m^3 of air to breath. What will be the height of the cone?

a)20m b)75m c)37.5m d)15m

4.) Sharmila wishes to prepare Christmas caps in the form of right circular cones for her birthday party, using a sheet of paper whose area is 7150cm2, how many caps can be made with radius 5 cm and height 12 cm.

a)35 b) 28 c)25 d) 32

5.) A 14 m deep well with inner diameter 12 m is dug and the earth taken out is evenly spread all around the well to form an embankment of width 6m. Find the height of the embankment .

a)5m b)5.25m c)4.5m d)5.5m

6.) A right angled triangle whose sides are 6 cm, 8 cm and 10 cm is revolved about the sides containing the right angle in two ways. Find the difference in volumes of the two solids so formed.

a)100.58cm^3 b)120.58cm^3 c)98.42cm^3 d) None of these

7.) A cylinder is 6 cms in diameter and 6 cm in height. If spheres of the same size are made from the material obtained, what is the diameter of each sphere?

a) 5 cms b) 2 cms c) 3 cms d) 4 cms

8.) A garden roller whose length is 3 m long and whose diameter is 2.8 m is rolled to level a garden. How much area will it cover in 8 revolutions?

a)211.2 m^2 b) 220.8m^2 c)230m^2 d) None of these

9.) The radius of a spherical balloon increases from 12 cm to 16 cm as air being pumped into it. Find the ratio of the surface area of the balloons in the two cases.

a)4:5 b)1:4 c)9:16 d)4:9

10.) The ratio of the volumes of two cones is 2:3. Find the ratio of their radii if the height of second cone is double the height of the first.

a)2:3 b)2:$\sqrt{3}$ c)2:1 d)4: $\sqrt{3}$

11.) A solid sphere of radius 6 cm is melted into a hollow cylinder of uniform thickness. If the external radius of the base of the cylinder is 5 cm and its height is 32 cm, then find the thickness of the cylinder.

a)1cm b)2cm c)1.5cm d)2.5cm

12.) Three cubes each of volume of 216 m^3 are joined end to end. Find the surface area of the resulting figure.

a)504 m^2 b)480 m^2 c)432 m^2 d)216 m^2

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