

Virtusa Set - 1

- ① What will come next in series:
2, 6, 10, 20, 30, ?

A) 36

$$1^2 + 1 = 2$$

B) 40

$$2^2 + 2 = 6$$

C) 42

$$3^2 + 3 = 12$$

D) 44

$$4^2 + 4 = 20$$

Ans: 42

$$5^2 + 5 = 30$$

$$6^2 + 6 = 42$$

$$7^2 + 7 = 56$$

- ② Which word does not belong to the group?

Pencil, Eraser, Sharpener, Brush, Scale.

A) Pencil

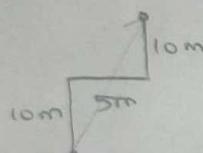
B) Brush

C) Eraser

D) Scale.

- ③ If in a code language, MOBILE is written as OMCJNG, how is LAPTOP written in that code?

- ④ A person walks 10m north, then turns right and walks 5m, then turns left and walks 10m. In which direction is he from the starting point?



Ans: B) North-East.

- ⑤ 5 People (A, B, C, D, E) are sitting in a row. C is sitting to the right of A but to the left of D. B is sitting at the extreme left. Who is sitting in the middle?

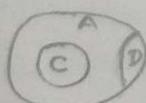
B A C D E

Ans: C

- ⑥ Statements:

All cats are animals

Some animals are dogs.



Ans: Neither follows.

Conclusion:

I. Some cats are dogs

II. All dogs are animals.



Ans: Brother.

⑧

$$5+3=28$$

Don't

$$6+2=48$$

$$7+1=63$$

$$8+2=?$$

Ans:

$$15+13=28$$

$$12+36=48$$

$$7+56=63$$

$$16+70=?$$

⑨

▲, □, ○, ▲, □ ?

Ans:

Ans: Friday.

so all days are Friday, except

M	T	W	Th	F	Sa	Su	dt
1	2	3	4	5	6	7	

⑩

$x^2 + 3x + 2 = 0$

$$\frac{2x^2}{2} + 1$$

$$x+1=0$$

$$x=-1$$

$$\begin{array}{r} 31 \\ 29 \\ \hline 60 \end{array} \quad \begin{array}{r} 8 \\ 55 \\ \hline 5 \end{array}$$

⑪

$x^2 + 3x + 2 = 0$

$x+1=0$

$x=-1$

$x+2=0$

$x=-2$

$x+2=0$

- ① 3, 4, 12, 45, 196,

$$3 \times 1 + 1^2 = 4$$

$$4 \times 2 + 2^2 = 12$$

$$12 \times 3 + 3^2 = 45$$

$$45 \times 4 + 4^2 = 196$$

$$196 \times 5 + 5^2 = 1005$$

Ans: 1005

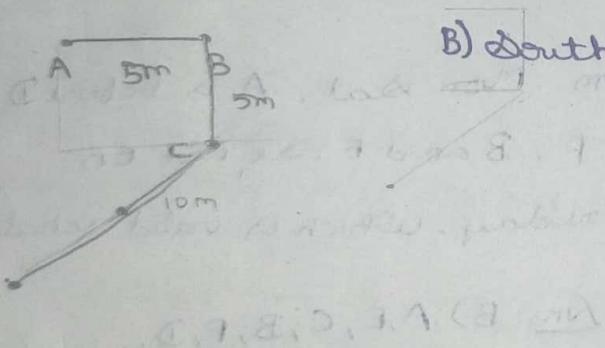
- ② In a certain code, MACHINE is coded as LB B J H O F. How will MONSTER be coded?

M A C H I N E

L B B J H O F

A B C D E F G H I J

- ③ A man starts from point A and walks 5m East to point B. He then turns South and walks 5m to point C. Then he turns 45° to his right (clockwise) and walks 10m to point D. In which direction is he now from the starting point A?



B) South-West.

- ④ 8 friends are sitting around square table. Corners face center and middle face outside.

P (faces center) sits 3rd to the right of V

T (faces center) sits is not neighbour of V

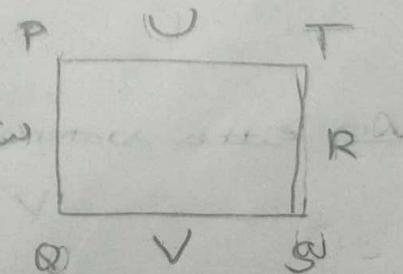
Ans: U

I sits between V and W

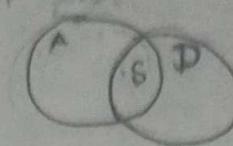
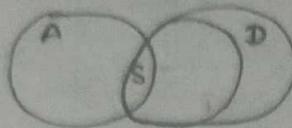
S sits 2nd to right of Q (faces center)

R is not neighbour of P

Who sits third to left of Q?



- ⑤ Statements:
 Some actors are singers
 All singers are dancers
 No dancer is a director
- ⑩ Conclusion:
 I At least some actors are
 dancers.
 II No singer is a director.

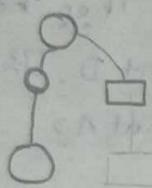


Ans: Both I and II follows.

- ⑥ $Z_1 A, X_2 D, V_6 G, T_2 I, R_8 M, P \quad P$

Ans: A) P445P

- ⑦ Pointing to a woman, a man says, "She is the only daughter-in-law of my father's mother". How is woman related to man?



Ans: Mother.

- ⑧ 6 lectures are scheduled from Mon-Sat. A is before D. E is on Wed but not after F. B and C are not on consecutive days. F is on Friday. Which is valid schedule.

M T W Thu F S

Ans: B) A, E, C, B, F, D.

- ⑨ What is the value of x , if x is positive?

I. $x^2 + 5x - 14 = 0$ II. $3x + 10 = 14$

$$\frac{14x^2}{7} = -2$$

$$x+7 \quad x-2=0$$

$$\frac{3x+10}{3} = 4$$

Ans: Either statements is sufficient.

- 10) A clock is set right at 8 am. It gains 10 min in 24 hrs. What is true time when clock indicates 1 pm. on the following day?

Ans: 12:50 pm.

8 am \rightarrow 8 am \rightarrow 7:50 am

$$\begin{array}{r}
 24 \text{ hrs} \rightarrow 10 \text{ min} & 7:50 \text{ pm} \\
 1 \text{ hr} \rightarrow \frac{10}{24} & - 5 \text{ min} \\
 & \hline
 & 12:48 \text{ min.} \\
 & \frac{5 \times 10}{24} = \frac{25}{24} = \frac{25}{24} \text{ hrs}
 \end{array}$$

- 11) A and B can do a job in 12 days. B and C in 16 days. A works for 5 days, B for 7 days, then C finishes the rest in 13 days. In how many days could C do the work alone?

$$\begin{array}{ccc}
 A+B & & B+C \\
 12 \text{ days} & & 16 \text{ days} \\
 & \swarrow & \searrow \\
 & 48 & \\
 A & \rightarrow & 4 \text{ units/day} \\
 & & \rightarrow 2.0 \\
 & & 3 \text{ units/day}
 \end{array}$$

$$\begin{array}{l}
 A+B \Rightarrow 5 \times 4 \Rightarrow 20 \\
 3B+C \Rightarrow 2 \times 3 \Rightarrow 6 \\
 \hline
 26
 \end{array}$$

$$C \rightarrow 11 \cdot 48 - 26 \Rightarrow 22 \text{ units.}$$

$$11 \text{ days} \Rightarrow 22 \text{ units.}$$

$$-12 \text{ B} \quad 1 \text{ day} \Rightarrow 2 \text{ units.}$$

$$-12 \text{ B} \quad \text{C efficiency} \rightarrow 2 \text{ units.}$$

$$\frac{48}{2} \Rightarrow 24 \text{ days.}$$

Ans: 24 days.

- 12) A trader sells good at an 8% loss. but uses a 900g instead of 1kg. What is his actual profit or loss.

$$\begin{array}{ccc}
 1000 & \rightarrow & 920 \\
 900 & \swarrow & \searrow
 \end{array}$$

Ans: 2.21% Profit.

- 13) The diff between SP and CP on sum of 2 years at 10% p-a is 150. What is sum?

$$\left[\left(P \times \frac{R}{100} \right)^2 \right] \Rightarrow \left(P \times \frac{10}{100} \right)^2 = 150$$

$$P \times \frac{100}{10,000} \Rightarrow P \times \frac{1}{100} = 150$$

Ans: Rs. 15,000

$$\frac{100}{P} = 150 \text{ 00}$$

(14)

A boat covers 54 km upstream and 36 km downstream in 6 hrs. It covers 36 km upstream and 24 km downstream in 6.5 hrs. What is speed of current?

$$U - \frac{24}{U-v} + \frac{36}{U+v} = 6$$

$$\frac{36}{U-v} + \frac{24}{U+v} = 6.5$$

$$\frac{24}{U-v} \left(\frac{12}{U+v} - \frac{12}{U-v} \right) = 0.5$$

$$36(U+v) + 24(U-v) = 6.5 \times 60$$

$$12(U+v) - 12(U-v) = 0.5(U^2 - v^2)$$

$$24v = 0.5(U^2 - v^2)$$

$$U^2 - v^2 = 48v$$

$$U^2 = 48v + v^2$$

Ans: 2 km/hr.

(15)

$$70\% \text{ Passed I} \rightarrow 0.7x$$

$$60\% \text{ Passed II} \rightarrow 0.6x$$

$$15\% \text{ Failed Both} \rightarrow 0.15x$$

$$\text{Passed both} = 270$$

$$\text{Passed atleast} \quad 1 = x - 0.15x = 0.85x$$

$$\Rightarrow 0.85x = 0.7x + 0.6x - 270$$

$$x = \frac{270}{0.45} = 600$$

Ans: 600

(16)

ABINATION SSSS

$$\frac{10!}{3! \times 2! \times 2!} \times \frac{4!}{4!} \times \frac{10 \times 9 \times 8 \times 7 \times 6 \times 5}{2 \times 2}$$

Ans: 151200

(17)

$$B = x$$

$$B = \frac{2}{3}C$$

$$A : B : C$$

$$A = 3x$$

$$C = \frac{3}{2}x$$

$$3x : x : \frac{3}{2}x \Rightarrow 6x : 2x : 3x \Rightarrow \frac{2}{11} \times 6600 = 1200$$

Ans: 1200

(18)

$$7M \quad 6W \Rightarrow 13$$

$${}^7C_3 \times {}^6C_2 + {}^7C_4 \times {}^6C_1 + {}^7C_5 \times {}^6C_0 = \frac{7 \times 6 \times 5}{1 \times 2 \times 3} \times \frac{3}{1 \times 2} + \frac{7 \times 6 \times 5 \times 4}{1 \times 2 \times 3 \times 4} \times 6$$

$$= 525 + 210 + 21 = 756 + \frac{7 \times 6 \times 5 \times 4 \times 3}{1 \times 2 \times 3 \times 4 \times 5} \times 13.5$$

Ans: 756

① 5, 7, 17, 55, 225, ?

$$5 \times 1 + 2 = 7$$

$$7 \times 2 + 3 = 17$$

$$17 \times 3 + 4 = 55$$

$$55 \times 4 + 5 = 225$$

$$225 \times 5 + 6 = 1130$$

$$\begin{array}{r} 225 \\ \times 5 \\ \hline 1125 \end{array}$$

Ans: 1131

② REASON \rightarrow 5

BELIEVED \rightarrow 7

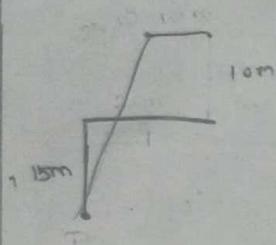
GOVERNMENT \rightarrow ? $10 - 1 = 9$

A	B	C	D	E	F	G
1	2	3	4	5	6	7

H	I	J	K	L	M	N
8	9	10	11	12	13	14

D	P	Q	R	S	T	U
15	16	17	18	19	20	21

Ans: 9



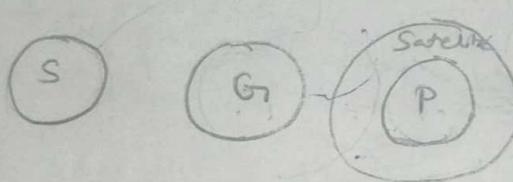
V	W	X	Y	Z
22	23	24	25	26

$$\begin{array}{r} 18 \\ 5 \\ ? \\ 19 \\ 15 \\ 14 \\ \hline 52 \rightarrow 7 \end{array}$$

④ A \downarrow B \downarrow C \downarrow

$$52 \times 7 + 5 = 1$$

⑤



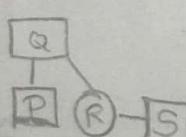
⑥ $(12, 145), (8, 65), (10, 101), (6, 35)$

⑦ A @ B A is wife of B

A \$ B A is son of B

A 'i' B A is brother of B

P \$ Q 'i' R @ S



Ans: B) P is the brother-in-law of S.

Ans. Statement II alone is sufficient
Either of statements

1511 1946

4

H	B	A
	B	C
D	E	C

10

$$\text{Cube} = l \times b \times h$$

$$\begin{array}{cccc|c}
 & 3 & & 3 & 3 \\
 & \underline{3} & & \underline{3} & \underline{3} \\
 3 & | & & | 3 & | & | 3 \\
 & \underline{3} & & \checkmark 3 & \underline{3} & \\
 & 3 & & 3 & 3 &
 \end{array}$$

Ans: 36

1

$$\textcircled{1} \quad \text{Doubt} \quad A = B + B \times \frac{50}{100} = B(1 + 0.5) \quad A = 1.5B$$

$$A + B \quad 12 \text{ hrs} \quad \frac{1}{12}$$

$$\frac{1}{12} - \frac{1}{20} = \frac{5-3}{60} = \frac{2}{60} = \frac{1}{30}$$

Ans. 30 m

2
Dolby

$$C.P = L + L \times \frac{25}{100} = 0.75L$$

3

STATISTICS

STATISTICS

A 11

September

① 0, 4, 18, 48, 100, ?

$$1^3 - 1^2 = 0$$

$$2^3 - 2^2 = 4$$

$$3^3 - 3^2 = 18$$

$$4^3 - 4^2$$

$$5^3 - 5^2$$

$$6^3 - 6^2 = 216 - 36 = 180$$

Ans: 180

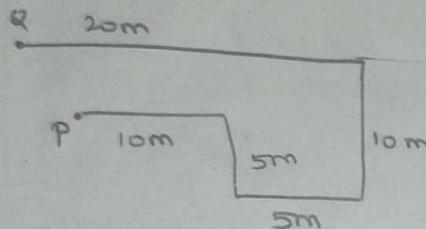
② WORK \rightarrow 4-12-9-16 \rightarrow 27-23, 27-15, 27-18, 27-11

LOVE \rightarrow 15-12-5-22 \rightarrow 27-12, 27-15, 27-22, 27-6

Ans: 15-12-5-22,

27
12
15

9, 12, 15, 18, 11, 6



Ans: North East West

④ Pilot \rightarrow Delhi

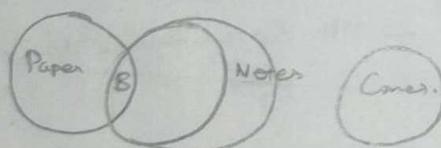
C \rightarrow Lawyer \rightarrow Pune.

A \rightarrow Doctor

\rightarrow Engineer \rightarrow Mumbai

E \rightarrow Teacher

Ans: A is Doctor.



Ans: Only Conclusion I follows.

⑥

$$30H - \frac{11}{2}M = 180$$

$$120 - \frac{11}{2}M = 180$$

$$-\frac{11}{2}M = 60$$

$$M = -\frac{120}{11}$$

~~45u+45-45~~ \times ~~11~~ \rightarrow 45u+45-45 = 180

$$\frac{11}{2}M - 120 = 180$$

$$\frac{11}{2}M = 300$$

$$M = \frac{600}{11}$$

$$\begin{array}{r} 98 \\ \times 54 \\ \hline 492 \\ 490 \\ \hline 54 \\ 45 \\ \hline 54 \\ 45 \\ \hline 27 \\ 27 \\ \hline 6 \\ 6 \\ \hline 27 \\ 27 \\ \hline 0 \end{array}$$

$$9.2 + 9.2 = 18.4$$

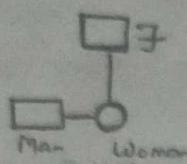
Ans: 54 6/11 first 4

(7)

8, 27, 64, 100, 125, 216, 343
 2^3 3^3 4^3 5^3 6^3 7^3

Ans: 100

(8)



Ans: Husband

(9)

Neither statement nor both together are sufficient.

(10)

 $A_1 B_1 \quad A_2 B_2 \quad A_3 B_3$
Ans: $A_1 B_1 A_2 B_2 A_3 B_3$

(11)

A 20 days $\frac{1}{20}$

B 30 days $\frac{1}{30}$

$$7\left(\frac{1}{20} + \frac{1}{30}\right) + 10\left(\frac{1}{C}\right) = 1$$

$$7\left(\frac{3+2}{60}\right) + 10\left(\frac{1}{C}\right) = 1$$

$$\frac{10}{C} = 1 - \frac{35}{60} \Rightarrow \frac{10}{C} = \frac{60-35}{60} \Rightarrow \frac{1}{C} = \frac{25}{60 \times 10} = \frac{1}{24}$$

Ans: 24 days.

(12)

When products are sold at same price with same percentage of profit and loss

$$\text{Ans} \Rightarrow \text{Net loss \%} = \frac{x^2}{100} = \frac{12^2}{100} = \frac{144}{100} = 1.44\%$$

Ans: 1.44%, Loss.

$$C.P_1 = \frac{S.P}{1 + P/100}$$

$$C.P_2 = \frac{S.P}{1 + L/100}$$

$$C.P = C.P_1 + C.P_2$$

$$S.P = S.P_1 + S.P_2$$

$$\text{Net Loss or Profit} = \text{Total SP} - \text{Total CP}$$

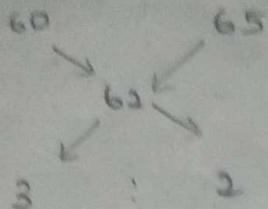
③ LEADING \Rightarrow LEADING EAT $5! \times 4!$

Ans: 720.

$5! \times 4! \times 3! \times 2! \times 1! \times 3! \times 2! \times 1!$

④

$$68.20 \times 10 \over 100 \Rightarrow \frac{682}{100} = 6.82 \Rightarrow \frac{682}{6.82} = \frac{100}{1} \Rightarrow 63 \text{ kg}$$



Ans: 3:2

⑤

- 1 \rightarrow 2, 4, 6
2 \rightarrow 1, 2, 3, 4, 5, 6
3 \rightarrow 2, 4, 6
4 \rightarrow 1, 2, 3, 4, 5, 6
5 \rightarrow 2, 4, 6
6 \rightarrow 1, 2, 3, 4, 5, 6

$$\frac{27}{36} \text{ pt} \quad \text{Ans: } 3/4$$

⑥

$$10/30, 20, 10$$

3, 2, 1

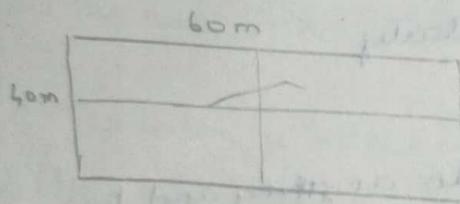
$$A \rightarrow \frac{1}{10} \text{ min}$$

$$3 \text{ min} \rightarrow \frac{3}{10}$$

$$\frac{1}{30} + \frac{1}{20} + \frac{1}{10} = \frac{2+3+6}{60} = \frac{11}{60} \rightarrow 11 \text{ min} \rightarrow \frac{11}{60} \text{ min} \rightarrow \frac{11}{60} \text{ min} \rightarrow \frac{11}{60} \text{ min}$$

Ans: 6/11

⑦



$$60 \times 40 = 2400$$

$$\text{Lawn Area} = 2109 \text{ m}^2 \quad \frac{3}{2400} \times 2400 = 2109$$

$$2400 - 2109$$

$$(l \times b) + (l \times b) = 291$$

$$b(100) = 291$$

$$b = 2.91$$

Ans: 3m

⑧

Qn 100m race,

A gives B 10m \Rightarrow A - 100m, B - 90m \Rightarrow wins first and A (1)

A gives C 28m \Rightarrow A - 100m, C - 72m

B gives C \Rightarrow wins first and A wins 0.6s (1)

⑨

$$P = 30000 \quad n = 7 \text{ yrs}$$

$$C.I. = P \left(1 + \frac{7}{100}\right)^n - 1$$

$$4347 = 30000 \left(1 + \frac{7}{100}\right)^n - 1$$

$$\left(1.07\right)^n - 1 = \frac{4347}{30000}$$

$$\left(1.07\right)^n = \frac{34347}{30000} = 1.1449 \quad \left(1.07\right)^n = 1.1449$$

$$\left(1.07\right)^n = \left(1.07\right)^2$$

Ans: 2 years.

⑩

$$\frac{x}{20} = 0$$

$$\Rightarrow x = 0$$

Ans: 19

- ① B) Was because he was too young.
- ② D) No improvement
- ③ C) intransigent
- ④ C) Capricious - whimsical
- ⑤ C) Assiduous x Negligent
- ⑥ C) A foolish and hopeless pursuit
- ⑦ D) exacerbate
- ⑧ A) If he would have practiced regularly
- ⑨ Most intelligent boys in the class.
- ⑩ Omnipotent \rightarrow A person who can do anything and has unlimited power.
- ⑪
- ⑫ A) The variable will not be serialized when the object is written to a stream
- ⑬ C) Single Responsibility Principle.
- ⑭ B) Stack
- ⑮ B) A lock that causes a thread to "spin" in a busy-wait loop
- ⑯ C) To speed up the retrieval of rows.

- ⑥ D) collect()
⑦ B) To keep the height difference of subtrees less than \sqrt{n} .
⑧ E) Redundancy.
⑨ c) Swapping
⑩ B) LEAD()
⑪ B) Unsupported Operation exception
⑫ Composition over inheritance \rightarrow Preserving to build complex objects by including instances of other classes.
⑬ A) It can handle large keys by mapping them to smaller indices.
⑭ D) Heap sort
⑮ B) A design that intentionally violates normalization for performance.
⑯ Completable Future \rightarrow A future that may be explicitly completed and used in a computation pipeline.
⑰ B) DELETE (slow), TRUNCATE (fast), DROP (removes table)
⑱ A) seek time
⑲ B) Method Overriding
⑳ A) It can handle large keys by mapping them to smaller indices
- ① B) 3
② C) The number of distinct combinations of coins that sum up to $\$2.15$
③ C) The vertex u is the root of a SCC.
④ B) The total volume of water that can be trapped between the bars of a histogram.
⑤ C) It checks if the characters at the ends do not match, so the longest PS must be either in the substring $s[i+1 \dots j]$ or $s[i \dots j-1]$.
⑥ B) $O(n \log n)$
⑦ c) To eliminate $n-1$ people who cannot be celebrity.
⑧ D) Edit Distance (Levenshtein Distance).

2

Largest Rectangle in Histogram.
Sliding Window Maximum.

Essay Writing:

Comprehension:

S. 857

Vidhusha Adet-4

① $2, 10, 36, 80, 150, ?$

$$\begin{array}{ccccccc}
 & 2 & 10 & 36 & 80 & 150 & \\
 \overbrace{10} & 2 & 4 & 7 & 10 & & \\
 & 14 & 30 & 26 & 32 & & \\
 & & & & & 102 & \\
 & & & & & \overline{102} & \\
 & & & & & & 252
 \end{array}$$

Ans: 252

② $G.O = 32$

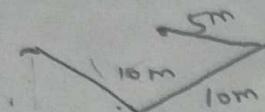
$$\begin{array}{r}
 70 \\
 32 \\
 \hline
 102
 \end{array}$$

$S.H.E = 49$

$SOME = 8 + 12 + 14 + 22 = 56$

Ans: 56

③



Ans: East

Doubt

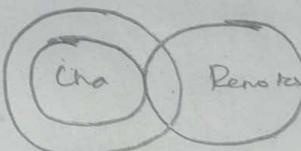
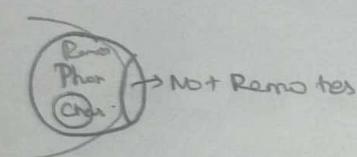
④



Ans: T3

Who likes T3 (A and B)

⑤



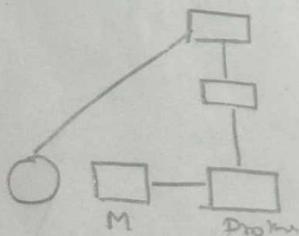
A) All chargers are phones. Some phones are remotes

⑥ $(8, 25), (27, 64), (125, 216), (343, 512)$

$$\begin{array}{ccccccc}
 2^3 & 5^2 & 3^2 & 4^2 & 5^2 & 6^2 & 7^3 & 8^3 \\
 & & & & & & &
 \end{array}$$

Ans: (8, 25)

⑦

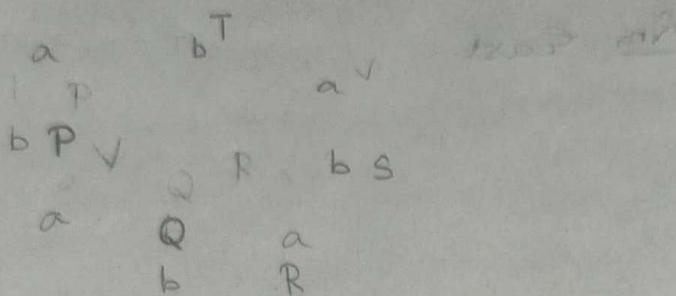


Ans: Sister

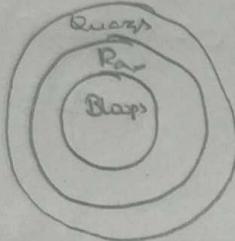
$$\begin{aligned}
 1) & B = C + 30 \quad C = A - 30 \\
 & \Rightarrow A - 80 + 30 \\
 & A + B + C = 120 \\
 & 2A + A - 30 = 120 \\
 & 3A = 90 \\
 & \boxed{A = 30}
 \end{aligned}
 \quad
 \begin{aligned}
 \frac{A+C}{2} & = B \Rightarrow B = \frac{80}{2} = 40 \\
 A + \frac{A+C}{2} + C & = 120 \\
 \frac{3A + 3C}{2} & = 120 \\
 A + C & = \frac{120 \times 2}{3} = 80
 \end{aligned}$$

D) Other statement alone is sufficient.

9



10



Ans: B) I and II only

11

$$\begin{array}{lll}
 A & 16 \text{ days} & \frac{1}{16} \\
 B & 24 \text{ days} & \frac{1}{24}
 \end{array}$$

$$\frac{1}{16} + \frac{1}{24} \Rightarrow \frac{3+2}{48} = \frac{5}{48}$$

$$\frac{5}{48} \times 9 = \frac{45}{48} + \frac{15}{48} = \frac{60}{48} = \frac{5}{4} \quad \text{Rem} = 1 - \frac{15}{16} = \frac{1}{16} \rightarrow A \text{ } \frac{65}{48} \text{ days}$$

Ans: 19 days.

12

$$M.P = C.P + 0.5 C.P = 1.5 \times C.P$$

$$S.P = M.P - M.P \times \frac{x}{100} = M.P \left(1 - \frac{x}{100}\right)$$

$$S.P = C.P + C.P \times \frac{20}{100} = C.P \times 1.2$$

$$\Rightarrow M.P \left(1 - \frac{x}{100}\right) = 1.2 \text{ C.P}$$

$$\Rightarrow 1.5 C.P \left(1 - \frac{x}{100}\right) = 1.2 C.P$$

$$\Rightarrow 1 - \frac{x}{100} = \frac{1.2}{1.5}$$

$$\frac{-x}{100} = \frac{1.2}{1.5} - 1 \Rightarrow \frac{1.2 - 1.5}{1.5} = \frac{-0.3}{1.5}$$

$$x = \frac{30}{1.5} = \frac{20}{1.5}$$

$$\boxed{x = 20}$$

Ans: 20

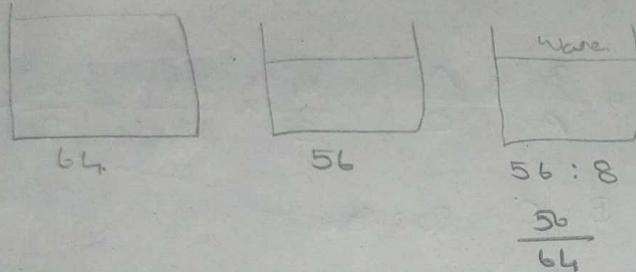
③ $3 \times 1 \text{ Indian} \Rightarrow (7-11) = 61$

$$61 \times {}^7 P_5$$

Ans: $61 \times {}^7 P_5$

Doubt

④



Repeated Dilution
M

⑤

$$\begin{array}{lll} A & 4R & 5B \\ B & 3R & 7B \end{array}$$

Red from A to B

15

$$\frac{4}{9} \times \frac{1}{11} = \frac{16}{99}$$

Black from A to B

$$\frac{5}{9} \times \frac{3}{11} = \frac{15}{99}$$

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$$h = 10\text{cm}$$

$$r = 20\text{cm}$$

1 cm

$$\text{Volume of cone} = \frac{1}{3}\pi r^2 h$$

$$\text{Volume of Sp.} = \frac{4}{3}\pi r^3$$

$$\text{No. of Balls} = \frac{\frac{1}{3}\pi 20^2 \times 10}{\frac{4}{3}\pi r^3}$$

$$= \frac{1000}{r^3}$$

Ans: 1000

⑧

Total 100 Points

A can give B 20 points $\Rightarrow A - 100$

A can give C 28 points $\Rightarrow A - 100$

B give C = ?

$$B = 80$$

$$C = 72 \times \frac{100}{100} = 72$$

$$\begin{array}{r} 80 \\ 72 \\ \hline 6 \end{array}$$

$$28$$

$$25$$

$$18$$

$$6$$

$$A:B = 5:4$$

$$A:C = 25:18$$

$$B:C = ?$$

$$\frac{B}{C} = \frac{B}{A} \times \frac{A}{C} = \frac{4}{5} \times \frac{25}{18} = \frac{10}{9}$$

$$B:C = 10:9$$

If B scores 100, then C scores

$$100 \times \frac{9}{10} = 100 \times \frac{9}{18} = 90$$

Ans: 10

⑨

To find CI and SI

$$P \left(\frac{R}{100} \right)^T \Rightarrow 150000 \times \left(\frac{R}{100} \right)^2 = 96$$

$$\frac{R^2}{150000 \times 100} = \frac{96}{150000}$$

$$R^2 = 64$$

$$R = 8$$

Ans: 8%

Q1 Q2 Q3

$$\begin{aligned}
 10) \quad n &\equiv 24 \pmod{5} & 2n &\equiv 11 \pmod{5} \\
 n &= 5k + 4 & 2k + 4 &\equiv 11 \pmod{5} \\
 2n &= 10k + 8 & 4 &\equiv 11 \pmod{5} \\
 & 48 & 48 &\equiv 34 \pmod{5} \\
 & 48 & 48 &\equiv 3 \pmod{5}
 \end{aligned}$$

Ans: 37

- 1) Hardly \rightarrow When Ans then the storm broke out
- 2) A) is responsible for
- 3) c) bombast \rightarrow high sounding language with little meaning.
- 4) Pernicious \rightarrow Malicious.
- 5) Quiescent \times Frenetic (Active)
- 6) To be at daggers drawn \rightarrow To be in a state of extreme enmity or hostility.
- 7) Precipitous \rightarrow sudden
- 8) No error
- 9) A) but also the teacher was
- 10) B) Pedantic \rightarrow Shows off academic knowledge.
- 11) -
- 12) B) map() transforms each element into another object, flatMap() transforms each element into a stream of other objects and then flattens these streams into single stream.
- 13) C) Efficiently calculating prefix sums of an array while allowing point updates.
- 14) Materialized View \rightarrow A view whose results are physically stored in a table and periodically updated from the source table.
- 15) FCFS \rightarrow Conway Effect.
- 16) D) Buffer Overflow SQLi
- 17) C) ACDE
- 18) B) Polymorphism

- ⑨ c) Topological sort
 B) It automatically deletes all corresponding child rows when a parent row is deleted.
- ⑩ B) It dynamically load JAVA classes into the JVM at run time
- ⑪ A) UNION combines rows from two queries and removes duplicates, UNION ALL includes all rows, including duplicates
- ⑫ c) Deadlock avoidance
- ⑬ B) Prevent the compiler from performing implicit type conversions using that constructor.
- ⑭ c) Implementing a FIFO queue
- ⑮ c) $\text{SELECT Salary FROM (SELECT Salary, DENSE_RANK() OVER (ORDER BY Salary DESC) AS R FROM Employees) WHERE R = 2;}$
- ⑯ A) Phantom Reference \rightarrow To refer to objects that have already been finalized but not yet reclaimed by the garbage collector.
- ⑰ B) Open / Closed Principle.
- ⑱ A Min Heap and Max Heap
- ⑲ The process of increasing the priority of processes that have been waiting for a long time to prevent starvation
- ⑳ c) All rows from both Table A and B with NULLs in place where a match does not exist.
- ① B) 1 2 3 5 6 7
- ② O(n)
- ③ A) A pair of indices i and j such that $i < j$ $\& A[i] > A[j]$
- ④ c) Finding all occurrences of a set of keywords in a given text in a single pass
- ⑤ B) Graham Scan
- ⑥ B) Length of longest Palindrome Substring

① B)

② O(\sqrt{n})

③ Coding

④ Find All Duplicates in an Array

⑤ Word Search II

Essay writing

Comprehension

Al and

min 22 and

③

(4)

Ques 3

$$\begin{array}{ccc}
 W & & M \\
 20 & & \\
 & 80 & \\
 \end{array}$$

After $1/6$ setting

$$\begin{array}{ccc}
 W & M & \\
 15 & 60 & \rightarrow 75 \quad 100 - 75 = 25 \\
 + & & \\
 25 & & \\
 \hline
 40 & \hline 60 \\
 & 2:3 & \\
 \end{array}$$

Ans: 2:3

(5)

 $r \rightarrow$ Center to Point $R-r \rightarrow$ Point to Circumference

$$r < R-r \Rightarrow 2r < R \quad r < \frac{R}{2}$$

$$P = \frac{\pi (R/2)^2}{\pi R^2} = \frac{1}{4} \quad \text{Ans: } 1/4$$

$$L-2 = 2 \text{ m}^3/\text{min} \quad \text{For } 2 \text{ hr} \quad 240 \text{ m}^3/\text{min}$$

[L80]

Ans: 60 min

L80 - 240

(b)

$$A = 20 \quad 1/20 \rightarrow \frac{1}{16} \quad 25 \uparrow \quad \frac{1}{20} + \frac{1}{20} \times \frac{25}{180}$$

-240

$$L \times \frac{1}{20} + L \times \frac{1}{16} + x \left(\frac{1}{16} + \frac{1}{50} \right) = 1$$

$$\frac{L+1}{80} = \frac{5}{80} \quad 10 \text{ b.c.s.}$$

$$\frac{L}{20} + \frac{L}{16} + x \left(\frac{5+2}{80} \right) = 1 \quad B = \frac{11}{40}$$

L/16, 60

2/4, 10

$$x = \left(\frac{7}{80} \right) = 1 - \frac{L}{20} - \frac{L}{16}$$

$$\frac{16}{53}$$

$$x = \frac{80}{7} \times \left(\frac{80-16-20}{80} \right)$$

2/20, 16

2/10, 8

$$x = \frac{56}{7} \times \frac{6+28}{80}$$

$$\frac{60}{16} \quad \frac{20}{80} \quad \frac{5}{16}$$

$$8+6-28$$

Ans: 14.2 days.

$$\begin{array}{c}
 1000 \quad 1000 \\
 1200 \quad 1000 \\
 \hline
 \end{array}
 \xrightarrow{+200}$$

$$\underline{\text{Ans: } 357}$$

$$\begin{array}{c}
 0 \quad 0 \\
 1 \quad 1 \\
 2 \quad 2 \\
 3 \quad 0 \\
 4 \quad 1 \\
 5 \quad 0 \\
 6 \quad 0
 \end{array}$$

$$\begin{array}{c}
 \textcircled{1} \quad m \quad w \\
 5 \quad \frac{1}{6} \quad \frac{5}{6} \\
 4 \quad \frac{3}{8} \quad \frac{5}{8} \\
 5 \quad \frac{5}{12} \quad \frac{7}{12}
 \end{array}
 \quad \text{Total} \quad \frac{9}{24} \quad \frac{17}{24}$$

$$\frac{5x}{6} + \frac{12x}{8} + \frac{25x}{12} = \frac{20x + 36x + 50x}{24} = \frac{106x}{24} = \frac{53x}{12} \text{ Milk}$$

$$\text{Water} \quad \frac{25x}{6} + \frac{20x}{8} + \frac{35x}{12} = \frac{100x + 60x + 70x}{24} = \frac{230x}{24} = \frac{115x}{12}$$

$$\frac{\text{Milk}}{\text{Water}} = \frac{53x}{115x} \quad \underline{\text{Ans: } 53:115}$$

Set-2

$$\begin{array}{c}
 \text{30m} \\
 \text{36 km/hr} \\
 \text{6 km/hr} \\
 \hline
 \text{200m} \\
 \text{15 sec}
 \end{array}
 \quad
 \begin{array}{c}
 36 \text{ km/hr} \Rightarrow 36 \times \frac{5}{18} = 10 \text{ m/s} \\
 6 \text{ km/hr} \Rightarrow \frac{6 \times 5}{18} = 1.67 \text{ m/s} \\
 15 \text{ sec} \Rightarrow 150 \text{ m} + \frac{1.67 \times 150}{10} = 250 \text{ m}
 \end{array}$$

$$\sqrt{150^2 + 200^2} = \sqrt{62500} = 250 \text{ m}$$

$$\underline{\text{Ans: } 250 \text{ m}}$$

$$\frac{Y}{11} = 5 \rightarrow 22 \text{ years}$$

304-1

③	A + B	20 days	1/20
	B + C	30 days	1/30
	A + C	24 days	1/24

$$2(A+B+C) = \frac{1}{20} + \frac{1}{30} + \frac{1}{24}$$

$$2(A + \frac{1}{30}) = \dots$$

$$2A + \frac{2}{30} =$$

$$SA = \frac{1}{20} + \frac{1}{30} + \frac{1}{24} - \frac{2}{30} = \frac{6+4+5-8}{120} = \frac{7}{120}$$

$$2A = \frac{37}{120} \Rightarrow A = \frac{37}{240} = \frac{7}{240} = \frac{1}{32}$$

Ans: 34,24

4

$$C.I = P \left(1 + \frac{\gamma}{100} \right)$$

$$P = 80 \text{ dB}$$

8:51

$$y = 3455$$

$$\Rightarrow 8000 \left(1 + \frac{5}{100}\right)^3$$

$$\Rightarrow 8000 \times \frac{105}{100}^{21} \times \frac{21}{105} \times \frac{21}{100}$$

Ans 926

$$\textcircled{5} \quad \frac{x}{50} = 52 \quad \Rightarrow x = 2080$$

$$\frac{2080+x}{41} = 53 \Rightarrow 2080+x = 2173$$

$$20 = 93$$

$$\begin{array}{r}
 & 52 \\
 & 5 \\
 \hline
 & 208 \\
 \\[-1.5ex]
 53 & \\
 41 & \\
 \hline
 53 & \\
 212 & \\
 \hline
 2173 & \\
 \hline
 \end{array}
 \quad
 \begin{array}{r}
 2017 \\
 2080 \\
 \hline
 2173
 \end{array}
 \quad
 \text{Ans: 93b} \quad 93$$

Aug. 93 b. 93

⑥ $7, 10, 18, 34, 66, 130$

Ans: 130

$$\underbrace{3}_{52} \quad \underbrace{8}_{52} \quad \underbrace{16}_{52} \quad \underbrace{32}_{52}$$

$$\begin{array}{r} 62 \\ 21 \\ \hline 73 \end{array}$$

73

$$\begin{array}{r} 36 \\ 11 \\ \hline 47 \end{array}$$

$$2000 \rightarrow 90^\circ \rightarrow 1800 \rightarrow 157^\circ \rightarrow 1530$$

Ans: 1530.

$$\begin{array}{r} 180 \\ 90 \\ \hline 270 \end{array}$$

$$\begin{array}{r} 7 \\ 10 \\ \hline 17 \end{array}$$

$$\begin{array}{r} 15 \\ 10 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 15 \\ 10 \\ \hline 25 \end{array}$$

$$\begin{array}{r} 15 \\ 10 \\ \hline 25 \end{array}$$

⑦

⑧

Speed of Boat =

$$S = \frac{D}{T}$$

$$u+v = \frac{25}{2}$$

$$u+v = 12$$

$$u-v = \frac{24}{3}$$

$$u-v = 8$$

$$\Rightarrow \begin{array}{l} 2u = 20 \\ \boxed{u = 10} \end{array}$$

Ans: 10 km/hr.

⑨

A 10000

12 mon

B 15000

6 mon

Total Prod 16000

$$\frac{16000}{2} = 8000$$

Ans: 8000

$$A \Rightarrow 10000 \times 12 = 120000$$

$$B \Rightarrow 15000 \times 8 = 120000$$

1:1

A:B = 1:1

$$\frac{120 \times 30}{100} = 36$$

$$120 - 12 - 36 = 72$$

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

$$\begin{array}{r} 36 \\ 12 \\ \hline 48 \end{array} \quad \begin{array}{r} 0 \\ 11 \\ 120 \\ 10 \\ \hline 48 \\ 72 \end{array}$$

Ans: 72

Set-3

- ① B) Their report, highlighting the need
- ② C) is as banal as
- ③ B) Specious - Actually wrong or deceptive
- ④ exigency \rightarrow Emergency
- ⑤ Sanguine \times Morose
- ⑥ To keep one's powder dry \rightarrow To be prepared for a potential emergency or conflict.

- ① B) placate → to calm or soothe someone
 ② B) were responsible for the decision
 ③ C) bent on causing
 ④ C) conscious

- ⑤ B)
 ⑥ A)
 ⑦ C) Red Black Tree
 ⑧ B)

- ⑨ A)
 ⑩ B)
 ⑪ XOR (^)

- ⑫ B)
 ⑬ B)
 ⑭ D)
 ⑮ B)

- ⑯ B)
 ⑰ B)

- ⑱ B)
 ⑲ A)
 ⑳ B)

- ㉑ B)
 ㉒ C)
 ㉓ B)

- ㉔ D) ALTER

- ① C) $O(n^2)$

- ② C) Find the number of distinct islands.

- ③ A) $[0, 0, 0, 1, 1, 1, 2, 2]$

- ④ $res = 0 + 1^*$

- 114 $res = 0 + 1^*$
 $res = 0 + 1^2$

- ⑤ c) A stack's LIFO Property.
- ⑥ Bellman Ford Algorithm \rightarrow B) It can handle graphs with negative edge weights.
- ⑦ a) abacaba
 - c) ↑
- ⑧ c) The maximum value obtainable from the first i items with a maximum weight capacity of w .
- ⑨

Coding

- ① Group Anagrams
- ② Minimum Knight Moves

Essay Writing

Comprehension

- Dot-2
- ① c) then the students stood up
 - ② B) If I were you
 - ③ A) At loggerheads \rightarrow Strong disagreement or dispute.
 - ④ Profligate \rightarrow Extravagant
 - ⑤ Esoteric x Commonplace
 - ⑥ to throw down the gauntlet \rightarrow To issue a challenge.
 - ⑦ A) Pertinent \rightarrow Relevant or Applicable.
 - ⑧ B) are practising very hard
 - ⑨ A) hell bent on
 - ⑩ Laconic x Verbose
 - \rightarrow Use too many words.
 - Using very few words.

- ① D) An abstract class can contain concrete (non-abstract) methods.
- ② B) To access members of the superclass that have been hidden by the subclass
- ③ C) Heap
- ④ B) O(N)
- ⑤ B) Increasing page frames increases page faults.
- ⑥ C) Thrashing.

- ④ D) GRANT
 ⑤ C) All rows from Table A, and matching rows from Table B.
- ⑥ A) All employees with salary above average.
 ⑦ C) 3NF
 ⑧ C) False, True.
 ⑨ B) The variable's value may be modified by multiple threads and should not be cached
 ⑩ D) Synchronized Block
 ⑪ C) Cyclical
 ⑫ B) An I/O operation to complete.
 ⑬ B) All leaf nodes are at the same level
 ⑭ B) Stored procedure automatically executed in response to a DML event.
 ⑮ C) It filters groups of rows created by the GROUP BY clause
 ⑯ D) Agile Model
 ⑰ B) To ensure the correct destructor is called when deleting an object via a base class pointer.
 ⑱ C) If n is a power of 2
 ⑲ C) $a = 20, b = 20$
 $x = 30$
 $y = 10$
 $z = 20$
 ⑳ $x = 2$
 $[2, 3, 5] \ 5, 0$
 $\hookrightarrow \text{solve}([2, 3, 5], 3, 1) + \text{solve}([2, 3, 5], 5, 1)$
 $\hookrightarrow \text{solve}([2, 3, 5], 0, 2) \quad \hookrightarrow \text{solve}([2, 3, 5], 1, 1)$
 Ans: 2
- ④ B) To find minimum element in an array.
 ⑤ D) The length of the longest common subsequence.

6

$x = 0$

$n = 16$

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17

3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

- ⑦ B) $slow = 3$, $fast = 3$
- ⑧ C) $O(n \log \log n)$

Coding:

- ① Rotate Image
- ② Word Break

Essay Writing

Comprehension

Set-1

- ① C) were present
- ② B) have submitted
- ③ A) of
- ④ C) had studied
- ⑤ C) Thorough
- ⑥ C) Friendly
- ⑦ B) She ignored the warning
- ⑧ C) Breakthrough

- ① A) 10

- ② B) Method Overriding

- ④ D) Priority (Non-Preemptive) C) Shortest Job First

- ⑤ B) Pages are of Variable size.

- ⑥ B) fork()

- ⑦ B) Employees in Sales and HR with salary higher than all in Marketing
- ⑧ D) INNER JOIN

- ⑩ C) GROUP BY.
 A) Connect
 A) Total count of IT employees shown for each row
- ⑪
- ⑫

$4^* M(3) \leftarrow$
 $\downarrow 3^* M(2) \leftarrow$
 $\downarrow 2^* M(1) \leftarrow$
 $\downarrow 1^* M(0) \leftarrow$
Ans: 24

- ⑬ 5 3 1

$1 \rightarrow \text{sum} = 0 + 1 = 1$
 $2 \rightarrow \text{sum} = 1 + 4 = 5$
 $3 \rightarrow \text{sum} = 5 + 9 = 14$
 $4 \rightarrow \text{sum} = 14 + 16 = 30$

Ans: 30

- ⑭ B) x will be 22

Coding:

- ⑮ 1) Count Subarrays with $\text{Sum} = k$.