# UPSC CSE (PRE) 2023 CSAT ANSWER KEY (SET- A)

| Q. NO. | ANS. | Q. NO. | ANS. | Q. NO. | ANS. | Q. NO. | ANS. |
|---|---|---|---|---|---|---|---|
| 1 | A | 21 | B | 41 | D | 61 | D |
| 2 | D | 22 | B | 42 | A | 62 | D |
| 3 | C | 23 | B | 43 | C | 63 | B |
| 4 | B | 24 | A | 44 | C | 64 | C |
| 5 | B | 25 | C | 45 | D | 65 | D |
| 6 | B | 26 | B | 46 | C | 66 | C |
| 7 | A | 27 | A | 47 | A | 67 | C |
| 8 | A | 28 | C | 48 | C | 68 | D |
| 9 | D | 29 | B | 49 | B | 69 | C |
| 10 | C | 30 | C | 50 | B | 70 | B |
| 11 | C | 31 | D | 51 | D | 71 | B |
| 12 | A | 32 | C | 52 | A | 72 | A |
| 13 | B | 33 | B | 53 | A | 73 | D |
| 14 | A | 34 | C | 54 | B | 74 | D |
| 15 | D | 35 | B | 55 | B | 75 | D |
| 16 | A | 36 | C | 56 | D | 76 | A |
| 17 | D | 37 | D | 57 | C | 77 | D |
| 18 | A | 38 | D | 58 | A | 78 | A |
| 19 | C | 39 | C | 59 | D | 79 | A |
| 20 | A | 40 | D | 60 | B | 80 | C |

Solution by –
SUDHIR KUMAR
(PGDM, IIM Lucknow)
Faculty @ LukmaanIAS

# CSAT - 2023 Set - A

(Quant & Reasoning Solution)

LukmaanIAS

Q4:– Ans B

| R | W | B |
|---|---|---|
| 2×10 = 20 | 9×2 = 18 | 8×2 = 16 |

In the worst scenario, Raj may choose only White and Black in the first 18+16 = 34 attempts. But in the 35th and 36th attempt, Raj will definitely get "a red pair of shoes".



Q5:: Ans B

$25 = x + 4y + 6z$

$x$ → singles (II), $y$ → fours (III), $z$ → sixes (IV)

Case: I

| 6×4 = 24 | 6×3 = 18 | 6×2 = 12 | 6×1 = 6 | V 6×0 |
|---|---|---|---|---|
| 24, 0, 1 | 18, 4, 3 | 12, 4×2, 1 | 6, 4×4, 3 | 0, 4×6, 1 |
| | 18, 0, 7 | 12, 8, 5 | 6, 12, 7 | 4, 20, 5 |
| | | 12, 4, 9 | 6, 8, 11 | 0, 16, 9 |
| | | 12, 0, 13 | 6, 4, 15 | 0, 12, 13 |
| | | | 6, 0, 19 | 0, 8, 17 |
| | | | | 0, 4, 21 |
| | | | | 0, 0, 25 |

∴ Total Ways = 1 + 2 + 4 + 5 + 7 = 19

Ans B

Q.6 :→

| | | | |
|---|---|---|---|
| $L_1$ | $L_2$ | $L_3$ | $L_4$ |
| $E_1$ | $E_2$ | $E_3$ | $E_4$ |

If the three letters and three envelops are ~~in the~~ placed rightly, then the fourth letter ~~one~~ has to be in the right envelop. Hence, statement I, is correct.

Ways in which only two letters can go into the correct envelop are :—

| $E_1$ | $E_2$ | $E_3$ | $E_4$ |
|---|---|---|---|
| $L_1$ | $L_2$ | $L_4$ | $L_3$ |
| $L_1$ | $L_4$ | $L_3$ | $L_2$ |
| $L_1$ | $L_3$ | $L_2$ | $L_4$ |
| $L_4$ | $L_2$ | $L_3$ | $L_1$ |
| $L_3$ | $L_2$ | $L_1$ | $L_4$ |
| $L_2$ | $L_1$ | $L_3$ | $L_4$ |

→ Total 6 ways.

Q.7 Ans A

$85 \times 87 \times 89 \times 91 \times 95 \times 96$ divisible by 100?

- One observation is that multiplication of $95 \times 96$ will give unit digit zero, Hence, the remainder would be zero.
- Also, by applying remainder theorem

$= -15 \times (-13) \times (-11) \times (-9) \times (-5) \times (-4)$

$=$ 300 · 99 · 13

$\Rightarrow$ Hence, remainder zero.



Q0- Ans A

$(57242)^{2+7\times5\times3\times1} = (57242)^{945}$

$= (57242)^{944} (57242)^{1}$

Cyclicity of 2 $\rightarrow$ $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, $2^4 = 16$ } Hence, remainder is 2.

Q.9:-
Ans. D

$$\begin{array}{ccc} A & B & C \\ D & E & F \\ \hline 1 & 1 & 1 \quad 1 \end{array}$$

$2+9=11$
$3+8=11$
$4+7=11$
$5+6=11$

$$\begin{array}{ccc} 6 & 3 & 2 \\ 4 & 7 & 9 \\ \hline 1 & 1 & 1 \quad 1 \end{array} \qquad \begin{array}{ccc} 1 & 3 & 5 \\ 9 & 7 & 6 \\ \hline 1 & 1 & 1 \quad 1 \end{array}$$

$1+9=10$
$2+8=10$
$3+7=10$
$4+6=10$

$$\begin{array}{ccc} 1 & 2 & 7 \\ 9 & 8 & 4 \\ \hline 1 & 1 & 1 \quad 1 \end{array}$$



Q10 - Ans. C

observe the ratio

$\frac{100}{1+0+0} = 100$, $\frac{123}{1+2+3} = 20.5$ $\frac{999}{9+9+9} = 37$

some analysis (i.e maximising denominator and minimising numerator) will suggest you that ratio would be minimum at $\frac{199}{1+9+9} = 10.47$

Q14 – Ans A

Remember,

Even + Even = Even

Odd + odd = Even

E + O = O

E − E = E

O − O = E

O − E = O

E − O = O

$\underbrace{p+q+r}_{3,\text{ Even}} \underbrace{-s-t}_{2,\text{Odd}} = E - E = E$

$\underbrace{p+q+r}_{\substack{2,\text{Odd}\\1,\text{Even}}} \underbrace{-s-t}_{2,\text{Even}} = E$

$\underbrace{p+q+r}_{\substack{2,\text{Even}\\1,\text{odd}}} \underbrace{-s-t}_{\substack{1,\text{Even}\\1,\text{Odd}}} = O + O = E$



Hence, statement I correct

But for $2p+q+2r-2s+t$, if we take q and t to be odd, then the expression is Even.

Q15: Ans D

2 is a prime, and composite numbers have more than two factors.

$$\frac{b+c}{b-c} = \frac{2+6}{2-6} = \frac{8}{-4} = -2$$

$$2b+c = 2 \cdot 2 + 9 = 4+9 = 13$$

$$b \cdot c = 2 \cdot 11 \cdot 9 = 99$$

(2 → prime; 11 · 9 → composite)

Q16: Ans A

$$\begin{array}{r} A\,B\,C \\ \times\ D \\ \hline 3\,7\,0\,D \end{array}$$



Since the number is 3700 plus, so the possible values of A and D are

| A | D |
|---|---|
| 9 | 4 |
| 7 | 5 |
| 4 | 9 |
| 5 | 7 |
| 8 | 4 |
| 6 | 8 |

$$\begin{array}{r} 926 \\ \times\ 4 \\ \hline 3704 \end{array}$$

∴ 9+2+6 = 18

To get this, you have to check case

Q17 Ans D

Divisibility rule of 7, 11 and 13 says — Sum if the difference of the sum of digits (in a group of 3) at odd and sum of digits at even position (in a group of 3) is '0' or divisible by 7, 11 and 13.

Hence, XYZXYZ, is divisible by 7, 11, 13 ; because XYZ − XYZ = 0

Also, 7 × 11 × 13 = 1001



Q18 :- Ans A Remove 2 from each side i.e, (l − 1)(b − 1)(h − 1) = 3 · 3 · 3 = 27

Q19 :- Ans C → 4 digits can occupy this even place

4 4 3 3 2 2 1 1

i.e 4 digits can occupy this place of odd

$$\therefore \quad \frac{4^2 \cdot 3^2 \cdot 2^2}{2!\,2!\,2!\,2!} = 36$$

Q 20 **Ans A**

$$\frac{1}{8} = 12.5 \;;\; \frac{1}{16} = 6.25 \;;\; \frac{1}{12} = 8.33$$

$$\left.\frac{1}{8} + \frac{1}{16} + \frac{1}{12} = \frac{6+3+4}{48} = \frac{13}{48}\right\} \text{work done in 1 days}$$

$\therefore$ in 9 days $\frac{13 \times 3}{48} = \frac{39}{48}$ work done.

Remaining Work $1 - \frac{39}{48} = \frac{9}{48}$ will be done in $\frac{1}{8} + \frac{1}{16} = \frac{6+3}{48} = \frac{9}{48}$

$\therefore$ work will be completed in 11 days and work completed on Thursday.

Q 24 :- Ans A

observe that $7 \oplus 9 \oplus 10 = 8$

$9 \oplus 11 \oplus 30 = 5$

$11 \oplus 17 \oplus 21 = 1$

Also $7+9+10 = 26$ (sum of digits = 8)
bcz $= 2+6 = 8$

$9+11+30 = 50$ (sum of digits = 5)

$\therefore$ $23 \oplus 4 \oplus 15 = 23+4+15$

$= 42$

sum of digits $= 4+2$

$= 6$.



Q 25 :- Ans C

$7x+96$ is divisible when $x = 1, 2$

3, 4, 6, 8, 12, ~~24~~, 16, 24, 32, 48, 96

$\therefore$ total 12 numbers

Also note that $96 = 2^5 \cdot 3^1$

∴ no. of factors $(5+1)(1+1) = 6 \times 2$
$= 12$

~~And all those factors~~

Q 26 Ans B

It is natural to choose 6, 7, 8, 9 to maximise $(b+2)(8+5)$

$(6+9)(7+8) = 15 \cdot 15 = 225$

* We know that if $x+y$ = constant, then the product of $x \cdot y$ is maximum when the distance between x and y is minimum.



Q 27 :- Ans A

To check for the divisibility by 13 we make a group of 3 digits. ~~from left~~ And if the difference between odd groups and even groups is zero or

divisible by 13, then the number is divisible by 13.

For instance, 999 999 ... 999 999 999

↓ Even group ↓ odd group

$\because 3 \times 37 = 96 \Rightarrow$ 96 of '9' digits will cancel

$\therefore$ only 999 will left, and it gives a remainder of 11 when divided by 13.

Q 28:- Ans c

Observe the pattern: $11 \times 11 = 121$, $111 \times 111 = 12321$

$1111 \times 1111 = 1234321$

Therefore $11111111 \times 11111111 = 1234567898765432 1$

$1+2+\ldots+8 = \frac{8 \times 9}{2} = 36$

$1+2+\ldots+9 = \frac{9 \times 10}{2} = 45$

$\therefore 26 + 45 = 81$

Q 29 :- Ans B

first check for all two digit numbers

i.e. $\frac{9}{\downarrow}$ $\frac{10}{\searrow}$ at unit place,

Zero not allowed — Zero allowed

$\therefore$ 1, 2, ..... 9 each appears 19 times. Hence, sum would be

$19(1+2+\cdots+9) = 19\left(\frac{9\times10}{2}\right) = 19\times45$

$= 855$

Now in 855 add the sum of digits of 100, i.e. 855 + 1 = 856.

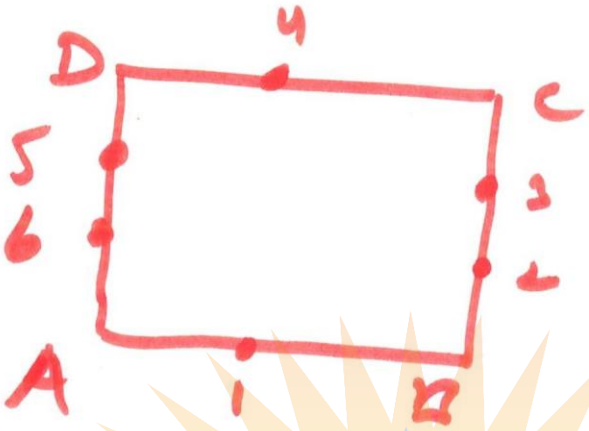


* Also, you must know that sum of digits from 1 to 100 is equal to 901. Out of 901, now subtract sum of 1+2+3+... 9

to get sum of digits of 10 to 10

$$901 - 45 = 856$$

Q 30:- Ans c




Counting from point '1' in anti-clockwise direction, we get

$$4 + 3 + 2 + 1 = 10$$

4 → Total Δs with 1-2 as the base

3 → Total Δs with 1-3 as the base

2 → 1-4 base

1 → 1-5 base

$$3 + 2 + 1 = 6$$

3 → 2-3 as base

2 → 2-4 as base

1 → 2-5 as base

2 + 1 = 3

↙ 3-4 as base ↘ 4-5 as base

1

↙

Triangle with 4-5 as base

∴ Total $\Delta_s$ = 10 + 6 + 3 + 1 = 20

Q 36 :- Ans C

14 + 20 + 26 + 28 + 30 + 34 = 180

Blue White Green Yellow Red Orange



If we assume that we selected 174 balls (leaving one ball each of all colour then in 175th selection we will have one full group of at least one colour.

Similarly, to get at least one ball of each colour, we can select all Blue, Green, balls (except any Black ball) in 167 attempts. And then select one Black ball in 168th attempt.

Q27 Ans D



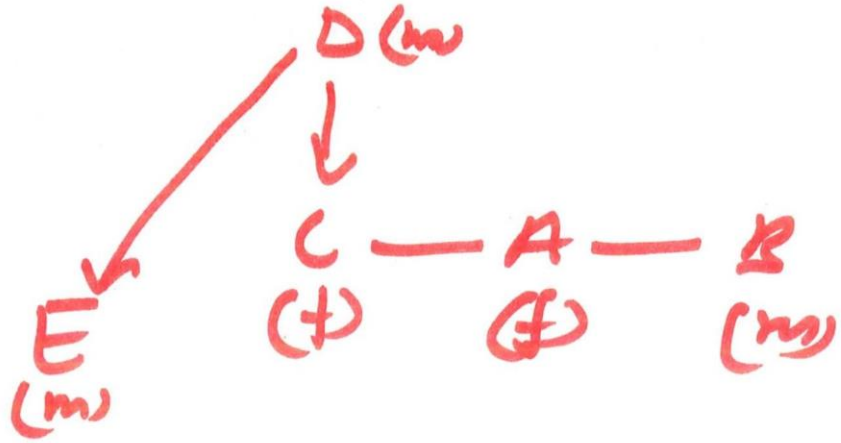


Q28 Ans D

The question is simple; all statements are required.

A > B, C = D, D > F, F > A, E youngest

Q 39 Ans C




m → male
f → female

Statements 1, 2 and 3 only don't give relationship between E & B.

Similarly, statements 1, 3 and 4 only don't give relationship between D & C; hence, between E & B



Q 40 Ans D

91 is not a prime number, all other groups have prime numbers.

Q 44 Ans C

When the rate (R.I.) is equal

in both cases (i.e half-yearly compounding or yearly compounding then the final amount/principle would be more in the case of ~~less~~ half-yearly compounding.

But in this question, the final amount (Q) is same in both case; hence R < S.

Q45 Ans D

$$1186 = Q(N) + 31$$

$$QN = 1155$$



Also, $1155 = 11 \times 7 \times 5 \times 3$

Number of factors $= (1+1)(1+1)(1+1)(1+1)$

$= 2^4 = 16$

But out of these 16 factors, some will not leave a remainder of 31 when these factors divide 1186.

Therefore, we need to eliminate those factors. factors, 1, 3, 5, 7, 11, 15, 21 will not give remainder 21. ∴ 16 − 7 = 9 numbers

**Q46** Ans C

$p < q < r$ $pp + qq + rr = tt0$

$tt0$ can take values 110, 220.



combinations are:—

for 110:

| | | | |
|---|---|---|---|
| 11 | 22 | 33 | 44 |
| 22 | 33 | 44 | 55 |
| 77 | 66 | 55 | 55 |

for 220:

| | | | |
|---|---|---|---|
| 33 | 44 | 55 | 55 |
| 88 | 77 | 66 | 77 |
| 99 | 99 | 99 | 88 |

∴ p can take 11, 22, 33, 44, 55

66, 77, 88.

Q47 Ans A

1 3 2 1

Only 1 can occupy this place, because no. in less than 2000

Therefore, to 6 digits.

1 2 3 4
1 2 4 3
1 3 2 4
1 3 4 2
1 4 3 2
1 4 3 2

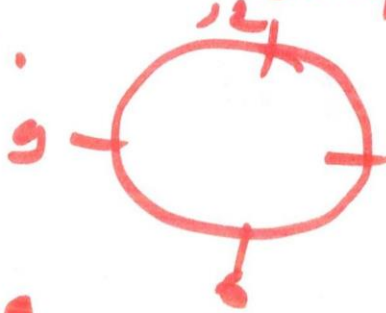
7 9 9 8



Q48 Ans C

This question is very simple.

Imagine a clock.




selections are

12-9
1-10
2-11

3-12
4-1
5-2

6-3
7-4
8-5

10-7, 11-8

Therefore 12 ways.

**Q 49 :- Ans B**

$\frac{10^{10}}{7}$ calculate remainder

$\frac{3^{10}}{7} = \frac{(27)^3 \cdot 3}{7} = \frac{(-1)^3 \cdot 3}{7} = \frac{6 \cdot 6 \cdot 6 \cdot 3}{7}$

$\frac{36 \cdot 10}{7} = 1 \cdot 4$ ∴ remainder = 4

The day will be Sunday + 4 days

= Thursday



**Q 50 :- Ans D**

Red to Green then Green to Red

LCM of 25, 30, 60 is = 300

$\frac{5 \times 5}{12 \times 3}$ : $2 \times 2 \times 3 \times 5$

3900 sec = $1^h\ 5^m$

∴ after $2^h\ 10^m$ again Red

**Q 54** Ans D (Look for numbers 41, 81, 121, 161)

1 → 2 – 4 – 7 – 11 – 16 – 22 – 29 → 37

↓

(121) – 106 – 92 – 79 ← 67 – 56 ← 46

Therefore, 15 changes.



**Q 55** – Ans B

{2, 3, 4, .... 27} → sum of the series = $\frac{27 \times 28}{2} - 1 = 377$

The middle term of 377 is 189th term.

Now count (from end entry), 189th term

| | | | |
|---|---|---|---|
| A → 27 | C → 25 | E → 23 | G → 21 |
| B → 26 | D → 24 | F → 22 | H → 20 |

Since A to H = 18 terms

I is 18th term.

**Q56 :- Ans D**

$P \times Q > 0$ implies

$P = -2, Q = -3$ ; $P = -3, Q = -2$

$P = 2, Q = 3$ ; $P = 3, Q = 2$

Therefore, statement I alone is not sufficient to decide whether $P > Q$ or not.

For $P^2 > Q^2$, we get

$(-3)^2 > (-2)^2$ ~~$(-5)^2 > (-3)^2$~~

or

$(3)^2 > (2)^2$ or ~~$(5)^2 > (3)^2$~~

Hence, Statement 2 also alone cannot decide if $P > Q$ or not.

Even if we take both the statements together, then from statement two we know $(-3)^2 > (-2)^2$

i.e $p = -3$ $q = -2$ ; but from statement I, p could be -2, and $q = -3$. Hence, both statements together cannot help decide.

Q57 :- Ans C

$p + q - r > p - q + r$



$2q > 2r \Rightarrow q > r$

Statement I says $p > q$

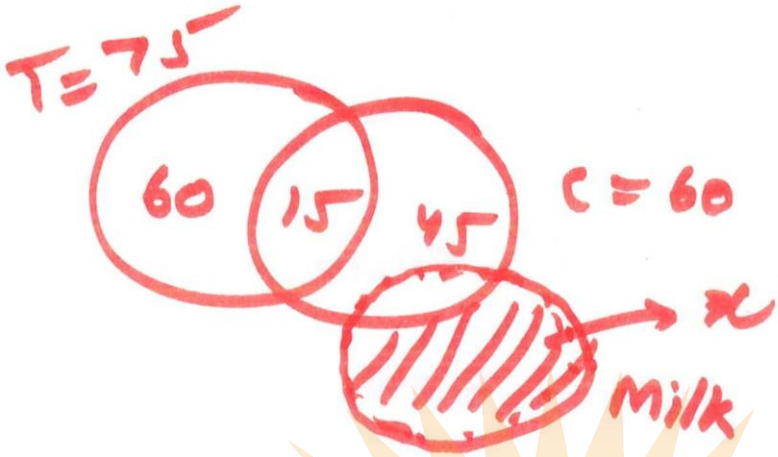
Statement 2 says $p < r$

Hence, both statements together suggest $r > p > q \Rightarrow r > q$

* You can also solve this question

by taking values.

Q58 :- Ans A




Statement I alone cannot decide (number of person attended party) because if milk has overlap with coffee, then we don't know the amount of overlap.



However, statement 2 gives us

$5x = x + 60 + 15 + 45$

$4x = 120 \Rightarrow x = 30$

∴ Party attended by $5.30 = 150$

Q 59 :- Ans D

123, 132, 213, 231, 312, 321

↓

sum of digits = 6 = product of digits

132, 312 are divisible by 6. ~~Hence~~

Hence, we can't identify the number uniquely.

Other numbers ~~where the number~~ which are divisible by the sum of the digits are 156, 120, 450, 540, 111, 312 etc.

Q 60 :- Ans B

$a < b < c < d < e$

Statement I says $\rightarrow \begin{cases} e = 3x \\ a = x \end{cases}$

$\therefore \quad 3x = x + 2 \times 4$

$x = 4$

Statement 2 says $c = b$ = average

$\therefore \quad a = b - 2 \times 2 = 4$

Hence, question can be answered by using either statement alone.

Q65 :- Ans D

99% of 400 = 396

so we have to distribute 396 in 4 places.

Case I :- 96 100 100 100 } 4 ways

Case II :- 97 99 100 100 $= \frac{4!}{2!} = 12$

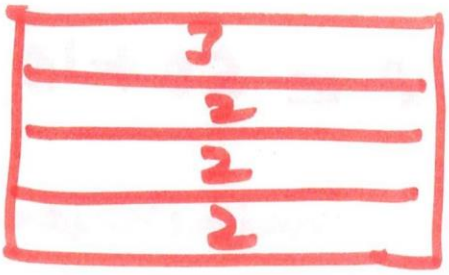
Case III :- 98 98 100 100 $= \frac{4!}{2!2!} = 6$

Case IV :- 99 99 98 100 $= \frac{4!}{2!} = 12$

Case V :- 99 99 99 99 $= 1$

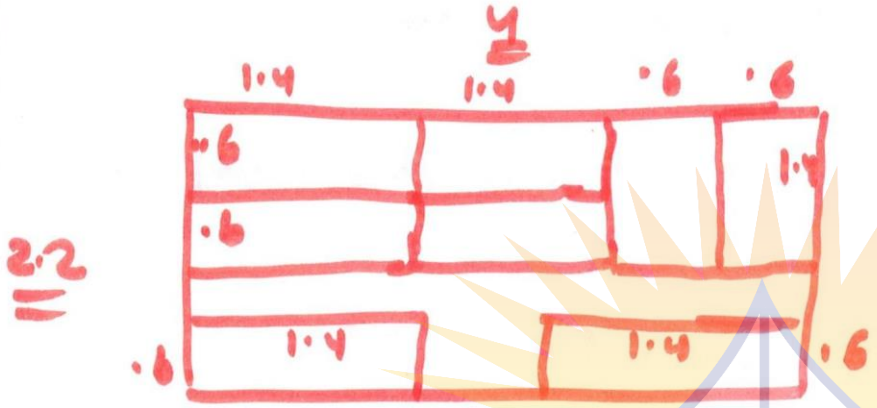
$\therefore$ total $4 + 12 + 6 + 12 + 1 = 35$

Q 66 :- Ans C




3×2×2×2
= 24

Q 67 :- Ans C




Q 68 :- Ans D



$\frac{3}{P}\ \frac{2}{Q}\ \frac{1}{R}\ \frac{2}{S}\ \frac{1}{T}$ = 3×2×2 = 12

+

$\frac{3}{-}\ \frac{2}{-}\ \frac{2}{-}\ \frac{1}{-}\ \frac{1}{-}$ = 3×2×2 = 12

∴ total 12 ways.

Q 69 :- Ans C

Hence, 7P = 50 + 10 + 10 + 2 + 2 + 2 + 2,

and 7 is minimum no. of coins to make 7P; Hence, statement I is correct.

Other combination is

7P = 50 + 2 + 5 + 2 + 5 + 2 + 5 + 2 + 5

To weigh 7P we can use




Hence, using only 5 coins.

∴ Both statements correct.

Q70:- Ans B

$A + B \Rightarrow A > B$

$A - B \Rightarrow A \leq B$

$A \times B \Rightarrow A \geq B$

$A \div B \Rightarrow A < B$

$A \pm B \Rightarrow A = B$

Statement :- $P \times Q \Rightarrow P \geq Q$

$P - T \Rightarrow P \leq T$

$T \div R \Rightarrow T < R$

$R \pm S \Rightarrow R = S$



$\therefore S = R > T \geq P \geq Q$

Conclusion 2 :- $Q \pm T \Rightarrow Q = T$

doesn't follow because T could be greater than Q, or $T = Q$.

Similarly, $S + Q \Rightarrow S > Q$

definitely follows from statement.

Q74 :- Ans D

$$\frac{2^{192}}{6} = \frac{(2^4)^{48}}{6} = \frac{(4)^{48}}{6}$$

$2^1 = 2$
$2^2 = 4$
$2^3 = 8$
$2^4 = 16$

$$\frac{(4^2)^{24}}{6} = \frac{(4)^{24}}{6} = \frac{(4)^{12}}{6} = \frac{(4)^6}{6}$$

$4^1 = 4$
$4^2 = 16$
$4^3 = 64$
$4^4 = 256$

$$\frac{(4)^3}{6} \quad \therefore \quad \frac{4 \times 4 \times 4}{6} = \frac{64}{6}$$

Remainder = 4

Q75 :- Ans D

ABCD ABCD ABCD ABCD ABCD



Observe that first D is being duplicating, then C, then B and A.

Q76 :- Ans A

$$\begin{array}{r} AB \\ \times\ CD \\ \hline DEF \end{array} \qquad \begin{array}{r} DEF \\ 4\,4\,I \\ \hline 975 \end{array}$$

given { E = 0, F = 8 }

Since F = 8, I should be 7

and $E=0$, so H should be 6.

Also, $D+G=9$; D & G can only take values 4, 5

But D has to 4, because

$$\begin{array}{r} AB \\ \times\ CD \\ \hline DEF \\ \hline \end{array}$$

Since $F=8$, so $D=4$, and $B=2$

Also, A or C cannot be 9, otherwise the product won't be DEF.

$\therefore A+B+C = 1+2+3=6$

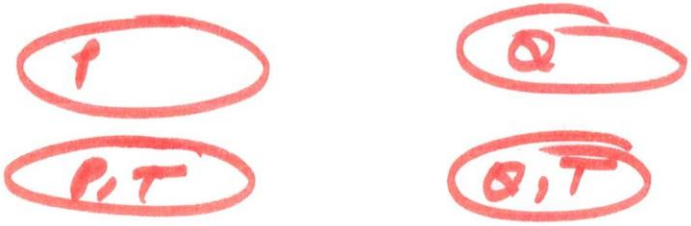
$$\begin{array}{r} AB \\ \times\ CD \\ \hline DEF \\ \hline \end{array} \qquad \begin{array}{r} 12 \\ \times\ 34 \\ \hline 408 \\ \hline \end{array}$$

Q 77 :- Ans D




True case of statement 2 is that none of R and S was selected.

∴ final 'selected' are



Q 78:- Ans A

P = True then

| Q | S |
|---|---|
| True | True |

→ Table I

P = False then

| Q | S |
|---|---|
| T | T |
| F | F |
| F | T |
| T | F |

→ Table 2

T = false

| R | S |
|---|---|
| T | T |

↓ Table 3

T = True

| R | S |
|---|---|
| F | F |
| F | T |
| T | F |

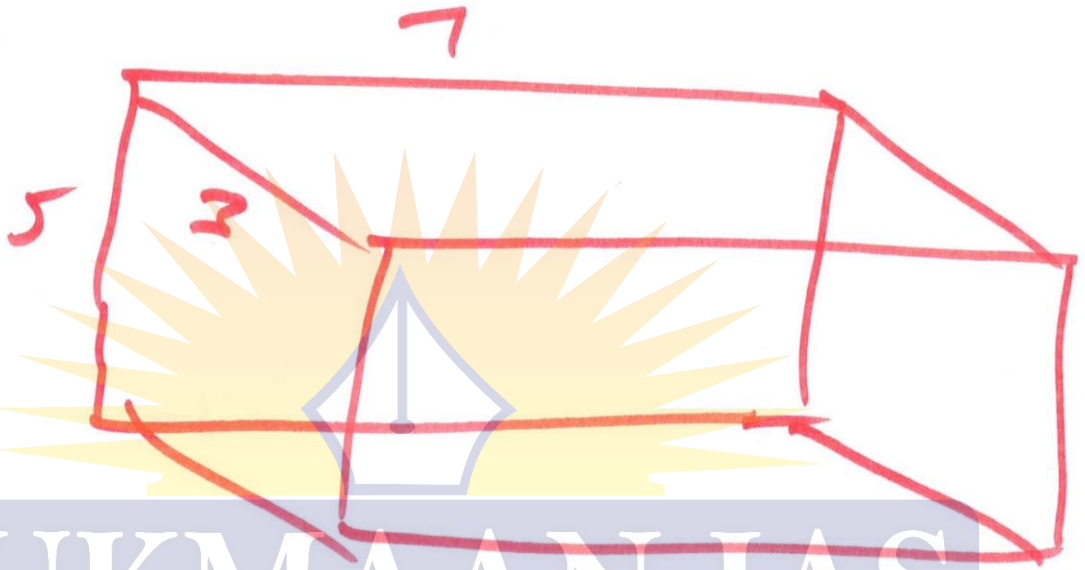
→ Table 4



Statement I is correct because if T is True then R can be true (and in this case S would be false), but if S is false then P cannot be true.

Statement 2 is incorrect because if Q is true, then P will be true only if S is true; but S could be false or True.

Q79 :- Ans A




$(7-2)(5-2)(3-2) = 5 \times 3 \times 1 = 15$

Hence, statement 2 correct

There are only 4 cubes on four sides (where Green and Blue intersect) having exactly two faces coloured — one blue, another Green.

Q80 :- Ans C

I N C O M P R E H E N S I B I L I T I E S

B C E E E H I I I I I L M N N O P R S S T

T S S R P O N N M L I I I I I H E E E C B

Reverse alphabetical order

Alphabetical order

∴ 2 I's are unchanged