in P (4, 4)
= 4x3x2x1= 24 ways.

Q.11. (3) Solution Wearing 3 different rings in four fingers with at most one in each finger is equivalent to arranging 3 different objects in 4 places.
This can be done in P (4, 3) = 4 x 3 x 2 = 24 ways.

Q.12.(4) Solution - Each apple can be given to any one of the 4 boys and this can be done in 4 ways.
∴ The required number of ways = 4^6 = 4096.

Q.13.(3) Solution - Number of letters in the word 'KURUKSHETRA' is 11 of which 2 are K's, 2 are U's, 2 are R's and remaining are different.
∴ Required number of permutations.

$$\frac{11!}{2!2!2!} = 4989600$$

Q.14.(1) Solution - The word ALLAHABAD has 9 letters in all. The letter 'A' occurs 4 times, the letter 'L' occurs 2 times and the remaining three letters H, B, D each occur once.
∴ The require number of permutations.

$$\frac{9!}{4!2!} = \frac{9\times8\times7\times6\times5\times4!}{4!\times2}$$
= 9×8×7×3×5 = 7560.

Q.15.(2) Solution There are three places to be filled up to form a three-digit number. Since any digit may be repeated any number of times, each one of three places can be filled up by any of the given 4 digits in 4 ways.
Hence, the number of words that can be formed.
= 4^3 = 64

Q.16.(5) Solution
The given word consists of 11 letters out of which A occurs 2 times, R occurs 2 times, N occrus 2 times and E occurs 2 times and remaining three are different.
∴ Number of arrangements

$$= \frac{11!}{2!2!2!2!} = 2491800$$

Q.17.(5) Solution
Starting with E and arranging the other ten letters X, A, M, I, N, A, T, I, O, N (I occurs twice N occurs twice, A occurs twice).

$$\frac{10!}{2!2!2!} = \frac{10\times9\times8\times7\times6\times5\times4\times3\times2\times1}{2\times2\times2}$$
= 453600 words
∴ The number of items in the list before the first word starting with E is 453600.

Q.18.(1) Solution
A number greater than a million has 7 places, and thus all the 7 given digits are to be used. But 2 is repeated twice and 3 is repeated thrice.
∴ Total number of ways of arranging these 7 digits amongst themselves.

$$= \frac{7!}{2!3!} = 420$$

But numbers beginning with zero are no more seven digited numbers, hence we have to reject those numbers which begin with zero, and such numbers are.

$$= \frac{6!}{2!3!} = 60$$

Hence, the required number of arrangements, = 420 – 60 = 360.

Q.19.(3) Solution : n = Total no. of beads = 6+5 = 11
P = 6 P = 5
∴ No. of different necklaces =

$$\frac{1}{2}\frac{(11-1)!}{6!5!} = \frac{10!}{2.6!5!}$$

$$= \frac{10.9.8.7.6!}{2.6!.5.4.3.2.1} = 3\times7 = 21$$

Q.20.(1) Solution : Treat the Punjab and Madras Chief Ministers as one then we have (P.M.) + 9 others.
∴ We have to arrange 10 persons round a table. This can be done in (10–1)! = 9! ways.
Corresponding to each of these 9! ways and Punjab and Madras Chief Ministers can interchange their places in 2! ways.
Associating the two operations, total number of ways.
= 9!2! = (9.8.7.6.4.3.2.1)(2.1) = 725760.

Q.21.(2) Solution : We know that C(n, r) = $\frac{n!}{r!(n-r)!}$

Now, C(n, 7) = C(n, 5)

$$\Rightarrow \frac{n!}{7!(n-7)!} = \frac{n!}{5!(n-5)!}$$

$\Rightarrow$ 5!(n–5)! = 7!(n–7)!
$\Rightarrow$ [5!], (n–5) (n–6) [(n–7)!] = 7.6.[5](n–7)!
$\Rightarrow$ n^2–11n + 30 = 42
$\Rightarrow$ n^2 – 11n + 30 – 42 = 0
$\Rightarrow$ n^2–11n–12=0
$\Rightarrow$ (n–12)(n+1) = 0
$\Rightarrow$ n–12 = 0 or n + 1 =0
$\Rightarrow$ n = 12 or n = – 1
But n = – 1 is rejected as n is a non-negative integer.
∴ n = 12

Q.22.(1) Solution C (n, 8) = C(n, 6)

$$= \frac{n!}{8!(n-8)!} = \frac{n!}{6!(n-6)!}$$

$\Rightarrow$ 6!(n–6)! = 8!(n–8)!
$\Rightarrow$ 6! (n–6) (n–7)[(n–8)!] = 8.7.6!(n–8)!
$\Rightarrow$ n^2 – 13n +42=56
$\Rightarrow$ n^2 –13n + 42 – 56 = 0
$\Rightarrow$ n^2 – 13n – 14 = 0
$\Rightarrow$ (n–14)(n+1) = 0
$\Rightarrow$ n – 14 = 0 or n + 1 = 0
$\Rightarrow$ n =14 or n = –1
But n = –1 is rejected as n is a non-negative integer
$\Rightarrow$ n = 14

$$\therefore C(n, 2) = C(14, 2) = \frac{14!}{2!12!} = \frac{14.13.12!}{2.12!}$$
= 91.

Q.23.(1) ∴ 4 vowels occupy odd places, that is 1, 3, 5 and 7. No. of odd places = 4
∴ 4 vowels can be arranged in 4 'X' marked places = P(4, 4) ways = 4! ways
∴ The required no. of words
= 4!×4! = 24 × 24 = 576

Q.24.(2) Solution
7!× 3! = 30240

Q.25.(1) 6!×2! ÷ 2! = 6! = 720.

Q.26.(2) Solution
11 player can be selected out of 16 players in

$$^{16}C_{11} \text{ ways} = \frac{16!}{11!5!} = 4368 \text{ ways}$$

If one particular player is to be excluded, then selection is to be made of 11 players out of 15 players and this can be done in $^{15}C_{11}$ ways

$$\frac{15!}{11!5!} = 1365 \text{ ways}$$

Q.27.(1) Solution 11 players can be selected out of 16 players in $^{16}C_{11}$ ways

$$= \frac{16!}{11!5!} = 4368 \text{ ways}$$

If two particular players are to be included and one particular player is to be rejected, then we have to select 9 more out of 13 in $^{13}C_9$ ways

$$\frac{13!}{9!4!} = 715$$

Q.28.(5) $\frac{\lfloor 6}{\lfloor 2} = 6 \times 5 \times 4 \times 3 = 360$

Q.29.(1) Solution

$$\text{Total ways} = {}^7C_5 \times {}^3C_2 = \frac{7\times6}{2}\times3$$
= 63

Q.30.(3)Solution

$$\text{Total ways} = {}^8C_5 \times {}^{10}C_6$$
$$= \frac{8\times7\times6}{3\times2\times1}\times\frac{10\times9\times8\times7}{4\times3\times2\times1}$$
= 11760

Q.31.(1)120
Number of words form by word "initial" must have started and ended with letter 'I'

$$= \frac{6!}{3!} = 120$$

Q.32.(1)C V C V C
No. of ways to arrange = L3 L2
= 3 x 2 x 2
= 12

Q.33.(1)360
There are six letters in 'RUSSIA' in which letter 'S' is twice

$$\text{Therefore possible words} = \frac{6!}{2!}$$
= 360 words

Q.34.(1)148
The way of making the team in which majority of women will be.
$= {}^5c_4 \times {}^8c_2 + {}^5c_5 \times {}^8c_1$
= 5 x 28 + 1 x 8 = 140 + 8=148

Q.35.(2)36000
otal strength = 5 + 3 = 8
it can be arranged by = 8!
Now condition of Arrangement of 5 boys = 5!
& arrangement of 3 girls = 3!
Total conditions of sitting in a row so that all three girls not sit together
= 8! - 3! x 6!
40320 - 4320 = 36000

CHAPTER-18

PROBABILITY

Q.1.(2) Sample space S ={HH, HT, TH, TT}
Number of exhaustive cases = 4
There are one favourable cases TT

$\therefore$ P (2 Tails) = $\frac{1}{4}$

Q.2.(1) Sample space S = {HH, HT, TH, TT}
Number of exhaustive cases = 4
There are two favourable cases HT, TH.

$\therefore$ P (exactly 1 tail) = $\frac{2}{4}=\frac{1}{2}$

Q.3.(3) Sample space S = {HH, HT, TH, TT}
Number of exhaustive cases = 4.
There is only one favourable case HH.

$\therefore$ P (no tails) = $\frac{1}{4}$

Q.4.(2) Sample space S = { HHH, HHT, HTH, HTT, THT, TTH, THH, TTT}
Number of exhaustive cases = 8
There is only one favourable case HHH.

$\therefore$ P (all heads) = $\frac{1}{8}$

Q.5.(1) Sample space S = { HHH, HHT, HTH, HTT, THT, TTH, THH, TTT}
Number of exhaustive cases = 8
There are three favourable cases HHT, HTH,THH.

$\therefore$ P (exactly 2 heads) = $\frac{3}{8}$

Q.6.(2) Sample space S ={HHH, HHT, HTH, HTT, THT, TTH, THH, TTT}
Number of exhaustive cases = 8

$\therefore$ P (no heads) = P (all tails) = $\frac{1}{8}$

Q.7.(3) There are 6 favourable cases HHT, HTH, HTT, THT, TTH, THH.

Required probability = $\frac{6}{8}=\frac{3}{4}$

Q.8.(2) There are 4 favourable cases TTTH, TTHT, THTT, HTTT,

$\therefore$ P (exactly 3 tails) = $\frac{4}{16}=\frac{1}{4}$

Q.9.(3) There are 6 favourable cases HHTT, HTHT, HTTH, THHT, THTH, TTHH.

$\therefore$ P (exactly 3 tails) = $\frac{6}{16}=\frac{3}{8}$

Q.10.(1) A 'doublet' means that both the dice show the same number on the upper most faces. Therefore, the outcomes, favourable to this event are.
(1,1),(2,2),(3,3),(4,4),(5,5),(6,6)
Thus, the number of favourable cases= 6

Hence, P (doublet)= $\frac{6}{36}=\frac{1}{6}$

Q.11.(3) In this case, the favourable cases are

(2,3),(2,6),(4,3),(4,6),(6,3),(6,6),(3,2),(3,4), (3,6),(6,2),(6,4).
Thus, the number of favourable cases = 11

$\therefore$ Required probability = $\frac{11}{36}$

Q.12.(3) Favourable cases are

(1,3),(1,6),(3,3),(3,6),(5,3),(5,6),(3,1),(6,1),(6,3),(3,5),(6,6)
Total No. of exhaustive cases
$= 6 \times 6 = 36$.

$\therefore$ Required probability = $\frac{11}{36}=\frac{11}{36}$

Q.13.(3) There are 7 letters in the word 'SOCIETY' which can be arranged in 7! ways. Considering the three vowels in the word 'SOCIETY' as one letter, we can arrange 5 letter in a row in 5 ! ways also, three vowels can themselves be arranged in 3! ways
$\therefore$ The total number of arrangements in which three vowels come together are 5! ×3!
Hence, the required probability

$\frac{5!\times 3!}{7!}=\frac{3\times 2\times 1}{7\times 6}=\frac{1}{7}$

Q.14.(1) Out of the letters in the word 'UNIVERSITY' two letters 'I' are alike.
$\therefore$ Required probability

$$=\frac{\frac{|10}{|2}-\frac{|9\times|2}{|2}}{\frac{|10}{|2}}=\frac{4}{5}$$

Q.15.(1) Number of ways in which 6 letters of the word PENCIL can be arranged is P (6,6) = 6!
If N is next to E, they can be considered as one and the 5 letters can be arranged in P(5,5) =5! ways.

$\therefore$ The required probability = $\frac{5!}{6!}=\frac{1}{6}$

Q.16.(2) A : Getting a queen B : Getting an ace

$P(A)=\frac{4}{52}, P(B)=\frac{4}{52}, P(A\cap B)=\frac{0}{52}=0$

$\therefore$ Required probability = $P(A\cup B)$
$=P(A)+P(B)-P(A\cap B)$

$=\frac{4}{52}+\frac{4}{52}-0=\frac{8}{52}=\frac{2}{13}$

Q.17.(3) A:Roll number is multiple of 5, B : Roll number is multiple of 7.
A = (5,10, 15,20,25) B = (7,14,21)

$P(A)=\frac{5}{25}, P(B)=\frac{3}{25}, P(A\cap B)=\frac{0}{25}=0$

$\therefore$ Required probability = $P(A\cup B)$
$= P(A)+P(B)-P(A\cap B)$

$=\frac{5}{25}+\frac{3}{25}-0=\frac{8}{25}$

Q.18.(4) A : Getting spade card B:Getting ace card
C: Getting red card
P(A)
=

$\frac{13}{52}, P(B)=\frac{4}{52}, (C)=\frac{26}{52}, P(A\cap B)=\frac{1}{52},$

$P(B\cap C)=\frac{2}{52}, P(C\cap A)=\frac{0}{52}=0,$

$P(A\cap B\cap C)=\frac{0}{52}=0$

$\therefore$ Required probability= $P(A\cup B\cup C)$
$= P(A)+P(B)+P(C)-P(A\cap B)-P(B\cap C)$
$-P(C\cap A)+P(A\cap B\cap C)$
=

$\frac{13}{52}+\frac{4}{52}+\frac{26}{52}-\frac{1}{52}-\frac{2}{52}+0=\frac{40}{52}=\frac{10}{13}$

Q.19.(3) Probability of drawing a white ball from the first bag = $4_{C_1}\div 6_{C_1}=\frac{4}{6}=\frac{2}{3}$
Probability of drawing a white ball from the second bag = $\frac{3_{C_1}}{8_{C_1}}=\frac{3}{8}$
Since the events are independent, the probability that both the balls are white

$=\frac{2}{3}\times\frac{3}{8}=\frac{1}{4}$

Q.20.(1) Probability of drawing a black ball from first bag = $\frac{2}{6}=\frac{1}{3}$
Probability of drawing a black ball from the second bag = $\frac{5}{8}$
$\therefore$ Probability that both balls are black

$=\frac{1}{3}\times\frac{5}{8}=\frac{5}{24}$

Q.21.(2) The event one is white and one is black' is the same as the event 'either the first is white and the second is black or the first is black and the second is white'
$\therefore$ The probability that one is white and one is black = $\frac{2}{3}\times\frac{5}{8}+\frac{1}{3}\times\frac{3}{8}=\frac{13}{24}$

Q.22.(1) Success : Getting odd number P = $\frac{13}{25}$

$\Rightarrow q=1-P=1-\frac{13}{25}=\frac{12}{25}$

P (two successes) = pp

$=\frac{13}{25}\times\frac{13}{25}=\frac{169}{625}$

Q.23.(2) P (exactly one success) = pq + qp

$\frac{13}{25}\times\frac{12}{25}+\frac{12}{25}\times\frac{13}{25}=\frac{156+156}{625}=\frac{312}{625}$

Q.24.(3) P (at least one success) =1 P (no success)

$=1-qp = 1-\left(\frac{12}{25}\right)\left(\frac{12}{25}\right)=1-\frac{144}{625}$

$=\frac{625-144}{625}=\frac{481}{625}$

Q.25.(4) P (no success) = qp = $\frac{12}{25}\left(\frac{12}{25}\right)=\frac{144}{625}$

Q.26.(3) A : First card is diamond card B : Second card is king card.

$P(A)=\frac{13}{52}=\frac{1}{4}, P(B)=\frac{4}{52}=\frac{1}{13}$

∴ Required probability = P(A)P(B)

$= \frac{1}{4} \times \frac{1}{13} = \frac{1}{52}$

Q.27.(1) A : Husband selected, B : wife selected

$P(A) = \frac{1}{7} \Rightarrow (A) = 1 - P(A) = 1 - \frac{1}{7} = \frac{6}{7}$

$P(B) = \frac{1}{5} \Rightarrow (B) = 1 - P(B) = 1 - \frac{1}{5} = \frac{4}{5}$

P(only one of them will be selected)

$= P(A)P(\overline{B}) + P(B)P(\overline{A})$

$= \frac{1}{7}\left(\frac{4}{5}\right) + \frac{1}{5}\left(\frac{6}{7}\right) = \frac{4+6}{35} = \frac{10}{35} = \frac{2}{7}$

Q.28.(2) P (both of them will be selected)

$= P(A) \times P(B) = \frac{1}{7} \times \frac{1}{5} = \frac{1}{35}$

Q.29.(3) P (at least one of them will be selected)

$= P(\overline{A}) \times P(\overline{B}) = \frac{6}{7} \times \frac{4}{5} = \frac{24}{35}$

Q.30.(4) P (at least one of them will be selected)

$= 1 - P(\overline{A})\,P(\overline{B})$

$= 1 - \frac{6}{7} \times \frac{4}{5} = 1 - \frac{24}{35} = \frac{11}{35}$

CHAPTER-19

AREA AND VOLUME

Q.1.(1) $l^2 + b^2 = (\text{diagonal})^2$ or $b^2 = [(\text{diagonal})^2 - l^2]$.

$\therefore b^2 = (5^2 - 4^2) = 9$ and therefore $b = 3$m

Hence, the area of the field = (4×3) m^2

= 12 m^2

Q.2.(1) Let length = l m. and breadth = b m.

According to question -

$l = \frac{3}{2}b$

$2l = 3b$

$lb = \frac{2}{3} \times 10000$

$l \times \frac{2l}{3} = \frac{2}{3} \times 10000$

$l = 100$m

Q.3.(1) Let the original length x metres & breadth y metres, new breadth = z metres

$(160\% \text{ of } x)\, x = xy$ or $z = xy \times \frac{100}{160x} = \frac{5}{8}y$

decrease $= \left(y - \frac{5}{8}y\right) = \frac{3}{8}y$.

∴ Decrease percentage

$= \left(\frac{3}{8}y \times \frac{1}{y} \times 100\right)\% = 37\frac{1}{2}\%$

Q.4.(3) Length of the carpet $= \left(\frac{4 \times 12}{2}\right)$ m = 24m.

Q.5.(3) Area of the floor = (400×300) cm^2

Area of one tile = (8×6) cm^2

Number of tiles $= \frac{400 \times 300}{8 \times 6} = 2500$

Q.6.(5) Then breadth = x cm and length = 2x cm.

Then $(2x-5)(x+5) - x \times 2x = 75$

∴ $2x^2 + 5x - 25 - 2x^2 = 75$ or $5x = 50$ or $x = 10$.

Hence, length = 20 cm.

Q.7.(4) Area of the lawn

$= [(100 \times 80) - (80 \times 40)]m^2 = 4800$ m^2

Q.8.(5) $x \times 4x = 3600 \Rightarrow x = 30$

∴ Length = (4×30) m = 120 m.

Q.9.(4) Let length = x metres and breadth = (x-3) metres.

∴ Perimeter = $2[x + (x-3)] = (4x-6)$.

So, $4x - 6 = 30 \Rightarrow x = 9$.

∴ Length = 9m breadth = 7m hence, area = 63m^2

Q.10.(1) Let length = x metres & breadth = y metres.

Then area = (xy) m^2.

New length = $112\frac{1}{2}\%$ of x & new breadth = $106\frac{1}{4}\%$ of y.

∴ New area

$= \frac{225}{200}x \times \frac{425}{400}y = \left(\frac{153}{128}xy\right)$ m^2.

increase in area

$= \left(\frac{153}{128}xy - xy\right) = \left(\frac{25}{128}xy\right)$ m^2.

∴ Increase percent

$= \left(\frac{23}{128}xy \times \frac{1}{xy} \times 100\right)\% = 19.53\%$

Q.11.(2) Original length = 15cm & breadth

$= \frac{150}{15}$ = 10cm.

New area $= \left(150 \times \frac{4}{3}\right)$ cm^2 = 200 cm^2

∴ New length

$= \frac{\text{New area}}{\text{Original breadth}} = \frac{200}{10}$cm = 20 cm

New perimeter = 2(20+10) cm = 60 cm.

Q.12.(2) $x(x-6) = 72 \Rightarrow x^2 - 6x - 72 = 0$

$\Rightarrow (x-12)(x+6) = 0$

$\Rightarrow x = 12$ (neglecting $x = -6$

∴ Breadth = (12-6) m

= 6m.

Q.13.(4) Length of the rod $= \sqrt{(12)^2 + (5)^2} = 13$m

Q.14.(3) $2(x+y) = 4 \Rightarrow x+y = 2$ & $xy = 0.75 = \frac{3}{4}$.

∴ $(x-y)^2 = (x+y)^2 - 4xy = \left(4 - 4 \times \frac{3}{4}\right) = 1$

So , (x-y) = 1 km.

Q.15.(2) Breadth $= \sqrt{(20)^2 - (12)^2} = \sqrt{256}$

= 16m

Q.16.(4) $(x+4)^2 - x^2 = 60 \Rightarrow x = 5.5$ m.

Q.17.(1) Area $= \frac{1440}{160} = 9$ hectares $= (9 \times 10000)$m^2

Side = $3 \times 100 = 300$ m . so, perimeter = 1200 m.

∴ Cost of fencing = Rs. $\left(1200 \times \frac{3}{4}\right)$ = Rs. 900

Q.18.(3) Let the original side be x. Then ,area= x^2

Then, new area $= \left(\frac{140x}{100} \times \frac{130x}{100}\right) = \frac{91}{52}x^2$

Change in area $= \left(\frac{91}{50}x^2 - x^2\right) = \frac{41}{50}x^2$.

Increase in percent

$= \left(\frac{41}{50}x^2 \times \frac{1}{x^2} \times 100\right)\% = 82\%$

Q.19.(3) Let the side of the square be 100 m.

Then, increase in area

$= \left[\frac{(150)^2 - (100)^2}{100 \times 100} \times 100\right]\% = 125\%$.

Q.20.(4) Let their diagonals be 2d and d respectively.

Ratio of their areas $= \frac{\frac{1}{2} \times (2d)^2}{\frac{1}{2} \times d^2} = \frac{4}{1}$

Q.21.(2) Area of the first square = 10000 m^2.

Side of this square $= \sqrt{10000} = 100$m.

Side of the new square = 101 m.

Q.22.(2) Length of the rectangle = 40 cm.

Let the side of the square be x cm.

Then, breadth of the rectangle $= \frac{3}{2}x$ cm.

$40 \times \frac{3}{2}x = 3x^2 \Rightarrow x = 20$.

Q.23.(4) $\frac{x^2}{y^2} = \frac{16}{1} \Rightarrow \frac{x}{y} = \sqrt{\frac{4}{1}} = \frac{2}{1} \Rightarrow \frac{4x}{4y} = \frac{8}{4} = \frac{2}{1}$

∴ Ratio of perimeters = 2 :1

Q.24.(1) H.C.F. of 1075 and 825 is 25.

∴ size of each tile = 25 cm ×25 cm.

Q.25.(2) $2(115+35) \times h = 77 \Rightarrow h = \frac{77}{2 \times 15} = 2.5$m.

Q.26.(4) $2(x+8) \times 6 = 168 \Rightarrow x+8 = 14 \Rightarrow x = 6$m

Q.27.(2) Cost of papering $[2(l+b) \times h]$m^2=Rs.48

∴ Cost of papering.

= [2 (2l + 2b) × 2h] m^2

i,e 4 [2 (l +b)) × h]

= 48 × 8 = Rs. 384

Q.28.(5) Let the width of the plot be x metres.

Then, $144 \times x = 86 \times 86 \Rightarrow x = \frac{86 \times 86}{144}$

$= 51.36$

Q.29.(1) Let the length of rectangle = x metres & its breadth = y m.

Also, let the side of the square be z metres.

Then $2(x+y) = 4z = 48 \Rightarrow x + y = 24$ and $z = 12$

Also, $z^2 - xy = 4 \Rightarrow xy = z^2 - 4 = 144 - 4 = 140$.

So, $(x-y)^2 = (x+y)^2 - 4xy = 576 - 560 = 16$.

$\therefore x-y = 4$ and $x+y = 24$. so, $2y = 20$ or $y = 10$ m

Q.30.(2) Let base = x cm & altitude = 2x cm.

$\therefore$ **$x \times 2x = 72 \Rightarrow x^2 = 36$ or $x = 6$ cm**

Hence, base = 6 cm

Q.31.(2) a = 6 cm

diagonal = $a\sqrt{3}$

= $6\sqrt{3}$ **cm.**

Q.32.(1) Surface area = 54 m^2

$6a^2 = 54$

$a^2 = 9$

$a = 3$

Volume of cube = $a^3 = 3^3 = 27$ m^3

Q.33.(3) Diagonal = $10\sqrt{3}$ cm.

$a\sqrt{3} = 10\sqrt{3}$

$a = 10$

volume of cube = $a^3 = 10^3 = 1000$ cm^3

Q.34.(2) Volume of cuboid = 1728 cm^3

$l \times b \times h = 1728$

$l \times b \times 12 = 1728$ (h = 12 cm)

Area of base $(l \times b) = \frac{1728}{12} = 144$ cm^2

Q.35.(1) Total surface area of cuboid = 846 cm^2

$2(lb + bh + hl) = 846$

$(5x \times 4x + 4x \times 3x + 3x \times 5x) = \frac{846}{2}$

$47x^2 = 423$

$x = 3$

$\therefore l = 5x = 5 \times 3 = 15$ cm

$b = 4x = 4 \times 3 = 12$ cm

$h = 3x = 3 \times 3 = 9$ cm

Q.36.(1) $\frac{r_1}{r_2} = \frac{1}{2}$

$\frac{h_1}{h_2} = \frac{4}{1}$

$\frac{v_1}{v_2} = \frac{\pi r_1^2 h_1}{\pi r_2^2 h_2}$

$\therefore v_1 : v_2 = 1 : 1$

Q.37.(1) Area rolled by roller in 1 revolution.

$= 2\pi rh$

$= 2 \times \frac{22}{7} \times \frac{0.7}{2} \times 2$

$= 4.4$ m^2

Area in 60 revolutions = 4.4×60

= 264 m^2

Q.38.(3) $\pi r^2 h = 924$ ...(i)

$2\pi rh = 264$

$\pi rh = 132$ ——(ii)

(i) divided by (ii)

$\frac{\pi r^2 h}{\pi rh} = \frac{924}{132}$

$r = 7$

From eq. (ii) put r = 7

$h = 6$ m.

Q.39.(3) $r = \frac{14}{2} = 7$ cm., h = 20 cm.

curved surface area of cylinder

$= 2\pi rh$

$= 2 \times \frac{22}{7} \times 7 \times 20 = 880$ cm^2

Q.40.(2) r = 21 cm

h = 20 cm

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

$\frac{1}{3} \times \frac{22}{7} \times 21 \times 21 \times 20$

= 9240 cm^2

Q.41.(3) h = 24 cm

volume = 616 cm^3

$\frac{1}{3}\pi r^2 h = 616$

$\frac{1}{3} \times \frac{22}{7} \times r^2 \times 24$

r = 7 cm

Surface area = πrl

$= \frac{22}{7} \times 7 \times 25$ $\left(l = \sqrt{h^2 + r^2} = \sqrt{(24)^2 + (7)^2} = 25\right)$

= 550 cm^2

Q.42.(4) $d_1 = d_2$

$\therefore r_1 = r_2 = r$

$\frac{SA_1}{SA_2} = \frac{\pi rl_1}{\pi rl_2}$

$\left(\frac{l_1}{l_2} = \frac{5}{4}\right)$

$\frac{SA_1}{SA_2} = \frac{5}{4}$

Q.43.(1) Volume of sphere = 4851 m^3

$\frac{4}{3}\pi r^3 = 4851$

$r = \frac{21}{2}$ m.

Surface area of sphere = $4\pi r^2$

$= 4 \times \frac{22}{7} \times \left(\frac{21}{2}\right)^2$

= 1386 m^2

Q.44.(2) Surface area of sphere = 64π

$4\pi r^2 = 64\pi$

r = 4 cm

Q.45.(1) $\because \frac{4}{3}\pi r^3 = 4\pi r^2$

r = 3

CHAPTER-20

DATA SUFFICIENCY

Q.1.(4) A+B+C+D=96

(i) gives, $A+B+D=(3\times20) \Rightarrow A+B+D=60$

(ii) gives, $C+D=(2\times50) \Rightarrow C+D=100$

From (i),(ii) also, we cannot find B.

Q.2.(4) Let there be x children.

(i) gives, age of teacher= x years.

(ii) gives, average age of (x+1) persons=(x+1) years.

$\therefore$ Teacher's age $=(x+1)(x+1)-x^2$

$=(x^2+1+2x) - x^2 = (1+2x)$

Thus teacher's age cannot be obtained.

Q.3.(4) Let the number of team members be n.

(i) Total increase in weight on replacement=(20n) kg.

(ii) Total weight of new mem bers= [(64+75+66)+ 20 n kg.

=(205+20n) kg.

$\therefore$ Required average $= \frac{(205+20n)}{3}$ kg

and we need n to get the answer.

Q.4.(4) $P+Q+R+S=(30\times4) \Rightarrow P+Q+R+S=120$

(i) P+R=60

(ii) S=(R-10)

From(i),(ii), we cannot find R.

Q.5.(5) Let here be x children in the group.

I. $A+B = (15\times2)+(5\times2) \Rightarrow A+B=40$

II $A+B+C=(20\times3) \Rightarrow A+B+C=60$

From (i) and (ii),we get C=20.

C's age after 10 years=(20+10) years=30 years.

Q.6.(1) Let there be x children in the group.

I. Average age= 15 years.

$\therefore$ Total age =15x years.

$\therefore 15x=240 \Rightarrow x = \frac{240}{15} \Leftrightarrow x=16.$

Q.7.(5) Let the tens and unit digits be x and y respectively. Then.

(i) x-y= 9

(ii) x+y=x-y

from (i) and (ii), we get x-y=9 and x+y=9

On solving, we get x=9 and y=0.

$\therefore$ Required number is 90.

Thus both (i) and (ii) are needed to get the answer.

Q.8.(5) Let the tens and unit digits be x and y respectively. Then.

(i) x+y=8 .....(i)

(ii) $\left(\frac{1}{2} \times 44\right) - \frac{1}{5}(10x+y) = 15$

$\Rightarrow 10x+y=35$ .....(ii)

On solving (i) and (ii) ,we get x=3 and y=5.

thus , i and ii together give the answer.

Q.9.(1) Let the two numbers be x and y.

(i) gives, $x+y = 2(x+y) \Leftrightarrow$ **$x=3y \Leftrightarrow$**

$\frac{x}{y}=\frac{3}{1} \Leftrightarrow x:y=3:1.$

thus (i) only gives the answer.
(ii) does not give the answer.

Q.10.(5) Given : P+Q+R = 96 ....(I)
(i) P=R + 6 ....(II)
(II.) Q+R= 56 ....(iii)
on subtracting (iii) from (i) we get P=40 putting P = 40 in (ii),we get R = 34. Putting R=34 in(iii) we get Q=32. Thus, i and ii both together give together give the answer.

Q.11.(4) The ratio in which X and Y are mixed, is not given.
So, both (i) and (ii) together cannot give the answer.

Q.12.(2) (ii) gives, S.P. = Rs. 310 and gain = Rs.70
$\therefore$ C.P. = Rs. (310-70) = Rs. 240

$\therefore \text{Gain\%} = \left(\frac{70}{240}\times 100\right)\%$

Thus, (ii) alone gives the answer.
Clearly, (i) alone does not give the answer.

Q.13.(1) Let the C.P.be Rs. x then,

(i) $\frac{(78-x)}{x}\times 100 = 2\times\frac{(69-x)}{x}\times 100$

$\Leftrightarrow 78-x = 138-2x \Leftrightarrow x=60.$

Thus 108% of x = $\frac{27x}{25}$. This does not gives x .
$\therefore$ (ii) does not give the answer.

Q.14.(5) Let the labelled price be Rs. x
(i) C.P. = 80% of Rs.

$x = \text{Rs.}\left(x\times\frac{80}{100}\right) = \text{Rs.}\frac{4x}{5}$

(ii) S.P. = Rs. 2000, S.P. = 125% of Rs. $x = \text{Rs.}\left(\frac{125}{100}\times x\right) = \text{Rs. } \frac{5x}{4}$.

$\therefore \frac{5x}{4}=2000 \Rightarrow x = \frac{2000\times 4}{5}=1600.$

$\therefore$ C.P.

$= \text{Rs. } \frac{4x}{5} = \text{Rs.}\left(\frac{4}{5}\times 1600\right) = \text{Rs.}1280$

Thus, (i) and (ii) together give the answer.

Q.15.(4) Since B's investment is not given both the statements even do not give the answer.

Q.16.(3) (A+B)'s 1 hour filling work = $\frac{1}{6}$.

(i) Suppose A takes x hours to fill the tank.
Then, B takes(x+5) hours to fill the tank.
$\therefore$ (A's 1 hour work) + (B's 1 hour work) = (A+B)'s 1 hour work.

$\Leftrightarrow \frac{1}{x}+\frac{1}{(x+5)}=\frac{1}{6}$

$\Leftrightarrow \frac{(x+5)+x}{x(x+5)}=\frac{1}{6}$

$\Leftrightarrow x^2-5x = 12x+30 \Leftrightarrow x^2-7x-30=0$
$\Leftrightarrow x^2-10x+3x-30=0 \Leftrightarrow x(x-10)+3(x-10)=0$
$\Leftrightarrow (x-10)(x+3)=0 \Leftrightarrow x=10.$
so, A alone takes 10 hours to fill the tank.
(ii) Suppose A takes 2x hours and B takes 3x hours to fill the tank. then,

$\frac{1}{2x}+\frac{1}{3x}=\frac{1}{6} \Leftrightarrow \left(\frac{1}{2}+\frac{1}{3}\right).\frac{1}{x}=\frac{1}{6} \Leftrightarrow \frac{5}{6x}$

$=\frac{1}{6} \Leftrightarrow x=5.$

So, A alone takes (2×5) = 10 hours to fill the tank.
Thus, each one of i and ii gives the answer.

Q.17.(3) (i) Let B's 1 min. work = $\frac{1}{x}$. Then,A's 1 min. work $\frac{3}{x}$.

(A+B)'s 1 min. work = $\left(\frac{1}{x}+\frac{3}{x}\right)=\frac{4}{x}$.

(A+B)'s 10 min. work = $\left(\frac{4}{x}\times 10\right)=\frac{40}{x}$.

$\therefore \frac{40}{x}=\frac{2}{3} \Leftrightarrow x=60$

$\therefore$ B's 1 min. work = $\frac{1}{60}$.

$\frac{1}{60}$ part is filled by B in 1 min.

$\frac{1}{3}$ part is filled by B in $\left(60\times\frac{1}{3}\right)$ min.
= 20 min.

(ii) B's 1 min. work = $\frac{1}{60}$.

$\frac{1}{60}$ part is filled by B in 1 min.

$\frac{1}{3}$ part is filled by B in $\left(60\times\frac{1}{3}\right)$ min.
=20 min.

Q.18.(5) (i) if Y takes 4 min, then X takes 3 min.
(ii) if Y takes 36 min. then

X takes $\left(\frac{3}{4}\times 36\right)$ min. = 27 min

Thus, i and ii together give the answer.

Q.19.(5) Let the usual speed of the train be x kmph.
Time taken to cover 150 km at usual speed = $\frac{150}{x}$ hrs.

(i) Time taken at increased speed

$= \frac{150}{x+25}$ hrs.

(ii) $\frac{150}{x}-\frac{150}{x+25}=\frac{30}{60}$

$\Leftrightarrow \frac{1}{x}-\frac{150}{x+25}=\frac{1}{300} \Leftrightarrow [(x+25)-x]\times 300 = x(x+25)$
$x^2+25x-7500=0 \Leftrightarrow (x-75)=0 \Leftrightarrow x=75.$
Thus, i and ii together give the answer.

Q.20.(4) Let the distance between the two stations be x km.
(i) Let the speed of the express train be y km/hr.
Then, speed of the mail train = (y+12) km/hr.

(ii) $\frac{x}{y}-\frac{x}{y+12}=\frac{40}{60}.$

Thus, even i and ii together do not give x.

Q.21.(3) Let AC = x km. Then, CB = (100-x) km.
A × C (100-x) B
(i) AB = 125% of CB =

$\Leftrightarrow 100=\frac{125}{100}\times(100-x) \Leftrightarrow 100-x = \frac{100\times 100}{125}=80 \Leftrightarrow x=20 \text{ km.}$

$\therefore AC=\frac{1}{4}CB \Leftrightarrow \frac{1}{4}(100-x) \Leftrightarrow 5x = 100 \Leftrightarrow x=20.$
$\therefore$ AC = 20 km.

Thus, ii alone gives the answer.

Q.22.(1) Let the whole distance be 4x km.
(i)Total time taken =

$\left(\frac{x}{10}+\frac{x}{20}+\frac{x}{30}+\frac{x}{60}\right)=\frac{6x+3x+2x+x}{60}$

$\frac{12x}{60}=\frac{x}{5}$

$\therefore \text{Speed} = \frac{\text{Distance}}{\text{Time}}=\frac{4x}{x/5}$

= 20 km/hr.
$\therefore$ i alone is sufficient to answer to question.
ii alone does not give the answer.

Q.23.(5) Speed of the first train

$= \frac{\text{(Sum of the lengths of the two trains)}}{\text{Time taken}}$

$= \frac{(120+180)}{4} \text{ m/s} = 75 \text{ m/s.}$

So, both the statements are necessary to get the answer.

Q.24.(1) Speed of the train

$= \frac{\text{Length of the train}}{\text{Time taken to cross the post}}$

$= \frac{90}{9} \text{m/s} = 10 \text{m/s.}$

Thus, i alone gives the answer.
Time taken to cross a platform.

$= \frac{\text{(Length of train + Length of platform)}}{\text{Speed of the train}}$

$\Rightarrow \text{Speed} = \frac{(L+180)}{27}$

But L is not given. so speed can not be obtained
So, (ii) alone does not give the answer.

Q.25.(3) Time taken by train to cross a man

$= \frac{\text{Length of train}}{\text{Speed of train}} \Rightarrow \frac{1}{9} \quad \text{.... (1)}$

Time taken by train to cross a platform

$= \frac{\text{(Length of train + Length of platform)}}{\text{Speed of the train}}$

$\text{speed} = \frac{L+240}{24}$

From (i) and (ii), we get $\frac{1}{9}=\frac{L+240}{24}$

Thus, L can be obtained, So both (i) and (ii) are necessary to get the answer.

Q.26.(4) We know that, $R = \left(\frac{100 \times S.I.}{P \times T}\right)$

Now, (i) gives, S.I. = Rs. 4000
ii gives T = 4 years.
But, P is unknown. so, we cannot find R
So, given data is isufficient to get R.

Q.27.(3) Given : S.I. = Rs. 50.
(i) gives. R = 10% p.a.
(ii) gives T = 10 years.

$$\text{sum} = \left(\frac{100 \times S.I.}{T \times R}\right) = \text{Rs.}$$

$$= \left(\frac{100 \times 50}{10 \times 10}\right) = \text{Rs } 50$$

Thus, i and ii together give the answer.

Q.28.(1) Suppose X invests Rs. x.

(i) gives : $R_1 = \frac{39}{8}\%$, $R_2 = \frac{41}{8}\%$

increase in S.I. = Rs. 25.

$$\Rightarrow \left(\frac{x \times 1 \times \frac{41}{8}}{100}\right) - \left(\frac{x \times 1 \times \frac{39}{8}}{100}\right) = 25$$

$\Rightarrow (41x-39x) = (25 \times 800) \Rightarrow x = \left(\frac{25 \times 800}{2}\right) = 10000.$

Thus (i) only gives the answer.
ii gives. S.I. = Rs. x, R = 8 % and T

$= \frac{25}{2}$ years.

$$P = \frac{100 \times S.I.}{R \times T} = \left(\frac{100 \times x}{8 \times 25} \times 2\right)$$

Thus, P is not obtained.
∴ (i) alone is sufficient to get the answer.and (ii) is not sufficient to get the answer.

Q.29.(5) Let the rate be R% p.a.
(i) gives, P = Rs. 8000 and T = 4 years.
(ii) gives. S.I. = Rs. (8800-8000) Rs. 800

$$\therefore R = \left(\frac{100 \times S.I.}{P \times T}\right)$$

$$= \left(\frac{100 \times 800}{8000 \times 4}\right)\% = 2\frac{1}{2}\% \text{ p.a.}$$

Thus, (i) and (ii) both are needed to get the answer.

Q.30.(4) Let Principal = Rs. P and Rate = R% p.a. then,

$$\text{Amount} = \text{Rs.} \left[P\left(1+\frac{R}{100}\right)^4\right]$$

$$\therefore P\left[\left(1+\frac{R}{100}\right)^4 - 1\right] \Rightarrow P\left[\left(1+\frac{R}{100}\right)^4 - 1\right] = 1491$$

Clearly, it does not give the answer.

Q.31.(5) (i) Let the sides be x cm and (x+5) cm.

(ii) $d = \sqrt{(x+5)^2 + x^2} \Leftrightarrow (x+5)^2 + x^2 = (10)^2 \Leftrightarrow 2x^2+10x-75 = 0$

$$\Leftrightarrow X = \frac{-10 \pm \sqrt{100+600}}{4}$$

$$= \frac{-10+\sqrt{700}}{4}$$

$$= \frac{-10+10\sqrt{7}}{4} = \frac{-10+10\times 2.6}{4}$$

Thus, sides and therefore area may be known
Thus,both (i) and (ii) are needed to get the answer.

Q.32.(4) From (i), (ii) and (iii) we get P:Q:R: = (120000×8) : (x+9)
Since R's investment is not given, the above ratio can not be given.
∴ Given data is inadequate.

Q.33.(4) (i) P's investment = (80000×6+60000×6) = 840000 for 1 month.
(ii) & and (iii) Q's investment
= 80% of Rs. 60000 for 8 months
= Rs.(48000×8) for 1 month
= 384000 for 1 month
P.Q. = 840000 : 384000 +35 : 16.
But total profit is not given, so data is inadequate.

Q.34.(4) Let C's contribution be Rs. x.
From (i) and (ii), we get : C = Rs. x. B

$= \text{Rs. } 2x \text{ and } A = \text{Rs. } \left(\frac{3}{2} \times 2x\right) = \text{Rs.}$

$= 3x$
From (ii) and (iii), we get C = Rs. 2x and A
= Rs. 3x.
From (i) and (iii), we get C = Rs. x, A = Rs. 3x and B =Rs. $\left(\frac{3}{2} \times 3x\right)$=Rs. 2x

Thus, any two of three give the answer.

Q.35.(5) (i) $\frac{20}{100}$ work can be completed by (8×8) workers in 1 day.
⇒ Whole work can be completed by (8×8×5) workers in 1 day.
whole work can be completed in 10 days

$= \frac{8 \times 8 \times 5}{10}$ workers in 10 days

= 32 workers in 10 days.
(ii) (20×16) workers can finish it in 1 days.
⇒ 32 workers can finish it in 10 days.
(iii) $\frac{1}{8}$ work can be completed by (8×5) workers in 1 day.
⇒ whole work can be completed by (8×5×8) workers in 1 day.
whole work can be completed by in 10 days.

$\frac{8 \times 5 \times 8}{10} = 32$ workers.

∴ Any one of the three gives the answer.

Q.36.(3) Clearly, any two of the three will give two equations in x and y, which can be solved simultaneously.

Q.37.(1) (i) (10×6) men can complete the work in 1 day.

$\Rightarrow$ 1 man's 1 day's work = $\frac{1}{60}$.

(ii) $\left(10 \times \frac{24}{7}\right)men + \left(10 \times \frac{24}{7}\right)$ women can complete the work in 1 day.

$\Rightarrow \left(\frac{240}{7}\right)$ men's 1 day work + $\left(\frac{240}{7}\right)$ women's 1 day work =1

$\Rightarrow \left(\frac{240}{7} \times \frac{1}{60}\right) + \left(\frac{240}{7}\right)$ women's 1 day work = 1.

$\Rightarrow \left(\frac{240}{7}\right)$ women's 1 day's work

$= \left(1 - \frac{4}{7}\right) = \frac{3}{7}$

$\Rightarrow$ 10 women's 1 day's work

$= \left(\frac{3}{7} \times \frac{7}{240} \times 10\right) = \frac{1}{8}$.

so, 10 women can finish the work in 8 days.
(iii) (10 men's work for 3 day's) +(10 women's work for 4 day's)=1
$\Rightarrow$ (10×3) men's 1 days work+(10×4) women's 1 day's work =1
$\Rightarrow$ 30 men's 1 day's work + 40 women's 1 day's work = 1
Thus, (i) and (iii) will give us the answer.
And (ii) and (iii) will give us the answer.

Q.38.(2) Let the speed of the train be x in/sec.
Time taken to cross a platform

$$= \frac{(\text{Length of train} + \text{Length of platform})}{\text{Speed of the train}}$$

Time taken by the train to cross a stationary train

$$= \frac{\text{Sum of the lengths of the trains}}{\text{Speed of moving train}}$$

Time taken to cross a signal pole

$$= \frac{\text{Length of train}}{\text{Speed of train}}$$

(i) gives, $21 = \frac{(L+300)}{x}$

(ii) gives, $\frac{29}{2} = \frac{21}{2}$

(iii) gives, $\frac{39}{4} = \frac{l}{x}$

Thus,(i) and (ii) or (i and iii) give x.

Q.39.(4) Let the speed of the train be x m/s.

$$= \frac{\text{Length of train}}{\text{Speed of train}}$$

Time taken to cross a platform

$$= \frac{(\text{Length of train} + \text{Length of platform})}{\text{Speed of the train}}$$

Length of train=330m.

(i) and (iii) give, $\frac{330}{x} \Rightarrow x = \frac{330}{18}$ m/s

$= \frac{55}{3}$ m/s

(ii) and (iii) give, $36 = \frac{2 \times 330}{x}$.

$\Rightarrow x = \frac{660}{36} m/s = \frac{55}{3} m/s$.

Q.40.(5) Time taken to cross a pole

$= \frac{\text{Length of train}}{\text{its speed}} \Rightarrow 20 = \frac{L}{\text{speed}}$

$\Rightarrow$ speed $= \frac{L}{20}$ .....(1)

Time taken to cross a platform $= \frac{L+800}{\text{speed}}$

$\Rightarrow 100 = \frac{L+800}{\text{speed}} \Rightarrow \frac{L+800}{100}$ .....(2)

Time taken to pass through a tunnel

$= \frac{L+400}{60}$

$\Rightarrow 60 = \frac{L+400}{\text{speed}} \Rightarrow \text{speed} = \frac{L+400}{60}$ ... (3)

Equating any two out of three will give us L.

CHAPTER-21

DATA INTERPRETATION

Q.1.(2) Required ratio = 1100 : 1500= 11 : 15

Q.2.(4) Required average $= \frac{7425}{5} = 1485$

Q.3.(1) Required % $= \frac{375}{1250} \times 100 = 30\%$

Q.4.(3) Required% $= \frac{300}{2700} \times 100$

=11.11% (approx)

Q.5.(5) Required difference

$= \frac{2375}{5} - \frac{2350}{5}, \Rightarrow 5$

Q.6.(4) Average number $= \frac{120}{6}$

= 20 thousand

= 20000

Q.7.(3) Required percentage $= \frac{35}{145} \times 100$

= 24% (approx)

Q.8.(1) Difference = 37.5 – 27.5

= 10 thousand = 10000

Q.9.(4) Ratio = 25 : 27.5= 10 : 11

Q.10.(5) Percent $= \frac{35}{55} \times 100 = 64$ (approx)

Q.11.(3) Total number = 135000 + 67500 + 67500

= 270000

Q.12.(3) Percent increase $= \frac{40500}{67500} \times 100 = 60\%$

Q.13.(1) Number of Cars

$= 45000 \times \frac{15}{100} + 54000 \times \frac{15}{100}$

= 6750 + 8100 = 14850

Q.14.(5) Difference = 13500

Q.15.(2) Required percentage $= \frac{216000}{27000} \times 100$

= 800%

Q.16.(4) Four

Q.17.(2) August

Q.18.(1) Required % $= \frac{13240 - 7180}{7180} \times 100$

= 84% (approx)

Q.19.(4) Required ratio = 5900 : 9450= 118 : 189

Q.20.(3) Required average $= \frac{73680}{8} = 9210$

Q.21.(5) Required average $= \frac{650}{6} = 108$ crores

Q.22.(2) Required % $= \frac{100}{350} \times 100 = 29\%$ (approx)

Q.23.(2) In 2003,

Q.24.(1) Required %$= \frac{350 - 150}{150} \times 100 = 133\frac{1}{3}\%$

Q.25.(2) Required average $= \frac{2550}{6} = 425$ crores

Q.26.(2) Required % $= \frac{147}{737} \times 100 = 20\%$ (approx)

Q.27.(4) Required % $= \frac{255}{730} \times 100 = 35\%$

Q.28.(1) Required % $= \frac{395}{454} \times 100 = 87\%$ (approx)

Q.29.(5) Required % $= \frac{130}{1465} \times 100 = 9\%$ (approx)

Q.30.(3) C

Q.31.(1) Average number $= \frac{15648}{6} = 2608$

Q.32.(4) Total number = 2280 + 1950= 4230

Q.33.(2) $5x \times \frac{40}{100} = 1200$, x = 600

Number of student = 600×7= 4200

Q.34.(1) Ratio = 42 : 56= 3 : 4

Q.35.(1) Percentage decrease $= \frac{15}{75} \times 100 = 20$

Q.36.(5) Percentage increase in 2006

$= \frac{25}{45} \times 100 = 55.55$

Q.37.(2) Percentage $= \frac{365}{440} \times 100 = 83$ (approx)

Q.38.(5) Percentage $= \frac{125}{155} \times 100 = 81$ (approx)

Q.39.(5) Average production $= \frac{440}{7}$

$= 62\frac{6}{7}$ thousand tonne

Q.40.(1)

Com.	P	Q	R	S	U
% growth	10%	22.22%	33.33%	40%	28.57%

Q.41.(4) Percentage decline $= \frac{5}{40} \times 100 = 12.5\%$

Q.42.(5) Required difference $= \frac{335 - 280}{6}$

= 916666 tonnes

Q.43.(4) Required % $= \frac{(40+35)}{60} \times 100 = 125\%$

Q.44.(3) It is clear that the highest average production is in T and lowest production is in R. So the maximum difference would be T and R.

Q.45.(1) Percentage of export with respect to production in 2001

$= \frac{96}{480} \times 100 = 20\%$

Q.46.(3) Quantity of tea available for domestic consumption in

2001 = 480 – 96 = 384

2002 = 540 – 180 = 360

2003 = 720 – 288 = 432

2004 = 700 – 340 = 360

2005 = 200

2006 = 210

Q.47.(1) Required average $= \frac{1946}{6}$

= 324.33 million kg.

Q.48.(5) Population in 2001 $= \frac{384 \times 1000}{390} = 985$

" " 2002 $= \frac{360 \times 1000}{410} = 878$

" " 2003 $= \frac{432 \times 1000}{400} = 1080$

" " 2004$= \frac{360 \times 1000}{4050} = 800$

" " 2005$= \frac{200 \times 1000}{500} = 400$

" " 2006$= \frac{210 \times 1000}{525} = 757$

Average population $= \frac{4900}{6} = 816$ million

Q.49.(3) In 2006 $= \frac{450 \times 1000}{660} = 68.18\%$

Q.50.(4) Cannot be determined

Q.51.(2) Required differece = 5089 – 4917= 172

Q.52.(2) Required % $= \frac{5089}{46583} \times 100$

= 11% (approx)

Q.53.(2) Required % in 2001 = $\frac{745 \times 100}{6325}$

= 11.77% (approx)

" 2002 = $\frac{785 \times 100}{7185}$ = 10.92% (approx)

" 2003 = $\frac{842 \times 100}{8545}$ = 9.85% (approx)

" 2004 = $\frac{898 \times 100}{6987}$ = 12.85%

" 2005 = $\frac{685 \times 100}{5896}$ = 11.61% (approx)

" 2006= $\frac{746 \times 100}{6754}$ =11.04% (approx)

Q.54.(3) Required difference = 46637 – 35675 = 10962

Q.55.(3) Percentage of qualified candidates of state Q in 2001 = $\frac{864}{7200} \times 100$ = 12%

Percentage of qualified candidates of state Q in 2002 = $\frac{840}{8100} \times 100$ = 10.37%

Required % difference = 12 – 10.37= 1.63

Q.56.(1) Average production of rice = $\frac{518}{6}$

= 86.33 million tonnes

Q.57.(3) Percentage decrease in foodgrain production for year 2007-08

$= \frac{(199.4 - 192.3) \times 100}{199.4} = \frac{710}{199.4} \cong 3.56\%$

and for year 2010-11

$= \frac{(209.8 - 195.9) \times 100}{209.8} = \frac{1390}{209.8} \cong 6.63\%$

Q.58.(4) Average production of rice is 86.33 tonnes. As % of maximum recorded other foodgrain it will be= $\frac{86.33 \times 100}{212}$ = 40.7%

Q.59.(3) Percentage increase

$= \frac{(89.7 - 81.7) \times 100}{81.7}$ = 9.79%

Q.60.(5) Percentage share of rice produced to the total food grains production in year 2010-12

$= \frac{93.1 \times 100}{212} \approx 43.91\%$

Q.61.(1) Ratio =3 : 3.36= 25 : 28

Q.62.(1) Percent increase = $\frac{0.19}{6.25} \times 100 = 3.04$

Q.63.(4) Difference = 420000 – 336000= 84000

Q.64.(2) Total population = 500000 + 336000 = 836000

Q.65.(2) Percent = $\frac{2.75}{3.36} \times 100 = 82\%$ (approx)

Q.66.(3) Required difference = (24-7)% of 12000 = 17% of 12000= 2040

Q.67.(2) Total appeared candidates from P, T and V.

$= 56000 \times \frac{(14 + 21 + 10)}{100} = 560 \times 45$

Average = $\frac{560 \times 45}{3}$ = 8400

Q.68.(4) Required% = $\frac{12000(18 + 24)\%}{56000(14 + 28)\%} \times 100$

= 21. 42%

Q.69.(4) Total number = 15680 + 3960 = 19640

Q.70.(2) Required ratio

$= \frac{(18 + 24)\% \text{ of } 12000}{(8 + 10)\% \text{ of } 56000} = \frac{1}{2}$

Q.71.(2) From observing the graph

Q.72.(3) $\frac{x \times 100}{190} : \frac{x \times 100}{200}$

200 : 190

20 : 19

Q.73.(4) We cannot corelate the income or expenditure and % profit for both the companies.

Q.74.(5) $\frac{Ex}{In} = \frac{100}{100 + P\%}$

The denominator of which is the greatest the ratio will be minimum.

Q.75.(1) Income of A in 2007 = 150 × 1.60

= Rs 240 lakhs

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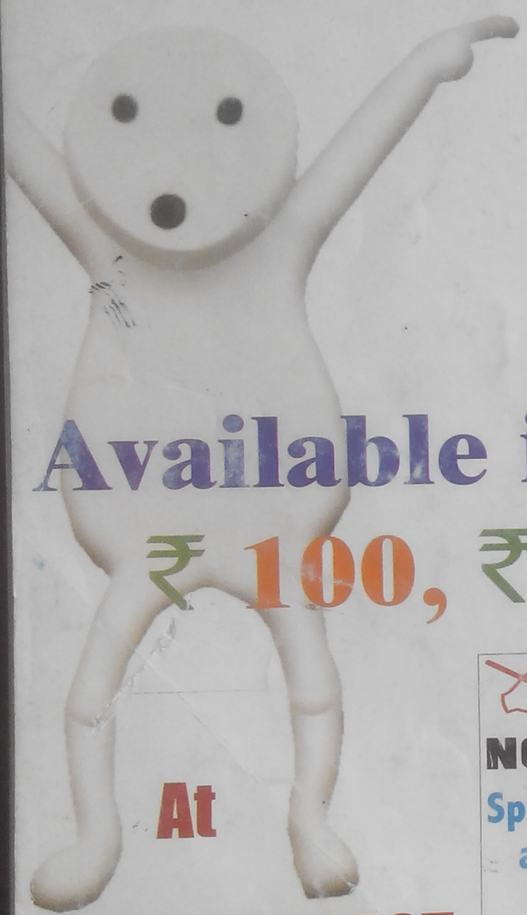

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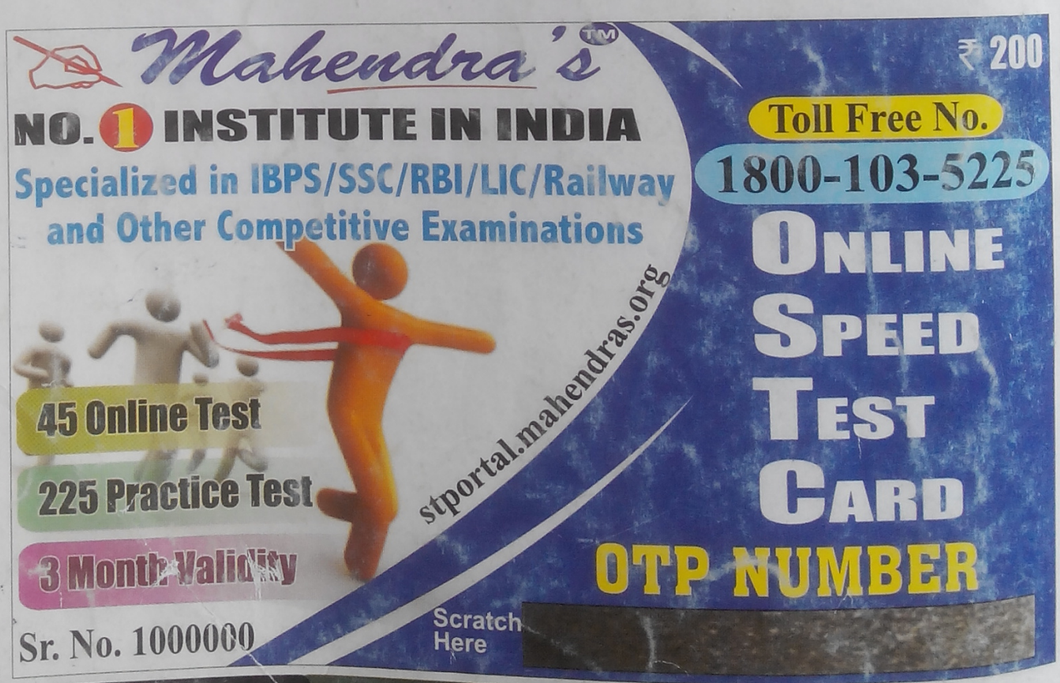

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