

MBA PIONEER 2024

Data Interpretation & Logical Reasoning

DPP: 02

Venn Diagrams - 2

Directions (1-5) Read the following passage and answer the given questions.

In a B.Sc. department, all the students are enrolled in different types of subjects, viz., Physics, Chemistry, and Math. The total number of students in B.Sc. is 2250 and the ratio of the number of boys to girls is 5: 4. The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc department. The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only chemistry. The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math. The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics. The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math. The ratio of the number of boys who enrolled in both physics and chemistry together but not math to the number of boys who enrolled in both Math and chemistry together but not physics is 8: 7.

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department. The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry. The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three.

subjects together. The number of boys who enrolled in both Physics and Chemistry together but not math is twice the number of girls who enrolled in both Physics and Math together but not chemistry, which is one-third of the number of girls who enrolled in all three subjects together. The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in both Physics and Chemistry together but not math.



Directions (6-10) Read the following passage and answer the given questions.

In the school, there were a total of 1040 students in class seventh, class eighth, class ninth, and class tenth together. In class ninth the number of students was 40% more than that of class tenth and in class eighth the number of students was 80% of the number of students in class tenth. The number of students in class seventh was 120% of that of the class eighth. An Intra school game competition was held in the school and only some number of students from each class had participated in three games: Football, Cricket, and Hockey.

In the Football game, 44 participants were of class seventh, 88 participants were of class eighth, 92 participants were of class ninth, and 72 participants were of class tenth. In the Cricket game, 38 participants were of class seventh, 76 participants were of class eighth, 78 participants were of class ninth, and 58 participants were of class tenth. In the Hockey game, 42 participants were of class seventh, 84 participants were of class eighth, 104 participants were of class ninth, and 99 participants were of class tenth. The ratio of the number of participants of class seventh, class eighth, class ninth, and class tenth in both Cricket and Football was 2: 4: 3: 2 respectively and the difference between the number of participants of class seventh and that of class ninth who had participated in both Cricket and Football was 11. The ratio of the number of participants of class seventh, class eighth, class ninth, and class tenth in both Cricket and Hockey was 1: 3: 2: 1.5 respectively and the difference between the number of participants of class seventh and that of class ninth who had participated in both Cricket and Hockey was 18. The ratio of the number of participants of class seventh, class eighth, class ninth, and class tenth in both Hockey and Football was 1: 4: 2: 2.5 respectively and the difference between the number of participants of class

seventh and that of class Ninth who had participated in both Hockey and Football was 16. 90 students had participated in all the three games and their respective ratio in each class i.e., class 7th to class 10th was 2: 6: 4: 3.

Directions (11-15) Read the following passage and answer the given questions.



Overall, there are around 1000 villagers in Shadipur village in which some are involved in three different activities which include Meditation, Satsang and Music.

Some of the important facts include:

1. From all the villagers in Shadipur village, 5% are not involved in any of the activities.
 2. 360 villagers are involved in Meditation, 120 villagers are involved in all three activities, and the number of villagers who are involved in only Satsang is $333\frac{1}{3}\%$ of the number of villagers who are involved in all three activities.
 3. The ratio of the number of villagers who are involved in Satsang to the number of people who are involved in only Satsang is 3:2
 4. Number of villagers involved in only Satsang and Meditation, only Meditation and Music and only Music and Satsang are the same.

Q11 How many villagers are involved in only Meditation and Music?

Q12 Number of villagers involved in only Music is how much more/less than the total number of villagers involved in only Meditation?

Q13 What is the ratio of the number of villagers involved in exactly two activities to the number of villagers who are involved in at least two activities?

- (A) 1 : 2 (B) 1 : 3
 (C) 1 : 4 (D) 1 : 5

Q14 If 50 new villagers are added to the activities, and among them, 20% are involved in all three activities, and the remaining are involved in only Satsang & Meditation, then find the percentage increase in the no. of villagers who are involved in Music.

- (A) $2\frac{6}{7}\%$
 (B) $3\frac{6}{7}\%$
 (C) $4\frac{6}{7}\%$

(D) $5\frac{6}{7}\%$

Q15 What is the difference between the number of villagers involved in both Meditation & Satsang and the number of villagers involved in both Music and Satsang?

Directions (16-20) Read the following passage and answer the given questions.

In Rajeev Gandhi National Stadium, athletes choose from four different racquet games (apart from athletics which is compulsory for all). These are Table Tennis, Tennis, Squash, and Badminton. It is also known that 20% of the athletes practicing there are not choosing any of the racquet sports. The four games given here are played by 460, 360, 360, and 440 students respectively. The number of athletes playing exactly 2 racquet games for any combination is 40 each. The number of athletes who play all four games is 60. Also, it was noticed that the number of people who play exactly three games is 20 for each combination of games.

Q16 What is the number of athletes in the stadium?

Q17 What is the number of athletes in the stadium who play either only squash or only tennis?

- (A) 230 (B) 240
(C) 250 (D) 260

Q18 The sum of athletes who play Table Tennis and Tennis only and the number of athletes who play Squash and Table Tennis?

Q19 If all the athletes were compulsorily asked to add one game out of these four to



their existing list(except those who were already playing all four games)-then what would be the number of athletes who would be playing all four games after this change.

Directions (21-25) Read the following passage and answer the given questions.

In a sports club which is newly launched in VR mall in Jan 2022 in Nagpur, The club is giving discounts to the people for the annual subscription. There are a total of four games in the club for annual subscription. Table- tennis, Chess, Badminton, and carrom. The data here is the people who are taking annual subscriptions. Total visitors calculated during the year is 500 among which 10% are the normal visitors (with no annual subscription) 45 visitors took subscriptions for all the four games, which is 10% less than the people who had taken subscriptions only in badminton. The number of people who have taken subscription in any three sports only is 30 each and 90 visitors who had taken subscription only in table tennis. The ratio of visitors who had taken subscription only in table-tennis and chess, and visitors taking all four games subscription is 7: 5. Visitors playing only chess and only Carrom are the same. The number of visitors visiting table tennis and badminton only, Chess and badminton only, table tennis and carrom only, and chess and carrom only are in the consecutive value of natural numbers with least

value as 8 respectively. The total visitors playing only chess and only carrom is 26.

Directions (26-30) Read the following passage and answer the given questions.

In PW MBA Wallah, out of 100 students who enrolled for Foundation, Pioneer, and Elite the following constraints are known:

1. The number of students who enrolled for Foundation is more than the number of students who enrolled for Pioneer which in turn is more than the number of students enrolled for Elite.
 2. The number of students who enrolled for exactly one of the batches is more than those



who enrolled for exactly two batches which is more than those students who enrolled for exactly three batches.

3. Out of these 100 students atleast one student enrolled for all three batches.

Q26 What is the maximum number of students who enrolled for Elite batch?

Q27 What is the maximum number of student who enrolled for Elite batch only if the number of student enrolled for Foundation is as minimum as possible?

Q28 What is the maximum number of students who enrolled for all three batches?

Q29 What is the minimum number of students who enrolled for the Foundation batch only?

Q30 Find the difference of number of students enrolled for exactly two batches to the number of students enrolled in exactly 1 batch if it is given that the number of students enroll for Foundation only is minimum.



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Answer Key

Q1 (D)
Q2 (B)
Q3 (A)
Q4 (B)
Q5 (B)
Q6 (B)
Q7 (A)
Q8 (D)
Q9 (D)
Q10 (B)
Q11 40
Q12 10
Q13 (A)
Q14 (A)
Q15 0

Q16 (A)
Q17 (B)
Q18 (C)
Q19 (C)
Q20 (A)
Q21 (C)
Q22 (D)
Q23 (C)
Q24 (D)
Q25 (D)
Q26 64
Q27 32
Q28 32
Q29 2
Q30 2



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Hints & Solutions

Q1. Text Solution:

Topic: Venn Diagram

Let areas in the Venn diagram be "a, b, c, d, e, f, g,

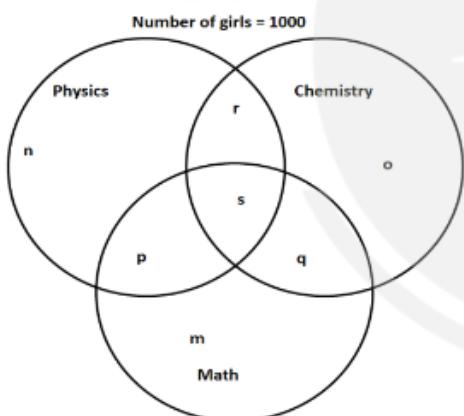
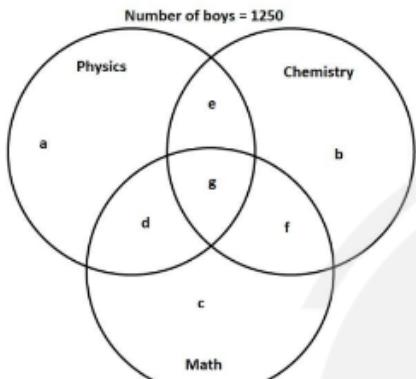
For Boys

And m, n, o, p, q, r and s for Girls

Total number of students = 2250

$$\text{So, Boys} = 2250 \times \frac{5}{9} = 1250$$

$$\text{Girls} = 2250 \times \frac{4}{9} = 1000$$



The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc. department (b) = $\frac{20}{100} \times 1250 = 250$

The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only Chemistry (c) = $30 + b = 30 + 250 = 280$

The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math (f) = $\frac{25}{100} \times 280 = 70$

The ratio of the number of boys who enrolled in both physics and chemistry together but not

math to the number of boys who enrolled in both Math and chemistry together but not physics is 8:7

$$e : f = 8 : 7$$

$$\text{So, } e = 70 \times \frac{8}{7} = 80$$

The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics

$$d = e + f$$

$$\Rightarrow d = 80 + 70$$

$$\Rightarrow d = 150$$

The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math

$$g = 20 + e$$

$$\Rightarrow g = 20 + 80$$

$$\Rightarrow g = 100$$

$$\text{Since, } a + b + c + d + e + f + g = 1250$$

$$\Rightarrow a = 1250 - 250 - 280 - 150 + 80 + 70 + 100$$

$$\Rightarrow a = 320$$

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department

$$q = \frac{10}{100} \times 1000 = 100$$

The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry

$$n = b = 250$$

The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three subjects together

$$o = 2 \times g = 2 \times 100 = 200.$$

The number of boys who enrolled in both Physics and Chemistry together but not math is



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twice the number of girls who enrolled in both Physics and Math together but not chemistry

$$e = 2 \times p$$

$$p = \frac{80}{2}$$

$$\Rightarrow p = 40$$

the number of girls who enrolled in both Physics and Math together but not chemistry is one-third of the number of girls who enrolled in all three subjects together

$$p = \frac{1}{3} \times s$$

$$s = 3 \times 40$$

$$s = 120$$

The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in both Physics and Chemistry together but not math

$$a = 8 \times r$$

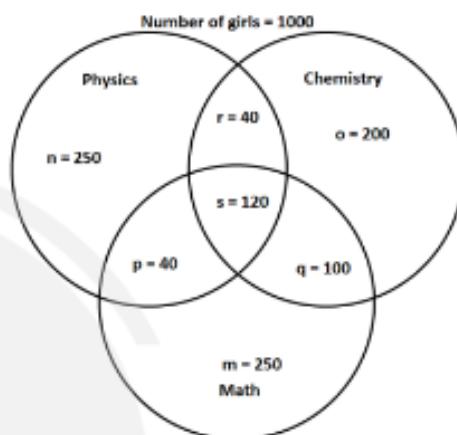
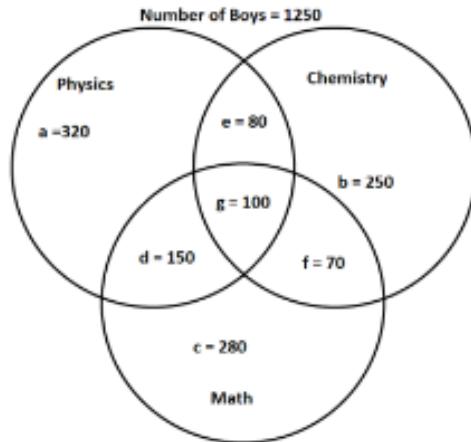
$$r = \frac{1}{8} \times 320$$

$$r = 40$$

$$\text{Since, } m + n + o + p + q + r + s = 1000$$

$$m = 1000 - (250 + 200 + 40 + 100 + 40 + 120)$$

$$m = 250$$



The number of students who enrolled in exactly two courses = $80 + 70 + 150 + 40 + 40 + 100 = 480$

Q2. Text Solution:

Topic: Venn Diagram

Let areas in the Venn diagram be "a, b, c, d, e, f, g, for Boys

And m, n, o, p, q, r and s for Girls

Total number of students = 2250

$$\text{So, Boys} = 2250 \times \frac{5}{9} = 1250$$

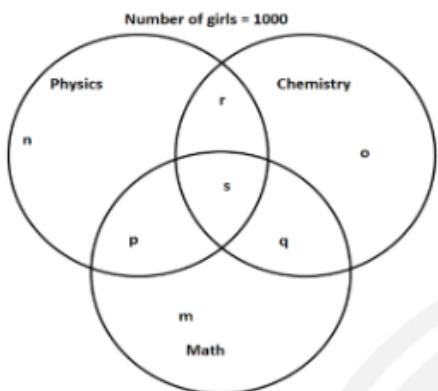
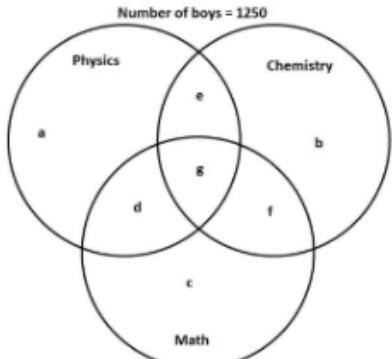
$$\text{Girls} = 1000$$



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The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc. department (b) = $\frac{20}{100} \times 1250 = 250$

The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only chemistry (c) = $30 + b = 30 + 250 = 280$

The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math (f) = $\frac{25}{100} \times 280 = 70$

The ratio of the number of boys who enrolled in both physics and chemistry together but not math to the number of boys who enrolled in both Math and chemistry together but not physics is 8:7

$$e:f = 8:7$$

$$\text{So, } e = 70 \times \frac{8}{7} = 80$$

The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics

$$d = e + f$$

$$\Rightarrow d = 80 + 70$$

$$\Rightarrow d = 150$$

The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math

$$g = 20 + e$$

$$\Rightarrow g = 20 + 80$$

$$\Rightarrow g = 100$$

$$\text{Since, } a + b + c + d + e + f + g = 1250$$

$$\Rightarrow a = 1250 - 250 - 280 - 150 + 80 + 70 + 100$$

$$\Rightarrow a = 320$$

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department

$$q = \frac{10}{100} \times 1000 = 100$$

The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry

$$n = b = 250$$

The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three subjects together

$$o = 2 \times g = 2 \times 100 = 200.$$

The number of boys who enrolled in both Physics and Chemistry together but not math is twice the number of girls who enrolled in both Physics and Math together but not chemistry

$$e = 2 \times p$$

$$P = \frac{80}{2}$$

$$\Rightarrow p = 40$$

the number of girls who enrolled in both Physics and Math together but not chemistry is one-third of the number of girls who enrolled in all three subjects together

$$P = \frac{1}{3} \times s$$

$$\Rightarrow s = 3 \times 40$$

$$\Rightarrow s = 120$$

The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in both Physics and Chemistry together but not math



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$$a = 8 \times r$$

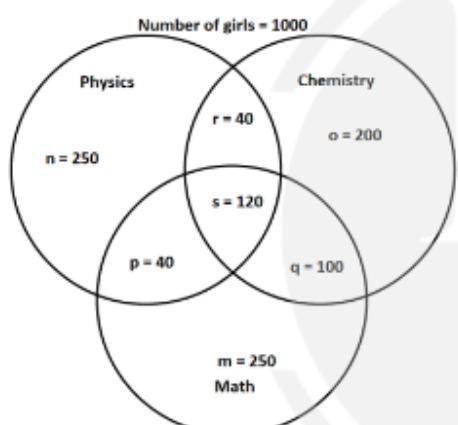
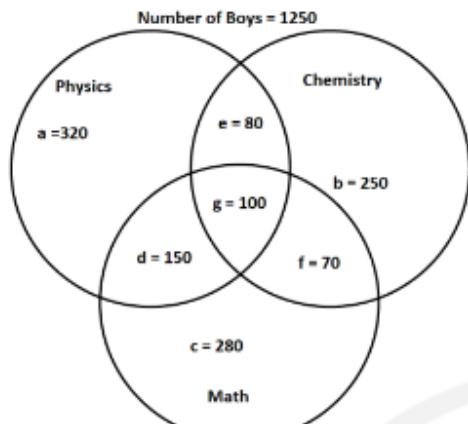
$$r = \frac{1}{8} \times 320$$

$$r = 40$$

$$\text{Since, } m + n + o + p + q + r + s = 1000$$

$$m = 1000 - (250 + 200 + 40 + 100 + 40 + 40 + 120)$$

$$m = 250$$



The number of students who enrolled for Chemistry = $250 + 80 + 70 + 100 + 200 + 40 + 120 + 100 = 960$

$$\text{So, required \%} = \frac{960}{2250} \times 100 = 42.67\%$$

Q3. Text Solution:

Topic: Venn Diagram

Let areas in the Venn diagram be "a, b, c, d, e, f, g,

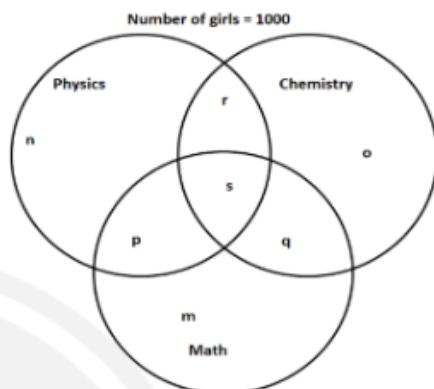
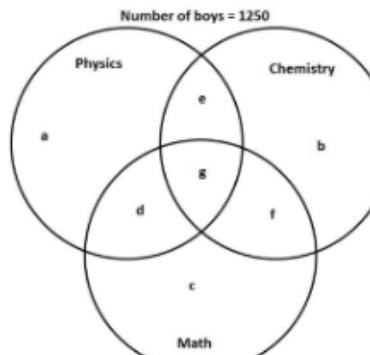
For Boys

And m, n, o, p, q, r and s for Girls

Total number of students = 2250

$$\text{So, Boys} = 2250 \times \frac{5}{9} = 1250$$

Girls = 1000



The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc. department ($b = \frac{20}{100} \times 1250 = 250$)

The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only chemistry ($c = 30 + b = 30 + 250 = 280$)

The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math ($f = \frac{25}{100} \times 280 = 70$)

The ratio of the number of boys who enrolled in both physics and chemistry together but not math to the number of boys who enrolled in both Math and chemistry together but not physics is 8:7

$$e:f = 8:7$$

$$\text{So, } e = 70 \times \frac{8}{7} = 80$$

The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics

$$d = e + f$$



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$$\Rightarrow d = 80 + 70$$

$$\Rightarrow d = 150$$

The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math

$$g = 20 + e$$

$$\Rightarrow g = 20 + 80$$

$$\Rightarrow g = 100$$

$$\text{Since, } a + b + c + d + e + f + g = 1250$$

$$\Rightarrow a = 1250 - 250 - 280 - 150 + 80 + 70 + 100$$

$$\Rightarrow a = 320$$

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department

$$q = \frac{10}{100} \times 1000 = 100$$

The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry

$$n = b = 250$$

The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three subjects together

$$o = 2 \times g = 2 \times 100 = 200.$$

The number of boys who enrolled in both Physics and Chemistry together but not math is twice the number of girls who enrolled in both Physics and Math together but not chemistry

$$e = 2 \times p$$

$$p = \frac{80}{2}$$

$$\Rightarrow p = 40$$

the number of girls who enrolled in both Physics and Math together but not chemistry is one-third of the number of girls who enrolled in all three subjects together

$$p = \frac{1}{3} \times s$$

$$s = 3 \times 40$$

$$s = 120$$

The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in both Physics and Chemistry together but not math

$$a = 8 \times r$$

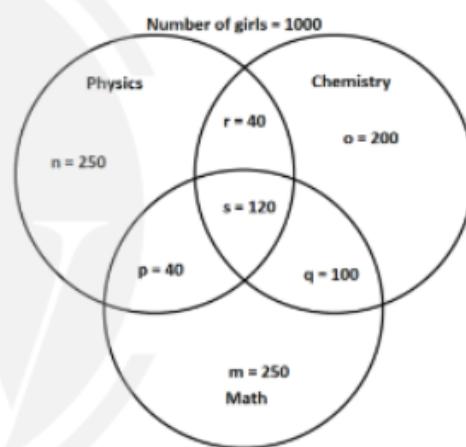
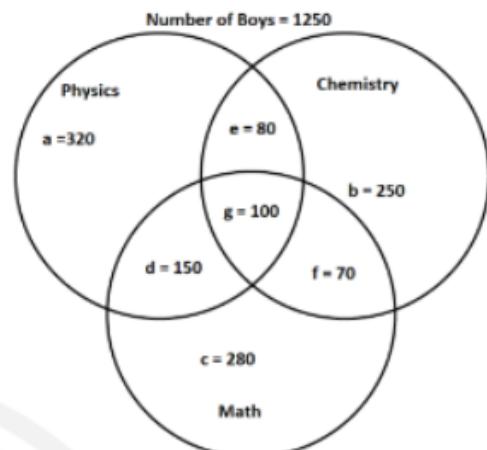
$$r = \frac{1}{8} \times 320$$

$$r = 40$$

$$\text{Since, } m + n + o + p + q + r + s = 1000$$

$$m = 1000 - (250 + 200 + 40 + 100 + 40 + 120)$$

$$m = 250$$



The number of boys who enrolled only in Physics = 320

The number of girls who enrolled only in Math = 250

So, required difference = $320 - 250 = 70$

Q4. Text Solution:

Topic: Venn Diagram

Let areas in the Venn diagram be "a, b, c, d, e, f, g,

For Boys

And m, n, o, p, q, r and s for Girls

Total number of students = 2250

$$\text{So, Boys} = 2250 \times \frac{5}{9} = 1250$$

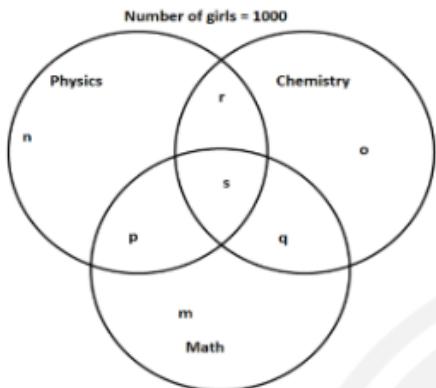
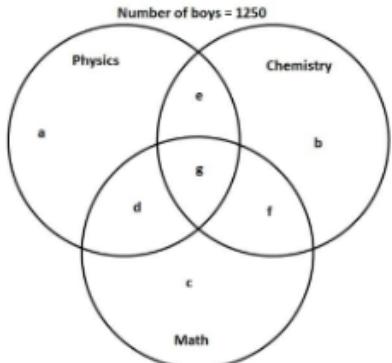
$$\text{Girls} = 1000$$



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The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc. department (b) = $\frac{20}{100} \times 1250 = 250$

The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only chemistry (c) = $30 + b = 30 + 250 = 280$

The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math (f) = $\frac{25}{100} \times 280 = 70$

The ratio of the number of boys who enrolled in both physics and chemistry together but not math to the number of boys who enrolled in both Math and chemistry together but not physics is 8:7

$$e:f = 8:7$$

$$\text{So, } e = 70 \times \frac{8}{7} = 80$$

The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics

$$d = e + f$$

$$\Rightarrow d = 80 + 70$$

$$\Rightarrow d = 150$$

The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math

$$g = 20 + e$$

$$\Rightarrow g = 20 + 80$$

$$\Rightarrow g = 100$$

$$\text{Since, } a + b + c + d + e + f + g = 1250$$

$$\Rightarrow a = 1250 - 250 - 280 - 150 + 80 + 70 + 100$$

$$\Rightarrow a = 320$$

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department

$$q = \frac{10}{100} \times 1000 = 100$$

The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry

$$n = b = 250$$

The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three subjects together

$$o = 2 \times g = 2 \times 100 = 200.$$

The number of boys who enrolled in both Physics and Chemistry together but not math is twice the number of girls who enrolled in both Physics and Math together but not chemistry

$$e = 2 \times p$$

$$p = 80/2$$

$$\Rightarrow p = 40$$

the number of girls who enrolled in both Physics and Math together but not chemistry is one-third of the number of girls who enrolled in all three subjects together

$$p = \frac{1}{3} \times s$$

$$s = 3 \times 40$$

$$s = 120$$

The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in both Physics and Chemistry together but not math



$$a = 8 \times r$$

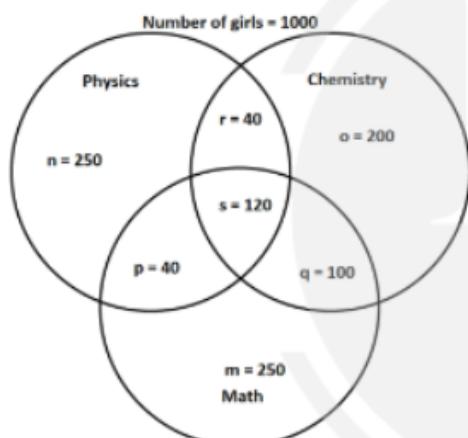
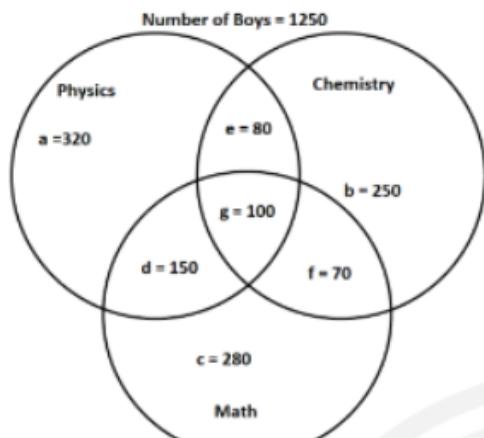
$$r = \frac{1}{8} \times 320$$

$$r = 40$$

$$\text{Since, } m + n + o + p + q + r + s = 1000$$

$$m = 1000 - (250 + 200 + 40 + 100 + 40 + 40 + 120)$$

$$m = 250$$



The number of boys who enrolled in all three subjects = 100

The number of girls who enrolled in all three subjects = 120

So, the total number of students who enrolled in all three subjects = $100 + 120 = 220$

Q5. Text Solution:

Topic: Venn Diagram

Let areas in the Venn diagram be "a, b, c, d, e, f, g,

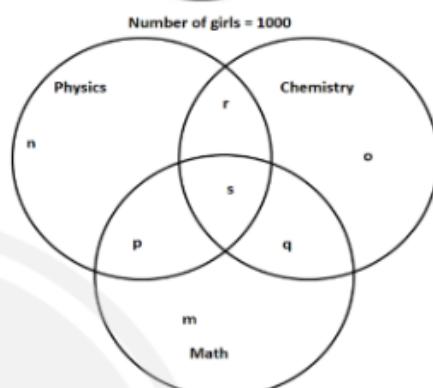
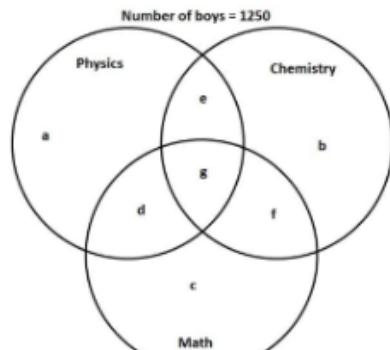
For Boys

And m, n, o, p, q, r and s for Girls

Total number of students = 2250

So, Boys = $2250 \times \frac{5}{9} = 1250$

Girls = 1000



The number of boys who enrolled in only Chemistry is 20% of the total number of boys in the B.Sc. department (b) = $\frac{20}{100} \times 1250 = 250$

The number of boys who enrolled in only Math is 30 more than the number of boys who enrolled in only chemistry (c) = $30 + b = 30 + 250 = 280$

The number of boys who enrolled in both Chemistry and Math together but not physics is 25% of the number of boys who enrolled in only Math (f) = $\frac{25}{100} \times 280 = 70$

The ratio of the number of boys who enrolled in both physics and chemistry together but not math to the number of boys who enrolled in both Math and chemistry together but not physics is 8:7

$e : f = 8 : 7$

So, $e = 70 \times \frac{8}{7} = 80$

The number of boys who enrolled in both Physics and Math together but not chemistry is the sum of the number of boys who enrolled in both Physics and Chemistry together but not math and the number of boys who enrolled in both Chemistry and Math together but not physics



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$$d = e + f$$

$$\Rightarrow d = 80 + 70$$

$$\Rightarrow d = 150$$

The number of boys who enrolled in all three subjects together is 20 more than the number of boys who enrolled in Physics and chemistry together but not math

$$g = 20 + e$$

$$\Rightarrow g = 20 + 80$$

$$\Rightarrow g = 100$$

$$\text{Since, } a + b + c + d + e + f + g = 1250$$

$$\Rightarrow a = 1250 - 250 - 280 - 150 + 80 + 70 + 100$$

$$\Rightarrow a = 320$$

The number of girls who enrolled in both Chemistry and Math together but not physics is 10% of the number of girls in the B.Sc. department

$$q = \frac{10}{100} \times 1000 = 100$$

The number of girls who enrolled in only Physics is equal to the number of boys who enrolled in only Chemistry

$$n = b = 250$$

The number of girls who enrolled in only chemistry is twice the number of boys who enrolled in all three subjects together

$$o = 2 \times g = 2 \times 100 = 200.$$

The number of boys who enrolled in both Physics and Chemistry together but not math is twice the number of girls who enrolled in both Physics and Math together but not chemistry

$$e = 2 \times p$$

$$p = 80/2$$

$$\Rightarrow p = 40$$

the number of girls who enrolled in both Physics and Math together but not chemistry is one-third of the number of girls who enrolled in all three subjects together

$$p = \frac{1}{3} \times s$$

$$s = 3 \times 40$$

$$s = 120$$

The number of boys who enrolled in only Physics is eight times the number of girls who enrolled in

both Physics and Chemistry together but not math

$$a = 8 \times r$$

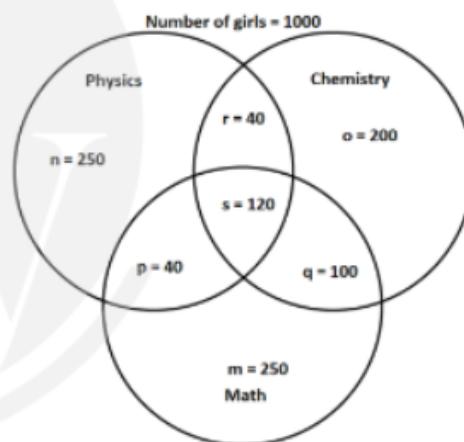
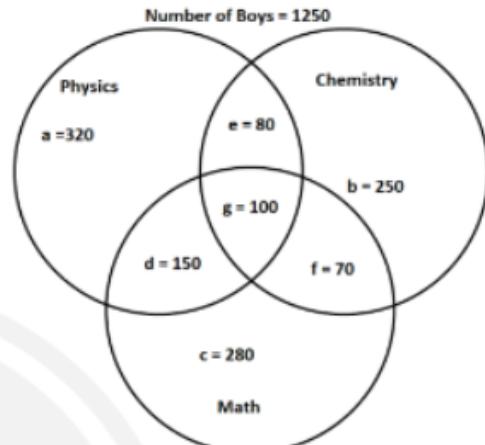
$$r = \frac{1}{8} \times 320$$

$$r = 40$$

$$\text{Since, } m + n + o + p + q + r + s = 1000$$

$$m = 1000 - (250 + 200 + 40 + 100 + 40 + 120)$$

$$m = 250$$



The number of boys who enrolled only for physics and chemistry = 80

The number of girls who enrolled only for physics and chemistry = 40

So, total number of students who enrolled only physics and chemistry = $80 + 40 = 120$.

Q6. Text Solution:

Topic: Venn Diagram

Let the total number of students in class 10th = T then the total number of students in class 9th = 140% of T = $1.4T$



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The number of students in class 8th = 80% of $T = 0.8T$

The number of students in class 7th = 120% of $0.8T = 0.96T$

The total number of students
 $= 0.96T + 0.8T + 1.4T + T = 4.16T = 1040$
 $T = 250$

The total number of students in class 7th = $0.96T = 0.96 \times 250 = 240$

The total number of students in class 8th = $0.8T = 0.8 \times 250 = 200$

The total number of students in class 9th = $1.4T = 1.4 \times 250 = 350$

The total number of students in class 10th = $T = 250$

Number of students who participated in all the three games = 90

The ratio = 2 : 6 : 4 : 3

The number of students of class 7th who participated in all the three games
 $= 2 \times \frac{90}{15} = 12$

For class 7th,

The number of participants,

In football = 44

In cricket = 38

In hockey = 42

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1 = 18$

In both hockey and football = $16 \times 1 = 16$

In all the three games = 12

Only football and cricket = $22 - 12 = 10$

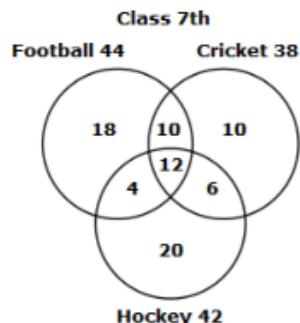
Only cricket and hockey = $18 - 12 = 6$

Only hockey and football = $16 - 12 = 4$

Only football = $44 - 10 - 4 - 12 = 18$

Only Hockey = $42 - 4 - 6 - 12 = 20$

Only cricket = $38 - 10 - 6 - 12 = 10$



For class 8th,

The number of participants,

In football = 88

In cricket = 76

In hockey = 84

In both football and cricket = $11 \times 4 = 44$

In both cricket and hockey = $18 \times 3 = 54$

In both hockey and football = $16 \times 4 = 64$

In all the three games = $6 \times 6 = 36$

Only football and cricket = $44 - 36 = 8$

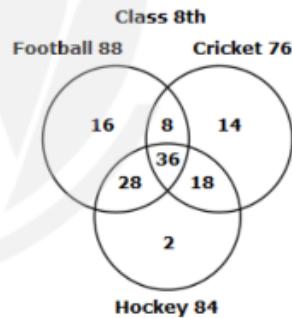
Only cricket and hockey = $54 - 36 = 18$

Only hockey and football = $64 - 36 = 28$

Only football = $88 - 28 - 8 - 36 = 16$

Only Hockey = $84 - 28 - 18 - 36 = 2$

Only cricket = $76 - 8 - 18 - 36 = 14$



For class 9th,

The number of participants,

In football = 92

In cricket = 78

In hockey = 104

In both football and cricket = $11 \times 3 = 33$

In both cricket and hockey = $18 \times 2 = 36$

In both hockey and football = $16 \times 2 = 32$

In all the three games = $6 \times 4 = 24$

Only football and cricket = $33 - 24 = 9$

Only cricket and hockey = $36 - 24 = 12$

Only hockey and football = $32 - 24 = 8$

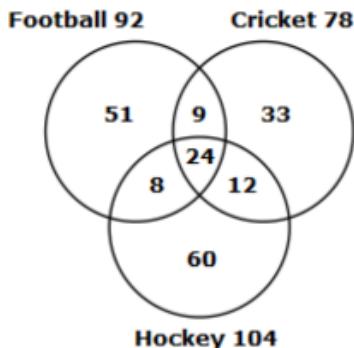
Only football = $92 - 8 - 9 - 24 = 51$



Only Hockey = $104 - 8 - 24 - 12 = 60$

Only cricket = $78 - 9 - 12 - 24 = 33$

Class 9th



For class 10th,

The number of participants,

In football = 72

In cricket = 58

In hockey = 99

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1.5 = 27$

In both hockey and football = $16 \times 2.5 = 40$

In all the three games = $6 \times 3 = 18$

Only football and cricket = $22 - 18 = 4$

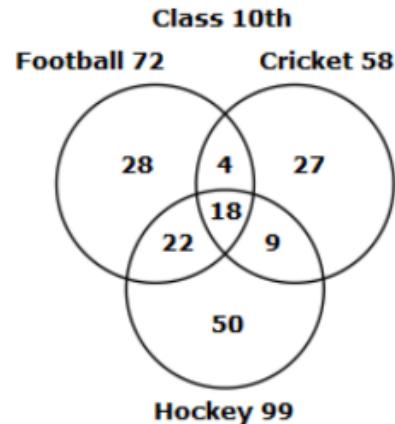
Only cricket and hockey = $27 - 18 = 9$

Only hockey and football = $40 - 18 = 22$

Only football = $72 - 22 - 4 - 18 = 28$

Only Hockey = $99 - 22 - 9 - 18 = 50$

Only cricket = $58 - 18 - 9 - 4 = 27$



	Only F	Only C	Only H	Only F and C	Only C and H	Only F and H	All three games	Total
Class 7 th	18	10	20	10	6	4	12	80
Class 8 th	16	14	2	8	18	28	36	122
Class 9 th	51	33	60	9	12	8	24	197
Class 10 th	28	27	50	4	9	22	18	158
Total	113	84	132	31	45	62	90	557

The number of students of class seventh who had not participated in any of the games = $240 - 80 = 160$.

The number of students of class ninth who had not participated in any of the games = $350 - 197 = 153$.

The required difference = $160 - 153 = 7$

Q7. Text Solution:

Topic: Venn Diagram

Let the total number of students in class 10th = T then the total number of students in class 9th = 140% of T = $1.4T$

The number of students in class 8th = 80% of T = $0.8T$

The number of students in class 7th = 120% of $0.8T$ = $0.96T$

The total number of students = $0.96T + 0.8T + 1.4T + T = 4.16T = 1040$
 $T = 250$

The total number of students in class 7th = $0.96T = 0.96 \times 250 = 240$



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The total number of students in class 8th = $0.8T = 0.8 \times 250 = 200$

The total number of students in class 9th = $1.4T = 1.4 \times 250 = 350$

The total number of students in class 10th = $T = 250$

Number of students who participated in all the three games = 90

The ratio = 2 : 6 : 4 : 3

The number of students of class 7th who participated in all the three games = $2 \times \frac{90}{15} = 12$

For class 7th,

The number of participants,

In football = 44

In cricket = 38

In hockey = 42

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1 = 18$

In both hockey and football = $16 \times 1 = 16$

In all the three games = 12

Only football and cricket = $22 - 12 = 10$

Only cricket and hockey = $18 - 12 = 6$

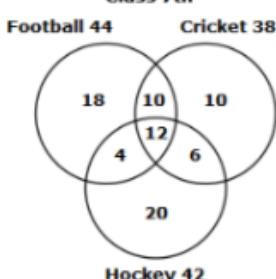
Only hockey and football = $16 - 12 = 4$

Only football = $44 - 10 - 4 - 12 = 18$

Only Hockey = $42 - 4 - 6 - 12 = 20$

Only cricket = $38 - 10 - 6 - 12 = 10$

Class 7th



For class 8th,

The number of participants,

In football = 88

In cricket = 76

In hockey = 84

In both football and cricket = $11 \times 4 = 44$

In both cricket and hockey = $18 \times 3 = 54$

In both hockey and football = $16 \times 4 = 64$

In all the three games = $6 \times 6 = 36$

Only football and cricket = $44 - 36 = 8$

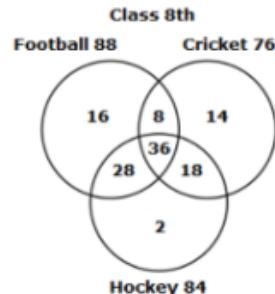
Only cricket and hockey = $54 - 36 = 18$

Only hockey and football = $64 - 36 = 28$

Only football = $88 - 28 - 8 - 36 = 16$

Only Hockey = $84 - 28 - 18 - 36 = 2$

Only cricket = $76 - 8 - 18 - 36 = 14$



For class 9th,

The number of participants,

In football = 92

In cricket = 78

In hockey = 104

In both football and cricket = $11 \times 3 = 33$

In both cricket and hockey = $18 \times 2 = 36$

In both hockey and football = $16 \times 2 = 32$

In all the three games = $6 \times 4 = 24$

Only football and cricket = $33 - 24 = 9$

Only cricket and hockey = $36 - 24 = 12$

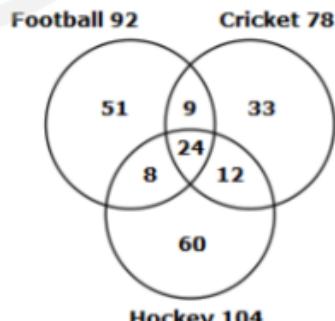
Only hockey and football = $32 - 24 = 8$

Only football = $92 - 8 - 9 - 24 = 51$

Only Hockey = $104 - 8 - 24 - 12 = 60$

Only cricket = $78 - 9 - 12 - 24 = 33$

Class 9th



For class 10th,

The number of participants,

In football = 72

In cricket = 58

In hockey = 99

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1.5 = 27$



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In both hockey and football = $16 \times 2.5 = 40$

In all the three games = $6 \times 3 = 18$

Only football and cricket = $22 - 18 = 4$

Only cricket and hockey = $27 - 18 = 9$

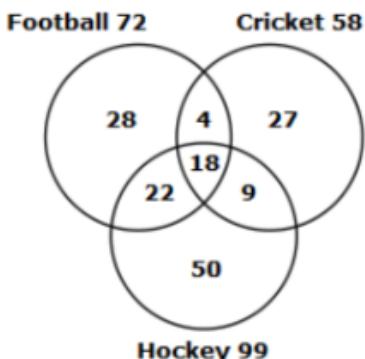
Only hockey and football = $40 - 18 = 22$

Only football = $72 - 22 - 4 - 18 = 28$

Only Hockey = $99 - 22 - 9 - 18 = 50$

Only cricket = $58 - 18 - 9 - 4 = 27$

Class 10th



	Only F	Only C	Only H	Only F and C	Only C and H	Only F and H	All three games	Total
Class 7th	18	10	20	10	6	4	12	80
Class 8th	16	14	2	8	18	28	36	122
Class 9th	51	33	60	9	12	8	24	197
Class 10th	28	27	50	4	9	22	18	158
Total	113	84	132	31	45	62	90	557

The total number of participants only in cricket = 84

The number of females = 33.33% of 84

$$= \frac{84}{3} \\ = 28$$

The total number of participants only in Hockey

$$= 132$$

The number of females = 66.67% of 132

$$= 132 \times \frac{2}{3} \\ = 44 \times 2 \\ = 88$$

The required difference = $88 - 28$

$$= 60$$

Q8. Text Solution:

Topic: Venn Diagram

Let the total number of students in class 10th = T then the total number of students in class 9th = 140% of T = $1.4T$

The number of students in class 8th = 80% of T = $0.8T$

The number of students in class 7th = 120% of $0.8T$ = $0.96T$

The total number of students = $0.96T + 0.8T + 1.4T + T = 4.16T = 1040$
 $T = 250$

The total number of students in class 7th = $0.96T = 0.96 \times 250 = 240$

The total number of students in class 8th = $0.8T = 0.8 \times 250 = 200$

The total number of students in class 9th = $1.4T = 1.4 \times 250 = 350$

The total number of students in class 10th = $T = 250$

Number of students who participated in all the three games = 90

The ratio = 2 : 6 : 4 : 3

The number of students of class 7th who participated in all the three games = $2 \times \frac{90}{15} = 12$

For class 7th,

The number of participants,

In football = 44

In cricket = 38

In hockey = 42

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1 = 18$

In both hockey and football = $16 \times 1 = 16$

In all the three games = 12

Only football and cricket = $22 - 12 = 10$

Only cricket and hockey = $18 - 12 = 6$

Only hockey and football = $16 - 12 = 4$

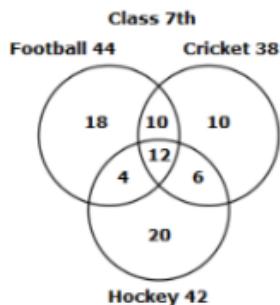
Only football = $44 - 10 - 4 - 12 = 18$

Only Hockey = $42 - 4 - 6 - 12 = 20$



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Only cricket = $38 - 10 - 6 - 12 = 10$



For class 8th,

The number of participants,

In football = 88

In cricket = 76

In hockey = 84

In both football and cricket = $11 \times 4 = 44$

In both cricket and hockey = $18 \times 3 = 54$

In both hockey and football = $16 \times 4 = 64$

In all the three games = $6 \times 6 = 36$

Only football and cricket = $44 - 36 = 8$

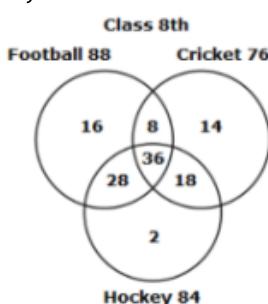
Only cricket and hockey = $54 - 36 = 18$

Only hockey and football = $64 - 36 = 28$

Only football = $88 - 28 - 8 - 36 = 16$

Only Hockey = $84 - 28 - 18 - 36 = 2$

Only cricket = $76 - 8 - 18 - 36 = 14$



For class 9th,

The number of participants,

In football = 92

In cricket = 78

In hockey = 104

In both football and cricket = $11 \times 3 = 33$

In both cricket and hockey = $18 \times 2 = 36$

In both hockey and football = $16 \times 2 = 32$

In all the three games = $6 \times 4 = 24$

Only football and cricket = $33 - 24 = 9$

Only cricket and hockey = $36 - 24 = 12$

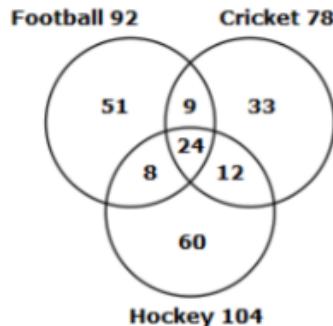
Only hockey and football = $32 - 24 = 8$

Only football = $92 - 8 - 9 - 24 = 51$

Only Hockey = $104 - 8 - 24 - 12 = 60$

Only cricket = $78 - 9 - 12 - 24 = 33$

Class 9th



For class 10th,

The number of participants,

In football = 72

In cricket = 58

In hockey = 99

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1.5 = 27$

In both hockey and football = $16 \times 2.5 = 40$

In all the three games = $6 \times 3 = 18$

Only football and cricket = $22 - 18 = 4$

Only cricket and hockey = $27 - 18 = 9$

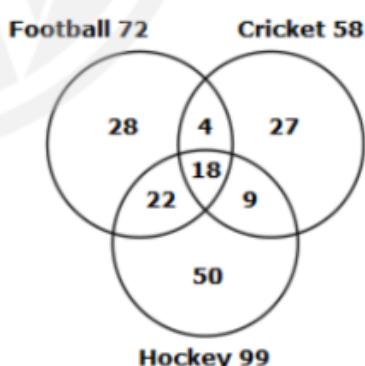
Only hockey and football = $40 - 18 = 22$

Only football = $72 - 22 - 4 - 18 = 28$

Only Hockey = $99 - 22 - 9 - 18 = 50$

Only cricket = $58 - 18 - 9 - 4 = 27$

Class 10th



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	Only F	Only C	Only H	Only F and C	Only C and H	Only F and H	All three games	Total
Class 7 th	18	10	20	10	6	4	12	80
Class 8 th	16	14	2	8	18	28	36	122
Class 9 th	51	33	60	9	12	8	24	197
Class 10 th	28	27	50	4	9	22	18	158
Total	113	84	132	31	45	62	90	557

The total number of students in all the class together = 1040

The total number of participants in all the three games together = $80 + 122 + 197 + 158 = 557$

The required difference = $1040 - 557 = 483$

Q9. Text Solution:

Topic: Venn Diagram

Let the total number of students in class 10th = T then the total number of students in class 9th = 140% of T = $1.4T$

The number of students in class 8th = 80% of $T = 0.8T$

The number of students in class 7th = 120% of $0.8T = 0.96T$

The total number of students = $0.96T + 0.8T + 1.4T + T = 4.16T = 1040$
 $T = 250$

The total number of students in class 7th = $0.96T = 0.96 \times 250 = 240$

The total number of students in class 8th = $0.8T = 0.8 \times 250 = 200$

The total number of students in class 9th = $1.4T = 1.4 \times 250 = 350$

The total number of students in class 10th = $T = 250$

Number of students who participated in all the three games = 90

The ratio = 2 : 6 : 4 : 3

The number of students of class 7th who participated in all the three games = $2 \times \frac{90}{15} = 12$

For class 7th,

The number of participants,

In football = 44

In cricket = 38

In hockey = 42

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1 = 18$

In both hockey and football = $16 \times 1 = 16$

In all the three games = 12

Only football and cricket = $22 - 12 = 10$

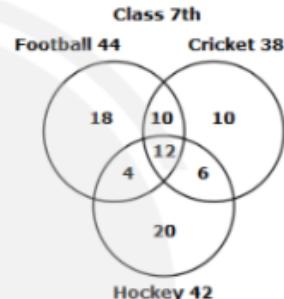
Only cricket and hockey = $18 - 12 = 6$

Only hockey and football = $16 - 12 = 4$

Only football = $44 - 10 - 4 - 12 = 18$

Only Hockey = $42 - 4 - 6 - 12 = 20$

Only cricket = $38 - 10 - 6 - 12 = 10$



For class 8th,

The number of participants,

In football = 88

In cricket = 76

In hockey = 84

In both football and cricket = $11 \times 4 = 44$

In both cricket and hockey = $18 \times 3 = 54$

In both hockey and football = $16 \times 4 = 64$

In all the three games = $6 \times 6 = 36$

Only football and cricket = $44 - 36 = 8$

Only cricket and hockey = $54 - 36 = 18$

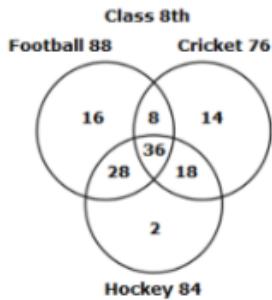
Only hockey and football = $64 - 36 = 28$

Only football = $88 - 28 - 8 - 36 = 16$

Only Hockey = $84 - 28 - 18 - 36 = 2$

Only cricket = $76 - 8 - 18 - 36 = 14$





For class 9th,

The number of participants,

In football = 92

In cricket = 78

In hockey = 104

In both football and cricket = $11 \times 3 = 33$

In both cricket and hockey = $18 \times 2 = 36$

In both hockey and football = $16 \times 2 = 32$

In all the three games = $6 \times 4 = 24$

Only football and cricket = $33 - 24 = 9$

Only cricket and hockey = $36 - 24 = 12$

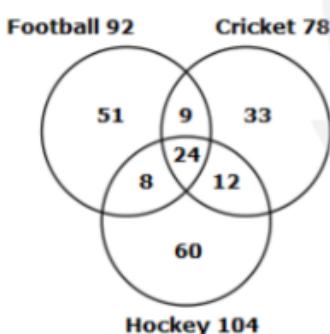
Only hockey and football = $32 - 24 = 8$

Only football = $92 - 8 - 9 - 24 = 51$

Only Hockey = $104 - 8 - 24 - 12 = 60$

Only cricket = $78 - 9 - 12 - 24 = 33$

Class 9th



For class 10th,

The number of participants,

In football = 72

In cricket = 58

In hockey = 99

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1.5 = 27$

In both hockey and football = $16 \times 2.5 = 40$

In all the three games = $6 \times 3 = 18$

Only football and cricket = $22 - 18 = 4$

Only cricket and hockey = $27 - 18 = 9$

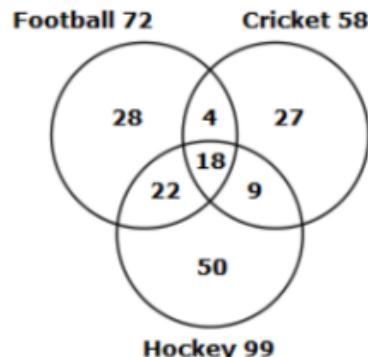
Only hockey and football = $40 - 18 = 22$

Only football = $72 - 22 - 4 - 18 = 28$

Only Hockey = $99 - 22 - 9 - 18 = 50$

Only cricket = $58 - 18 - 9 - 4 = 27$

Class 10th



	Only F	Only C	Only H	Only F and C	Only C and H	Only F and H	All three games	Total
Class 7 th	18	10	20	10	6	4	12	80
Class 8 th	16	14	2	8	18	28	36	122
Class 9 th	51	33	60	9	12	8	24	197
Class 10 th	28	27	50	4	9	22	18	158
Total	113	84	132	31	45	62	90	557

The total number of participants only in cricket = 84

The total number of participants only in football = 113

The required difference = $113 - 84 = 29$

Q10. Text Solution:

Topic: Venn Diagram

Let the total number of students in class 10th = T then the total number of students in class 9th = 140% of T = $1.4T$

The number of students in class 8th = 80% of T = $0.8T$

The number of students in class 7th = 120% of $0.8T$ = $0.96T$

The total number of students = $0.96T + 0.8T + 1.4T + T = 4.16T = 1040$
 $T = 250$

The total number of students in class 7th = $0.96T = 0.96 \times 250 = 240$

The total number of students in class 8th = $0.8T = 0.8 \times 250 = 200$



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The total number of students in class 9th = $1.4T = 1.4 \times 250 = 350$

The total number of students in class 10th = $T = 250$

Number of students who participated in all the three games = 90

The ratio = 2 : 6 : 4 : 3

The number of students of class 7th who participated in all the three games = $2 \times \frac{90}{15} = 12$

For class 7th,

The number of participants,

In football = 44

In cricket = 38

In hockey = 42

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1 = 18$

In both hockey and football = $16 \times 1 = 16$

In all the three games = 12

Only football and cricket = $22 - 12 = 10$

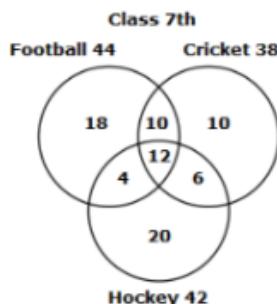
Only cricket and hockey = $18 - 12 = 6$

Only hockey and football = $16 - 12 = 4$

Only football = $44 - 10 - 4 - 12 = 18$

Only Hockey = $42 - 4 - 6 - 12 = 20$

Only cricket = $38 - 10 - 6 - 12 = 10$



For class 8th,

The number of participants,

In football = 88

In cricket = 76

In hockey = 84

In both football and cricket = $11 \times 4 = 44$

In both cricket and hockey = $18 \times 3 = 54$

In both hockey and football = $16 \times 4 = 64$

In all the three games = $6 \times 6 = 36$

Only football and cricket = $44 - 36 = 8$

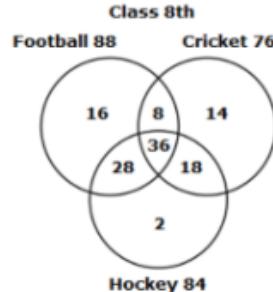
Only cricket and hockey = $54 - 36 = 18$

Only hockey and football = $64 - 36 = 28$

Only football = $88 - 28 - 8 - 36 = 16$

Only Hockey = $84 - 28 - 18 - 36 = 2$

Only cricket = $76 - 8 - 18 - 36 = 14$



For class 9th,

The number of participants,

In football = 92

In cricket = 78

In hockey = 104

In both football and cricket = $11 \times 3 = 33$

In both cricket and hockey = $18 \times 2 = 36$

In both hockey and football = $16 \times 2 = 32$

In all the three games = $6 \times 4 = 24$

Only football and cricket = $33 - 24 = 9$

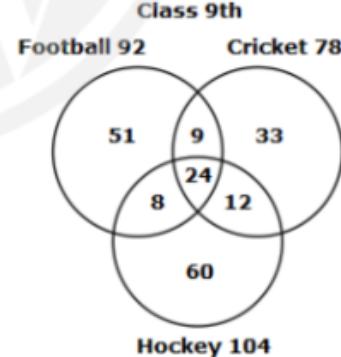
Only cricket and hockey = $36 - 24 = 12$

Only hockey and football = $32 - 24 = 8$

Only football = $92 - 8 - 9 - 24 = 51$

Only Hockey = $104 - 8 - 24 - 12 = 60$

Only cricket = $78 - 9 - 12 - 24 = 33$



For class 10th,

The number of participants,

In football = 72

In cricket = 58

In hockey = 99

In both football and cricket = $11 \times 2 = 22$

In both cricket and hockey = $18 \times 1.5 = 27$

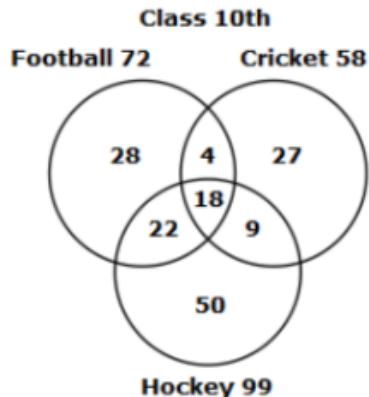
In both hockey and football = $16 \times 2.5 = 40$

In all the three games = $6 \times 3 = 18$



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Only football and cricket = $22 - 18 = 4$
 Only cricket and hockey = $27 - 18 = 9$
 Only hockey and football = $40 - 18 = 22$
 Only football = $72 - 22 - 4 - 18 = 28$
 Only Hockey = $99 - 22 - 9 - 18 = 50$
 Only cricket = $58 - 18 - 9 - 4 = 27$



	Only F	Only C	Only H	Only F and C	Only C and H	Only F and H	All three games	Total
Class 7 th	18	10	20	10	6	4	12	80
Class 8 th	16	14	2	8	18	28	36	122
Class 9 th	51	33	60	9	12	8	24	197
Class 10 th	28	27	50	4	9	22	18	158
Total	113	84	132	31	45	62	90	557

The total number of participants of class 8th that play all three games together = 36
 The total number of participants of class 9th that play all the three games together = 24
 The required difference = $36 - 24 = 12$

Q11. Text Solution:

Topic: Venn Diagram

Total = 1000

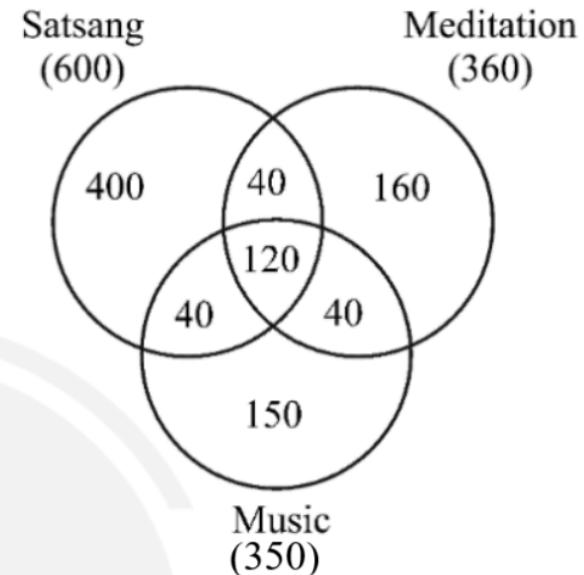
Total villagers who are involved in 3 activities = $\frac{100-5}{100} \times 1000 = 950$

Number of villagers who are involved in only Satsang = $33\frac{1}{3}\% \times 120 = 40$

Number of villagers who are involved in Satsang: No. of people who are involved in only Satsang = 3 : 2

Number of villagers who are involved in Satsang = 600

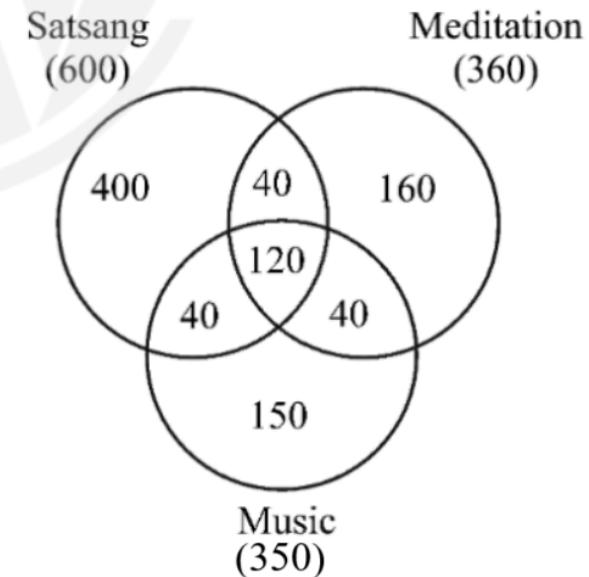
Number of villagers who are involved in only Satsang & Meditation = only Meditation & Music = only Music & Satsang = $\frac{600-400-120}{2} = 40$
 Villagers who are involved – Villagers who are involved in Satsang or Meditation = Villagers who are involved in only music = $950 - 800 = 150$



Both Meditation & Music = 40

Q12. Text Solution:

Topic: Venn Diagram

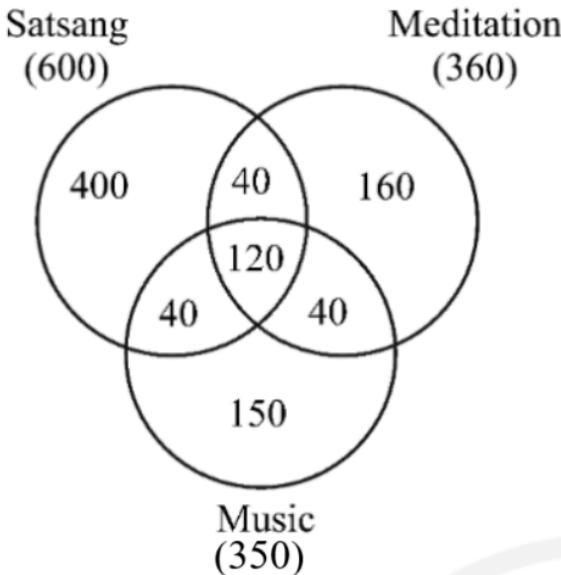


Only Music = 150

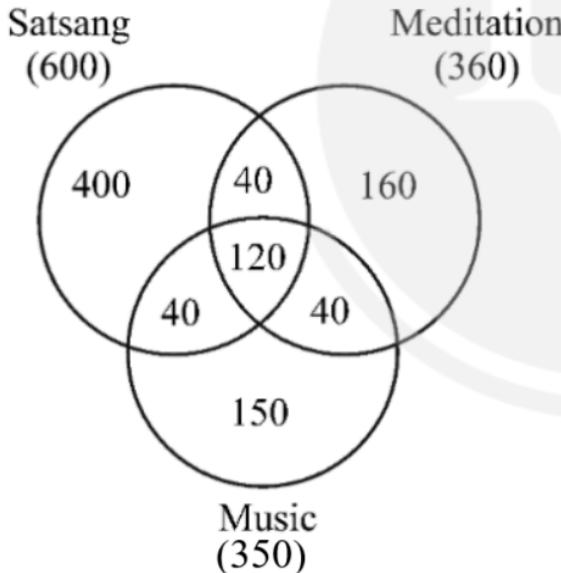
Only Meditation = 160

Difference = $160 - 150 = 10$



Q13. Text Solution:**Topic: Venn Diagram**

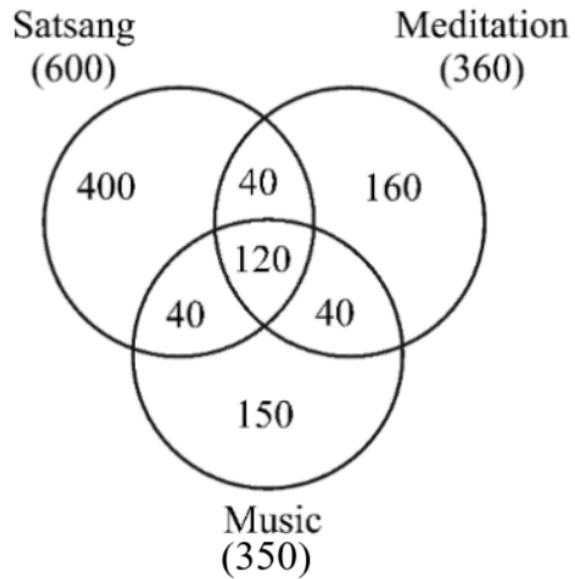
$$\text{Required Ratio} = \frac{40+40+40}{40+40+40+120} = 1:2$$

Q14. Text Solution:**Topic: Venn Diagram**

Initial no. of villagers who are involved in Music =
 $40 + 120 + 40 + 150 = 350$

New villagers added = 20% of 50 = 10

$$\% \text{ increase} = \frac{10}{350} \times 100 = 2\frac{6}{7}\%$$

Q15. Text Solution:**Topic: Venn Diagram**

Required difference $(40 + 120) - (40 + 120) = 0$

Q16. Text Solution:**Topic: Venn Diagram**

There are four different games and various conditions under 4 Set-Venn diagrams as given.
 Let Table Tennis be represented by TT, Tennis by T, Squash by S, and Badminton by B.

According to the given conditions.

The total number of athletes who played TT = 460
 $T = 360$

The total number of athletes who played T = 360
 $S = 360$

The total number of athletes who played S = 360
 $B = 440$

The number of athletes playing exactly 2 games = 40

The number of athletes playing exactly 3 games = 20

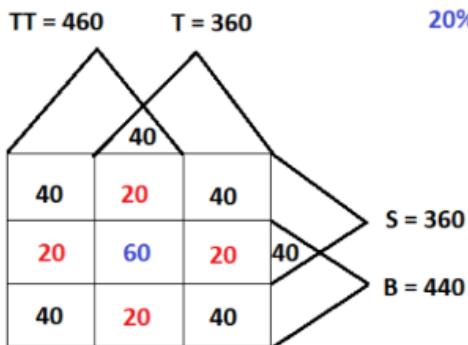
The number of athletes who play all 4 games = 60

The number of athletes practicing that are not choosing any of the racquet sports = 20%

The information can be filled in the Venn



diagram as



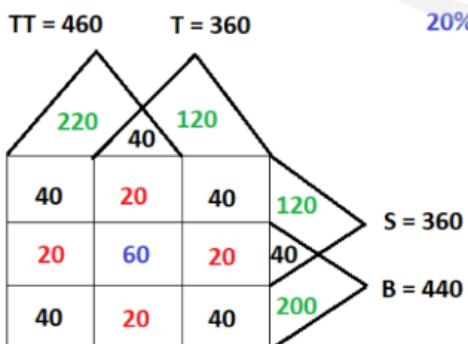
$$\begin{aligned} \text{The total number of athletes who played only TT} &= 460 - (40 + 40 + 20 + 20 + 60 + 40 + 20) \\ &= 460 - 240 \\ &= 220 \end{aligned}$$

$$\begin{aligned} \text{The total number of athletes who played only T} &= 360 - (40 + 20 + 60 + 20 + 40 + 20 + 40) \\ &= 360 - 240 \\ &= 120 \end{aligned}$$

$$\begin{aligned} \text{The total number of athletes who played only S} &= 360 - (40 + 20 + 40 + 20 + 60 + 20 + 40) \\ &= 360 - 240 \\ &= 120 \end{aligned}$$

$$\begin{aligned} \text{The total number of athletes who played only B} &= 440 - (20 + 60 + 20 + 40 + 20 + 40 + 40) = 440 - 240 \\ &= 200 \end{aligned}$$

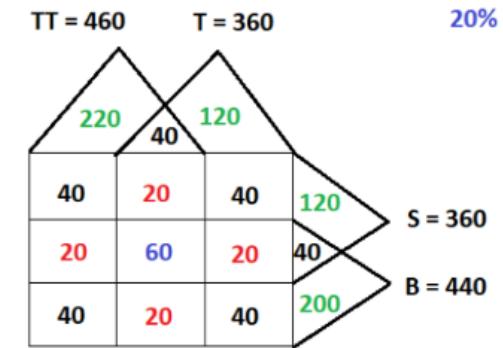
Now the final Venn diagram looks like



$$\text{Total number of Athletes} = \frac{1040}{0.8} = 1300 \text{ Hence Option a.}$$

Q17. Text Solution:

Topic: Venn Diagram



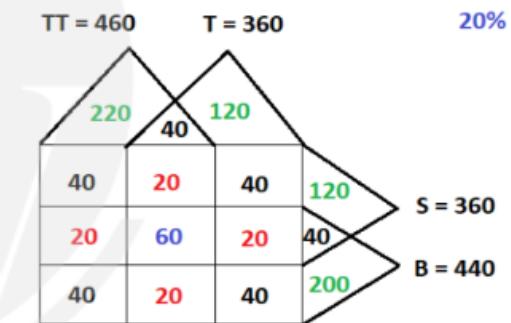
The number of athletes in the stadium who play only squash (S) = 120

The number of athletes in the stadium who play only Tennis (T) = 120

The number of athletes in the stadium who play either only squash or only tennis = 120 + 120 = 240

Q18. Text Solution:

Topic: Venn Diagram



The number of athletes who play Table Tennis and Tennis only = 40

The number of athletes who play Squash and Table Tennis = (40 + 20 + 60 + 20) = 140

Hence,

The sum of athletes who play Table Tennis and Tennis only and the number of athletes who play Squash and Table Tennis = 40 + 140 = 180

Q19. Text Solution:

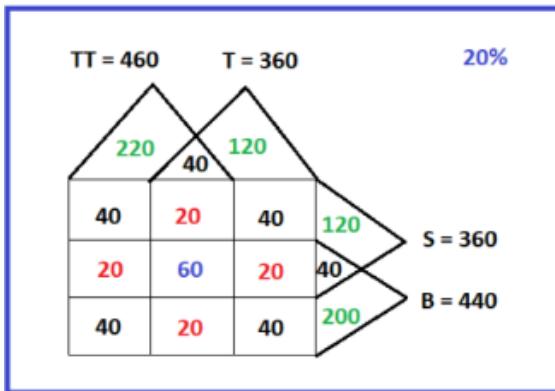
Topic: Venn Diagram



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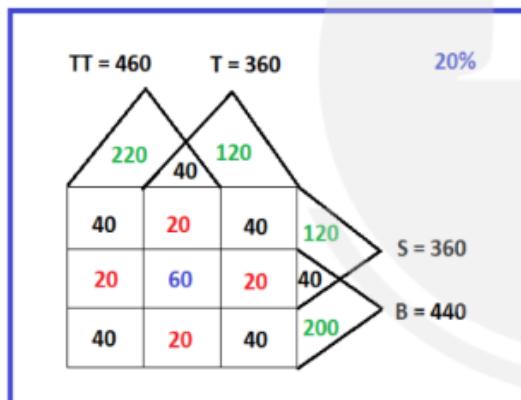
After adding one game to their existing list, those athletes who were playing 3 games will now play 4 games and there is no change in the number of athletes who played 4 games.

$$\begin{aligned} \text{Number of athletes who played 3 games} &= 20 + 20 + 20 \\ &= 80 \end{aligned}$$

$$\begin{aligned} \text{Total Number of athletes playing four games} &= 60 + 80 = 140. \end{aligned}$$

Q20. Text Solution:

Topic: Venn Diagram



$$\begin{aligned} \text{The number of athletes who play only Table Tennis, only Squash, and only Badminton} &= 220 + 120 + 200 \\ &= 540 \end{aligned}$$

$$\begin{aligned} \text{The number of athletes who play at least three games} &= \text{Number of athletes who play three games} + \text{Number of athletes who play four games} \\ &= (20 + 20 + 20 + 20) + 60 \\ &= 140 \end{aligned}$$

Hence, the difference between the number of athletes who play only Table Tennis, only Squash, and only Badminton and the number

of athletes who play at least three games = $540 - 140 = 400$

Q21. Text Solution:

Topic: Venn Diagram

$$\text{Total Visitors} = 500$$

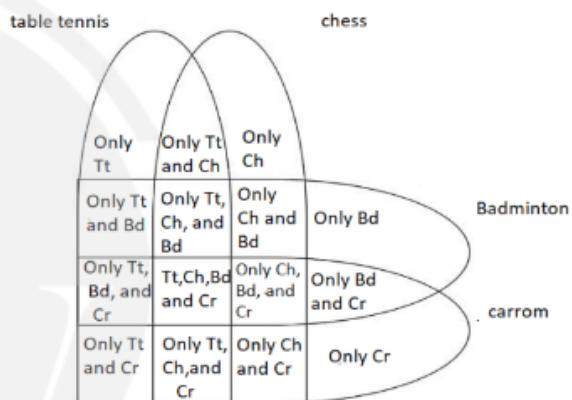
$$\begin{aligned} \text{Total visitors who have taken subscription} &90\% \\ \text{of } 500 &= 450 \end{aligned}$$

$$\text{So normal Visitors } 500 - 450 = 50$$

Among 450 Visitors, the subscription is taken for four games Table- tennis, Chess, Badminton, and carrom.

So, the data for four set Venn diagram is as follows:

Table Tennis is Tt, Chess is Ch, Badminton is Bd, and Carron is Cr.



45 visitors took subscriptions for all the four games,

which is 10% less than the people who had taken subscriptions only in badminton.

So the number of people who took a subscription in badminton only will be 50.

The number of people who have taken subscriptions in any three sports only is 30 each.

The number of visitors who have taken subscription-only in Table tennis will be 90.

The ratio of visitors who had taken subscription only in table-tennis, and chess, and visitors taking all four games subscription is 7: 5. So, the total number of visitors in only table tennis and chess will be 63.

The number of visitors visiting table tennis and badminton only, Chess and badminton only,



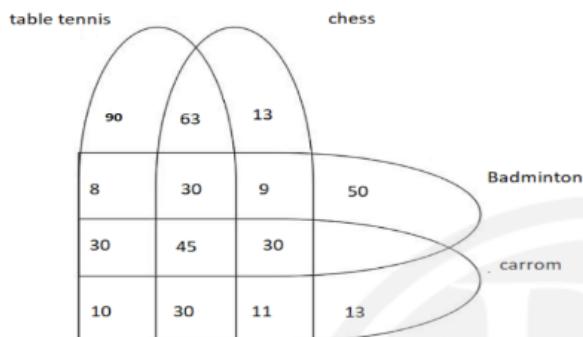
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table tennis and carrom only, and chess and carrom only are in the consecutive value of natural numbers with the least value as 8 respectively.

Hence, the values are 8, 9, 10, and 11 respectively.

The total number of visitors playing only chess and only carrom is 26.

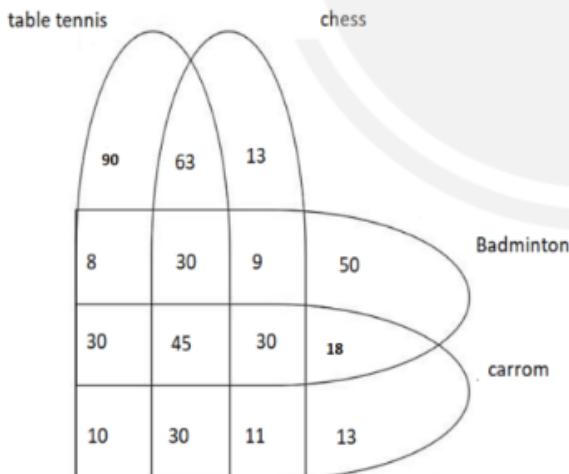
So putting the values in the diagram we get :



Number of Visitors who have taken subscription to badminton and carrom only

$$= 450 - (90 + 63 + 13 + 8 + 30 + 9 + 30 + 45 + 30 + 11 + 30 + 10 + 50 + 13) \\ = 18$$

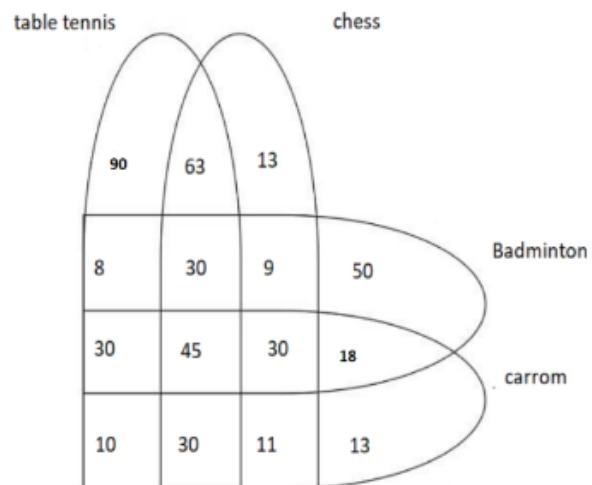
Hence, the final set diagram is:



$$\text{Visitors playing chess} = 63 + 13 + 30 + 9 + 45 + 30 + 30 + 11 = 231.$$

Q22. Text Solution:

Topic: Venn Diagram

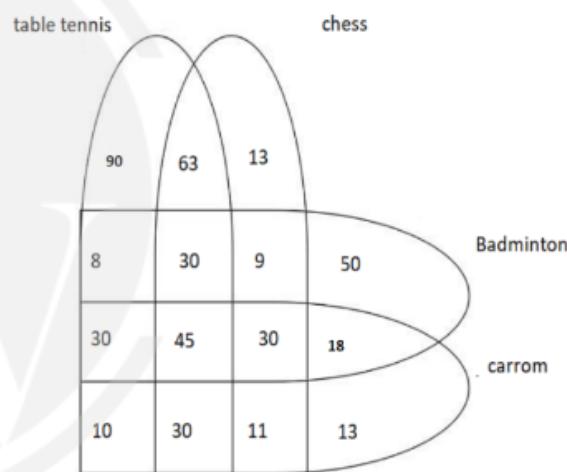


Visitors taking a subscription of only carrom = 13

Visitors taking a subscription to all four games = 45

$$\text{So, } \frac{13}{45} \times 100 = 28.8\% = 29\% \text{ (Approximately)}$$

Q23. Text Solution:



The number of visitors taking a subscription of at least two games includes all the values of the visitors taking a subscription of 2, 3 and 4 games, except the values of those who taking subscriptions of only one game.

So, from 450 we will subtract the values of those who are taking subscriptions to only one game

$$\text{So, } 450 - (90 + 13 + 50 + 13) = 284$$

Q24. Text Solution:

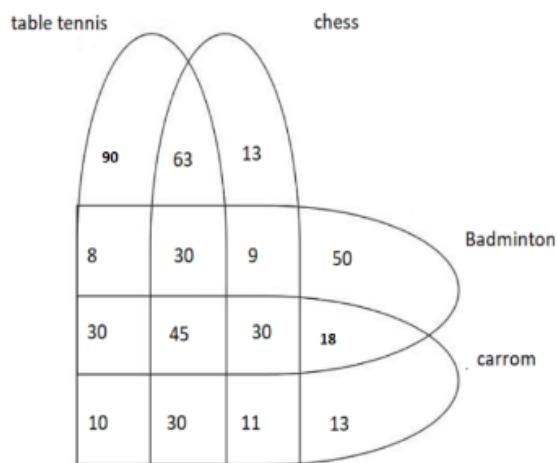
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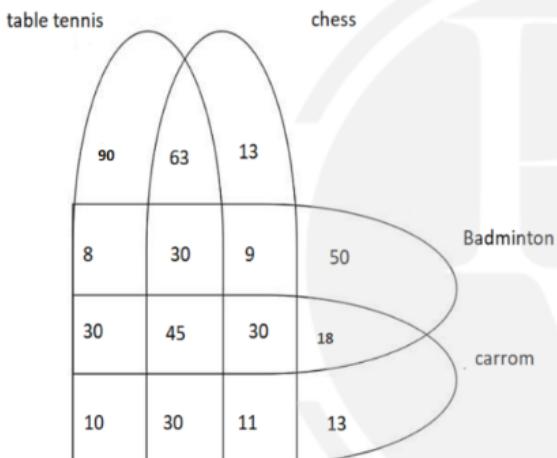
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$$\text{Required value} = 50 + 13 + 18 + 9 + 30 + 11 + 30 + 45 + 30 + 8 + 30 + 10 = 284$$

Q25. Text Solution:

Topic: Venn Diagram



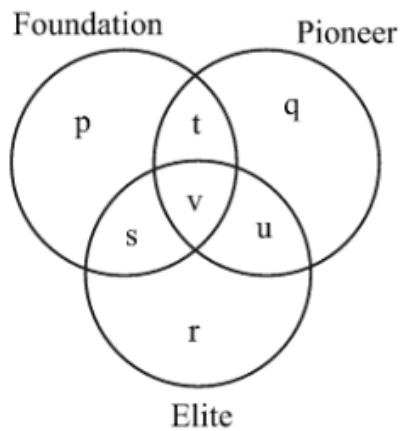
$$\text{Visitors taking a subscription of any three games} = 30 + 30 + 30 + 30 = 120$$

$$\text{Visitors taking subscription of any two games} = 63 + 8 + 18 + 9 + 10 + 11 = 119$$

$$\text{Difference} = 120 - 119 = 1.$$

Q26. Text Solution:

Topic: Venn Diagram



From (1) : Foundation > Pioneer > Elite

From (2) : $p + q + r > s + t + u > v$

From (3) : $v \geq 1$

Here we have to maximize $(r + s + v + u)$ along with satisfying all three conditions above.

To find maximum value of $(s + v + u + r)$

v is as max as possible.

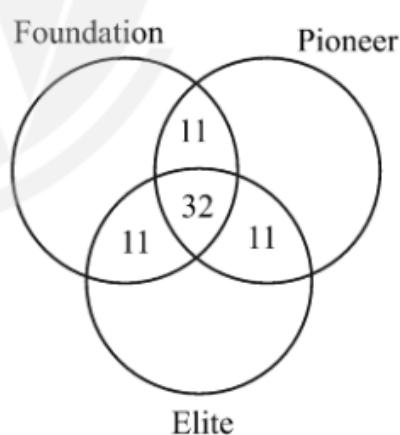
$$\rightarrow p + q + r > s + t + u > v$$

Only $v = 32$, $s + t + u = 33$ and $p + q + r = 35$ satisfy

$$\text{Here } s + t + u = 33$$

So they can individually distributed equally $s = 11$, $t = 11$, $u = 11$

Now the venn-diagram looks like,



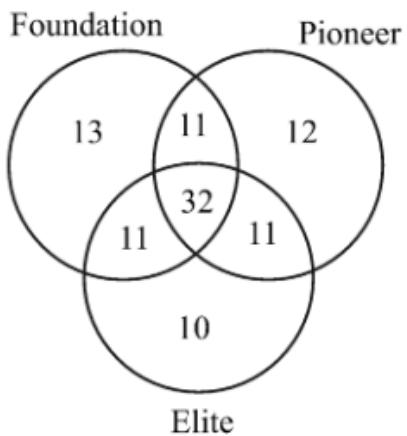
Now we have to distribute $p + q + r$ in such a way that, Foundation > Pioneer > Elite

it is only possible if

$p = 13$, $q = 12$ and $r = 10$ so all condition will satisfy.



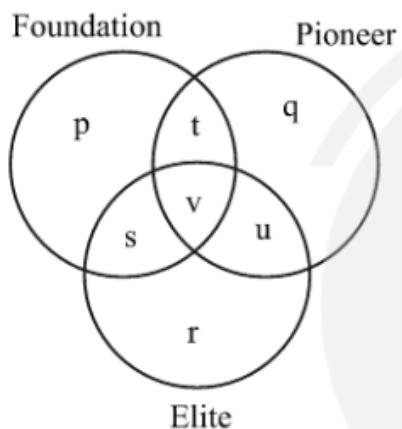
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Maximum number of students enrolled for Elite is 64.

Q27. Text Solution:

Topic: Venn Diagram



From (1) : Foundation > Pioneer > Elite

From (2) : $p + q + r > s + t + u > v$

From (3) : $v \geq 1$

Here we have to maximize r

so s, u, v as minimum as possible and $(p + t + s + v)$ is as minimum as possible.

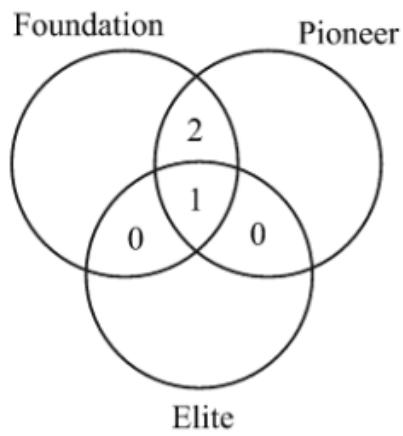
$(p + q + r) > s + t + u > v$

v can take minimum value of 1.

So to minimize s and v , $(s + t + u)$ is equal to 2.

Here s and u is minimum when equal to 0.

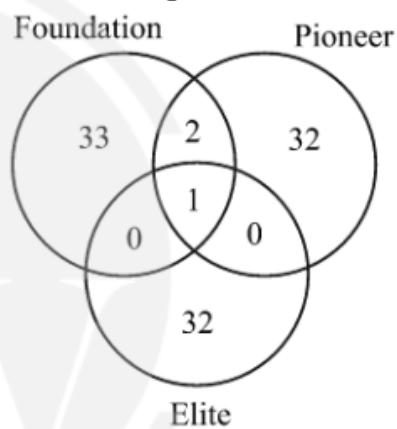
So $t = 2$



Now, $p + q + r = 97$ we have to distribute 97 in such a way that Foundation > Pioneer > Elite this equation satisfy.

Only possible value is $p = 33, q = 32, r = 32$

Final Venn diagram.



Foundation = 36 students

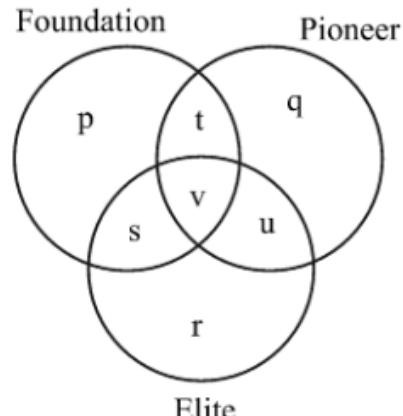
Pioneer = 35 students

Elite = 33 students

32 will be the correct answer.

Q28. Text Solution:

Topic: Venn Diagram



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From (1) : Foundation > Pioneer > Elite

From (2) : $p + q + r > s + t + u > v$

From (3) : $v \geq 1$

Here we need to maximise the value of v by satisfying second equation,

$$p + q + r > s + t + u > v$$

Minimum value of v is 1.

only possible condition satisfying is

$$p + q + r = 35$$

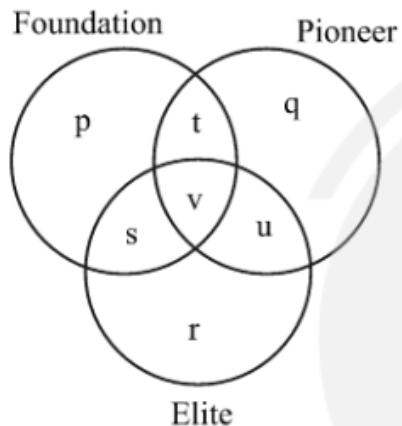
$$s + t + u = 33$$

$$v = 32$$

32 is the correct answer.

Q29. Text Solution:

Topic: Venn Diagram



From (1) : Foundation > Pioneer > Elite

From (2) : $p + q + r > s + t + u > v$

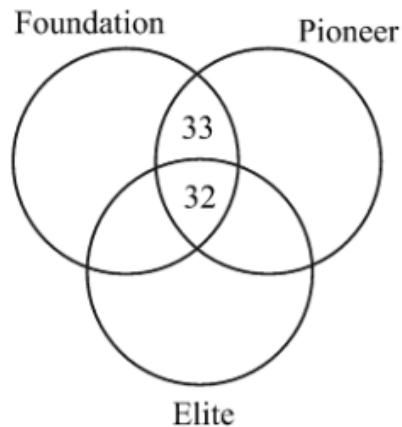
From (3) : $v \geq 1$

Here we have to minimise the value of p so we have to maximise the value of s, t, v .

$$p + q + r > s + t + u > v$$

to maximise v we have only possibility as $p + q + r = 35$, $s + t + u = 33$ and $v = 32$.

Now $s + t + u = 33$, s and t as max as possible and we have to satisfy equation 1 as well so suppose $t = 33$ and s and u become zero.



Number of students in batches till now

$$\text{Foundation} = 33 + 32 = 65$$

$$\text{Pioneer} = 33 + 32 = 65$$

$$\text{Elite} = 32 \text{ only}$$

$$\text{Now we are left with } = 100 - 65 - 65$$

$$= 35 \text{ students}$$

We have to distribute,

$p + q + r = 35$ in such a way that p will be minimum and Foundation > Pioneer > Elite.

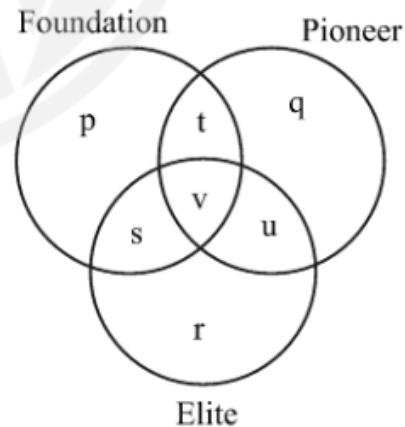
It is possible when $a = 2$, $b = 1$ and $c = 32$

Hence minimum of 2 students are possible who enrolled for the foundation batch only.

2 is the correct answer.

Q30. Text Solution:

Topic: Venn Diagram



From (1) : Foundation > Pioneer > Elite

From (2) : $p + q + r > s + t + u > v$

From (3) : $v \geq 1$

Number of students who enrolled for Foundation only is minimum if s, t, v are maximum.

$$p + q + r > s + t + u > v$$



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Only possible value for v to be maximum is

$$p + q + r = 35$$

$$s + t + u = 33$$

$$v = 32$$

$$\text{Required difference} = 35 - 33 = 2$$

2 will be the correct choice.



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