Set Theory

1) A survey shows that 41%, 35% and 60% of the people watch “A”, “B” and “C” respectively. 27% people watch exactly two of the three movies and 3% watch none. What percentage of people watches all the three movies?

a) 40% b) 6% c) 9% d) 12%

2) In a car agency one day 120 cars were decorated with three different accessories via, power window, AC and music system. 80 cars were decorated with power windows, 84 cars were decorated with AC and 80 cars were decorated with music systems. What is the minimum and maximum no of cars which were decorated with all of three accessories?

a) 10, 61 b) 10, 45 c) 25, 35 d) None of these

3) In a test in which 120 students appeared ,90 passed in History ,65 passed in Sociology and 75 passed in Political science,30 students passed in only one subject and 55 students in only two. 5 students passed no subjects.

1) How many passed in all three?

2) How many passed in at-least two subjects?

4) A group of 100 people play carom, snooker & chess.90 play chess, 80 play carom and 80 play snooker. Find the max. no. of people who play all 3 games, if each person plays at least one game.

a) 80 b) 70 c) 75 d) 65

5) In a society with 200 people, 77 people are dog owners, 80 are cat owners and 73 are bird owners. If 40 people do not have any of these pets, what is the maximum possible number of people who own all three pets?

6) Out of 100 families in the neighbourhood, 50 own radios, 75 have TVs and 25 have VCRs. Only 10 families have all three and each VCR owner also has a TV. If 25 families have radio only, how many have only TV?

a) 30 b) 35 c) 40 d) 45

7) Eighty five children went to an amusement park where they could ride on the merry-go-round, roller coaster and giant wheel. It was known that 20 of them took all three rides and 55 of them took at least 2 of the 3 rides. Each ride costs Rs 1 and total expense is Rs. 145.

a) Then how many children did not try any of the rides?

b) How many took exactly one ride?

8) A survey about preferred TV channels was conducted among a group of 10000 people. The following were the results - 93% liked Sony TV, 89% liked Zee TV, 81% liked Star PLUS, 75% liked Zee Cinema, 78% liked MTV and 100 people did not like any of these five channels. Find the minimum number of people who like all these five channels

a) **1500 b) 1000 c) 2500 d) 2000**

9) Half of a class of 200 students enrolled for exactly one of the three activities swimming, skating and dancing. Total enrolments were 80 in swimming, 75 in skating and 60 in dancing from the class. Number of students who enrolled for skating and swimming only was 10 more than the number of students who enrolled for skating and dancing only.

(i) Find the minimum possible number of students who enrolled for at least one of the three activities.

(a) 142 (b) 143 (c) 144 (d) 141

(ii) Find the maximum possible number of students who enrolled for exactly 2 activities?

(a) 57 (b) 56 (c) 55 (d) 54

10) 450 students participate in a college festival, which has exactly four sports competitions -cricket, football, badminton and hockey. Each student can choose any number of competitions among the four options. Exactly 195,185,180 and 210 students chose cricket, football badminton and hockey respectively. The difference between the number of students who choose exactly three sports and then number of students who chose all four sports is 40. Exactly 60, 30, 40 and 70 students chose only cricket only football, only badminton and only hockey respectively.

(i) What is the total number of students who chose exactly two sports?

(ii) How many students chose all four sports in the college festival?

(iii) The number of students who chose at least three sports sum of what percent of total number of students -

11. In a class of 100 students, each student studies at least one subject. The number of students studying MATHS is 54, Social science is 77, Science is 64 and history is 50.

(i) What is the maximum number of students studying all 4 subjects?

a) 46 b) 48 c) 49 d) 50

(ii) What is the maximum number of students studying only one subject?

a) 48 b) 49 c) 51 d) 52

(iii) What is the minimum number of students studying exactly one of subject?

a) 0 b) 1 c) 2 d) 3

(iv) What is the value of b+5c+d when value of a is minimum,

a=number of students studying exactly one subject;

b=number of students studying exactly 2 subjects;

c=number of students studying exactly 3 subjects;

d=number of students studying exactly 4 subjects

12. There are 4 consulting firms- A, B, C, D which came to recruitment in B-schools. After Interviewing these Students were finally selected or rejected by these firms. 20% of these students were rejected by all 4 firms .A, B, C and D finally selected 230,180,180,220 students respectively. 50 students were selected by each pair of firms and 30 were selected by all 4 firms. No students was selected by 3 of these firms -

(i) What percentage of students who are selected in A do not have offers from any other company?

a) 59.67% b) 60.86% c) 54.23% d) 67.23%

(ii) How many students were rejected by the entire firms?

a) 150 b) 100 c) 120 d) 130

(iii) How many students were selected by only one firm?

a) 600 b) 500 c) 450 d) 420

(iv) What is the difference between the number of students having offer from only B and number of students having offer from only C

a) 30 b) 0 c) 40 d) None of these

13) In a college, each of 200 Students in a class is a member of at least one of the three clubs IE, ISTE, DDFC. 80 students are member of IE, 90 students are members of ISTE and 100 students are members of DDFC
(i) What is the maximum possible number of students who are members of all the three clubs.
a) 45 b) 37 c) 35 d) 50

(ii) If 25 students are members of only IE then the maximum number of persons who are members of all the three clubs
a) 15 b) 20 c) 25 d) 30

(iii) If 130 students belong to either IE or ISTE then at least how many members belong to both IE and ISTE but not DDFC?

14) A survey of 200 people in a community who watched at least one of the three channels BBC, CNN and DD showed that 80% of the people watched DD, 22% watched BBC and 15% watched CNN

(i) Find maximum percentage of people who can watch all the three channels
1)12.5% 2) 8.5% 3)15% 4) CBD

Question (2) if 5% of people watched DD and CNN, 10% watched DD and BBC then what percentage of people watched BBC and CNN only
1)2% 2)5% 3)8.5% 4) CBD

15) In a gathering of some friends it was observed that five of friends don't like to play cards. Five don't want to watch TV and Five Don't Like to listen songs. Among those who like to play cards, only four Like to watch TV. Among those who like to watch TV, only three like to listen songs. Among those who listen songs, only two like to play cards. Only one of the friends likes all the three activities mentioned

(i) What is the total number of friends?
1) 15 2) 14 3) 11 4) CBD

(ii) What is the number of friends who like exactly one of the three activities?
1) 3 2)4 3)5 4) CBD

16) In a class of 107 students, each student plays at least one game among cricket, tennis, football and hockey. The number of students who play cricket is same as the number of students who play football, which in turn is equal to 50, which in turn is one less than the number of students who play tennis which in turn is five less than the number of students who play hockey. The number of students who play both cricket and tennis is 20, which in turn is six less than the number of students who play both cricket and hockey which in turn is three more than the number of students who play tennis and hockey, which in turn is five less than the number of students who play football and hockey, which in turn is seven more than the number of students who play tennis and football, which in turn is three less than the number of students who play cricket and football. The number of students who play cricket, tennis and football is equal to the number of students who play cricket, tennis and hockey, which in turn is two more than the number of students who play tennis, football and hockey which in turn is five less than the number of students who play cricket,football and hockey which is equal to 15. The number of students who play all the four games is 7.

(i) How many Students play Only Cricket?
(ii) How many students play exactly two Sports?
(iii) How many students play hockey and cricket but not football?

17) In a society 60 families read TOI, 70 read HT and 40 read TEL . 10 families read both HT and TEL but not TOI, 18 families read HT and TOI, number of family who read only TOI and TEL but not HT is 10 less than the number of family who read all the three newspapers.

(i) What could be the total number of family in society assuming that each family read at least one newspaper?

a) 114 b) 126 c) 129 d) not

(ii) If number of family who read both TOI and HT but not TEL is more than the number of family who read both TOI and Tel but not HT then what could be then number of family who read only TEL

a) 15 b) 10 c) 16 d) None of these.

18) 3 electives and at least one elective is compulsory to opt. 75% opted for marketing, 62% for finance and 83% for HR. What is the max number of students that can specialize in all three?

19) In a school of 100 students each of them play at least one sport among cricket, football, volleyball, basketball, hockey and tennis. It is known that exactly 90 play cricket, 80 play football, 70 play hockey, 60 play basketball, 40 play volleyball and 10 play tennis.
(i) What is the maximum number of students who play exactly four of the six games?
(ii) What is the maximum number of students who play exactly five of the six games?

20) In a class of 50 students, 25 passed in physics, 27- maths, 29 passed in chemistry, 33 in bio and 35 in geo, what is the max no students passed in at least 3 subjects?

21) In a neighbourhood consisting of 150 people, 66 drink tea, 45 drink coffee and 42 drink ice-tea. 27 people drink exactly 2 of the 3 beverages. 3 people drink all 3 beverages. How many people in the neighbourhood drink none of the three beverages?

22) A survey was conducted on the eating habits of a group of 1000 people .results show that 92% of the people surveyed eat south Indian food, 91% eat north Indian food,82% eat American food , 78% eat Chinese food, 79% eat Italian food and 80% eat continental food. What must be the minimum no. of people who eat all the 6 type of food, if 7 people do not eat any of the 6 types of food?
A) 0 B) 13 C) 27 D) 55

23) Mr. Hemant who is doing a project on racial features, observed that in his class of 130 students, 60 had black eyes, 50 had an aquiline nose, 45 had a broad forehead and 90 had exactly one of the three features.
a) What are max students who had at least two of the three features?
1)26 2) 32 3) 34 4) 38
b) What are the max students who had none of the three features?
1)40 2)32 3)18 4)8

24) Literary critics complain that 80% of all fictional pirate captains have an eye-patch, 75% have a hook-hand, 67% have a peg-leg, and 90% have a pet parrot. By this accounting, at least what percent of these pirate captains must have an eye-patch, a hook-hand, a peg-leg and a parrot?
A) 12% B) 18% C) 26% D) 36%

25) In a group of 100, 50 are having an umbrella, 60 have a hat and 80 have sunglasses. 70 are such that they don't have both umbrellas and hat, 50 do not have both hat and sunglasses and 60 do not have both umbrellas and sunglasses. If there are 5 who do not own any of the three items, find the number of people who own all three items.

26) A survey shows that 63% of the people watch a news channel whereas 76% watch another channel. If x% of the people watch both Channels then
a) x =35 b) x=63 c) 39<=x<=63 d) x=39

27) There are 200 hundred students in a class. Each student is a member of at least one of the clubs-Eagles, Falcons, Tigers and Pythons.
(i) If each club has 100 students, then the number of students who are members of all the four clubs is at the most.
(ii) If each club has 120 students, then the number of students who are members of at the most two clubs is at the least.
(iii) If each club has 140 students, then the number of students who are members of at least three clubs is at least.

28) There is a group of 200 students, where each student studies one or more of the three subjects among Aeronautics, Biotechnology and Cryogenics. The number of students studying cryogenics is more than the number of students studying aeronautics, which, in turn, is more than the number of students studying Biotech, which, in turn is more than the number of students who study exactly two of the three subjects, which in turn, is more than the number of students who study all the three subjects. It is known at least 1 student studies all the three subjects. What is the maximum number of students who study Biotech?
A) 147 B) 148 C) 150 D) None of these

29) In a colony a survey was conducted regarding the ownership of three different type of vehicles-car scooter and bicycle. The number of residents owing all d three vehicle is the same owing none and the number of residents owing any two of the three vehicles is the same as those owing any other two which in turn is the same as those owing none of the three and the number of residents owing scooter alone is the same as those owing cars alone and each in turn is twice those owing bicycles alone and half the number of residents who own a bicycle also own at least one of the other two vehicles
1- If the number of residents who own a bicycle is 150 then what is the total number of resident in the colony?

2-what is the percentage of the residents who own a car also own at least one other vehicle?

3-if 15 residents do not own any of the three vehicles then how many residents are there in the colony?

4- What percentage of the colony owns a scooter or a car but not a bicycle?

Answer Keys

1	6%
2	Max=62, Min=4
3	(i) 30 (ii) 85
4	75
5	35
6	35
7	(i)15 (ii) 15
8	2000
9	(i)142 (ii) 56
10	(i)190 (ii) 10% (iii) 13.33%
11	(i)48 (ii) 51 (iii) 0 (iv) 280
12	(i)60.86 (ii) 150 (iii) 450 (iv) 0
13	(i)35 (ii) 15 (iii) 10
14	(i)8.5% (ii) 2%
15	(i)11 (ii) 3
16	(i)12 (ii)) 37 (iii) 11
17	(i)126 (ii) 16
18	60%
19	(i)83 (ii) 62
20	49
21	5
22	55
23	(i)32 (ii) 18
24	12%
25	10
26	39<=x<=63
27	60,60,80
28	165
29	(i)500 (ii) 15% (iii) 300 (iv) 65%