CATapult Courseware

Module 4
DI-LR

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DI-4.1 | VENN DIAGRAMS

CLASS EXERCISE

1. A survey was taken of 100 employees in a company. Exactly 28 of them had an MBA. The number of women without an MBA was 12 more than the number of men with an MBA. What fraction of the surveyed employees were men?

   1) $\frac{16}{25}$ 2) $\frac{2}{5}$ 3) $\frac{3}{5}$ 4) $\frac{13}{25}$

2. A poll of the superhero preferences of 85 people at the DC panel of Comicon revealed that 40 liked Shazam, 45 liked Wonder Woman and 35 liked Aquaman. Find the minimum and maximum number of people who liked exactly all three superheroes.

   1) Min = 0, Max = 17
   2) Min = 0, Max = 35
   3) Min = 1, Max = 17
   4) Min = 1, Max = 35

3. There are 150 members in a gym, each of whom does at least 1 of aerobics, weights, treadmill and yoga. In all, 120 people do aerobics, 118 do weights, 115 do treadmill and 112 do yoga.

a) What is the maximum number of people who do all 4?

b) What is the minimum number of people who do all 4?

4. Amongst 150 students of a class, 80 students pass in Physics, 70 students pass in Chemistry and 55 students pass in Biology. Amongst these, 50 students pass in Physics and Chemistry, 35 students pass in Chemistry and Biology, while 40 students pass in Physics and Biology.

a) Minimum number of students who pass in all the 3 subjects.

b) Minimum number of students who pass in at least 1 subject.

c) Maximum number of students who pass in all the 3 subjects.

d) Maximum number of students who pass in at least 1 subject.

Answer questions 5 to 8 based on the following information:

The Association of Tennis Professionals has decided to institute a year-end award for the best emerging player on the tour. Accordingly, they have collected data about a hundred players aged between 16 and 20, regarding their participation in the 4 major events of the year (called Grand Slams): the Australian Open (A), the French Open (F), the US open (U) and Wimbledon (W), which took place in the given order (i.e. A, F, U, W). The following information was gathered:

- 45 people participated in A, 42 in F, 48 in U and 41 in W, but only 1 played in all four tournaments.
- 7 people participated in A, F and U, 6 in A, F and W, 7 in A, U and W, and 5 in F, U and W.
- 18 people participated in A and F, 19 in A and U, 15 in A and W, 18 in F and U, 19 in F and W and 21 in U and W

5. How many people played in Wimbledon but not in any of the other 3 Grand slams?

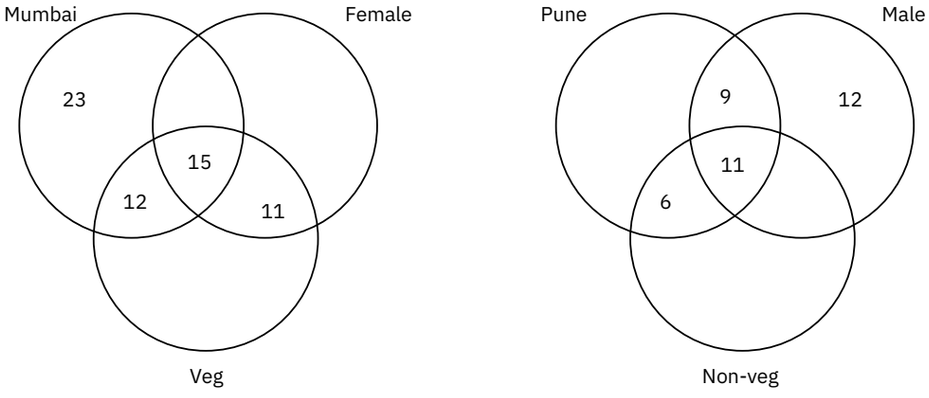
6. How many people did not play in any of the four Grand Slams?

7. How many people played in exactly 2 consecutive Grand Slams?

8. How many players played in at least three consecutive Grand Slams?

Answer questions 9 to 12: based on the following information:

PQR Analytics had organised a picnic at Lonavala last year for the employees of its Mumbai and Pune offices. They collated the data about Location (Mumbai or Pune), Gender (Male or Female) and food preference (Veg or Non-veg) of the 100 employees who attended. The following data (with some values deliberately removed) was then given as an exercise to the new batch of trainees for analysis.



9. The number of female vegetarians from Pune is

10. How many female non-vegetarians were there in total?

11. What is the ratio of the number of females to the number of males?
    1) 1 : 1 2) 13 : 16 3) 9 : 11 4) Cannot be determined

12. The total number of vegetarians, "V", is best described by
    1) $40 \le V < 45$ 2) $45 \le V < 50$ 3) $50 \le V < 55$ 4) $55 \le V < 60$

Challengers

Survey IT conducted a survey of employees with 2-3 years of work experience in the IT industry. Every one of the respondents was proficient in one or more of the languages Python, C++ and Java. The following data was noted:

a) In all there were 80 respondents.

b) 45 respondents were proficient in Python, 42 in C++ and 38 in Java.

c) The average salary of all the respondents was Rs. 9.5 lakhs

d) Fewer than 10 people were proficient in all 3 languages.

e) Among those proficient in exactly two languages, the number proficient in only C++ and Java was 25% less than the number proficient in only Python and C++, which in turn was 50% more than the number proficient in Python and Java.

f) The average salary of the respondents who were proficient in exactly two languages was Rs 10 lakhs while that of those who were proficient in all 3 was Rs 15.75 lakh.

1. How many respondents were proficient in only Python?

2. How many respondents were proficient in Java but not C++?

3. What was the average salary, in Rupees, of the respondents who were proficient in exactly 1 language?

4. If the average salary of the respondents who were proficient in only Python and Java was Rs 9.4 lakhs and that of the respondents who were proficient in only C++ and Java was Rs 9.2 lakhs, what was the average salary, in lakhs of Rupees, of the respondents who were proficient in only Python and C++?

PRACTICE EXERCISE-1

DIRECTIONS for questions 1 to 4: Refer to the data and answer the following questions.

In a class of 120 students, the following information is known:

- 95% of the students like at least one fruit among Apple, Mango and Orange.
- The number of students who like Mango is equal to the number of students who like Orange.
- 20% of the students who like Apple like the other two fruits as well.
- 66.66% of the students who like exactly two fruits like Mango.
- 40% of the students who like Apple like exactly one more fruit.
- The number of students who like Mango is 10 more than the number of students who like Apple.
- The number students who like at least two fruits is equal to the total number of students who like only Apple or only Mango.

1. What percentage of students who like Mango like exactly one more fruit?
   1) 30% 2) 32% 3) 40% 4) 45%

2. What percentage of students who like Apple like Orange but not Mango?
   1) 20% 2) 24% 3) 25% 4) 30%

3. What percentage of students who like Orange like Apple and Mango as well?
   1) 16.67% 2) 21.67% 3) 22.22% 4) 33.33%

4. What percentage of students who like at least one fruit like exactly one fruit?
   1) 50.45% 2) 52.63% 3) 57.89% 4) 59.65%

DIRECTIONS for questions 5 to 8: Refer to the data and answer the following questions.

In 2016, three popular movies (named A, B and C) were released. A survey was conducted among all students of National Institute of Management-Indore (NIM-I) about the movies they have watched. Each student watched at least one movie. Following points are known:

1. For each movie, the number of students who watched only that movie is equal to the number of the students who watched both remaining movies but did not watch that particular movie. For example, the number of students who watched only A is equal to the number of students who watched both B and C (but not A). This is valid for all the three movies.
2. The number of students who have watched only B is $\frac{1}{8}$th the total number of students in (NIM-I).
3. The number of students who have watched only A is $\frac{1}{2}$ times the number of students who have watched only B and $\frac{1}{3}$ times the number of students who have watched only C.
4. The number of students who have watched both A and B is more than the number of students who have watched both A and C by 10.
5. The number of students who have watched both B and C both is less than the number of students who have watched both A and B by 20.
6. In all 40 students have watched all the three movies.

5. How many students watched only one movie?

   1) 50 2) 60 3) 80 4) Cannot be determined

6. How many students watched only two movies?

   1) 50 2) 60
   3) 80 4) Cannot be determined

7. How many students watched both B and C?

   1) 10 2) 40 3) 50 4) Cannot be determined

8. What is the total number of students in NIM-I?

   1) 160 2) 150 3) 180 4) Cannot be determined

DIRECTIONS for questions 9 to 12: Refer to the data and answer the following questions.

In National Institute of Management-Shillong, all students have to specialize in one or two specializations among Finance, Marketing, Operations, HR, Systems and General Management. The following table gives information about the number of students who chose one or two of the 6 specializations. (The six different specializations have been disguised as A, B, C, D, E and F. The numbers along the diagonal 24, 40, 14, 12, 4 and 2 represent the number of students who specialized only in A, B, C, D, E and F respectively. Similarly, 8 represents the number of students who specialized in both A and B.)

	A	B	C	D	E	F
A	24					
B	8	40				
C	20	0	14			
D	0	24	0	12		
E	0	0	0	4	4	
F	0	0	10	0	36	2

Following points are known:

1] The number of students specializing in Finance and Operations both is two times the number of students who are specializing in General Management and HR both, but was one-third the number of students specializing in Operations and HR both.

2] The number of students specializing in Finance and Systems is two times the number of students specializing in Marketing and Systems, but is four less than the number of students specializing in Operations and HR.

9. What is the total number of students in National Institute of Management-Shillong?

10. What is the number of students who are specializing in Finance?

11. What is the absolute value of the difference between the number of students who are specializing in both Finance and Marketing and in both Systems and Operations?

12. What is the absolute value of the difference between the number of students specializing in only Marketing and the number of students specializing in only Operations?

DIRECTIONS for questions 13 to 16: Refer to the data and answer the following questions.

Applicants for the doctoral programmes of Ambi Institute of Engineering (AIE) and Bambi Institute of Engineering (BIE) have to appear for a Common Entrance Test (CET). The test has three sections: Physics (P), Chemistry (C), and Maths (M). Among those appearing for CET, those at or above the 80th percentile in at least two sections, and at or above the 90th percentile overall, are selected for Advanced Entrance Test (AET) conducted by AIE. AET is used by AIE for final selection.

For the 200 candidates who are at or above the 90th percentile overall based on CET, the following are known about their performance in CET:

1. No one is below the 80th percentile in all 3 sections.
2. 150 are at or above the 80th percentile in exactly two sections.
3. The number of candidates at or above the 80th percentile only in P is the same as the number of candidates at or above the 80th percentile only in C. The same is the number of candidates at or above the 80th percentile only in M.
4. Number of candidates below 80th percentile in P: Number of candidates below 80th percentile in C: Number of candidates below 80th percentile in M = 4:2:1.

BIE uses a different process for selection. If any candidate is appearing in the AET by AIE, BIE considers their AET score for final selection provided the candidate is at or above the 80th percentile in P. Any other candidate at or above the 80th percentile in P in CET, but who is not eligible for the AET, is required to appear in a separate test to be conducted by BIE for being considered for final selection. Altogether, there are 400 candidates this year who are at or above the 80th percentile in P.

13. What best can be concluded about the number of candidates sitting for the separate test for BIE who were at or above the 90th percentile overall in CET?

    1) 3 or 10 2) 10 3) 5 4) 7 or 10

    (Past CAT question)

14. If the number of candidates who are at or above the 90th percentile overall and also at or above the 80th percentile in all three sections in CET is actually a multiple of 5, what is the number of candidates who are at or above the 90th percentile overall and at or above the 80th percentile in both P and M in CET?

    (Past CAT question)

15. If the number of candidates who are at or above the 90th percentile overall and also at or above the 80th percentile in all three sections in CET is actually a multiple of 5, then how many candidates were shortlisted for the AET for AIE?

    (Past CAT question)

16. If the number of candidates who are at or above the 90th percentile overall and also are at or above the 80th percentile in P in CET, is more than 100, how many candidates had to sit for the separate test for BIE?

    1) 299 2) 310 3) 321 4) 330

    (Past CAT question)

PRACTICE EXERCISE-2

DIRECTIONS for questions 1 to 4: Refer to the data and answer the following questions.

Polyglot Language Academy is a foreign language training academy based in Mumbai. All the students of this academy study at least of one of the following four languages – French, German, Swedish and Norwegian. In all, 120 members study French and the number of students studying only French, only German, only Swedish and only Norwegian are 23, 14, 21 and 18 respectively. The number of students studying French, German and Swedish is 20. The number of students studying German, Swedish and Norwegian is 26. The number of students studying French, German and Norwegian is 24. The number of students studying French, Swedish and Norwegian is 27. The number of students studying French and German is 50 and the number of students studying Swedish and Norwegian is 55. The numbers of students who study exactly two languages are all equal except for those who study only French and German and only Swedish and Norwegian.

1. What can be the maximum number of students who study only French and Norwegian (but no other language)?

   1) 20 2) 22 3) 24 4) Cannot be determined

2. What can be the maximum number of students who study only Norwegian and Swedish (but no other language)?

   1) 20 2) 22 3) 24 4) Cannot be determined

3. If in all 14 students study only German and Norwegian (but no other language), how many students study French, Swedish and Norwegian but not German?

   1) 16 2) 18 3) 19 4) 21

4. What is the maximum possible number of total students in the academy?

   1) 201 2) 221 3) 240 4) 241

DIRECTIONS for questions 5 to 8: Refer to the data and answer the following questions.

Every year, National Institute of Management-Kozhikode (NIM-K) admits 200 students to their flagship one-year PGDM programme in Management. The institute offers courses in Finance, Marketing and Operations. Students can choose to take courses in only one or any two or all the three of these disciplines depending on their likings. Accordingly, the students may have only one or any two or all the three specializations.

The following points are known about the batches of 2015-16 and 2016-17:

1] The number of students who specialized in only one discipline in 2015-16 was more than the number of students who are specializing in only one discipline in 2016-17 by 20.

2] The number of students who specialized in only two disciplines in 2015-16 was less than the number of students who are specializing in only two disciplines in 2016-17 by 5.

3] The number of students who are specializing in all the three disciplines in 2016-17 is two times the number of students who specialized in all the three disciplines in 2015-16.

4] The number of students who are specializing in only one discipline in 2016-17 is more than the number of students who are specializing in only two disciplines in 2016-17 by 30.

5] The number of students who specialized in Finance in 2015-16 is equal to the number of students who are specializing in Finance in 2016-17 and that number is 115.

6] The number of students who specialized in Marketing in 2015-16 was 80 while the number of students who are specializing in Marketing in 2016-17 is 110.

7] The number of students who specialized in both Finance and Marketing (but not in Operations) in 2015-16 was less than the number of students who specialized in both Marketing and Operations (but not in Finance) in 2015-16 by 5.

8] The number of students who are specializing in both Finance and Marketing (but not in Operations) in 2016-17 is equal to the number of students who are specializing in both Marketing and Operation (but not in Finance) in 2016-17.

5. If the number of students who specialized only in Finance was the highest among the students who specialized in only one discipline in 2015-16, which of the following can be the number of students who specialized in both Marketing and Operations (but not in Finance) in 2015-16?

1) 10 2) 12 3) 8 4) 36

6. What can be the maximum number of students who are specializing only in Finance in 2016-17?

1) 35 2) 55 3) 50 4) 40

7. Each of the following options contains two quantities. In which of the following options can the two quantities be equal?
   1) The number of students who specialized in only Finance in 2015-16; The number of students who specialized in both Finance and Operations (but not in Marketing) in 2015-16.
   2) The number of students who specialized in only Marketing in 2015-16; The number of students who specialized in both Finance and Marketing (but not in Operations) in 2015-16.
   3) The number of students who are specializing only in Finance in 2016-17; The number of students who are specializing only in Operations in 2016-17.
   4) The number of students who are specializing only in Marketing in 2016-17; The number of students who are specializing in both Finance and Operations (but not in Marketing) in 2016-17.

8. If the number of students who are specializing in only Marketing in 2016-17 is equal to the number of students who are specializing only in Operations in 2016-17, what is the number of students who are specializing in both Finance and Operations (but not in Marketing) in 2016-17?

   1) 20 2) 25 3) 30 4) 40

DIRECTIONS for questions 9 to 12: Answer the questions on the basis of the information given below.

In a class of 150 students, students can either choose Electronics or Computer Science or neither (but not both). All students, whether they choose Electronics or Computer Science or neither, have to choose Mathematics. Every student has to choose at least one subject. The sum total of the number of students who choose Electronics and the number of students choosing Computer Science is a multiple of 9.

9. If the number of students who choose only one subject is more than twice the number of students who choose two subjects, then what is the minimum value of the number of students who choose only one subject?

   1) 79 2) 67 3) 105 4) None of these

10. If the number of students who choose only one subject is a multiple of 13, and the number of students who choose Electronics is a non-zero multiple of 8, then what can be the minimum and maximum values of the number of students who choose both Mathematics and Computer Science?

    1) 8 and 64 2) 16 and 76 3) 0 and 72 4) 0 and 64

11. If the number of students who choose only one subject is a multiple of 13 and the number of students who opt for Electronics is 24, what percent of the total students opt for Computer science?

    1) 25% 2) 32% 3) 30% 4) 40%

12. If in the next year, additional 90 students are enrolled and in the combined batch, the number of students who choose only one subject is a multiple of 13, and the number of students who choose Electronics is a non-zero multiple of 8, then what can be the minimum and maximum values of the number of students who choose both Mathematics and Computer Science?

    1) 2 and 160 2) 0 and 64 3) 2 and 154 4) 5 and 37

Direction for question 13 to 16: Answer the following question based on the information given below.

Fun Sports (FS) provides training in three sports – Gilli-danda (G), Kho-Kho (K), and Ludo (L). Currently it has an enrollment of 39 students each of whom is enrolled in at least one of the three sports. The following details are known:

1] The number of students enrolled only in L is double the number of students enrolled in all the three sports.

2] There are a total of 17 students enrolled in G.

3] The number of students enrolled only in G is one less than the number of students enrolled only in L.

4] The number of students enrolled only in K is equal to the number of students who are enrolled in both K and L.

5] The maximum student enrollment is in L.

6] Ten students enrolled in G are also enrolled in at least one more sport.

13. What is the minimum number of students enrolled in both G and L but not in K?

(Past CAT question)

14. If the numbers of students enrolled in K and L are in the ratio 19:22, then what is the number of students enrolled in L?

1) 19 2) 22 3) 17 4) 18

(Past CAT question)

15. Due to academic pressure, students who were enrolled in all three sports were asked to withdraw from one of the three sports. After the withdrawal, the number of students enrolled in G was six less than the number of students enrolled in L, while the number of students enrolled in K went down by one. After the withdrawal, how many students were enrolled in both G and K?

(Past CAT question)

16. Due to academic pressure, students who were enrolled in all three sports were asked to withdraw from one of the three sports. After the withdrawal, the number of students enrolled in G was six less than the number of students enrolled in L, while the number of students enrolled in K went down by one. After the withdrawal, how many students were enrolled in both G and L?

1) 5 2) 6 3) 7 4) 8

(Past CAT question)

DI-4.2 | DATA INTERPRETATION MISC SETS-II

CLASS EXERCISE

DIRECTIONS for questions 1 to 4: Answer the questions on the basis of the information given below.

Mazaksthan is a large country with several political parties. The country is divided into 3000 electoral regions or "seats", and the party holding the maximum number of seats forms the government. In the penultimate elections held there, in 2009, there were 6 contesting parties represented in the table as A, B, C, D, E and F; while in the most recent elections in 2014, there was one additional contesting party, represented as G. The table below shows the movement of seats between parties from the 2009 election to the 2014 one (for example, out of those seats where A had won in 2009, A won again in 2014 in 315 seats, B won in 11 seats, C in 42 seats and so on). A seat which was won by the same party in both elections may be defined as a "stronghold seat" for that party, while a seat which changed allegiance to a different party is defined as a "weathervane seat".

2009 \ 2014	A	B	C	D	E	F	G
A	315	11	42	33	41	33	68
B	48	268	51	19	47	25	68
C	17	22	337	28	18	33	63
D	48	32	38	278	31	23	54
E	7	15	21	33	282	45	78
F	33	41	45	37	31	149	92

1. If the parties are arranged in the ascending order of the seats garnered in 2014, then which of the following is a correct sequence?

   1) B, G, D, E, A 2) C, A, E, D, G 3) E, D, C, B, A 4) F, B, D, G, E

2. Considering the seats won by each party in 2014 as a base, the party with the highest percentage of stronghold seats and the party with the lowest percentage (excluding G) are respectively:

   1) C and B 2) C and F 3) A and F 4) B and F

3. Which party lost the lowest percentage of its 2009 seats to other parties in 2014?

   1) F 2) E 3) B 4) C

4. If the parties are ranked in descending order of total seats won in each election, how many parties retain the same rank in 2014 that they had in 2009?

   1) 0 2) 1 3) 2 4) 3

DIRECTIONS for questions 5 to 7: Refer to the data below and answer the questions that follow.

In a library, on a particular day, the following statistics for 5 different books were noted:
Table–1 shows the number of readers of each of the five books. Table-2 shows the number of persons to read different combinations of the books. The readers have been categorized gender wise. Every visitor reads atleast 1 book and no more than 2 books.

	Book 1	**Book 2**	**Book 3**	**Book 4**	**Book 5**
Male	5	4	11	6	9
Female	9	6	8	12	15

Table 1

	Book 2	Book 3	Book 4	Book 5
Book 1	10	3	0	1
Book 2		0	0	0
Book 3			11	1
Book 4				5

Table 2

Also, it was known that the person who read books 1 and 5 was male.

5. How many readers visited the library?

1) 23 2) 31 3) 85 4) 54

6. How many females read both book 1 and book 3?

1) Three
2) Four
3) Five
4) Cannot be Determined

7. How many males read only book 5?

1) Five
2) Six
3) Seven
4) Cannot be determined

DIRECTIONS for questions 8 to 11: Refer to the data below and answer the questions that follow.

Five cricketers played three matches to qualify for the national side. The minimum runs required to be scored by any batsman to qualify for the national side is 23, 26 and 21 in matches 1, 2 and 3 respectively. Also, according to the rules of the match, a player had to retire in case he scores 100 runs in a match. It was observed that the minimum score of any player in a match is thrice the score needed in that match to qualify for the national side. The highest score of a player in a match is 4 runs more than the lowest score. In each match, the runs scored by different players is different and they are ranked according to their scores, highest scorer ranked 1 and so on. For any player, the rank obtained in any two matches is not the same and the total score is the sum of the runs scored in all the three matches.

8. What is the highest possible total score of a player?
   1) 222 2) 215 3) 300 4) 219

9. What could be the maximum possible difference between the total scores of any two players?
   1) 4 2) 8 3) 6 4) 11

10. What could be the maximum possible total score of a person with the least total score?
    1) 215 2) 216 3) 217 4) None of these

11. If in a revised selection criteria, only the players with a total score of 217 or more will be qualified for the national side, then at most how many players can qualify for the national side?
    1) 1 2) 2 3) 3 4) 4

DIRECTIONS for questions 12 to 15: Refer to the data below and answer the questions that follow:

The Continental Invitational Championships are under way and 20 athletes from 4 countries are vying for the Triathlon competition. Each athlete is given a score out of 10 in the three events and the total score for each athlete is a weighted average of the three individual event scores. Athletes are ranked according to their total score. If two athletes get the same total score, then the one with the higher number of 10s will be ranked higher.
The table below gives the scores (both event-wise and total) of the athletes. Note that a few scores have been intentionally replaced by letters. In the table, the athletes of a given country have been arranged according to their final rank.

Country	Athlete	Event 1	Event 2	Event 3	Total Score
Germany	Otto	10	7	8	8.4
	Manfred	A	10	7	8.2
	Fritz	10	8	3	7.8
	Arnold	5	7	7	6.2
	Siegfried	4	6	5	5
France	Hugo	9	10	9	9.4
	Quentin	9	8	B	8.2
	Kensy	4	9	9	7
	Bernard	6	7	7	6.6
	Noel	3	4	7	4.2
Italy	Leonardo	9	10	10	9.6
	Enrique	9	10	8	9.2
	Grigori	8	8	7	7.8
	Pablo	9	4	7	6.6
	Carlo	C	6	8	D
Spain	Diego	9	8	E	F
	Tomas	10	8	5	8.2
	Rafael	8	7	10	8
	Inigo	6	9	9	7.8
	Juan	4	6	3	4.6

12. Which of the following values is the least?

1) A 2) B 3) C 4) D

13. Which of the following statements is definitely true?

1) The weights for the 1st and 3rd events are the same.
2) The weights for the 1st and 2nd events are the same.
3) The weights for the 2nd and 3rd events are the same.
4) The weights for all the three events are different.

14. Which of the following statements is definitely not true?
    1) The average score of each country's athletes in event 2 is the same.
    2) The overall winner belongs to the country with the highest median total score.
    3) France has the lowest average total score.
    4) The mode of the scores in event 2 is 8.

15. The country with the highest average total score was awarded a trophy. Then:
    1) Italy definitely wins the trophy.
    2) France can win the trophy if Carlo scores a 0 in Event 1.
    3) Spain can win the trophy if Carlo scores a 0 in Event 1.
    4) Germany can win the trophy if Carlo scores a 0 in Event 1.

DIRECTIONS for questions 16 to 19: Refer to the data below and answer the questions that follow:

The company "Star Tech" has been selling accessories (headphones, printers and keyboards) for several years. Since the sales of these items has not been growing, in 2011, the dynamic new CEO decided to diversify into other tech products, beginning with smart phones, and then adding laptops, tablets, pen drives and power banks over the next few years. In 2015, the CEO wishes to get an overview of the business, and to this end he collects data for two-year intervals starting in 2008-2009, as well as a prediction for the coming two-year interval (2016-2017). The table below shows the data at his disposal:

Note: Revenue in any period = (Number of units sold during that period) × (Average price per unit during that period)

	Number of units sold					Average price per unit				
	2009	**2011**	**2013**	**2015**	**2017 (proj)**	**2009**	**2011**	**2013**	**2015**	**2017 (proj)**
Laptops	0	0	250	800	1450	NA	NA	43500	40500	38500
Tablets	0	0	800	1000	1100	NA	NA	16000	16000	15000
Smart phones	0	400	1450	4500	8000	NA	9000	8000	7500	6000
Power banks	0	0	0	500	1500	NA	NA	NA	1600	1500
Pen drives	0	0	3500	8000	10500	NA	NA	850	700	600
Headphones	2000	2500	3500	4000	5000	1200	1250	1100	1100	1200
Printers	3200	3300	3250	3500	3600	5000	5500	5850	5600	6000
Keyboards	8000	8500	10500	9500	9000	300	300	300	300	300

16. The total revenue has increased with every time period till 2017 for every product except:
    1) Smart phones 2) Printers 3) Keyboards 4) Both (2) and (3)

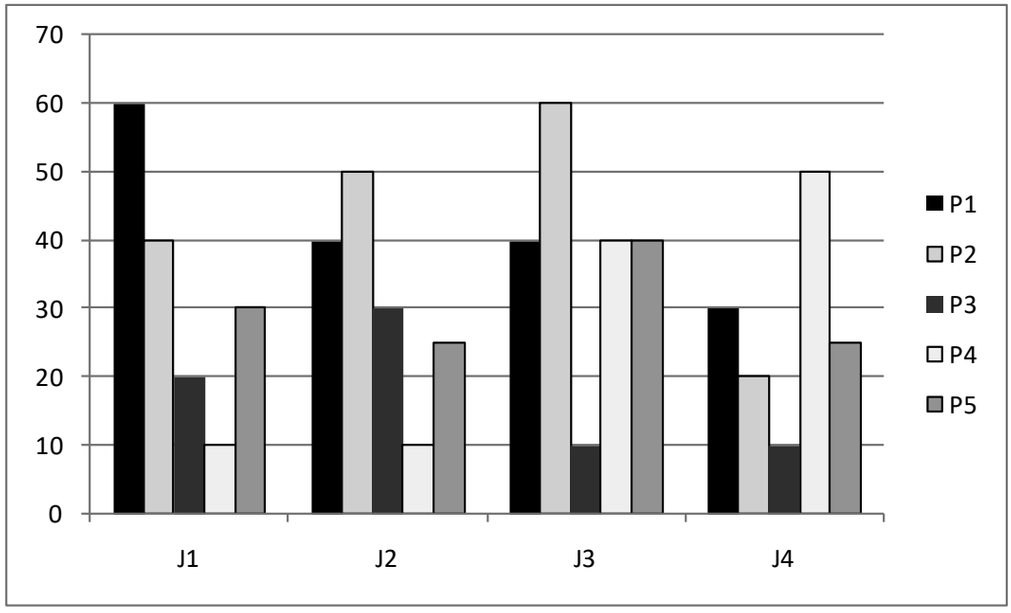
17. By what percent has the total revenue of Star Tech increased in 2013 over 2011?
    1) 53% 2) 92% 3) 134% 4) 228%

18. Over the entire period covered in the table (till 2017), which product has generated the maximum total revenue for Star Tech?
    1) Smart phones 2) Printers 3) Tablets 4) Laptops

19. If the actual total revenue of 2017 increases by roughly the same amount over that of 2015 as the revenue of 2015 increased over that of 2013, then what would be the percentage error in the estimate made in the above table as compared to the actual value?
    1) 23.2% 2) 30.2% 3] 37.5% 4) 44.4%

Challengers

There are four judges J1, J2, J3, J4 who heard 250, 200, 250 and 400 cases respectively. Out of the cases they heard, the verdict were as follows:



P1	The percentage of people who were sentenced "Guilty" by the judge
P2	The percentage of people out of "Guilty", where the defendant challenged the decision in Supreme Court
P3	The percentage of people out of "Not Guilty", where the prosecution challenged the decision in Supreme Court
P4	The percentage of cases out of "Challenged" by defendant and overturned by Supreme Court
P5	The percentage of cases out of "Challenged" by prosecution and overturned by Supreme Court

1. Out of the verdicts pronounced by Judge J3, how many people were finally pronounced guilty?
   1) 82 2) 168 3) 132 4) 118

2. In how many cases was the initial verdict overturned by the Supreme Court?
   1) 74 2) 55 3) 87 4) 104

3. In how many cases was the initial verdict challenged in the Supreme Court?
   1) 335 2) 283 3) 363 4) 208

4. For which of the following judges was the ratio of number of cases challenged to the number of verdicts given the lowest?
   1) J1 2) J2 3) J3 4) J4

PRACTICE EXERCISE-1

DIRECTIONS for questions 1 to 4: Refer to the data and answer the following questions.

Alex Pvt. Ltd, a Bangalore based company has four departments, namely R&D, Marketing, Finance and Engineering. As a part of annual appraisal process, each employee of the company is rated and is given one of the following four grades: A, B, C or D.
Table 1 shows the percent-wise breakup of employees in different departments who got different grades.

	R&D	Marketing	Finance	Engineering
A	$33\frac{1}{3}\%$	10%	40%	40%
B	15%	15%	28%	6%
C	20%	45%	18%	20%
D	$31\frac{2}{3}\%$	30%	14%	34%
Total	100%	100%	100%	100%

Table 2 shows the percent-wise breakup of employees who got different grades in different departments.

	A	B	C	D
R&D	$31\frac{1}{4}\%$	$28\frac{1}{8}\%$	$24\frac{24}{49}\%$	$34\frac{6}{11}\%$
Marketing	$6\frac{1}{4}\%$	$18\frac{3}{4}\%$	$36\frac{36}{49}\%$	$21\frac{9}{11}\%$
Finance	$31\frac{1}{4}\%$	$43\frac{3}{4}\%$	$18\frac{18}{49}\%$	$12\frac{8}{11}\%$
Engineering	$31\frac{1}{4}\%$	$9\frac{3}{8}\%$	$20\frac{20}{49}\%$	$30\frac{10}{11}\%$
Total	100%	100%	100%	100%

1. Out of the employees working in all the four departments of the company, what percentage of employees got 'A' grade?
   1) 24.50%
   2) 32.00%
   3) 16.00%
   4) More information is required to answer this question

2. What is the ratio of total number of employees in Finance department to the total number of employees in departments other than Finance who got 'C' grade?
   1) 2:3
   2) 4:5
   3) 5:4
   4) More information is required to answer this question

3. Which of the following is largest?
   1) Number of employees in R&D department who got 'D' grade
   2) Number of employees in Marketing department who got 'C' grade
   3) Number of employees in Engineering department who got 'D' grade
   4) Number of employees in Finance department who got 'A' grade

4. Which of the following statements cannot be correct?
   1) Total 45 employees in Finance department got 'C' grade
   2) Total 90 employees in Marketing department got 'C' grade
   3) Total 60 employees in R&D department got 'C' grade
   4) Total 75 employees in Engineering department got 'C' grade

DIRECTIONS for questions 5 to 8: Refer to the data and answer the following questions.

Bits & Bytes Computer Education is a computer training institute that offers training for various computer courses. Their courses are divided into different modules, named module A, B, C, D, E, F, G, H, I and J. Some of the modules have some other modules as 'prerequisites' and cannot be completed unless prerequisites have been completed. The list of prerequisites of the modules and the number of days needed to finish the module is as follows:

Module	Prerequisites	Number of days
A	None	3
B	A	5
C	A	4
D	B	6
E	C and D	4
F	E	7
G	B and E	10
H	G	8
I	G and F	3
J	G and E	5

The institute starts offering modules starting with module A on 1st January 2016. The institute offers more than one module simultaneously whenever possible. The new module is started on the next working day immediately after all its prerequisites have been completed. Once all the modules have been offered, one cycle is completed. The institute starts the next cycle after finishing the previous cycle starting on the next working day and offers the modules in the same sequence in every cycle.

The institute is closed for one day after the completion of every even numbered cycle and before the beginning of the odd numbered cycle. That means the institute is closed for one day between 2nd cycle and 3rd cycles, between 4th and 5th cycles, between 6th and 7th cycles and so on and so forth. Except for these days, the institute remains open on all other days.

A student can begin his/her modules in any cycle with module A. Depending on the time available, a student can choose to take multiple modules simultaneously. If enough time is not available, a student can take a few modules in one cycle and the remaining modules in the following cycle(s). A student can take modules in any order provided all the prerequisites of the modules have been completed. Once a student completes all the 10 modules, he/she is said to have completed the course and if conferred a certificate by the institute.

5. If we define a term 'Module days' for each day as the number of modules being offered simultaneously, what is the sum of 'Module days' for each cycle?

   1) 54 2) 55 3) 57 4) 58

6. On which of the following days was the institute closed in the year 2016?

   1) 25th May 2) 24th May 3) 23rd May 4) 22nd May

7. Ajay, a student who started his first module on 1st January 2016, cannot take more than two modules simultaneously because of his busy work schedule. What is the earliest date when he can finish all the modules?

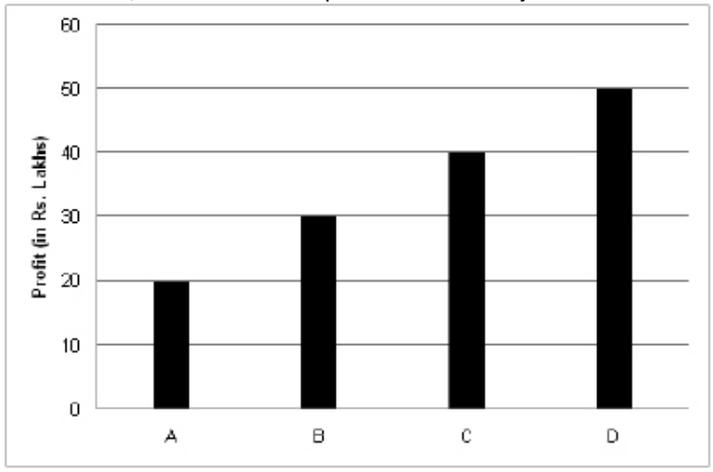
   1) 4th March 2) 7th March 3) 8th March 4) 9th March

8. Shweta, a student who started her first module on 1st January 2016, wanted to finish all the modules in minimum possible time. However she stays far and has to travel long distances everyday. As a result, she could not take more than one module simultaneously. What is the maximum number of modules that she would have completed by 10th March 2016?

   1) 6 2) 7 3) 8 4) 9

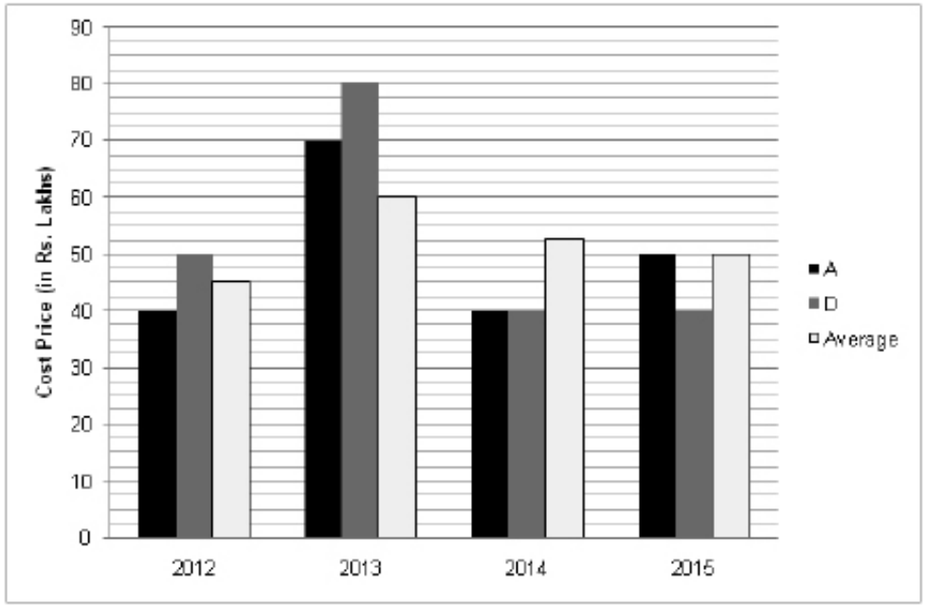
DIRECTIONS for questions 9 to 12: Refer to the data given below and answer the questions that follow:

A trading company trades four products, named A, B, C and D. Graph-1 shows the profit made by the company (in Rs. Lakhs) on these four products in the year 2014.



The absolute value of profit on all the four products shows a peculiar pattern. In all the odd years (for all products), it increases by 20% over its corresponding value in the previous year while in all the even years (for all products), it reduces by 20% over its corresponding value in the previous year.

The following graph shows the Cost Price (in Rs. Lakhs) of products A and D over the years 2012, 2013, 2014 and 2015. The same graph also shows the average Cost Price of the four products. All that is procured in a given year is sold in the same year and as a result there is no inventory in any year.



Profit = Total Sales – Total Cost Price (Profit can be measured for the four products as well as for the company)

9. Which of the following is closest to the average annual Sales of product D over the given four years period?

1) Rs. 61 Lakhs 2) Rs. 72 Lakhs 3) Rs. 109 Lakhs 4) Rs. 89 Lakhs

10. What is the percent change between the sales of product A between 2014 and 2015?

1) Decrease of 36.85% 2) Increase of 23.33%
3) Decrease of 23.33% 4) Increase of 56.17%

11. What is the percent change in the Cost Price of products B and C combined between the years 2013 and 2015?

1) 33.33% 2) 44.44% 3) 0% 4) 22.22%

12. In which year was the ratio of Total Sales of D to Total Sales of A the highest?

1) 2012 2) 2013 3) 2014 4) 2015

DIRECTIONS for questions 13 to 16: Refer to the data and answer the following questions.

Vishwakarma College of Architecture offers a five-year degree course in Architecture. In all, 100 new students are admitted to the first year every year and there are no new admissions to the 2^{nd} to 5^{th} years. The college follows an annual examination pattern and the exams are held in May every year. Each subject in which a student has failed contributes one 'backlog' to him/her.

The college follows the following rules for academic progress of students:

a. A student with zero backlogs is said to have passed the year and unconditionally moves to the next year.

b. A student with one or two backlogs in any of 1^{st} to 4^{th} years is conditionally promoted to the next year. Such a student has to appear for the exams of all backlog subjects next year. Suppose a student named 'Kumar' has got 2 backlogs in the 1^{st} year in 2015-16. He will be promoted to the 2^{nd} year in 2016-17. But he will have to appear for exams of all 2^{nd} year subjects and the backlog subjects of the 1^{st} year in May 2017.

c. A student with more than 2 backlogs in any of 1^{st} to 4th years fails and has to repeat the academic year with the junior batch the next year. Suppose a student gets 3 backlogs in the 2^{nd} year in 2015-16. He will have to repeat the 2^{nd} year with his junior batch in 2016-17.

d. A student who gets any backlog in the 5^{th} year is deemed to have failed the 5^{th} year and has to repeat the 5^{th} year with his/her junior batch the next year.

e. All students who complete the 5^{th} year without any backlog are conferred a degree certificate by the college.

The following points are also known:

1. In 2014-15, the number of students in each year (1^{st} year to 5^{th} year) was 100. Similarly, in 2015-16, the number of students in each year (1^{st} year to 5^{th} year) was 105. The number of students in the 1^{st} to 5^{th} year in 2016-17 were 105, 105, 110, 110 and 105 respectively in that order.
2. All students who got backlogs in 2014-15 were able to clear all those backlogs in 2015-16 and got no further backlogs till they passed the 5^{th} year exams.
3. The students who failed in 2014-15 did not fail again in 2015-16. They were able to clear all the subjects with their junior batch in 2015-16.
4. The number of students who got 1 or 2 backlogs in the 2^{nd} year in 2015-16 was lower than the number of students who got 1 or 2 backlogs in the 1^{st} year in 2014-15 by 5.
5. The number of students who got 1 or 2 backlogs in the 3^{rd} year in 2015-16 was lower than the number of students who got 1 or 2 backlogs in the 2^{nd} year in 2014-15 by 10.
6. The number of students who got 1 or 2 backlogs in the 4^{th} year in 2015-16 was lower than the number of students who got 1 or 2 backlogs in the 3^{rd} year in 2014-15 by 10.
7. No student got any backlog in the years prior to 2014-15.

13. How many students were conferred a degree certificate in 2014-15?

1) 65 2) 75 3) 85 4) 95

14. In all, how many students failed in the 5 years combined in 2015-16?

1) 30 2) 35 3) 50 4) 45

15. What can be the maximum number of students who passed the 3rd year examination in 2014-15 without any backlog?

1) 75 2) 80 3) 85 4) 90

16. If the number of students who passed the 3rd year examination in 2015-16 (i.e. without any backlog and hence unconditonally promoted to 4th year) was 18 times the number of students who were conditionally promoted to the next year (i.e. from 3rd year to 4th year) with up-to 2 backlogs in the 3rd year in 2015-16, how many students passed the 2nd year examination in 2014-15 without any backlog?

1) 65 2) 75 3) 85 4) 95

PRACTICE EXERCISE-2

DIRECTIONS for questions 1 to 4: Refer to the data and answer the following questions.

The sum total of the number of players from India who participated in the previous three Summer Olympic games held at Beijing, London and Rio was 255, out of which 60.39% were males and the remaining 39.61% were females. Out of the total number of male players from India, in all, 20.13% players participated in Beijing Olympics and 38.96% players participated in London Olympics. Out of the total number of female players from India, in all, 23.76% participated in Beijing Olympics and 22.77% participated in London Olympics.

The following table shows the number of male and female players from India who participated in each of the three Olympics in different events as a percentage of the total number of players of that particular gender from India who participated in that particular Olympics. For example, out of all the male players who participated in Beijing Olympics, 12.90% participated in Swimming.

	Beijing Olympics		London Olympics		Rio Olympics	
Event	Male	Female	Male	Female	Male	Female
Athletics	9.68%	54.17%	13.33%	26.09%	26.98%	31.48%
Shooting	22.58%	8.33%	11.67%	17.39%	14.29%	5.56%
Boxing	16.13%	0.00%	11.67%	4.35%	4.76%	0.00%
Swimming	12.90%	0.00%	1.67%	0.00%	1.59%	1.85%
Tennis	6.45%	8.33%	8.33%	8.70%	3.17%	3.70%
Archery	3.23%	12.50%	5.00%	13.04%	1.59%	5.56%

No player participated in more than one event in any Olympics.

1. What is the absolute value of the difference in the number of male players who participated in Athletics in London Olympics and the number of female players who participated in Athletics in Rio Olympics?

   1) 7 2) 8 3) 9 4) 10

2. What is the sum total of the total number of players who participated in the events other than the events mentioned in the table in the three Olympics combined?

   1) 97 2) 102 3) 105 4) 107

3. What is the difference between the number of male players who participated in Rio Olympics and the number of female players who participated in Rio Olympics?

   1) 7 2) 8 3) 9 4) 10

4. For the events mentioned in the table, what is the maximum number of players (men and women combined) who participated in any event in any Olympic?

   1) 32 2) 34 3) 36 4) 38

DIRECTIONS for questions 5 to 8: Refer to the data and answer the following questions.

In the final semester at Mahatma Business Academy, Marketing students are expected to do a live project with a company. Along with that, each student has to select a minimum of 1 and a maximum of 2 electives (to complete the credit requirements) out of the 8 available electives (A, B, C, D, E, F, G and H). Interestingly, it was observed that no two students in the Marketing batch selected the exact same combination of electives. All students in a particular elective will attend the lectures for that elective together. If two students have no elective in common, they will not attend any lectures together. 100% attendance was recorded by all the students during the semester.

5. What could be the maximum number of students in the Marketing batch?

6. If Joffrey selected electives C and G, what could be the maximum number of other students who attend at least one lecture along with him during the semester?

7. If Gregor selected only elective F, what could be the maximum number of students who do not attend any lecture with him during the semester?

8. If each of Petyr and Varys selected elective D along with exactly one other elective, what could be the maximum number of other students whom both Petyr and Varys encounter during classes during the semester?

DIRECTIONS for questions 9 to 13: Refer to the data and answer the following questions.

The following partially-filled table shows the marks scored by 5 students named A, B, C, D and E in five different subjects, namely Physics, Chemistry, Mathematics, Biology and Statistics. The marks scored by all students in all subjects were natural numbers.

	Physics	Chemistry	Mathematics	Biology	Statistics	Total
A		87	72		58	340
B		64		96		354
C						318
D						402
E	67	44				388
Total	338	332	383	398	351	

Additionally, the following points are known:

1] There is exactly one student who scored 99 marks in one subject, which was the highest score among all students in all subjects. There is exactly one student who scored 44 marks in one subject, which was the lowest score among all students in all subjects.

2] C got 3 different perfect square marks in 3 different subjects and equal non-perfect square marks in Mathematics and Statistics.

3] D scored 2 marks more in Chemistry than in Physics and 3 marks more in Mathematics than in Statistics.

4] C's highest score was in Physics.

5] B's highest score was 96 in Biology but D got the highest score in Biology, which was a prime number.

6] Except in Mathematics, all scores of D were prime numbers.

7] B got equal marks in Mathematics and Statistics.

9. How much more did C score in Mathematics than in Biology?
1) 17 2) 13 3) 32 4) Cannot be determined

10. How much did D score in Statistics?
1) 79 2) 73 3) 71 4) Cannot be determined

11. Who scored the maximum marks in Chemistry?
1) A 2) B 3) D 4) Cannot be determined

12. The highest marks scored by any student in any subject were scored in which of the following subjects?
1) Physics 2) Chemistry 3) Mathematics 4) Cannot be determined

13. The difference between B's and D's scores in Statistics is:
1) 10 2) 11 3) 21 4) Cannot be determined

DIRECTIONS for questions 14 to 17: Refer to the data and answer the following questions.

The following table shows the information on the number of students who got a first class in two subjects (Physics and Chemistry) in two years (FY and SY) of B.Sc over four calendar years (2012, 2013, 2014 and 2015) in Imperial College of Science.

	Number of students who got a first class in SY		Number of students who got a first class in FY		Number of students who did not get a first class in any subject in		Total number of students in	
	Physics	Chemistry	Physics	Chemistry	SY	FY	SY	FY
2012	80	60	60	70	30	20	150	140
2013	70	50	50	90	40	30	160	150
2014	90	70	130	90	a	10	180	200
2015	80	50	110	70	30	20	150	160

One entry has been disguised as 'a'. A total of 30 students got a first class in both Physics and Chemistry in SY in 2014.

14. How many students did not get a first class in any of the two subjects in SY in 2014?

15. What is the maximum number of students who got a first class in both subjects in a particular academic year (FY or SY) in a particular calendar year (2012, 2013, 2014 or 2015)?

16. Among the four calendar years, in which year did the maximum number of students get a first class in at least one subject?

17. What is the sum of the number of students who got a first class in FY or SY in at least one subject in the four years combined?

LR-4.1 | LOGICAL REASONING MISC SETS

CLASS EXERCISE

Teaser

Indiana Jones was lost in the jungles of South America, trying to find the legendary city of gold, El Dorado. Suddenly he came to a fork in the road, with a monstrous Sphinx standing guard. Next to the Sphinx was the following sign:

Brave traveller, if you would know the way ahead
You may ask a single question of Sphinx the wise
Ask more, or take the wrong path, and you'll be dead
But be warned! He alternately tells the truth and lies

What question should Indiana ask the Sphinx to find the correct road to El Dorado?

DIRECTIONS for questions 1 to 4: Refer to the data below and answer the questions that follow.

Five students applied for a position of 'research fellow' at the IIT. They were all alumni of the same institute with Grade Point Average (GPA) scores of 2, 3, 4, 5 and 6. Their work experience was 0, 1, 2, 4 and 5 years, not necessarily in the same order.

- Ankit's GPA score was twice that of Shubham but he was not selected.
- The institute did not select the student who had a GPA score half as much as Karan's but work experience twice as much as his.
- Rohit had a work experience of 3 years more than Ninad's but a GPA of 3 less than Ninad's.
- The only one who got selected had the highest total of GPA score + work experience (in years).

1. Who had a GPA score of 6?

   1) Karan 2) Ankit 3) Ninad 4) Cannot be determined

2. Who did not have more than a year of work experience?

   1) Shubham 2) Karan 3) Rohit 4) Ninad

3. What was Karan's total of GPA score + work experience (in yrs)?

   1) 5 2) 6 3) 7 4) 8

4. Who was selected?

   1) Shubham 2) Rohit 3) Ninad 4) Cannot be determined

DIRECTIONS for questions 5 to 8: Refer to the data below and answer the questions that follow.

Five people went to a pizza delivery shop at different times on a Sunday morning. They spent exactly 15 mins, 16 mins, 20 mins, 25 mins and 35 mins (in some order) in the shop. Not more than two people were in the shop at the same time. The following information is known:

- Mr. Nayak entered at 10:47.
- Mr. Shetty and Mr. Nayak were both together in the shop for exactly 8 mins.
- The person who came 44 mins after Mr. Das entered, spent 25 mins in the shop.
- Mr. Kamat complained that he was made to wait too long.
- Mr. Shetty entered 8 mins after Mr. Chitale did and left 23 mins after the latter left.
- The last person left at 11:27.

5. Who spent exactly 25 minutes in the shop?

   1) Mr. Nayak 2) Mr. Shetty 3) Mr. Chitale 4) Mr. Kamat

6. At what time did Mr. Shetty leave?
   1) 10:20 2) 10:37 3) 10:55 4) 11:27

7. For much time was Mr. Kamat alone in the shop?
   1) 8 mins 2) 15 mins 3) 16 mins 4) Cannot be determined

8. What is the difference in the entry times of Mr. Chitale and Mr. Das?
   1) 9 mins 2) 27 mins
   3) 44 mins 4) Cannot be determined

DIRECTIONS for questions 9 to 11: Refer to the data below and answer the questions that follow.

A multiplex has 5 screens screening 5 shows each, one after the other, every day. Currently 5 movies are being shown belonging to 3 different genres – Horror, Action and Comedy. No two consecutive shows on any screen belong to the same genre. No movie is shown simultaneously in any of the screens and no movie is shown more than once on any screen in a day. All the shows start at the same time and assume that all the movies are of equal duration.

Movie	Die Hard	Transformers	Shutter	Exorcist	Hangover
Genre	Action	Action	Horror	Horror	Comedy

The following information on the daily schedule for the current week is known:

	Screen 1	Screen 2	Screen 3	Screen 4	Screen 5
Show 1					
Show 2			Shutter		Hangover
Show 3					
Show 4	Transformers		Die Hard		
Show 5					

9. The movie, screened as the 2nd show on screen 1, belongs to which genre?
   1) Action 2) Horror
   3) Comedy 4) Cannot be determined

10. If 'Hangover' is screened as the 5th show on screen 4, then which movie is screened before 'Hangover' on screen 5?
   1) Exorcist 2) Die Hard
   3) Shutter 4) Cannot be determined

11. If 'Hangover' is screened as the 5th show on screen 2, then which movie is screened first on screen 4?
   1) Exorcist 2) Die Hard
   3) Shutter 4) Cannot be determined

DIRECTIONS for questions 12 to 15: Refer to the data below and answer the questions that follow.

At the annual awards ceremony of the International Cricket Association, the 12 winners are seated in line for a photo in seats numbered 1 to 12 from left to right. The following data is observed:

1] There are 4 cricketers from New Zealand, 3 from India, 2 each from South Africa and England, and 1 from Afghanistan.

2] No two cricketers from the same country are sitting adjacent to one another.

3] Seats 1 to 5 have no two cricketers from the same country.

4] Similarly seats 9 to 12 also have no two cricketers from the same country.

5] The two players from England have 5 other players in between them, one of whom is the player from Afghanistan.

6] All the New Zealanders are sitting in even numbered seats, while all the South Africans are in odd numbered seats.

12. If a cricketer from Afghanistan is in seat number 4, then the cricketer in seat 11 must be from

1) England 2) South Africa 3) India 4) Either (2) or (3)

13. The cricketer in seat 2 must be from

1) Afghanistan
2) New Zealand
3) India
4) New Zealand or India

14. If a cricketer from England is in seat 3, then the nationalities of the cricketers on how many other seats can be uniquely determined?

15. What is the maximum possible difference between the seat numbers of two cricketers of the same nationality?

DIRECTIONS for questions 16 to 18: Refer to the data below and answer the questions that follow.

Ten singers, from five different regions of India, participated in the Sursangeet singing competition. A and B belonged to west region, C and D belonged to North region, E and F belonged to South region, G and H belonged to East and I and J belonged to Central Region. Three rounds were held in this competition. The participant who came in the 1^{st}, $2^{nd,}$ 3^{rd},...,10^{th} place scored 10, 9, 8, ...,1 point respectively. For each of the three rounds, the total points of two participants from each region are given below.

Region	Round 1	Round 2	Round 3
West	7	15	5
North	16	8	18
South	4	3	10
East	17	11	7
Central	11	18	15

No two participants got equal points in a round.

16. Which of the following might be a correct combination of a participant and his rank in round 3?
    1) A-1^{st} 2) C-2^{nd} 3) E-4^{th} 4) G-8^{th}

17. If, in round 1, A ranked higher than E but lower than F, while C ranked higher than I but lower than J, which of the following statements is definitely true?
    1) A ranked 9^{th} in Round 1
    2) C ranked 6^{th} in Round 1
    3) F ranked 7^{th} in Round 1
    4) Both (1) and (3)

18. If no participant ranked at the same position in any of the two rounds, which of the following statements is false?
    1) A ranked 6^{th} in round 1 while E ranked 4^{th} in round 3.
    2) E ranked 10^{th} in round 1 while F ranked 8^{th} in round 3.
    3) C ranked 5^{th} in round 1 while D ranked 3^{rd} in round 3.
    4) F ranked 9^{th} in round 2 while E ranked 8^{th} in round 1.

Challengers

Total 18 students of Saraswati Secondary School with roll numbers 1 to 18 are to be divided into three groups consisting of 6 students each for representing the school in three different competitions, namely Quiz, Singing and Dancing. Each student is a member of only one group.
The following points are known:

1] The sum of the roll numbers of the students in one group is higher than the sum of the roll numbers of the students in one other group by one, which in turn is higher than the sum of the roll numbers of the students in the remaining group by one.

2] Each group consists of exactly two students with roll numbers that are multiples of 3.

3] The group representing the school in Quiz competition has all students with odd roll numbers. The other two groups have at least one student with an odd roll number.

4] The group representing the school in the Singing competition has students with roll numbers 12 and 16.

5] The student with roll number 7 represented the school either in the Singing or in the Dancing competition.

6] The students with roll numbers 1 and 5 are not together in any group.

7] The students with roll numbers 15 and 18 are not together in any group.

8] The sum of the roll numbers of the students in the Dancing group is odd.

1. In how many ways can the three groups be formed?

   1) 2 2) 3 3) 4 4) 5

2. If the student with roll number 18 does not represent the school in the Dancing competition, in how many ways can the three groups be formed?

   1) 0 2) 1 3) 2 4) 3

3. Which of the following roll numbers is definitely a member of the group that represented the school in the Dancing competition?

   1) 2 2) 6 3) 8 4) 10

4. Consider the following statements:

   Statement I: The students with roll numbers 1 and 2 are together in the same group.

   Statement II: The student with roll number 14 is in the Dancing group.

   What can be said about the two statements?

   1) Both statements are definitely correct.
   2) Both statements are definitely incorrect.
   3) Only Statement I is definitely correct.
   4) Only Statement II is definitely correct.

PRACTICE EXERCISE-1

DIRECTIONS for questions 1 to 4: Answer the questions on the basis of the information given below.

Hometowns of five friends named Abhijeet, Ajit, Arijit, Ashutosh and Avijit are five different towns named Agra, Ahmedabad, Ahmednagar, Allahabad and Amritsar (in no particular order).

Each of the five friends is travelling to the hometown of one of the remaining four friends subject to following conditions:

1] Abhijeet is travelling to Avijit's hometown
2] Ashutosh is travelling to Abhijeet's hometown
3] Arijit is travelling to Ajit's hometown
4] Avijit is travelling to Ashutosh's hometown
5] Ajit is travelling to Arijit's hometown
6] Ashutosh is not travelling to Ahmedabad. His hometown is not Allahabad.
7] Neither the hometown nor the destination of Avijit is Ahmednagar.

Data recorded in a computer was corrupted and as a result, neither the hometown nor the destination of any friend was correctly mentioned in the computer data. The corrupted data recorded on the computer is as follows:

Name of the friend	Hometown	Destination
Abhijeet	Ahmednagar	Agra
Ajit	Amritsar	Ahmednagar
Arijit	Agra	Amritsar
Ashutosh	Ahmedabad	Allahabad
Avijit	Allahabad	Ahmedabad

1. Which of the following statements is correct about Allahabad?
   1) It is Arijit's hometown and Ajit's destination
   2) It is Ashutosh's hometown and Abhijeet's destination.
   3) It is Ajit's hometown and Arijit's destination
   4) Nothing can be conclusively said about Allahabad

2. The hometowns and destinations of how many friends can be uniquely determined?
   1) All 5 2) Only 3 3) Only 2 4) Only 1

3. Which two cities are associated with Ajit (his hometown and his destination, in no specific order)?
   1) Agra and Amritsar
   2) Ahmednagar and Allahabad
   3) Agra and Ahmedabad
   4) Amritsar and Allahabad

4. Consider the following two statements:

I : Ashutosh is travelling to Agra

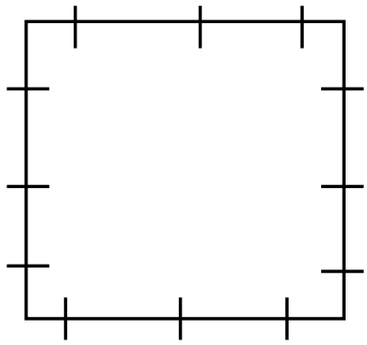
II : Ashutosh's hometown is Amritsar

What can be said about these two statements?

1) Both statements are necessarily correct
2) Statement II is correct only if statement I is correct
3) Statement II is incorrect only if statement I is correct
4) Both statements are necessarily incorrect

DIRECTIONS for questions 5 to 8: Refer to the data and answer the questions that follow.

Arvind, Bijoy, Charu, Dinanath, Ehsaan, Farid, Gaurav, Hari, Isaac, Jayendra, Kisan and Laxman are 12 friends who are seated (all facing inwards) along a square-shaped table having three equidistant chairs along each side, as shown below:



Following points are known:

1] Arvind, Ehsaan, Charu and Jayendra are seated along the four different sides of the table such that the number of friends between Arvind & Ehsaan, Ehsaan & Charu, Charu & Jayendra and Jayendra & Arvind are equal. None of them is occupying the middle seat along any side of the table.

2] Farid and Hari are seated farthest from each other in both clockwise and anticlockwise directions. Similarly, Bijoy and Gaurav are seated farthest from each other in both clockwise and anticlockwise directions.

3] Kisan and Laxman are directly facing each other. Similarly Dinanath and Isaac are directly facing each other.

5. Who among the following cannot be seated next to Arvind (not necessarily along the same side of the table)?

1) Dinanath 2) Farid 3) Hari 4) None of these

6. Which of the following pairs of friends cannot be seated facing each other?

1) Bijoy and Charu
2) Gaurav and Charu
3) Ehsaan and Dinanath
4) Ehsaan and Hari

7. If Kisan is sitting adjacent and to the left of Jayendra, who sits to the immediate right of Gaurav?

1) Kisan
2) Laxman
3) Charu
4) Cannot be determined

8. If Charu, Laxman and Hari are sitting along the same side of the table, who among the following definitely sit along one other side of the table?

1) Arvind, Kisan and Farid
2) Bijoy, Isaac and Ehsaan
3) Jayendra, Dinanath and Gaurav
4) Charu, Laxman and Hari cannot sit along the same side of the table

DIRECTIONS for questions 9 to 12: Refer to the data and answer the following questions.

In this set, all times are reported in 24-hour format. For example, 9 a.m. is written as 0900 hrs; while 2 p.m. is written as 1400 hrs.
Cathay Pacific, Lufthansa, KLM, Delta Airlines, Etihad Airways, Scandinavian Airlines and Qantas are the airlines having daily flights to one out of Hanoi, Panama City, Skopje, Tehran, Nairobi, Yalta and Osaka (not necessarily in that order) from London.
There are four slots of one hour duration each starting from 0900 hrs to 1300 hrs. A slot must have at least one flight, but no slot has more than three flights. Also, the following conditions are known:

1] The flights to Hanoi and Tehran are not in the same slot.
2] Etihad Airways must fly in the same slot as Cathay Pacific or Lufthansa.
3] Qantas must fly in the same slot as the flight going to Panama City.
4] Delta Airlines doesn't fly in the first slot.
5] KLM, in order to reach Tehran on time, has to travel in the slot beginning at 1000 hrs.
6] Cathay Pacific doesn't fly to Nairobi. It doesn't fly in the last slot.
7] KLM and Lufthansa fly in the same slot.
8] The flight to Osaka is the only flight that has no other flights in its slot.

The database of the London airport got destroyed in a fire, and the records of four of the airlines were found in the old archives. All their time slots are wrong and the destinations of only two of them are correct. They are as follows:

Airline	Destination	Slot
Lufthansa	Skopje	1100 hrs
Etihad	Yalta	1000 hrs
Scandinavian	Nairobi	0900 hrs
Delta	Hanoi	1200 hrs

9. If the destinations of the flights are arranged in reverse alphabetical order and they are given ranks accordingly (the first destination is given rank 1 and the last is given rank 7), what will be the rank of the destination of Qantas?

10. Time slots of how many airlines can be uniquely determined?

11. The flight going to Hanoi takes 5 hours to reach Hanoi. It stops at Hanoi for 4 hours and the same flight returns to London. If the time taken for the return journey is also 5 hours, what is the earliest time that the flight can reach back to London?

    Enter the time in the 24-hour format.

12. To go to Singapore, I need to board a flight from Yalta. Considering I have 3-hour transit time at Yalta and the length of the journey of the flight from London to Yalta is 7 hours, at what earliest local time in Yalta can I board the flight to Singapore?

    Note: Transit time is defined as the time spent at the airport between the two connecting flights. Consider local time of Yalta as London time + 2 hours)

DIRECTIONS for questions 13 to 16: Refer to the data and answer the following questions.

A family of 8 members is such that the number of males and females in each generation is the same. The male members are Jeevan, Shekhar, Vishal and Yogi whereas the female members are Janaki, Komal, Kusum and Shanti. They are all seated around a circular table with every member facing inwards. Some more information is known about them.

1] There are no married individuals in the 3rd generation and each married couple has at least one child.
2] Shanti is sitting 3 places to the left of her niece.
3] Janaki is sitting to the immediate right of her son.
4] Vishal is sitting 3 places to the right of his daughter.
5] Jeevan is sitting 3 places to the right of his grandfather.
6] Shekhar is sitting directly opposite his father-in-law.
7] Kusum is sitting directly opposite her grandmother.
8] Exactly one mother-son duo and one married couple are sitting opposite each other.

13. Who is sitting opposite Shanti?
1) Yogi 2) Vishal 3) Komal 4) Jeevan

14. Who is sitting opposite Vishal?
1) Komal 2) Shanti 3) Yogi 4) Shekhar

15. Who is sitting three places to the left of Jeevan?
1) Shekhar 2) Yogi 3) Vishal 4) Either Vishal or Yogi

16. Which of the following statements is true about Shekhar?
1) He is sitting to the immediate right of Vishal.
2) He is sitting 2 places to the left of Kusum.
3) He is sitting 3 places to the right of Komal.
4) He is sitting 4 places to the left of Shanti.

PRACTICE EXERCISE-2

DIRECTIONS for questions 1 to 4: Refer to the data and answer the following questions.

Anthony, Margeaux, Samuel, Dorothy, Ernstmayer and Theodore have gathered in San Diego for a worldwide comic-con. Their nationalities are one out of American, Dutch, Singaporean, Turkish, Malaysian and Estonian. Their occupations are one out of Engineer, Sportsman, Archaeologist, Tarot Reader, Mining Expert and Dermatologist. They live in one out of the following cities - Dresden, Amsterdam, Tijuana, Sao Paulo, Milwaukee and Edinburgh. Their nationalities, occupations and cities of residence may or may not be in the given order. Name, nationality, occupation and city of residence are called as 'entities'. Furthermore, the following information is known:

1] All of them have exactly two entities having the same initials.

2] No two of them have the same two entities with the same initials. For example, if Anthony is American, then no one else would have name & nationality starting with the same initial.

3] The engineer lives in Amsterdam & Ernstmayer lives in Sao Paulo.

4] Margeaux and Anthony arrive together. One of them is a Mining Expert while the other is an engineer. The Mining Expert lives in Dresden.

5] Samuel is Singaporean & Theodore is Estonian. None of them is a Sportsman or a Tarot Reader.

6] Dorothy is neither Dutch nor lives in Edinburgh.

7] The Dermatologist has his nationality and city of residence starting with the same initials.

8] The Archaeologist came to San Diego from Tijuana.

9] Ernstmayer is not Turkish by nationality.

1. What is the nationality of Anthony?

   1) Malaysian 2) Turkish 3) Dutch 4) Cannot be determined

2. If Dorothy wants to travel from her city of residence to Samuel's city of residence, what will be the starting point & destination of her journey?

   1) Milwaukee – Tijuana
   2) Tijuana – Dresden
   3) Milwaukee – Dresden
   4) Milwaukee – Edinburgh

3. For how many individuals can all the four entities be uniquely determined?

   1) 3 2) 2 3) 4 4) 6

4. If the places of residence of the American and the Sportsman are interchanged, what will be the place of residence of Ernstmayer?

   1) Dresden
   2) Edinburgh
   3) Cannot be done as they both are the same person
   4) Cannot be determined

DIRECTIONS for questions 5 to 8: Refer to the data and answer the following questions.

Anil, Bharat, Chandru, Deepak and Eckert are five part-time employees working with Alpha Novatech Pvt. Ltd. The company has a requirement for two assignments on each day of the week (excluding Saturday and Sunday) starting from Monday.
The number of hours taken by Anil, Bharat, Chandru, Deepak and Eckert to finish any assignment is 2, 2, 3, 6 and 3 respectively. Each assignment has a specific requirement of number of minutes within which it needs to be completed. The company assigns two of them on each assignment in such a way that both the assignments on any day are completed without any spare time left (i.e. both the employees working on the assignment do not get any idle time). Both the employees working on the assignment stay only for the time required for completing the two assignments. As soon as the assignment is completed, they leave the company. The same pair of employees works together only once in the given period.

The following points are known:

1] On each day, the second assignment of the day requires longer time to complete than the first assignment.
2] The total time required to complete both the assignments was equal on exactly three days. These days are Tuesday, Thursday and Friday.
3] The total time required to complete both the assignments on Monday and Wednesday is 192 minutes and 180 minutes respectively.
4] Only one employee works on both the assignments on exactly one day. That day is not Tuesday. On all other days, no employee works on both the assignments of the day.
5] Anil does not work on Monday and Eckert does not work on Tuesday and Thursday.
6] Bharat and Chandru don't work together on the same assignment on Thursday.

5. Who worked on the second assignment on Thursday?
1) Anil and Deepak
2) Anil and Chandru
3) Anil and Bharat
4) Bharat and Deepak

6. Who worked on both assignments on the same day?
1) Eckert 2) Deepak 3) Chandru 4) Bharat

7. Who worked on only the 1st assignment on all days when he worked?
1) Bharat 2) Anil 3) Deepak 4) No one

8. On which of the following days did Chandru not work?
1) Tuesday 2) Wednesday 3) Friday 4) Cannot be determined

DIRECTIONS for questions 9 to 13: Refer to the data and answer the following questions.

The finals of the 4 × 100m relay race of Jio Olympics had 4 teams—USA, Uzbekistan, Japan and Jamaica—eyeing for the gold. The race consisted of 4 laps. In each lap, one representative of each country ran with a baton in his hand. The runner in any lap had to carry the baton for the entire lap before passing it to his team member running the next lap. Eventually, the runners in the fourth lap who were the first, second and third to cross the finish line won the gold, silver and bronze medals respectively for their countries. The 16 players who participated in the race were Lewis, Heller, Maxim, Charis, Johannes, Erwin, Kohlberg, Oberlin, Austin, Festus, Nolan, Bailey, Gordon, Dalton, Isner and Planck. The following information is also known.

1] Lewis passed the baton to Bailey.

2] Dalton ran the same lap as Isner and Nolan.

3] The lap in which Bailey ran was immediately before the lap in which Gordon and Festus ran.

4] Kohlberg passed the baton to Maxim, who passed it to the final runner of his team.

5] Oberlin ran the same lap as Johannes and Planck.

6] Charis passed the baton to Dalton who won bronze for Uzbekistan.

7] Bailey, while running for Japan, passed his baton to another person who then passed it to Isner.

8] Austin ran the same lap as Heller and belonged to the same country as Erwin.

9. Who among the following ran in the 2nd lap?

1) Charis 2) Heller 3) Festus 4) Erwin

10. Who among the following did not run the same lap as Charis?

1) Maxim 2) Gordon 3) Festus 4) Austin

11. If Gordon is from Jamaica, who passed the baton to Isner?

1) Charis 2) Gordon 3) Festus 4) Nolan

12. If one of the runners shares the initials of his name with his country's name, who passed the baton to Austin? Use information from the previous question.

1) Oberlin 2) Planck 3) Heller 4) Johannes

13. If Planck is from Uzbekistan, who among the following is not from the USA? Use the information from the previous questions.

1) Oberlin 2) Erwin 3) Kohlberg 4) Nolan

DIRECTIONS for questions 14 to 17: Refer to the data and answer the following questions.

The memorial of the former President of Bungaland in the capital city of Port Arthur is open between 8 AM and 3 PM everyday. Entry and exit gates open after every one hour intervals at 8 AM, 9 AM, 10 AM etc. People can enter/exit the memorial only at those times. At 3 PM, all the persons who are in the memorial have to leave and the memorial is closed till 8 AM the next day.

Three types of people visit the memorial everyday. They are History Students, Government Employees and Journalists. History Students will only stay in the memorial for either 2 or 3 hours, Government employees will only stay in the memorial for either 3 or 4 hours and Journalists will only stay in the memorial for either 1 or 2 hours.

On a particular day, 10 History students, 8 Government Employees and 20 Journalists visited the memorial. The following table shows the partial data on the entry and exit of different types of people on that day at different times.

	Entry			Exit		
	History Students	Government Employees	Journalists	History Students	Government employees	Journalists
8:00 AM			1			
9:00 AM	4					
10:00 AM	0			3		0
11:00 AM		0		0		0
12 noon	1	2				8
1:00 PM			0	2		
2:00 PM			2	0	1	0
3:00 PM					2	

14. What is the total number of visitors of the three types taken together who entered the memorial at 8 AM or 9 AM?

    1) 12 2) 13 3) 14 4) Cannot be determined

15. If the number of Journalists who entered the memorial at 11 AM was equal to the number of Journalists who entered the memorial at 12 noon, which of the following can be the number of Journalists who entered at 10 AM?

    1) 4 2) 5 3) 6 4) 8

16. What is the number of Journalists who left the memorial at 1 PM?

    1) 7 2) 8 3) 9 4) Cannot be determined

17. How many History Students left the memorial at 12 noon?

    1) 2 2) 3 3) 4 4) Cannot be determined

PRACTICE EXERCISE-3

DIRECTIONS for questions 1 to 3: Refer to the data and answer the following questions.

In all, six individuals named A, B, C, D, E and F are standing in a straight line. At least one of them is facing north while at least one of them is facing south. No person faces any direction other than north or south.
The following points are known:

1] In all, 4 persons are standing to the left of A.

2] In all, 3 persons are standing to the left of B.

3] In all, 5 persons are standing to the left of D.

4] In all, 3 persons are standing to the left of E.

5] Only one person is standing to the left of F.

6] Nobody is standing to the left of C.

1. Who among the following are definitely standing next to each other?

   1) B and E 2) A and B 3) A and E 4) A and D

2. Who among the following are definitely facing the same direction?

   1) C and F 2) A and E 3) A and F 4) B and D

3. If B and F are standing facing the same direction, who among the following can be standing to the left of D?

   1) B 2) A 3) C 4) E

DIRECTIONS for questions 4 to 8: Refer to the data and answer the following questions.

Ten persons – A, B, C, D, E, F, G, H, I and J – have been invited to a discussion about a government policy on a particular issue on a TV programme. Five of them are supporting the government stand while the remaining five are opposing the government stand. Out of the ten individuals, four are women, out of which only one is supporting the government stand. The professions of the ten individuals are Banker, Bureaucrat, Consultant, Doctor, Journalist, Marketing Professional, Politician, Professor, Social Worker and Writer, in no specific order. They are the alumni of 10 different leading educational institutes I-1, I-2, ..., I-10.

The following points are known:

1] B and C, both women, are taking different sides in the debate. One of them is a Social Worker.

2] The Marketing Professional and the Writer are taking the same sides in the debate. So are the Politican and the Bureaucrat.

3] The Politician is an alumnus/alumna of institute I-1 while the Marketing Professional is an alumnus/alumna of institute I-8.

4] The Doctor, who is a woman, is an alumna of institute I-6 and she is supporting the government stand.

5] The Professor and the Journalist are taking different sides in the debate.

6] E and J, both men, are opposing the government stand. They are the alumni of institutes I-1 and I-9 respectively.

7] The Banker and the Writer, both men, are supporting the government stand. They are the alumni of institutes I-3 and I-7 respectively.

8] The alumni of both I-4 and I-10 are opposing the government stand.

9] H is a Consultant while F is a Journalist. Both of them are women.

4. The genders of how many individuals can be definitely matched with their names?

5. The institutes of how many individuals can be definitely matched with their names?

6. Consider the following four individuals: A, D, G and I. How many of these individuals are supporting the government stand?

7. Out of the 5 individuals opposing the government stand, the professions of how many individuals can be definitely determined?

8. Out of the Marketing Professional, Professor, Politican and Consultant, how many individuals are opposing the government stand?

DIRECTIONS for questions 9 to 12: Refer to the data and answer the following questions.

Seven friends— A, B, C, D, E, F and G—are sitting in 7 chairs that are arranged from left to right along a straight line. The chairs are aligned such that two people sitting next to each other are either facing each other or facing away from each other or facing the same direction. For any two persons, the person sitting on the chair on the left is said to be sitting to the left of the other person. The following information is known.

1] There are three pairs of friends who are adjacent to each other and are facing each other.

2] B, C and F are facing the same direction.

3] D, E and G are facing the same direction.

4] C, D and F are sitting next to each other such that two of them sitting next to each other are facing each other and two of them sitting next to each other are facing the same direction.

5] There are exactly two persons sitting between B and D (excluding B and D).

9. Which of the following pairs of individuals are definitely not sitting next to each other?

1) C & F 2) A & B 3) B & G 4) B & E

10. Which of the following pairs of individuals are definitely sitting next to each other?

1) A & E 2) C & D 3) A & D 4) A & G

11. If F is sitting to the immediate left of D, who is sitting in the rightmost position?

1) E or G 2) B or G 3) B or E 4) C or E

12. Who is sitting in the centremost position?

1) A 2) B 3) E 4) G

DIRECTIONS for questions 13 to 16: Refer to the data and answer the following questions.

The Director of National Institute of Management-Calcutta has appointed a committee of 10 professors to suggest the changes in the syllabus. The committee comprises 2 professors from the department of Finance (Prof. Awasthi and Prof. Bhalla), 2 professors from the department of Marketing (Prof. Panwar and Prof. Gokhale), 1 professor from the department of Operations (Prof. Chandrachud), 1 professor from the department of Systems (Prof. Subramaniam), 2 professors from the department of HR (Prof. Mukherjee and Prof. Gowda) and 2 professors from the department of Economics (Prof. Shah and Prof. Nayar).

Some professors have taught courses from other departments as well. As a result, they can give views on the courses from their own department as well as the other department whose courses they have taught. Prof. Awasthi can give his views on the courses pertaining to Finance as well as Operations. Similarly, Prof. Mukherjee and Prof. Gowda can give their views on courses from the department of HR as well as Economics. Prof. Chandrachud can give his views on the courses from the department of Operations as well as Systems.

The meetings of the committee will be held in two sessions (morning and afternoon). All professors cannot be free to attend the meetings in both sessions as they have to teach classes.

The following rules apply:

1] Every session should have at least one professor who can give his views on the courses offered by every department (Operations, Finance, Marketing, Systems, Economics and HR).

2] Each professor attends a meeting in at least one session.

3] The professors who can express their views on the courses offered by more than one department attend meetings in both the sessions, but they do not express their views on the courses offered by the same department in both the sessions. Further, such professors express their views on the courses offered by only one department in each session. The professors who can express their views on the courses offered by only one department attend the meeting in only one session.

4] Prof. Panwar cannot attend meetings in the afternoon session.

5] Prof. Awasthi expresses his views on the courses offered by the department of Finance in the morning session.

13. What is the maximum number of professors who can attend the meeting in the morning session?

1) 6 2) 7 3) 8 4) 9

14. If both the sessions require presence of at least two professors who can express their views on the courses offered by the department of Economics, which of the following cannot be a combination of professor and the departments on which he expresses his views for either a morning or an afternoon session?

1) Prof. Mukherjee and Prof. Gowda on HR; Prof. Nayar on Economics
2) Prof. Mukherjee on HR; Prof. Nayar, Prof. Shah and Prof. Gowda on Economics
3) Prof. Gowda on HR; Prof. Nayar, Prof. Shah and Prof. Mukherjee on Economics
4) All of the above

15. Out of Profs. Panwar, Subramaniam, Gokhale and Gowda, how many professors definitely attend morning session?

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

16. Which of the following can be the correct match for the professors and the sessions in which they attend the meetings?

I: Profs. Chandrachud, Awasthi, Panwar, Mukherjee, Shah: Morning
II: Profs. Awasthi, Bhalla, Gokhale, Mukherjee, Shah: Afternoon
III: Profs. Chandrachud, Subramaniam, Gokhale, Gowda, Nayar: Afternoon

1) Only I
2) Only II and III
3) Only I and II
4) All I, II and III