Solutions for Part – A

(DATA INTERPERTATION)

Exercise – 1

Solutions for questions 1 to 5:

Let a, b, c and d be the weightage of parameter F, R, P and I respectively.
Given that
(I) $6a + 4b + 4c + 8d > 8a + 6b + 4c + 4d$
(II) $8a + 6b + 4c + 4d > 8a + 4b + 4c + 4d$ and
(III) $10a + 10b + 8c + 10d > 10a + 10b + 10c + 5d$
From (I) 2d a + b
From (II) b > d and
From (III) d > c
$\Rightarrow$ b > d > c.
'd' cannot be 0.1 or 0.2 (if d is 0.2, 2d cannot be greater than a + b)
$\therefore$ d is 0.3 and b is 0.4
2 (0.3) > a + 0.4
$\therefore$ a = 0.1 and c = 0.2

	F (0.1)	R (0.4)	P (0.2)	I (0.3)	Total
B-school 1	0.4	1.6	1.6	1.8	5.4
B-school 2	1.0	4.0	1.6	3.0	9.6
B-school 3	0.8	2.4	0.8	1.2	5.2
B-school 4	0.6	1.6	0.8	2.4	5.4
B-school 5	1.0	4.0	2.0	2.4	9.4
B-school 6	0.6	0.0	0.8	1.2	2.6
B-school 7	0.8	1.6	0.8	1.8	5.0
B-school 8	1.0	4.0	1.6	2.4	9.0

1. The weight of the parameter placements is 0.2
<div align="right">Choice (B)</div>

2. B-schools 1, 3, 4 and 7 had a composite score between 5.0 and 8.0 (both inclusive) Choice (B)

3. The highest composite score is for B-school 2, i.e., 9.6
<div align="right">Choice (C)</div>

4. Three B-schools, i.e., 2, 5 and 8 received a grade of AAA
<div align="right">Ans: (3)</div>

5. B-school 2, 5 and 8 were awarded a better grade than B-school 1. Ans: (3)

Solutions for questions 6 to 10:

The base exchange rates of currencies P, Q, R with respect to D are in the ratio 1 : 120 : 100.
The given information can be tabulated as follows

	P	Q	R
Base exchange rate	1	120	100
Buying rate	0.95	114	95
Selling rate	1.10	132	110
Net addition	3000	0	800

The outlet received 88,000 units of D by selling R and the ratio of amounts of D used to buy Q and R are in the ratio 3 : 5 and from the sales of Q and R are in the ratio 9 : 5.

The set is a typical example of using the choices to narrow down the possibilities that exist. From the choices for the question that asked for the buying exchange rate of currency P with respect to currency D, we have only two possible values for base exchange rates of P, Q and R i.e., 1,120 and 100 or 2,240 and 200.

Assuming D to be 100 for R, units sold of R = $\frac{88,000}{110}$ = 800.

As there is an increase of 800 units in R, the number of units of currency R bought is 1600. Amount of D used to buy 1600 units of R is 1600 × 0.95 × 100 = 152000.

As the amount of D used by the outlet to buy Q and R are in the ratio 3 : 5, the amount of D used to buy Q is $\frac{152000}{5}$ × 3 = 91,200

Number of units of Q bought = $\frac{91,200}{114}$ = 800

As the net addition of Q during the day is zero, the number of units of Q sold = 800
The amount received by selling Q = 800 × 132 = 105600
As 88,000 : 105600 is not in the ratio of 5 : 9 as given in the data, the base exchange rate of R is not 100 and has to be 200
Units of R sold = $\frac{88000}{220}$ = 400.
As net addition of R is 800, the units of R bought is 400 + 800 = 1200.
Amount of D used in buying 1200 units of R = 1200 × 0.95 × 200 = 228000.
As the amount of D used by the outlet to buy Q and R are in the ratio 3 : 5, the amount of D used to buy Q is $\frac{228000}{5}$ × 3 = 136800.

Number of units of Q bought - $\frac{136800}{228}$ = 600.

As the net addition of Q is zero, the number of units of Q sold = 600.
The amount of D received from selling Q is 600 × 264 = 158400
The amount of D received from selling R = 88,000.

The required ratio = $\frac{158400}{88000} = \frac{9}{5}$

6. The number of units of currency Q the outlet sold on that day is 600. Choice (B)

7. The base exchange rate of currency Q with respect to currency D is 240. Ans: (240)

8. Number of units of R bought = 400 + 800 = 1200
<div align="right">Ans: (1200)</div>

9. The buying exchange rate of currency P with respect to currency D on that day is 1.9 . Choice (C)

10. As the net addition in the number of units of C is 3,000 and the buying and the selling rates are in the ratio 0.95 and 1.1, assuming 'x' units are sold 0.95 (x + 3000) = 1.1x
0.15x = 2850
x = 19,000 Choice (D)

Solutions for questions 11 to 15:

11. The maximum number of patients the clinic can cater to on any single day is $\frac{360}{20} + \frac{360}{30} + \frac{360}{40}$ + 18 + 12 + 9 = 39
<div align="right">Choice (C)</div>

12. The consultation charges earned by the doctors in a day would be
Dr. Shyam – 18 × 200 = 3600
Dr. Anand – 12 × 350 = 4200
Dr. Rahul – 9 × 500 = 4500.
Dr. Rahul would earn the maximum amount in consultation charges. Choice (C)

13. The token movement on Monday, Wednesday and Friday would be as follows.

Monday			Wednesday			Friday		
Time	No.	Room	Time	No.	Room	Time	No.	Room
8.00	1	1	8.00	1	1	8.00	1	1
8.00	2	2	8.00	2	2	8.00	2	2
8.00	3	3	8.00	3	3	8.00	3	3
8.20	4	1	8.20	4	2	8.20	4	3
8.30	5	2	8.30	5	3	8.30	5	1
8.40	6	1	8.40	6	1	8.40	6	2
8.40	7	3	8.40	7	2	8.40	7	3
9.00	8	1	9.00	8	2	9.00	8	1
9.00	9	2	9.00	9	3	9.00	9	3
9.20	10	1	9.20	10	1	9.20	10	2
9.20	11	3	9.20	11	2	9.20	11	3
9.30	12	2	9.30	12	3	9.30	12	1
9.40	13	1	9.40	13	2	9.40	13	3
10.00	14	1	10.00	14	1	10.00	14	1

On Monday, he would see Dr. Shyam and would be at the clinic till 10.20 a.m. On Wednesday, he would see Dr. Rahul and would be at the clinic till 10.40 a.m. and on Friday, he would see Dr. Anand and would be at the clinic till 10.30 a.m. He would be at the clinic for the maximum duration on Wednesday. Choice (B)

14. From the table for Wednesday in the previous question, Dr. Shyam would be in room No: 2 and would see patients with token number 2, 4, 7, 8 and 11. The 12th patient would go to room No: 3 at 9.30. Assume that after the 12th patient, the patients turn up in intervals of 40 mins, starting from 10.00 am i.e., patients turn up at 10.00, 10.40, 11.20, 12.00, 12.40 and 1.20 all of who will see Dr. Rahul. A maximum of 18 patients could have visited the clinic that day. Choice (C)

15. The time for which the doctors are engaged on that day would be as follows.

Dr. Anand (40)	Dr. Shyam (20)	Dr. Rahul (30)
8.00 – 8.40 8.40 – 9.20 9.20 – 9.40	8.00 – 8.20 8.20 – 8.40 8.40 – 9.00 9.00 – 9.20 9.20 – 9.40	8.00 – 8.20 (free 8.20 – 8.50 9.00 – 9.30)

It can be seen that Dr. Anand and Dr. Shyam would be always engaged. So the total duration in minutes when all three doctors are simultaneously free is zero.
Choice (A)

Solutions for questions 16 to 20:

Assume that 100 units were sold in 2018. The revenue and profit of the four brands in 2018 would be as follows:

Brand	Units sold	Revenue	Profit
Aska	40	8,40,000	1,26,000
Beta	25	7,00,000	2,10,000
Cora	15	6,30,000	2,20,500
Dega	20	7,00,000	1,75,000
Total	100	28,70,000	7,31,000

The revenue and profits of the four brands in 2019 would be

Brand	Units sold	Revenue	Profit
Aska	56	11,76,000	1,76,400
Beta	32	8,96,000	2,68,800
Cora	48	10,08,000	1,76,400
Dega	24	8,40,000	2,10,000
Total	160	39,20,000	8,31,000

16. Aska had the highest revenue in 2017. Choice (A)

17. Cora had the highest profit in 2017. Choice (C)

18. Beta had the highest profit in 2018. Choice (B)

19. The total revenue of the four brands grew by $\frac{10,50,00}{28,70,000} \times 100$
= 36.58% Choice (A)

20. The highest percentage increase was for Aska and it is $\frac{50,400}{1,26,000} \times 100 = 40\%$ Choice (D)

Solutions for questions 21 to 25:

Let the weight of the students be a, b, c, d and e such that $a \leq b \leq c \leq d \leq e$.
So we get
a + b + c = 134
a + b + d = 136 and so on till

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c + d + e = 150. Adding all of them
6 (a + b + c + d + e) = 1416
a + b + c + d + e = 236
Adding the lowest and the highest, we get
a + b + 2c + d + e = 284
∴c = 48 kg
Adding a + b + d and c + d + e, we get,
a + b + c + 2d + e = 286
∴d = 50 kg
e = 150 – (50 + 48) = 52 kg
b + d + e (the second highest) = 147
∴ b = 147 – 102 = 45 kg
and a = 41 kg
∴Weights of the five students are 41, 45, 48, 50 and 52 kg.

21. The weight of the lightest student was 41 kg.
Ans: (41)

22. Deepak is 50 kg and Eshan is 45 kg. Balu is 41 kg.
∴Chandra weighed 4 kg more than Amol. Ans: (4)

23. The combined weight = 45 + 48 + 50 = 143 kg
Choice (B)

24. The average weight of all the five students
= $\frac{236}{5}$ = 47.2.
∴Amol weighed 48 kg.
The minimum difference would be when two of them are 52 and 41 and the other two are 50 and 45.
The difference = 95 – 93 = 2 kg Choice (C)

25. The total weight of the five students is 236 kg.
Choice (D)

Exercise – 2

Solutions for questions 1 to 5:

1. To get calls from all colleges, he has to clear the cut off of all colleges and also clear the aggregate cut off (162).
∴ He has to score at least 41 marks in section A, 41 in section B, 42 in section C and 39 in section D.
The minimum aggregate score = 41 + 41 + 42 + 39 = 163.
Ans: (163)

2. If he scores 50, 50, 39 and 50 marks each in sections A, B, C and D, he would miss calls from colleges 2, 3 and 6.
∴ The maximum marks for three calls are 189.

Ans: (189)

3. To get calls from two colleges, she has to score at least 156 marks. If she scores 50, 50, 6 and 50 marks each in section A, B, C and D respectively, she would get calls from colleges 1 and 4.

Ans: (6)

4. If Ramesh scored 50, 50, 39 and 34 marks in sections A, B, C, and D respectively, he would miss calls from all the six colleges.
The marks would be 50 + 50 + 39 + 34 = 173.

Choice (C)

5. Minimum marks of a student who got one call is 151.
Maximum marks for a student with only one call is
50 + 50 + 39 + 36 = 175 marks.
The maximum difference is 175 – 151 = 24 marks.

Choice (D)

Solutions for questions 6 to 10:

Looking at both the tables, we can definitely say that Serena belongs to UK (as both have two silvers) and Anju belongs to India. Similarly, Keshav belongs to Kenya and Antony belongs to Kenya or Canada. John belongs to India or UK and Tony belongs to UK or India. The following is the list of countries and their athletes.

Canada	India	UK	Kenya	Australia
James/Antony	Anju John/Tony	Serena John/Tony	Keshav James/Antony	Martina

6. John can belong to India or UK. Choice (A)

7. Tony can belong to India or UK. Choice (D)

8. Three of the eight medal winners can belong to none of the five countries. Choice (A)

9. Two of the eight medal winners are from Kenya.

Choice (B)

10. Only for four athletes Anju, Serena, Keshna and Martina can the countries be uniquely determined. Choice (B)

Solutions for questions 11 to 15:

As the company started operations in 2011, for solar power generators manufactured in 2011, the company will provide panels free of cost in 2012 and 2013. 70% of the people would takes panels from third party vendors in 2014. The 2014 value is 70% of the sum of total production in 2011, 2012 and the total productions in 2013. In a similar way, we can determine the production in other years.

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Sales	X	Y	1100	800	900	1200	1500	1400	
Company replacement		X	X + Y	0.3X + Y + 1100	360 + 1100 + 800 = 2260	360 + 330 + 800 + 900 = 2390	3030	3900	4460
Third party replacement			0	0.7X	840	1610	2170	2800	2640

As 0.7 (x + y) = 840
X + Y = 1200

As the company replacement of 2017 is $\frac{30}{100}$ (1200 + 1100 + 800) + 900 + 1200 and

company replacement in 2018 is $\frac{30}{100}$ (1200 + 1100 + 800 + 900) + 1200 + 2017 production (X)

= $\frac{30}{100}$ (4000) + 1200 + X = 3900
X = 3900 – 2400 = 1500.
Similarly production in 2018 = 1400.

11. 1200 solar power generators were sold in 2016.

Choice (C)

12. 2300 solar power generators were sold from 2011 to 2013.

Choice (D)

13. In 2015, the company sold or replaced 2260 panels.

Choice (A)

14. 1100 solar power generators were sold in 2013.

Choice (C)

15. The company sold 1400 solar power generators in 2018.

Choice (B)

Solutions for questions 16 to 20:

16. Let the total subscribers in 2014 be 100
The total subscribers in 2019 would be = 305
The subscribers of company P in 2014 = 20

Subscribers of company P in 2019 would be $\frac{15}{100}$ × 305
= 45.75

The percentage increase in subscribers = $\frac{25.75}{20}$ × 100

= 128.75%. Choice (C)

17. Let total subscribers in 2016 be 100
Total subscribers in 2018 would be 156.25

Number of subscribers of R in 2016 = $\frac{15}{100}$ × 100 = 15

Number of subscribers of T in 2018 = $\frac{25}{100}$ × 156.25

= 39.06.
The required ratio = 5 :13. Choice (B)

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18. We need to only check for the last two years as the number of subscribers in continuously increasing. The maximum increase would be for company S in 2019 as its share in the total doubled.　　　　　　　　　　Choice (C)

19. From the first question in the set we can see that over a period of five years, the total number of subscribers increase from 100 to 305. That is 205% increase.
　　　　　　　　　　Choice (B)

20. Company P in 2016, Q in 2014, R in 2019, S in 2018, T in 2017 and U in 2014. All the six companies had a decrease in the number of subscribers at least once.
　　　　　　　　　　Choice (D)

Solutions for questions 21 to 25:

21. The minimum average return is obtained when the company which was expected to give 10% gave double the expected returns and the company that was expected to give 20% gave one and half times the expected returns.

∴ Minimum returns = $\dfrac{30 + 20 + 30 + 40}{4}$

= $\dfrac{120}{4}$ = 30%　　　　　　　Choice (A)

22. UBS could have obtained 35% return in the following cases.
Case (1)　A-40%, B-10%, C-30%, D-60%
Case (2)　A-30%, B-10%, C-60%, D-40%
In the first case company A gave double the expected returns and D gave one and half times the expected returns. In the second case, A gave one and half times the expected returns and C gave double the expected returns.
∴ Only statements II and III are necessary true.
　　　　　　　　　　Choice (B)

23. From a return of 38.75% on an average, the only possible returns from the different companies are
A-20%, B-10%, C-45%, D-80%
∴ Company C belongs to either the oil and gas or the pharma sector and company B did not announce extra-ordinarily good results.
　　　　　　　　　　Choice (C)

24. If company C belonged to the capital goods or the real estate sector and announced extraordinarily good results, it would have given a return of 60%.
∴ The three cases of returns of companies are
Case 1:　A-20%, B-15%, C-60%, D-40% - Total – 33.75%
Case 2:　A-30%, B-10%, C-60%, D-40% - Total – 35%
Case 3:　A-20%, B-10%, C-60%, D-60% - Total – 37.5%
Only statements II and IV are necessarily true.
　　　　　　　　　　Choice (B)

25. The maximum average return is obtained when the company expected to give 40% gave double the expected returns and the company that was expected to give 30% gave one and half times the expected returns.

The required value = $\dfrac{80 + 45 + 20 + 10}{4} = \dfrac{155}{4} = 38.75\%$
　　　　　　　　　　Choice (C)

Exercise – 3

Solutions for questions 1 to 4:

The scores of the five players in different matches can be determined as follows.
Total runs in match I – 220, that in match II – 180 and in match III – 170

Player / Match	Vijay (V)	Pujara (P)	Kohli (K)	Rohit (J)	Rahul (R)
1	14 – 41	48	14 – 41	42	75
2	47	0 – 36	59	38	0 – 36
3	43	47	29	23 – 28	23 – 28

1. The median scores of the given players are
Vijay – 43
Pujara – 47
Kohli 29 – 41
Rohit 38
and
Rahul 23 – 36　　　　　　　　　　Choice (B)

2. The exact median scores of Vijay, Pujara and Rohit can be determined.　　　　　　　　Choice (C)

3. The consistency index of the given players are
Vijay 6 – 33
Pujara 12 – 48
Kohli 30 – 45
Rohit 14 – 19
Rahul 47 – 75
Only Vijay and Rohit had a consistency index definitely less than 40.　　　　　　　　　Choice (A)

4. Only Rahul and Pujara can have the highest value for the consistency index.　　　　　　Choice (B)

Solutions for questions 5 to 9:

5. If no traffic is to flow on the street from D to F, and equal amount of traffic has to flow through junctions C and E, the total cost of travel along junction C and E must be equal and lower than total cost of travel along A – D – F i.e., the toll at E must be less than 12 – 4 – 2 = 6
Among the choices, only if the tolls are 0, 10, 4, 4 the cost of travel along routes A – C – F, A – B – C – F, A – B – E – F and A – D – E – F would be equal and more than that along route A – D – F　　　　　　　　　　Choice (C)

6. If the tolls at C, B, E and D are (0, 10, 6, 2) all motorists travelling from A to F pay the same amount (Fuel costs and toll combined) regardless of the route they chose.
　　　　　　　　　　Choice (B)

7. If the traffic at A gets evenly distributed along streets from A to C, A to B and A to D, the toll to be charged at C, B, E, D is 0, 10, 8, 2　　　　　　　Choice (B)

8. For all routes from A to F to get the same amount of traffic, the total cost along the routes have to be equal which can only be achieved by levying tolls 2, 10, 6 and 4 at junctions C, B, E and D respectively　　　　Choice (D)

9. If not more than 70 percentage of the total traffic is to pass through junction B, there must be one more route along which the total cost of travel is the same. For travel along a junction other than B, the minimum cost is 14 + 2 + 4 = 20. The minimum cost of travel along junction B must also be ₹20.　　　　　　　　　　Choice (C)

Solutions for questions 10 to 13:

10. Selling price/tonne of company B is $225 and that of E is $200
If K tonnes are exported by both the companies, then the total revenue of the companies is.

$\dfrac{255K}{0.08}$ = 3187.5K for company B and

$\dfrac{200K}{0.125}$ = 1600K for company E.

Therefore the total revenue of company B is approximately double that of company E.　　　　Choice (B)

11. In 2012, iron ore exports as a percentage of total revenue of the companies C and M will be 20% and 24% respectively. Let the volume of iron ore exported by both the companies be K tonne.

Selling price /tonne of M = 360 (1.25) = $450

Total revenue for M = $\dfrac{450K}{0.24}$ = 1875K

Therefore total revenue of C = (1875K)2 = 3750K
Thus selling price/tonne for company C = 3750(20%) =$750
Therefore the percentage increase in the selling price for company C = $\dfrac{750-210}{210}\times 100\% \approx 257\%$ Choice (C)

12. From the options we can check that only for companies D and M, the total revenue will be the same. Let us consider that the total volume of iron-ore exports for companies D and M be K tonne.

Total revenue of company D = $\dfrac{240K}{0.04}$ = 6000K.

Total revenue of company M = $\dfrac{360K}{0.06}$ = 6000K.
Choice (D)

13. We need to basically look for companies which are lower in the y-axis and have higher values along the x-axis. Assuming one unit of export for all the companies, we can see that the total revenue would be the highest for companies D and M.   Choice (D)

Solutions for questions 14 to 17:

14. Among those with 1 year experience, all 6 managers have 15 or more points.
Among those with 2 years experience, no one has 15 or more points.
Among those with 3 years experience, at most 2 engineers can have 15 or more (because the 3rd engineer has 12 points) points.
Among those with 4 years experience, at most 4 engineers can have 15 or more points
∴ at most 6 + 0 + 2 + 4 = 12 employees can have a performance appraisal of 15 or more points.   Choice (C)

15. The average appraisal of each group varies within a range, therefore nothing can be uniquely stated without knowing all the values.   Choice (D)

16. The average performance appraisal of engineers with 3 and 4 years experience lies in the range of 11.375 $\left(\dfrac{2(12)+16+4(9)+15}{8}\right)$ to 14.125 $\left(\dfrac{12+2(16)+9+4(15)}{8}\right)$.

Similarly the average performance appraisal of engineers with 3 years and 4 years work experience lies in the range 10.33 to 12.
Max possible difference = 14.125 − 10.33 = 3.79.
Choice (D)

17. The minimum average appraisal score of the managers would be

$$\dfrac{5\times 15+1\times 17+5\times 12+1\times 14+9\times 10+1\times 12+4\times 10+1\times 13}{27}$$

$$=\dfrac{75+17+60+14+90+12+40+13}{27}$$

$$=\dfrac{321}{27}=11.89.$$ Choice (C)

Solutions for questions 18 to 21:

18. Statement I: $\dfrac{2529}{26122}$ is greater than $\dfrac{2204}{23176}$
Hence true
Statement II: $\dfrac{7972}{9294}$ is smaller than $\dfrac{9234}{10379}$
Hence false.   Choice (A)

19. Statement I: success rate of graduates $\left(\dfrac{927+1132}{2204+2529}\right)$ is higher than that of post graduates $\left(\dfrac{741+1520}{2289+3314}\right)$
False
Statement II: $\dfrac{19152}{7972}$ is lower than $\dfrac{23140}{9234}$.
False.   Choice (D)

20. Statement I: (927 + 741) × 0.4 as a percentage of (23176 + 9294) is lower than (1132 + 1520) × 0.3 as a percentage of (26122 + 10379)
False
Statement II: $\dfrac{7271}{19158}$ is lower than $\dfrac{1520}{3314}$.
True.   Choice (B)

21. Statement I: Graduates among candidates forwarded for background check = 927 + 1132 = 2059.
Total number of candidates forwarded for background check = 927 + 741 + 1132 + 1520 = 4320
The required percentage = $\dfrac{2059}{4320}\times 100 = 47.67\%$
Statement I is correct
Statement II: Number of candidates selected for interview = 2204 + 2289 + 2529 + 3314 = 10,336
Number of Candidates who appeared for prelims = 19158 + 7972 + 23140 + 9234 = − 59,504.
The required percentage = 17.37%.
∴ Statement II is false.   Choice (A)

Solutions for questions 22 to 25:

When an employee aged 20 years joins, as the average age of the current employees is much more than 20, the average age of the group will decrease.
Similarly when a 55 years old employee retires, as his age is more than the average age of the group, the average age of the remaining members will drop.
∴ The new employee joined the finance department in 2015, the new employee joined the HR department in 2017, the 55 years old employee retired from the marketing department in 2015 and the new employee joined in 2016 and the new employee joined the operations department in 2015.

22. The total age of all the three persons on April 1 2014 = 44.33 × 3 = 133
The age of Naveen on that day = 47
The age of Deepak on that day = 44
The age of the third person on that day = 42
∴ His age on April 1, 2019 = 47.   Ans: (47)

23. The new employee joined the marketing department in 2016.   Ans: (2016)

24. The new employee joined the operations department on 1st April 2015
∴ His age on 1st April 2017 = 20 + 2 = 22 years.   Choice (D)

25. The average age is $\dfrac{40\times 4+47.5\times 4+40\times 5+39\times 7}{4+4+5+7}$

$=\dfrac{160+190+200+273}{20}=\dfrac{823}{20}=41.15$ Choice (A)

Solutions for questions 1 to 4:

From the given data the following table can be constructed.

Departure Day

Arrival Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat	Total
Sun	a	b	c	d	-	-	-	28
Mon	e	f	g	h	i	-	-	47
Tue	-	j	k	l	m	n	-	40
Wed	-	-	o	p	q	r	s	45
Thu	-	-	-	T	u	v	w	40
Fri	-	-	-	-	x	y	z	35
Sat	-	-	-	-	-	a'	b'	25
Total	37	43	50	45	35	30	20	

1. Given that e = 22
   $\Rightarrow$ a is (37 – 22) = 15
   $\therefore$ b + c + d is (28 – 15) = 13
   $\therefore$ The number of ships that arrived on Sunday and departed after the next Sunday is 13.   Choice (A)

2. From the table,
   d + h + i + l + m + n = 0
   $\Rightarrow$ a + b + c + e + f + g + j + k = 28 + 47 + 40 = 115
   And also a + b + c + e + f + g + j + k + o
   = 37 + 43 + 50 = 130
   $\Rightarrow$ o = 15
   $\therefore$ o is 15.   Choice (B)

3. From the table n + r + s + v + w + y + z + a' + b[1]
   = 30 + 20 = 50
   a' + b' = 25
   n + r + s + v + w + y + z = 25
   As r = 20, the maximum value of y + z = 5
   As, x + y + z = 35, the least possible value of x is 30.   Choice (D)

4. From the table, a + b + e + f + j = 80
   (a + b + e + f) is at most 75.
   $\therefore$ j is at the least 5.   Choice (C)

Solutions for questions 5 to 9:

As D got 24 marks, the only possibility is
$3 \times 2 + 6 \times 3$ (=24)
$\Rightarrow$ 9 correct attempts.
Now as E got 39 marks, the only possibility is
$(7 + 6) \times 3$ (= 39)
$\Rightarrow$ 13 correct attempts.
But given that D and E got the same number of correct attempts in Physics and Chemistry respectively (i.e., 6 correct attempts)
$\Rightarrow$ D has 3 correct attempts in Chemistry and E has 7 correct attempts in Physics.
As F got 51 marks the only possibility is
$9 \times 4 + 5 \times 3$ (= 51)
$\Rightarrow$ F has 14 correct attempts.
But given that B and C has the number of correct attempts in Chemistry as the correct attempts of F in different subjects.
$\Rightarrow$ B and C got 5 and 9 correct attempts in Chemistry respectively
($\because$ total correct attempts of B is 7)
$\Rightarrow$ B and C got 7 – 5 = 2 and 13 – 9 = 4 correct attempts in Physics.
As the total correct attempts of B, C, D and E in Chemistry
= 5 + 9 + 3 + 6 = 23,
F can have atmost 7 correct attempts in Chemistry.
$\Rightarrow$ F has 5 correct attempts in Chemistry and 9 in Physics.
$\Rightarrow$ A has 8 and 2 correct attempts in Physics and Chemistry respectively.

	Physics	Chemistry	Total	Marks
A	8	2	10	36
B	2	5	7	19
C	4	9	13	44
D	6	3	9	24
E	7	6	13	39
F	9	5	14	51
Total	36	30	66	213

5. A scored 36 marks.   Choice (D)

6. D scored the second lowest total marks.   Choice (D)

7. In Physics, only A and F scored more marks than E   Choice (C)

8. A, D, E and F got more marks in Physics than in Chemistry.   Choice (A)

9. Only A and D scored more than B in Physics and less marks in Chemistry when compared to B.   Choice (C)

Solutions for questions 10 to 12:

Value of A is = 28 + 21 + 12 = 61
Value of B is = 13 + 11 + 6 + 20 + 3 + 25 + 21 = 99
Value of C is = 6 + 20 + 14 + 17 + 5 + 19 = 81
Value of D is = 9 + 29 + 17 + 2 + 17 + 30 + 8 + 3 = 117
Value of E is = 17 + 11 + 12 + 9 + 29 + 17 + 14 + 20 + 11= 140
Abhinav's height = 3 x 117 – 3 x 61 = 168
Bindia's height = E ÷ only no. inside the right angled triangle X
The smallest number in the square
Bindia's height = 140 ÷ 5 x 2 = 56
Chetan's height = 20 + 17 = 37
Dravid's height = 21 + 6 + 11 + 20 + 14 + 17 + 9 + 29 + 19 + 30 = 194
Enosh's height = 13 + 11 + 20 + 21 + 25 + 9 + 17 + 29 + 19 + 30 = 194

10. Difference in the heights of Bindia and Abhinav is 168 – 56 = 112.   Choice (B)

11. The tallest person is Enosh.   Choice (C)

12. Suman's height = 20 + 17 = 37
    Dravids height = 146
    $\therefore$ Difference = 146 – 37 = 109.   Choice (D)

Solutions for questions 13 to 16:

13. The cost price per litre of
    Q = 0.3 × 50 + 0.4 × 20 + 0.1 × 40 + 0.2 × 30
    = 15 + 8 + 4 + 6 = ₹33.   Ans: (33)

14. Cost for 20 litres of R
    = 20(0.5 × 50 + 0.1 × 20 + 0.2 × 40 + 0.2 × 30)
    Cost of 30 litres of
    S = 30(0.1 × 50 + 0.2 × 20 + 0.3 × 40 + 0.4 × 30)
    Total cost = 20(25 + 2 + 8 + 6) + 30(5 + 4 + 12 + 12)
    = 20(41) + 30(33) = 820 + 990 = 1810.   Ans: (1810)

15. Cost per litre of
    T = 0.3 × 50 + 0.35 × 20 + 0.25 × 40 + 0.10 × 20
    = 15 + 7 + 10 + 3 = 35
    $\therefore$ Per litre cost = $\dfrac{33 \times 1 + 41 \times 2 + 33 \times 3 + 35 \times 4}{10}$

    = $\dfrac{33 + 82 + 99 + 140}{10}$ = 35.4   Choice (B)

16. The cost per litre of the different solutions are
    Q – ₹33
    R – ₹41
    S – ₹33 and
    T – ₹35
    The difference between the cost per litre of any two solutions is at most ₹8   Choice (C)

Solutions for questions 17 to 20:

17. Dhruv < Satish < Bijay
in each of the option, we have to concentrate on the total marks for individual persons.
Option (1) $(Satish)_{Total} > (Dhruv)_{Total}$
$(Satish)_{Physics} <$ or $> (Dhruv)_{Maths}$ This is not true.
Option (2) $(Bijay)_{chemistry + Biology} > (Satish)_{Physics}$
This is definitely true.   Choice (B)

18. $(Andrique)_{physics} = (Dhruv)_{chemistry}$

$\left(\dfrac{20}{100}\right)(A)_{Total} = \left(\dfrac{30}{100}\right)(D)_{Total} = \dfrac{A_{Total}}{D_{Total}} = \dfrac{3}{2}$ Choice (D)

19. $(D)_{Chemistry} = \left(\dfrac{30}{100}\right) D_{Total}$

$(S)_{Chemistry} = \left(\dfrac{40}{100}\right) S_{Total}$

$3 D_{Total} = (1.5)(4) S_{Total} = 6 S_{Total}$

$(S)_{Physics} = \left(\dfrac{10}{100}\right) S_{Total}$

$(D)_{Physics} = \left(\dfrac{30}{100}\right) D_{Total}$

$\dfrac{(S)_{Physics}}{(D)_{Physics}} = \dfrac{S_{Total}}{3 D_{Total}} = \dfrac{1}{6}$

% less $= \dfrac{500}{6} = 83\dfrac{1}{3}$ %   Choice (D)

20. By observation, Choice (C) is false.

$(Dhruv)_{Physics} = \left(\dfrac{30}{100}\right) D_{Total}$

$(D)_{Chemistry} = \left(\dfrac{30}{100}\right) D_{Total}$ Choice (C)

Solutions for questions 21 to 25:

21. Feroz wrote 16 mock CATs conducted by institute P. Hence the person who wrote more than 30 – 16 = 14 mock CATs conducted by P would have written at least one Mock CAT in common with Feroz.
Similarly, the values for Q, R, S and T are 19, 17, 12 and 16 respectively.
Only Hrithik satisfies the required condition. Choice (B)

22. The value will be the least when maximum number of mock CATs are written by both or none.
Among the tests conducted by P, at least 20 – 12 = 8 tests are written by exactly one of Akshay and Hrithik.
Similarly, the values for Q, R, S and T are 1, 4, 7 and 3 respectively.
∴ Required value = 8 + 1 + 4 + 7 + 3 = 23.   Choice (C)

23. Among the 32 Mock CATs conducted by R, Bobby, Emran and Govinda wrote 16, 18 and 20 i.e., a total of 54 instances. For the number of mock CATs written by more than one of them to be minimum, maximum possible tests are to be written by one or three persons.
If each Mock CAT is assigned one person, 54 – 32 = 22, instances will be left.
Among these 22 instances, 2 instances per Mock CAT be assigned to 11 Mock CATs.   Choice (B)

24. For the value to be maximum, each Mock CAT must be written by one or three persons.
Total instances = 16 + 15 + 12 = 43.
∴ Required value = $\dfrac{43 - 24}{2} = 9$.   Choice (D)

25. A total of 40 Mock CATS were conducted by institute Q.
Among these, Chahat and Govinda wrote at least 33 + 30 – 40 = 23 Mock CATs in common.
As no other person has written more than 23 Mock CATs in common with any person.
Hence it is the highest for Chahat and Govinda.
                                                  Choice (C)

Solutions for questions 1 to 4:

1. Since the maximum quantity of water flowing through a pipe is 1.5 times the total quantity of water entering into each pipe, the maximum quantity of water that can flow through pipe B = 1.5 × 120 = 180.
Quantity of net flow of water flowing through pipe B = 120 + 80 – 40 + 60 + x = 180
⇒ x = 40.   Choice (D)

2. Since point P_1 is closed 80 units of water does not flow into pipe B from pipe A. Similarly no water flows into pipe C from pipe B from Q_2. The quantity of water flowing through C at the point C_1 = 240 + (40 – 50) + (–40) + (50 – 20) + (10 – 10) = 220 units of water per unit of time.   Choice (C)

3. The maximum flow at C_1 = 240 × 15 = 360 units/unit time
∴ The maximum flow between r_3 and r_4 = 360 – (10 – 10) = 360
The maximum flow between r_2 and r_3 = 360 – (50 – 20) = 330
∴ The maximum flow between X and Y can be 330 units per unit of time.   Choice (A)

4. Quantity of water flown through point A_1
= 300 – (80 + 60 + 40 + 20) = 100 units.
Through B_1
= (120 + 80 – 40 + 60 – 40 + 40 – 50 + 20 – 10) = 180
Through C_1
= 240 + 40 – 50 + 40 – 40 + 50 – 20 + 10 – 10 = 260
Through D_1
= 90 + 50 + 40 + 20 + 10 = 210.   Choice (A)

Solutions for questions 5 to 8:

5. All 5 women and 18 men (19 – 1) in manufacturing sector can have salaries not more than ₹10,000.
Using the same logic, 17 – 1 = 16 men in IT and 16 – 1 = 15 women in IT can have a salary of at most 10,000 (10K)
∴ Maximum number = 5 + 18 + 16 + 15 = 54   Ans: (54)

6. In manufacturing, 4 women can have Income of more than 7K. The least salary in men must be for a man in Banking sector i.e., 7K.
Similarly in IT, 16 women can have Income of more than 7K.
∴ All 16 women in IT could satisfy the criteria.
Similarly in Medicine all 18 women could have Income greater than 7K
Among the 14 Banking women, at most 13 women can have salaries greater than 7K.
∴ maximum is 13.
∴ Maximum total = 4 + 16 + 18 + 13 = 51.
                                                  Ans: (51)

7. The minimum number of men with Incomes between 10,000 (10k) and 20,000 (20k) in the different sectors are
Manufacturing – 1
IT – 1
Medicine – 1
Banking – 0
Total – 3   Choice (C)

8. In Banking sector, at most 15 men (excluding one person with income of 7K) and 12 women (excluding one with Income of 5K) could have Incomes greater than that in the medicine sector.
15 + 13 = 28   Choice (D)

Solutions for questions 9 to 11:

9. If we observe the heads which are unique to funds A and B it can be seen than 10% of Fund A is 2% of the total fund while 10% of fund B is 5% of the total fund.
∴ the ratio of the amounts under Funds A and B was 2 : 5.
Now using this value we can find that the ratio of amount under Funds B and C was 5 : 3.
∴ required ratio 2 : 5 : 3.   Choice (D)

10. The ratio of the amounts under Funds are 2 : 5 : 3.
If the assets in equities was ₹47 lakhs, then the total amount under management was ₹2 crores.

∴ The assets under management in Funds A, B and C were respectively ₹40 lakhs, ₹1 crore and ₹60 lakhs.

∴ The amount in bonds in fund A was $\frac{35}{100} \times 40$ lakhs

= 14 lakhs.   Choice (A)

11. The ratio of amounts under fund B and C were 5 : 3.
∴ The ratio of amounts under commodities in fund C and under gold in fund B
= $0.3 \times 3 : 0.15 \times 5 = 0.9 : 0.75 = 6 : 5$ Choice (C)

Solutions for questions 12 to 15:

From the pie chart, the number of passengers who boarded the train at different stations can be found. The total number of passengers travelling in the train between any two stations can also be found once we know the number of passengers who boarded the train and those who got down from the train at different stations.

← boarding
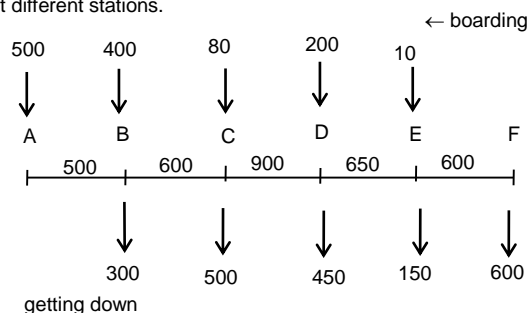
getting down

12. Maximum number of passengers boarded the train at station C. It can be observed that the difference in the number of passengers on board C to D and the number of passengers getting down at d is 900 – 450 = 450, which is the highest among the other such possible differences. Hence it is possible that the maximum possible number of passengers satisfying the requirement may have boarded at C. Maximum number of passengers who boarded the train at C and got down at station F will travel a distance 30 km which is more than 15 km, and these many passengers would satisfy the condition given in the questions. Therefore maximum number of passengers in the group of villagers will be the number of passengers boarded at C and got down at F.

From C to D we have 900 passengers, out of which 800 were from C and 100 were from other stations. Number of passengers got down at D is 450 in which 100 passengers could be those who boarded at other stations (before C) and 350 will be those who boarded at C. So, the number of passengers travelling from D to E who boarded at C is (800 – 350) i.e. 450. At station E, 150 passengers got down, all of who could be from the be 200 passengers who boarded at D.
So a maximum of 450 passengers who boarded at C can get down at F.   Choice (B)

13. Maximum number of passengers who got down at C and travelled not more than 15 km are the passengers boarded at stations A and B.
So, maximum number of passengers boarded at A or B and got down at C = 500.
Maximum number of passengers who boarded at C and travelled not more than 15 km are passengers who got down at stations D and E which is equal to 600.
So, total such passengers = 1100.   Choice (D)

14. If the passengers who boarded the train at A get down at E or F then they travelled at least 30 km similarly, if the passengers boarded at B get down at F then that travelled at least 30 km.
Maximum number of passengers who boarded at either A or B who can travel till E or F is 100. If the passengers boarded

at C get down at F then they travelled at least 30 km. Maximum number of such passengers is 350. So, total passengers satisfying the condition is at most 450.
                                            Choice (D)

15. The line diagram for return journey is as given below.

boarding

Travelling
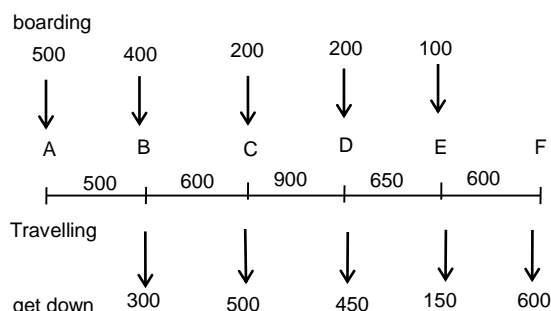
get down

Clearly Choice (A) is true, as number of passengers between any two stations in the evening is same as that in the morning.
Choice (B) is also true.
Choice (C) is true as the number of passengers who boarded at F and get down at C which is 30 km from F is 450. In the morning journey also, this number was 450, therefore this also is a true statement.   Choice (D)

Solutions for questions 16 to 18:

16.

Company	2014	2019	Change
A	27	38	+11
B	46	39	−7
C	50	60	+10
D	74	82	+8
E	110	110	0

                                            Choice (A)

17. A maximum of 50 people would have crossed the age of 50 years between 2014 and 2019.
This implies 60 people must have entered the age group.
                                            Choice (C)

18. Least possible number of employees
= 11 + 10 + 8 = 29.   Choice (B)

Solutions for questions 19 to 21:

19. Total exports of CTI in 2013-14
$\left(\frac{3946}{1 \cdot 8}\right)$ in crores of rupees.

Exports as a percentage of sales in 2013-14 = 61

Sales in 2013-14 = $\frac{100}{61} \times \frac{3946}{1 \cdot 8}$

Raw material cost = $\frac{28}{100} \times \frac{100}{61} \times \frac{3946}{1 \cdot 8} \cong 1006$

                                            Choice (B)

20. $\frac{\text{Exports}}{\text{Sales}} \times \frac{\text{Sales}}{\text{Raw material}}$

$\Rightarrow \frac{\text{Exports}}{\text{Raw material}}$

For Zen Technologies = $\frac{70}{28}$

For Dr. Varma's Labs = $\frac{14}{30}$

For ABD Ltd. = $\frac{20}{32}$

For Global Spinning $\frac{8}{34}$

For Indus shipping = $\frac{47}{6}$ Choice (D)

21. For Radiant Industries let the Imports for the year 2013 - 14 be 100 and 2014 - 15 will be 125.
Imports of capital goods for the year 2013 - 14 and 2014 - 15 will be respectively (5·6 × 100) and (2·1 × 125)
(5·6 × 100) > (2·1 × 125)
For zen technologies (100 × 2·1) < (148 × 3·8) for Dhanam Limited there is no increase.
For Nithyam Computers (100 × 7·8) > (135 × 5·6)
For Indus Shipping (100 × 1·7) < (250 × 4·5)
For C.T.I (100 × 2·4) < (155 × 5·3)
For Dr. Varma's Lab (100 × 4·8) < (124 × 4·3)
For Hindustan Steels (100 × 6·1) < (173 × 3·8)
For ABD Limited (100 × 2·6) < (76 × 7·2)
For Global Spinning (100 × 5·3) < (153 × 6·1)
There are seven such companies.   Choice (C)

Solutions for questions 22 to 25:

22. By observation
only R → U and U → U are possible choices

$$U \to U = \frac{15 \cdot 38 \cdot (males)}{7 \cdot 04\,(females)} \cong 2.2$$

$$R \to U = \frac{27 \cdot 27\,(males)}{11 \cdot 95\,(females)} \cong 2.3$$

∴ Maximum Gender Ratio is R → U.   Choice (A)

23. The ratio of total number of female immigrants to male immigrants is
$\frac{75.11}{24.89} \cong 3$. It is slightly more than 3.
Now the required value is

$$\frac{15.38}{11.95 \times 3} \times 100 = \frac{15.38}{35.85} \times 100 \cong 43\%$$

The value will be slightly less than 43%.   Choice (B)

24. Total male migrants from Urban to Rural areas is
= 7.68% of total male migrants

$$\cong 7.68\% \times \frac{1}{4} \times \text{total migrants}$$

$\cong 1.9\%$ of total migrants.   Choice (A)

25. As the ratio of total male migrants and total female migrants is 1 : 3.
Now total migrants from Rural to Rural areas as a percentage of total migrants from all streams can be found out by using allegations method i.e.,

$$= 76.71 - \frac{(76.71 - 49.67) \times 1}{(1+3)}$$

= 76.71 − 6.76 = 69.95%
As the actual ratio is a bit more than 1 : 3, the value will be slightly more than 69.95%.   Choice (C)

Exercise – 6

Solutions for questions 1 to 5:

The following results and notations will be used in solving the given questions.

$$\text{Revenue (R)} = \frac{\text{Pr of it(P)}}{\text{Pr of it as percentage of revenue (P\%)}}$$

Total Market by Value (MVal) =

$$\frac{\text{Revenue of company (R)}}{\text{Revenue of company as percentage (M\%) of total market (by value)}}$$

$$\text{Total Market by Volume (MVol)} = \frac{\text{Total market by value (MVal)}}{\text{Average selling price of TV's (Av.s)}}$$

1. For the revenue to be maximum Profit must be maximum while Profit as percentage of revenue (P%) must be minimum.
Clearly by observation it is so for the year 1995-96 and the value is $\frac{7}{0.2} = 35$.   Choice (B)

2. For expenses to be minimum the ratio $\frac{P}{P\%} \times (1 - P\%)$ must minimum.

$$\Rightarrow P\left(\frac{1}{P\%} - 1\right) \text{ must be minimum.}$$

⇒ P% must be high and P must be low.
By observation this is true for the year 1998-99.
          Choice (C)

3. The revenue in any year = $\frac{P}{P\%}$

Revenues for the years
90-91   →   ≅ 13.3
91-92   →   ≅ 16.67   ✓
92-93   →   = 15
93-94   →   = 20   ✓
94-95   →   = 23.3
95-96   →   = 35   ✓
96-97   →   = 26.67   ✓
97-98   →   = 16.67   ✓
98-99   →   = 7.5   ✓
99-00   →   = 15   ✓
∴ Seven instances.   Choice (C)

4. For market volume to be the highest the ratio $\frac{P}{P\% \times M\% \times Av.S}$ must be maximum, again by observation we see that it is so for the year 1995-96.

Alternate method:
M% is the least in 1992-93 and almost the least in 1995-96

Revenue of XYZ Ltd in 1992-93 = $\frac{6}{0.4} = 15$

$\Rightarrow$ Total market $\frac{15}{0.1}$ = 150

Revenue of XYZ Ltd in 1995-96 = $\frac{7}{0.2} = 35$

$\Rightarrow$ Total market $\frac{35}{0.2}$ = 175

∴ Mvol. in 1992-93 = $\frac{150 \times 100 \text{ crores}}{12000}$

Mvol. in 1995-96 = $\frac{175 \times 100 \text{ crores}}{9000}$

          Choice (B)

5. For total market value to be lowest the ratio $\frac{P}{P\% \times M}$ must be lowest. This is so for the year 1998-99.
          Choice (C)

Solutions for questions 6 to 9:

6. Average selling price (S) = (1 + profit margin) x Average cost price (C)
Given that average cost price increased by 20% every year.
Let C in 2014 = 100
⇒ S in 2014 = 1.27 x 100 = 127
S in 2015 = 1.3 x 120 = 156
S in 2016 = 1.24 x 144 ≅ 179
S in every other year will be more than that in 2016. Hence S is lowest in the year 2014.   Choice (A)

7. The ratio $\dfrac{\text{Exports}}{\text{Demand}}$ cannot be determined independent of the ratio $\dfrac{\text{Im ports}}{\text{Supply}}$.

Therefore in 2016, we can find $\dfrac{\text{Supply}}{\text{Demand}} \times \dfrac{\text{Exports}}{\text{Im ports}}$ as

$\dfrac{0.72}{0.9}$. But we cannot find only $\dfrac{\text{Exports}}{\text{Demand}}$.

Hence the question cannot be answered.　　　Choice (D)

8. Given that the value of widgets imported in 2017 = ₹200 crore
= Average import price per widget x Volume of Imports
= Average cost price per widget x Volume of imports
Now, Value of widgets exported = Average selling price per widget × Volume of exports.

Hence $\dfrac{\text{Average cost price x Volume of Im ports}}{\text{Average selling price x Volume of Exports}}$

$= \dfrac{1}{(1 + 0.3)} \times \dfrac{1}{0.5}$

$\Rightarrow$ Value of exports = $0.65 \times 200 = $ ₹130 crore.

Choice (C)

9. Since the imports increased by a steady (i.e., equal) percentage every year, to find the year in which the exports increased by the highest percentage we need to only consider the EXIM ratios. By observation, it is highest from 2017 to 2018.　　　Choice (B)

Solutions for questions 10 to 12:

Stages	Total	A_1	A_2	A_3	A_4	A_5	A_6
S_1	10,000	2000	2500	1000	1500	800	2200
S_2	8,000	1600	1600	800	1440	800	1760
S_3	4000	600	1000	600	800	400	600
S_4	2000	300	400	300	440	240	320
S_5	1000	150	210	160	230	130	120
S_6	100	20	20	20	15	2	3

10. By counting, the number of instances = 16　　Choice (D)

11. Rock Round – S_3
Ghazal Round – S_4
In age group A_2,
S_3 = 1000
S_4 = 400
So, the number of persons qualifying for the rock round was more than that for the Ghazal round by 150 %, which is maximum in A_2.　　　Choice (B)

12. By observation, in age group A_5 for stage S_2.
　　　Choice (B)

Solutions for questions 13 to 17:

Let the total runs scored by Gaurav, Sheru, Tenchin and Drahul in their first five matches be G, S, T and D respectively.

From (1), $\dfrac{18}{100} G \le \dfrac{15}{100} D$

$\Rightarrow \dfrac{D}{G} \ge \dfrac{6}{5}$ 　　→　(1)

From (2), $\dfrac{21}{100} T \ge \dfrac{24}{100} S \Rightarrow \dfrac{T}{S} \ge \dfrac{8}{7}$ 　　→　(2)

From (3), $\dfrac{7}{100} T \le \dfrac{1}{2} \dfrac{12}{100} G$

$\Rightarrow \dfrac{G}{T} \ge \dfrac{7}{6}$ 　　→　(3)

13. $\dfrac{23}{100} D \ge \dfrac{23}{100} \dfrac{6}{5} G \ge \dfrac{27.6}{100} G$
But Gaurav scored only 25% of the total runs in his fourth match. Hence Drahul scored more than Gaurav in the fourth match. Similarly, Drahul scored more than Sheru and Tenchin and hence is the highest scorer.　　　Choice (D)

14. Given $\dfrac{18}{100} D = 126$

$\Rightarrow D = 700$

$\dfrac{D}{T} = \dfrac{D}{G} \cdot \dfrac{G}{T} \ge \dfrac{6}{5} \dfrac{7}{6}$

$\Rightarrow T \le \dfrac{5}{7} D$

$\Rightarrow T \le 500$.　　　Choice (D)

15. Required ratio $= \dfrac{\dfrac{18}{100} G}{\dfrac{24}{100} S}$

$= \dfrac{3G}{4S} = \dfrac{3}{4} \dfrac{G}{T} \dfrac{T}{S} \ge 1$

The ratio is at least 1.　　　Choice (B)

16. For Drahul the highest score in any match is $\dfrac{23}{100} D$

$\ge \dfrac{23}{100} \dfrac{6}{5} G$
(i.e., 27.6%)

$\ge \dfrac{23}{100} \dfrac{7}{5} T$
(i.e., 32.2%)

$\ge \dfrac{23}{100} \dfrac{8}{5} S$
(i.e., 36.8%)
But none of G, T and S had more than these percentages as scores in any match.
∴ Drahul scored the highest.　　　Choice (D)

17. Given S = 1000

$\Rightarrow D \ge \dfrac{8}{5} (1000)$

$\Rightarrow D \ge 1600$
In his second match, Drahul scored 15% of the total score.

$\therefore \dfrac{15}{100} D \ge \dfrac{15}{100} 1600$

$\Rightarrow$ His score in his second match is at least 240.
　　　Choice (B)

Solutions for questions 18 to 22:

As given that no two persons gave equal number of true replies, the number of true replies are 0, 1, 2, 3, 4 and 6 (as if five replies are correct the sixth reply also has to be correct).
If all the replies of Aman are correct, then Biswa and Dev will have equal number of correct replies i.e., 1 each.
Similarly if all the replies of Biswa are correct, then Aman and Charan will have 1 each as correct replies.
If all the replies of Charan are correct, then Biswa and Dev will have 1 each as correct replies.
Similarly Dev and Fazal also cannot have all the replies correct.
∴If all the replies of Emma are correct, then
Aman – 4
Biswa – 0
Charan – 3
Dev – 2
Emma – 6
Fazal – 1

∴The persons and the city pairs are as follows :
Emma – Bangalore; Charan – Hyderabad, Biswa – Chennai;
Aman – Kolkata, Dev – Delhi; Fazal – Mumbai

18. Choice (A)

19. Choice (C)

20. Ans: (5)

21. Only Emma gave her city name correctly.
Ans: (1)

22. Charan and Fazal gave 3 and 1 correct replies.
∴ difference = 2. Ans: (2)

Solutions for questions 23 to 25:

23. The rank of persons having IQ more than or equal to 130 is 1 to 36.
The rank of persons having PQ less than 210 is 29 to 100.
Required number of persons = (36 − 29) + 1
= 7 + 1 = 8 Choice (B)

24. The rank of persons having IQ more than or equal to 110 is 1 to 66.
The rank of persons having PQ less than 200 is 33 to 100.
The rank of persons having WQ more than or equal to 180 is 1 to 38.
Required number of persons = (38 − 33) + 1 = 6
Choice (A)

25. Consider IQ level of 70. The rank of persons in this group is 1 to 98. Consider PQ level of 180. The rank of persons is 49 to 100.
Required number of persons = (98 − 49) + 1 = 50
Hence all the groups which having PQ more than or equal to 180 i.e., 5 groups satisfy for 1Q = 70. Similarly, for 1Q = 80, 90, 100, the number of possible pairs for PQ are 3, 3 and 1 respectively.
∴ Total possible pairs = 12
Choice (D)

Solutions for questions 6 to 9:

As C is the southernmost city, and as the cities are in a straight line, we have to find the distance of each city from C.

The corresponding distances are F – C = 65, G – C = 120, H – C = 405, I – C = 195, J – C = 290
To find the distance of cities A, B, D and E from C,
A – C
A – F = 160 and C – F = 65
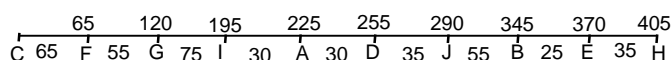A – G = 105 and C – G = 120
A – C = 160 − 65 = 95 or 160 + 65 = 225
and 120 − 105 = 15 or 120 + 105 = 225
As the common value is 225, the distance between A – C is 225
Similarly we can find the other values as B – C = 345, C – D = 255 and C – E = 370

The ten cities according to their distance from C as

6. The distance between G and I is 75 kms   Choice (C)

7. As C is the southernmost city and the cities are in a straight line the city farthest from C would be the northernmost city, i.e. H   Choice (D)

8. As he starts his journey from G, the shortest distance would be when he travels to C first and then travels northwards upto H, i.e. 405 + 120 = 525 kms   Choice (B)

Exercise – 7

Solutions for questions 1 to 5:

1. As there were 28% students from the East zone and as no college had more than 50% students from a single zone, to have the minimum number of colleges, we have to assume that 50% of the students in colleges with the highest number of students were from the east zone, i.e., in college E, H, I and B.
$$= \frac{17 + 16 + 13 + 12}{2} = 29$$
∴ students from east zone joined in at least four of the given colleges.   Ans: (4)

2. We have to arrange the students from the different zones such that students from a single zone are in at most two colleges. This can be done in the following way: North – H and C, South – A and D, East G and E, West B and F and Central – I and J.   Ans: (0)

3. For maximum possible number of colleges, we have to consider colleges with lesser students. Also its share must be as low as possible i.e., 30%.
30% of (4 + 4 + 6 + …..) ≤ 16
$$∴ 4 + 4 + 6 + …… ≤ 53\frac{1}{3}$$
∴ The values are 4, 4, 6, 8, 9, 11. The next highest value is 12 which would take the total to 54.
⇒ a total of 6 institutes.   Ans: (6)

4. All students from the west zone could have joined college H and all students from the south zone could have joined college I. Students from the remaining three zones joined more than a single college.   Choice (B)

5. 24% of the students are from the north zone
To get the least number of colleges, we have to consider those with maximum number of students and the percentage share must also be maximum i.e., 40%.
∴ 40% of (17 + 16 + …..) ≥ 24
⇒ 17 + 16 ….. ≥ 60.
The values are 17, 16, 13, 12 and 11.
(∵ 17 + 16 + 13 + 12 = 58)
⇒ at least five colleges.   Choice (C)

9. The least distance between any two cities is that between cities B and E, i.e. 25 kms   Choice (A)

Solutions for questions 10 to 12:

10. To definitely have an increase in profits, the change in sales must be positive and the change in expenses must be negative, i.e. companies C and E definitely had an increase in profit.   Choice (D)

11. Only for companies A and G whose sales decreased and expenses increased the profitability would have definitely decreased. For all others the profitability could have increased, i.e. for at most five companies   Choice (B)

12. For B and D, as both sales and expenses increased, profits also could have increased. For companies A and G as sales decreased and expenses increased the profits would have decreased. For F as both sales and expenses decreased, profits also could have decreased. For C and E as sales increased and expenses decreased profit would have increased, i.e., at most three companies showed a positive correlation between expenses and profits   Choice (A)

Solutions for questions 13 to 16:

13. The salaries of the six employees in the accounts section as a percentage of the total salary to all the employees in the section can be 22, 19, 18, 17, 15 and 9 percentage, which means only one person need to have more than 20% of the total salary of all employees in that section
The corresponding values in the other sections are marketing – 2, operations – 2, typists – 2, receptionists – 2, production – 1 and warehouse – 0
i.e., a total of 10 employees   Ans : (10)

14. As the share of salary, as a percentage of the total salary of all employees in his/her section is an integer and no two employees had the same salary, the values can be 19, 15, 14, 13, 12, 11, 9 and 7 percentage respectively from the highest to the lowest. The maximum salary of the employee with the second lowest salary is 9% of 120000 = 10800
Ans : (10,800)

15. In the accounts section as the highest salary is 22000 no employer can have a salary more than 25000. In marketing, the percentage share of the top two employees can be 28 and 27 and so both of them would be over 25000
Similarly the maximum number of employees earning above 25000 in other sections are
Operations – 4 and production – 3
A total of 2 + 4 + 3 = 9   Choice (A)

Solutions for questions 16 to 19:

Here 20% of the Maruti cars sold are of price less than or equal to 200000 and 32% of cars with price less than 200000 are Maruti cars
20% of Maruti = 32% of cars with price less than 200000
Ratio of Maruti cars sold to cars with price less than 200000 = 32 : 20 = 8 : 5
Similarly the ratio of Maruti cars to cars in the other price ranges are
Maruti : $200000 < P \le 300000 = 4 : 3$
Maruti : $300000 < P \le 400000 = 4 : 3$
Maruti : $400000 < P \le 500000 = 4 : 3$
The ratio of the cars sold in the different price ranges starting with cars less than 200000 are 5 : 6 : 6 : 6
Similarly the ratio of Maruti, Tata, Hyundai, and GM cars sold are 8 : 6 : 5 : 4

16. The required percentage = $\frac{8}{23} \times 100 = 34.8\%$

Choice (A)

17. The ratio of number of Hyundai cars and cars with price less than 300000 (less than 200000 + $200000 < P \le 300000$)
5 : (5 + 6] = 5 : 11   Choice (D)

18. The ratio of Tata and GM cars sold was 6 : 4 = 3 : 2
Choice (B)

19. The maximum possible value of all the cars sold happens when the cars are sold at their highest price points.
The number of cars sold in the different price points are
$P \le 200000 = 50$
$200000 < P \le 300000 = 60$

$300000 < P \le 400000 = 60$
$400000 < P \le 500000 = 60$
The maximum possible sales value
= 200000 x 50 + 300000 x 60 + 400000 x 60 + 500000 x 60
= 1 cr + 1.8 cr + 2.4 cr + 3 cr = 8.2 cr   Choice (C)

Solutions for questions 20 to 22:

As no adjacent box should contain adjacent numbers boxes b and e should contain number which have only one adjacent number, hence the numbers are 1 and 8 in any order.
g and h would contain one of 2 and 7 depending on the order in which boxes b and e are filled.

20. The number in box g can be 2 or 7   Choice (D)

21. The number in box c can be anything other than 1, 2, 7 or 8
Choice (D)

22. Box e can contain either 1 or 8   Choice (B)

Solutions for questions 23 to 25:

23. The total income tax to be paid for a person with an income of ₹3,60,000 is
15,000 + 20% of 60,000 = 27,000.
∴ Total tax = 27,000 + 810 = 27,810.   Choice (C)

24. For a person with an income of ₹5,00,000, the tax to be paid is ₹55,000 + 3% of 55,000.
As the tax paid is more than this, the income of the persons should be more than 5,00,000.
From choices if his income is 5,50,000, the total tax to be paid is = 55,000 + 15,000 + 3% of (55,000 + 15,000)
= ₹72,100.   Choice (B)

25. Assume a person has an income of ₹12 lakhs.
His tax could be = 55,000 + 2,10,000 + 3% education cess
= 2,65,000 + 8,000 = 2,73,000
which is less than 25% of is income.
For an income of ₹16.5 lakhs, the total tax would be
= 55,000 + 3,45,000 + 3% education cess
$\cong$ 4,12,000 which is nearly 25%.
∴ His income should be slightly more than this and for values much larger to any additional income has a tax of 30.9%, it will exceed much beyond 25%.
Choice (B)

Exercise – 8

Solutions for questions 1 to 4:

1. The number of female applicants selected from different streams is

MBA – $\frac{100}{250} \times \frac{900}{0.9} \times 0.1 \Rightarrow 40$

B.Tech. – $\frac{100}{1000} \times \frac{1400 \times 0.3}{0.7} \Rightarrow 200$

MCA – $\frac{100}{250} \times \frac{1200 \times 0.25}{0.75} \Rightarrow 160$

PGDCA – $\frac{100}{400} \times \frac{1200 \times 0.2}{0.8} \Rightarrow 75$

It is the highest for B.Tech.   Choice (B)

2. As the male applicants with work experience form 100% of the total applicants with work experience, the number of female applicants with work experience is zero.
∴ Those without work experience is (100 – 70)% of $\frac{300}{(100-40)\%} = 150$.   Choice (B)

3. Average number selection per stream will be

$$\frac{\dfrac{900}{0.9} \times 0.1 + \dfrac{1400}{0.7} \times 0.3 + \dfrac{1200}{0.75} \times 0.25 + \dfrac{1200}{0.8} \times 0.2 + \dfrac{300}{0.6} \times 0.4}{5}$$

= 320
and only for streams

B.Tech = $\dfrac{1400}{0.7} \times 0.3 = 600$

MCA = $\dfrac{1200}{0.75} \times 0.25 = 400$

The number of applicants selected is more than average.

Choice (A)

4.

$$\begin{Bmatrix} \text{Selected applicants with} \\ \text{work experience} \end{Bmatrix} : \begin{Bmatrix} \text{Selected male applicants} \\ \text{with work experience} \end{Bmatrix}$$

$$\qquad 150 \qquad\qquad : \qquad\qquad 100$$

i.e. among 150 applicants with work experience there are 100 male and 50 male applicants.
Therefore, for 30 females, there should be 60 male applicants who have work experience.
∴ Number of applicants without work experience is 2000 − (30 + 60) = 1910. Choice (D)

Solutions for questions 5 to 8:

5. The average annual growth in the country's exports from 2012-13 to 2016-17 was 20%.
∴ If exports in the year 2012-13 was x, that in the year 2013-14 was 1.2x, that in 2014-15 was 1.44x that in 2015-16 was 1.72x and that in 2016-17 was 2.0736x.
share of IT in 2012-13 = .15x
share of IT in 2016-17 = ,0.18 ×1.73x = 0.31x

% growth = $\dfrac{0.16x}{.15x} \times 100 \cong 107\%$. Choice (C)

6. As the total exports in 2012-13 was x and that in 2016-17 is 2.07x any company which maintained its share in exports would have more than doubled its exports.
∴ Q, R and T would have definitely had a more than 100% increase in exports.
For S, exports in 2012-13 = .15x.
For S, exports in 2016-17 = 0.14 × 2.07x = 0.29x
∴ Only Q, R and T had an increase of more than 100%.

Choice (B)

7. Exports of company R in 2012-13 = 0.17x.
Exports of company R in 2015-16 = 0.15 × 1.728x = 26x.

Growth in exports = $\dfrac{.09x}{.17x} \times 100 = 53\%$ Choice (A)

8. Share of automobiles in 2016-17 = 20%
∴ Share of automobiles in 2012-13 = 16%
If the total exports in 2012-13 was x, then the total exports in 2016-17 was 2.07x.
∴ automobiles exports in 2012-13 = 0.16x
automobile exports in 2016-17 = 0.414x.

% growth = $\dfrac{0.414 - 0.16}{0.16} \times 100$

= $\dfrac{0.254}{0.16} \times 100 \cong 160\%$. Choice (D)

Solutions for questions 9 to 12:

9. In database H, to maximise the number of people for whom the data on exactly five of the six features is known, first consider the case that for some of the people, the data on all the features except 'Fax Number' is known. Clearly by observation this number of people can be at most 30% (limited by the number of people whose ages are known).

Now consider another case where there are a few other (distinct from the earlier 30%) people for whom the data on all the features except ages is known. Again by observation this number of people can be at most 10% (limited by the number of people whose 'Fax Numbers' are known). Now counting any other combination of five features is found to include these above people more than one time. Hence, only 10% + 30% = 40% is the maximum possible number of persons in database H for each of whom the data on exactly five of the six features may be known.
∴ 40% of 100,000 = 40,000 Choice (C)

10. In database E, we need to find the minimum possible intersection of the three sets – Name, Fax number and Telephone number.
Name = 100%
Fax number = 50%
Telephone number = 80%
Clearly, the minimum possible intersection of Fax number and Telephone number is itself the answer (as Name = 100%).
∴ Minimum possible intersection of Fax number and Telephone number = 50% + 80% − 100% = 30%
30% of 15,000 = 4,500 Choice (B)

11. Since for 85% of the persons the data on Addresses is known, it is possible that for all of the remaining 15% people, no other data except their name is available. Hence, maximum possible expenditure on investigating all such cases = 15% of 10,00,000 x ₹6 = ₹9 lakh.

Choice (C)

12. The product of E-mail% x Number of entries must be the least. By observation B, M and F are amongst the possible databases.
Upon approximate calculation, it can be seen that for F 90% of 5,500 = 4,950 it is the least. Choice (A)

Solutions for questions 13 to 16:

The dissimilarity between different persons are

	B	C	D	E
A	10	12	8	12
B		10	8	2
C			6	8
D				10

13. From the table, it is A. Choice (A)

14. From the table, the required pair is A and C.

Choice (D)

15. The level of dissimilarity of D is the least with C.

Choice (C)

16. The level of dissimilarity of A and D is 8 and it same as that of B and D. Choice (C)

Solutions for questions 17 to 20:

17. The number of girls who wrote CAT 2019

= $\dfrac{2}{5} \times 2,00,000 = 80,000$.

The girls who wrote after attending coaching

= $\dfrac{3}{8} \times 80,000 = 30,000$. Ans: (30,000)

18. Girls who wrote CAT 2019 = 80,000
Freshers with engineering background among girls

= $\dfrac{1}{2} \times \dfrac{2}{3} \times 80,000 = \dfrac{1}{3} \times 80,000 = 26,667$

Girls with other than engineering background and had done self preparation = $\dfrac{1}{3} \times \dfrac{5}{8} \times 80,000 = 16,667$

The difference = 10,000. Ans: (10,000)

19. Ratio of boys with engineering background to others = 2 : 1.

∴ Required percentage = $\frac{2}{3} \times 100 = 66.67\%$

Choice (C)

20. Experienced engineers making their first attempt

$= \frac{1}{2} \times \frac{2}{3} \times \frac{2}{5} \times 2,00,000 = \frac{2}{15} \times 2,00,000 = 26,667$

Girls who were freshers and were making their second or

higher attempt = $\frac{2}{5} \times \frac{1}{2} \times \frac{3}{5} \times 2,00,000$

$= \frac{3}{25} \times 2,00,000 = 24,000$

Required difference = 2,667.   Choice (D)

Solutions for questions 21 to 25:

Year	Production	Sales (in %)	Sales (in ₹ crores)	Expenses	Profits
2015	700	K_1	$7 K_1$	$0.7K_1 + 1/5$ $(700 - 7K_1)$	$322 = 7.7$ $K_1 - 140$
2016	800	$K_2 = 50$	$8 K_2$	$0.8K_2 + 1/5$ $(800 - 8K_2)$	$8.8 K_2 - 160$
2017	900	K_3	$9 K_3$	$0.9K_3 + 1/5$ $(900 - 9K_3) = 144$	$9.9 K_3 - 180$
2018	1000	K_4	$10 K_4$	$K_4 + 1/5$ $(1000 - 10K_4)$	$11K_4 - 200$
2019	1100	$K_5 = 20$	$11 K_5$	$1.1 K_5 + 1/5$ $(1100 - 11K_5)$	$12.1 K_5 - 220$

Here $7.7 K_1 - 140 = 322$ (Profit)$_{2014} = (8.8) (50) - 160$
$\Rightarrow 7.7 K_1 = 462 = 440 - 160 = 280 \Rightarrow K_1 = 60$.
Similarly,
(sales)$_{2016}$ = 400
(expenses)$_{2016}$ = 40 + 1/5 (800 – 400) = 120
For year 2017.
180 – 0.9 K_3 = 144
0.9 K_3 = 180 – 144 = 36.
K_3 = 360/9 = 40.
For year 2019.
(sales)$_{2019}$ = 220
(expenses)$_{2017}$ = (1.1) (20) + 1/5 (1100 – 220)
= 22 + 1/5 (880) = 22 + 176 = 198
(sales)$_{2018}$ = 1700 – [420 + 400 + 360 + 220
= 1700 – [1400] = 300 ⇒ K_4 = 0.30

We get the following table:-

Year	Production Capacity	Sales (%)	Expenses	Profit
2015	700	60	98	322
2016	800	50	120	280
2017	900	40	144	216
2018	1000	30	170	130
2019	1100	20	198	22
			730	970

21. Sales (in ₹ crore) in year 2018 = 300
Sales (in ₹ crore) in year 2015 = 420

Required % = $\frac{120}{420} \times 100 = 28\frac{4}{7}\%$ Choice (A)

22. Total expenses = ₹730 crore   Choice (B)

23. Total sales (in ₹ Crore) in the year 2017

$= \left(\frac{40}{100}\right)(900) = ₹360$ crore.   Choice (C)

24. Difference in profits in the years 2016 and 2018
= 280 – 130 = ₹150 crore.   Choice (A)

25. In 2018, $\frac{\text{sales}}{\text{production}} = \frac{300}{1000} = 0.3$ Choice (B)

Exercise – 9

Solutions for questions 1 to 3:

1. The number of students playing the different games are

Cricket – 77 + x
Football – 63 + x + z
Hockey – 73 + y
Basket ball – 53 + z + y
The number of students playing any game is 120 + x + y + z
Maximum value of x + y + z is 30
As 53 + 2 + y is the maximum,
53 + y + z > 77 + x
Y + z > x + 24
As maximum value of x + y + z = 30, x is at most 2
77 + x is at most 79.   Choice (C)

2. We have to find the minimum value of x + 10 + 12 + 15 + z + y, i.e. the minimum value of x + y + z
As 63 + x + z was the highest
63 + x + z > 77 + x
Or z > 14
Minimum value of x + y + z = 15
The minimum number of students who play exactly two games = 15 + 10 + 12 + 15 = 52

Choice (B)

3. As maximum value of x + y + z = 30, and as x > y > z, the minimum value of x is 11, which means that the number of students playing cricket is the maximum.   Choice (A)

Solutions for questions 4 to 6:

4. For India to reach the finals with the minimum number of points, one of the teams, say Australia should have won all the marches and India and Sri Lanka should have won two matches each in the four matches they played. So India would have scored eight points, the same as Sri Lanka and can still advance to the finals on the basis of better net run rate.   Ans: (8)

5. This scenario happens when each team wins four matches that too all of them with bonus points, such that each team ends up with 20 points and one of the teams would be eliminated.   Ans: (20)

6. To top the preliminary stage with the least number of points, all teams should have the same number of wins, i.e., 4 and as Australia had the highest, it could have won one of the matches with a bonus point to have a total of 17 points.   Ans: (17)

Solutions for questions 7 to 10:

The fixed cost = 5,000 + 7,000 + 4,000 + 6,000 + 6,000 = ₹28,000.

The variable cost per unit = $\dfrac{35,000 + 15,000 + 12,000}{500}$ = 124.

7. As the selling price = ₹200.
When the per unit fixed cost is more than 76, then the company incurs a loss.
If number of units produced is n,

$n = \dfrac{28,000}{76} \cong 370.$ Ans: (370)

8. As the variable cost per unit is fixed at ₹124, the cost incurred

would be $124 + \dfrac{28,000}{1400} = 144.$ Ans: (144)

9. The selling price per unit is ₹180.
As the number of units produced increases, the per unit cost decreases, and hence the company will improve it's profit with every additional unit it sells.
∴ the company has to sell the maximum, i.e., 2000 units for its profit to be maximum.   Choice (C)

10. As the fixed cost is ₹28,000, the variable cost can be at most ₹1,72,000.
As variable cost per unit = ₹124,

Number of units that can be produced = $\dfrac{1,72,000}{124}$ = 1386.
     Choice (A)

Solutions for questions 11 to 14:

The core supporters for the different cities are
New Delhi – 6
Tehran – 8
Beijing = 18
Tokyo – 14
Seoul – 12
Jakarta – 5

The number of delegates with first preference votes for New Delhi
is = 15 + 22 + 18 + 15 + 12 = 82
For Tehran is = 5 + 7 + 6 + 7 + 13 = 38
For Beijing is = 12 + 10 + 10 +10 + 7 = 49
To Tokyo is = 10 + 12 + 15 + 14 + 9 = 60
For Seoul is = 14 + 14 + 12 + 13 + 8 = 61
For Jakarta is = 8 + 16 + 10 + 12 + 16 = 62

The number of delegates with second preference votes
For New Delhi is = 5 + 1 2 + 10 + 14 + 8 = 49
For Tehron is = 15 + 10 + 12 + 14 + 16 = 67
For Beijing is = 22 + 7 + 15 + 12 + 10 = 66
For Tokyo is = 18 + 6 + 10 + 13 + 12 = 59
For Seoul is = 15 + 7 + 10 + 14 + 16 = 62
For Jakarta is = 12 + 13 + 7 + 9 + 8 = 49

11. The total number of core supporters = 6 + 8 + 18 + 14 + 12 + 5 = 63   Choice (B)

12. The votes for each city are is follows:
New Delhi = (6 + 82) 2 + 49 = 225
Tehran = (8 + 38) 2 +67 = 159
Beijing = (18 + 49) 2 + 66 = 200
Tokyo = (14 + 60) 2 + 59 = 207
Seoul = (12 + 61)2 + 62 = 208
Jakarta = (5 + 62) 2 + 49 = 183   Choice (D)

13. The total number of delegates = 63 (core supporters) + 82 + 38 + 49 + 60 + 61 + 62 = 415   Choice (A)

14. The number of delegates whose second preference was Beijing or Tokyo = 66 + 59 = 125
The number of delegates whose first preference was New Delhi or Tehran = 120
The required difference = 125 − 120 = 5   Choice (C)

Solutions for questions 15 to 18:

Let the number of two mark questions be x, ∴ number of one mark questions is x + 1 and number of three mark questions is x − 1.
(x + 1) 1 + 2x + (x − 1) 3 = 100
∴ x = 17
∴ The number of one mark two mark and three mark questions in each section are 18, 17 and 16 respectively.
∴ Total number of questions = 51 × 3 = 153 and total number of three marks questions = 16 × 3 = 48.

15.   Choice (B)

16.   Choice (C)

17. Maximum number of attempts = 76
To score the maximum he has to attempt more of two and three mark questions with the mistakes being in the one mark questions.
minimum number of mistakes = 16
∴ Net score = $48 \times 3 + 12 \times 2 - 16 \times \frac{1}{4}$ = 144 + 24 − 4
= 164   Choice (D)

18. To have an accuracy of exactly 50%, he can attempt at most 152 questions
∴ He answered at most 76 questions correctly.
∴ maximum possible score
= $48 \times 3 + 28 \times 2 - 22 \times \frac{1}{2} - 54 \times \frac{1}{4}$
= 144 + 56 − 11 − 13.5
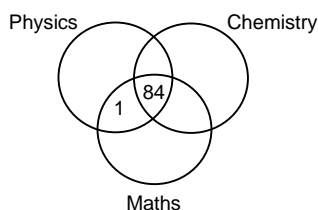= 200 − 11 − 13.5 = 175 .5   Choice (D)

Solutions for questions 19 to 21:

19. The least total number of students in the class is 47, which is as follows
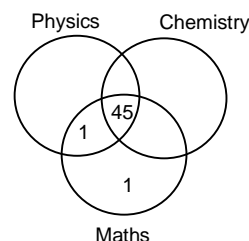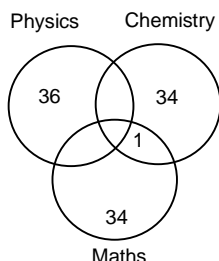

     Choice (D)

20. With a total strength of 85, the maximum number of students taking the subject (say Chemistry) taken up by the least number of students would be 84, as follows.

Physics   Chemistry

1   84

Maths

Choice (B)

21. The maximum number of students would be 105.

Physics   Chemistry

36   34

1

34

Maths

Choice (D)

Solutions for questions 22 to 25:

For player D, it can be seen that the runs scored through fours and sixes are in the ratio 4 : 9, i.e., the smallest possibility is 8 and 18 as the runs scored through sixes is a multiple of six.
In this case the runs scored by D is 50, which gives the total score as $\dfrac{100}{27.78} \times 50 = 180$, as 10% of the teams score was due to extras, the team score would be 200. The next higher possibility of D's, score takes the total score to 400, which is not possible as the teams total score is less than 250.
∴ The only possibility is a total score of 200.
∴ The runs and fours and sixes scored by the players are

Players	Fours	Sixes
A (60)	4 (1)	36 (6)
B (40)	0 (0)	30 (5)
C (30)	4 (1)	24 (4)
D (50)	8 (2)	18 (3)

22. The total score of the team was 200 runs.   Choice (D)

23. Player D scored five sixes.   Choice (C)

24. The team scored a total of 4 fours.   Choice (B)

25. Total runs scored by the four players = 180
Runs scored through fours or sixes = 124.
∴ Required percentage = $\dfrac{56}{180}$ = 31.11%   Choice (D)

Solutions for questions 5 to 8:

Taking data from the three tables, we can arrive at the following expert, actor and feature combination.

|	A₁			A₂		
	Expressions	**Dialogue delivery**	**Body language**	**Expressions**	**Dialogue delivery**	**Body language**
Anand	5	7	9	7	8	7
Babu	7	8	6	5	3	6
Charan	10	6	7	7	2	5
David	9	8	8	8	3	4

Exercise – 10

Solutions for questions 1 to 4:

As 103 customers ordered exactly two items, 42 customers opted for one for three items. If x is the number of customers who opted for all three items, we have
x + 6x = 42
∴ x = 6
Now, the given information can be represented as follows

Burger

8   x   16   Pastries

6

y   2x

12
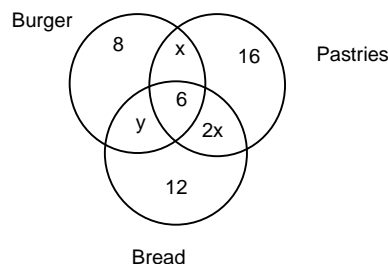
Bread

We have 18 + 2x = 14 + x + 25
4 + x = 25
∴ x = 21
and 2x + x + y = 103
y = 103 – 63 = 40

The complete information is as given below

Burger   Pastries

8   21   16

6

40   42

12
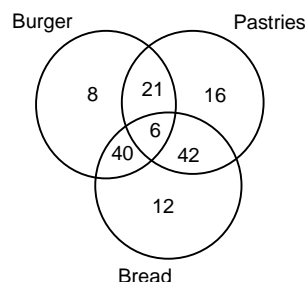
Bread

1. 16 customers ordered only pastries   Ans: (16)

2. 42 + 6 = 48 customers ordered both pastries and bread   Ans: (48)

3. 170 × 36 + 290 × 103 + x × 6 = 145 × 266
6120 + 29870 + 6x = 38570
6x = 38570 – 35990
6x = 2580
x = 430   Choice (A)

4. $\dfrac{8x + 16(2x) + 12(3x)}{36} = 170$

$\dfrac{76x}{36} = 170$

x = 80.5
The average amount paid by customers who ordered only pastries = 2x = 161   Choice (B)

5. The rating given by Babu for 'Expressions' for A_1 is 7.
Choice (C)

6. The rating given by Charan for 'Body language' for A_2 is 5.
Choice (B)

7. The rating given by Charan for 'Expressions' for A_2 is 7.
Choice (A)

8. The rating given by Anand for 'Dialogue delivery for A_2 is 8.
Choice (D)

Solutions for questions 9 to 11:

9. Ram's score in Maths = 75
Ramesh's score in Maths = 57
Total score of all students = $64 \times 4 = 256$
∴ Sum of the scores of Shyam and Arun = $256 - 75 - 57$
= 124
Minimum marks scored by Arun = 57
∴ Maximum marks scored by Shyam = $127 - 57 = 67$
∴ score of 69 is not possible
Choice (A)

10. Given minimum marks in English is 44
∴ Ramesh cannot score 43 in English.
Choice (B)

11. Sum, of the marks of all students = $59 \times 4 = 236$
∴ Sum of the scores of Ram and Shyam = $236 - 64 - 54 = 118$
∴ Different possible combinations are (54, 64) (55, 63) (56, 62)
(57, 61) (58, 60) (59, 59)
∴ Total possible ways are = $5 \times 2 + 1 = 10 + 1 = 11$ ways
Choice (A)

Solutions for questions 12 to 16:

⇒ Out of 5500 students, the number of boys and girls are in the ratio 5 : 6

⇒ The number of boys = $\frac{5}{11} \times 5500 = 2500$

⇒ The number of girls = 3000
18% of the girls play only football and chess

i.e., $\frac{18}{100} \times 3000 = 540$

20% of the total students play only tennis

i.e., $\frac{20}{100} \times 5500 = 1100$

But 540 girls play only tennis
⇒ $1100 - 540 = 560$ boys play only tennis
Number of boys playing only cricket is 110% of the girls playing the same.

⇒ $x \times \frac{110}{100} = 330$

⇒ $x = 300$.
⇒ 300 girls play only cricket.
Number of boys playing only football and chess is 120% of the girls playing the same.

i.e., $540 \times \frac{120}{100} = 648$

one tenth of the boys play only chess

i.e., $\frac{2500}{10} = 250$

Also given, 300 boys play only chess and tennis
Remaining boys = $2500 - (560 + 330 + 648 + 250 + 300)$
= $2500 - 2088$
= 412 boys play only cricket, tennis and football.
600 girls play only chess and 720 girls play only football and cricket.
The remaining girls = $3000 - (540 + 540 + 300 + 600 + 720)$
= $3000 - 2700 = 300$
⇒ 300 girls play only chess, cricket and tennis

12. The total number of students who play cricket.
= $330 + 412 + 300 + 720 + 300 = 2062$
Choice (C)

13. The number of girls who do not play tennis
= $300 + 720 + 540 + 600 = 2160$
Choice (B)

14. The total number of students
who do not play football
= $(330 + 560 + 300 + 250) + (300 + 540 + 300 + 600)$
= $1440 + 1740 = 3180$
Choice (A)

15. The total number of girls playing exactly two games
= $720 + 540 = 1260$
Ans: (1260)

16. The number of students who play at least two games
= $(412 + 648 + 300) + (720 + 540 + 300)$
= $1360 + 1560 = 2920$
Ans (2920)

Solutions for questions 17 to 20:

17. Of the people who got in at A, 10 of the them got down at P. Now at least 3 more from this group would have got down at Q or R. ∴ at most five passengers who got in at A travelled till the last stop.
Choice (B)

18. All people who got in at P would have got down either at Q or R and so the required number is zero.
Choice (D)

19. We have to look at passengers who got in at A, P, Q or R and got down at the third stop from where they got in.
The corresponding values are
A – R – 8
P – S – 2
Q – T – 3
R – B – 9
A total of $8 + 2 + 3 + 9 = 22$ people.
Choice (B)

20. Even if we assume that all people who got in at P, got down at Q or R, at least seven people who got in at R would have got down at T or B.
Choice (D)

Solutions for questions 21 to 25:

The cost of production and profits on both grades of the six items are as follows:

Item	Total cost	Grade A cost (₹Cr)	Grade B cost (₹Cr)	Grade A profit (lakh)	Grade B profit (lakh)
P	5 Cr	3	2	60	30
Q	2.5Cr	0.96	1.54	29	23
R	7.5Cr	3.63	3.87	72.5	97
S	2.5Cr	1.25	1.25	19	25
T	5Cr	2.27	2.73	45.5	68
U	2.5Cr	1.39	1.11	14.0	17

21. The total profit made on item R is = $72.5 + 97 = 170$ lakh.
Choice (C)

22. The ratio of total profit to total cost is the highest for product T.
Choice (B)

23. The total cost of producing grade A of products P, R and S = ₹7.88Cr.
Choice (A)

24. Only for products P and Q is the profit obtained on grade A products more than that of grade B.
Choice (B)

25. The total cost of producing grade A items – 12.5Cr
The total cost of producing grade B items – 12.5Cr
As the total cost of production is the same, and the ratio of the cost of production is 5 : 4, the ratio of the quantities produced is 4 : 5.
Choice (C)