**1. 6 MISCELLANEOUS**

**Solution Exercise – Easy**

1. (b)  
 The best way to solve these types of questions is the method of assumptions. For e.g. The 3 statements are:

I. Kamal has a Mercedes.

II. Hassan does not have the Mercedes.

III. Rajan does not have the Audi.

Let us assume that statement (I) is true. So other 2 are false. In other words it implies that both. Kamal and Hassan have the Mercedes. This is not possible.

Let us now assume that statement (II) is true. Which means that Statements (I) and (III) are false. Hence, Kamal and Hassan does not the Mercedes but even Rajan does not have the Mercedes as he has the Audi. So even this is contradctory.

Hence the only possibility exists is Statement (III) is true and (I) and (II) are false. This implies that Hassan has the

Mercedes, Rajan has the BMW and Kamal has the Audi.

2. (b)

The equations can be expressed as :

I. Karthik < Subash

II. Karthik + Subash = Chandan + Kaushik

III. Chandan + Subash < Kaushik + Karthik

Comparing (I) and (III), we can see that Kaushik > Chandan.

If we rearrange the statement (II) we get : (Subash **–** Karthik) < (Kaushik **–** Chandan). In other words the difference between Karthik and Subash is less than that between Kaushik and Chandan. Using this relationship and using the statement (II) we can say that the right order is Kaushik > Subash > Karthik > Chandan.

Hence the answer is (b).

**Solutions for 3 – 5:**

3. (c)

The answer to this question can be neither ‘No’ nor ‘Yes’ as both would contradict the given conditions.

4. (a)

The answer to the question has to be ‘yes’ implying that Laxman is ‘Yes’ hence Ram has to be ‘No’

5. (d)

The answer to this question can be ‘No’ as well as ‘Yes’.

6. (b)

If you were observe Charles statement carefully you will figure out that his first statement is true and second statement is false. For instance if his first statement were to be false, then his second statement cannot be true. There would be inconsistency in what he is talking. So, Charles is not the chief. This makes Bobby’s second statement false and first statement true. So Bobby is Amar’s father and hence Amar’s first statement is false. So his second statement must be true. This implies that the chief is wearing the red shirt. So Bobby is the chief.

7. (b)

Since Akbar likes rain, he cannot be a frisbee player (as no frisbee player likes rain). And since evry boy in the school does one of the two, Akbar has to be a fisherman.

**Solutions for 8 – 11:**

8. (b)

All the sentences are possible except (b) as Grumbs have to be used with Ihavitoo and Grumbs cannot be used in any other type but Bingoes.

9. (d)

Since Grumbs and Harrumphs are the Bingoes and Grumbs has to always go with Ihavitoo, so we will have to use Ihavitoo as the Cingo. Since statement I is true, the answer can only be (a) or (d). So we will only evaluate the option (d). Since we have not used Koolodo as Cingo, we can use either Lovitoo or Metoo or both as Dingos. Hence statement III is also true, so the answer is (d).

10. (a)

The sentences (b) uses two Cingo’s instead of one, hence grammatically incorrect. Sentence (c) violates the same rule again and in addition it uses ihavitoo without using Grumbs. Sentence (d) again uses two Cingo’s instead of one. Hence the only sentence that is grammatically correct is (a).

11. (b)

If Grumps is the Bingo, then Ihavitoo must also be used. And since Ihavitoo is common to Bingo and Cingo, Ihavitoo must be used as a Cingo . Also no other Cingo can be used. So obviously Harrumphs must also be used as a Bingo. And since we are not using Koolodo as Cingo, we can use Lovitoo as Dingo. So (a), (c) and (d) can all be true. So (b) cannot be true.

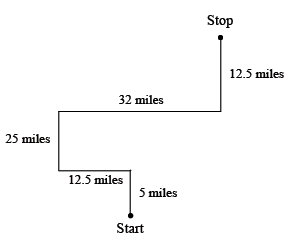
**Solutions for 12 – 15:**

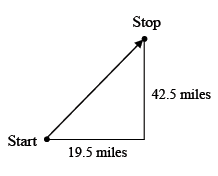
12. (b)

Total distance travelled by Hamilton

= 5 + 12.5 + 25 + 32 + 12.5 = 87 miles

13. (c)

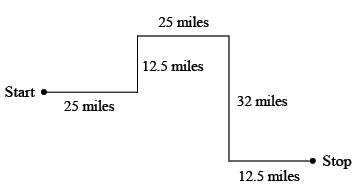


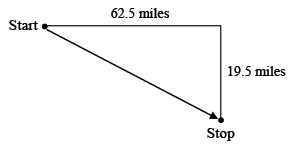


Distance =  = 46.76 miles

The direction is North-East.

14. (b)





Distance =  = 65.47 miles

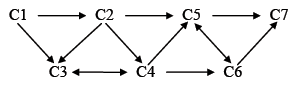
The direction is South-East.

15. (a)

He finishes North-East when he starts North, so when starting South he will finish South-West.

**Solutions for 16 – 19:**

16. (a)



The different phone lines without using hub in C4 from C1 to C7, without going through C5, are as follows:

C1 – C2 – C4 – C6 – C7

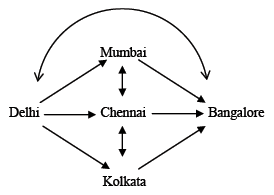
C1 – C2 – C3 – C4 – C6 – C7

C1 – C3 – C4 – C6 – C7

A total of 3 routes.

17. (c)

As per the given instructions, we get the following arrangement:



Following are the ways in which person in town Delhi can visit a town Bangalore:

I. Involving nobody (Direct): Delhi to Bangalore = 1 way.

II. Involving one person: Delhi-Mumbai-Bangalore, Delhi-Chennai-Bangalore, Delhi-Kolkata-Bangalore = 3 ways.

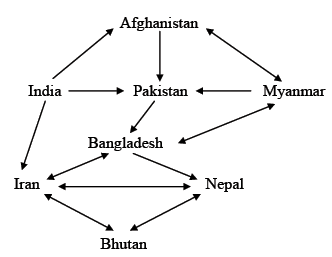
III. Involving two persons: Delhi-Mumbai-Chennai-Bangalore, Delhi-Chennai-Kolkata-Bangalore, Delhi-Chennai-Mumbai-Bangalore, Delhi-Kolkata-Chennai-Bangalore = 4 ways.

IV. Involving three persons: Delhi-Mumbai-Chennai-Kolkata-Bangalore, Delhi-Kolkata-Chennai-Mumbai-Bangalore = 2 ways.

Total number of ways = 1 + 3 + 4 + 2 = 10 ways.

18. (b)

Let us make an arrangement/network based on the given data:



Based on the network drawn above, let us find out various routes from India to Bhutan.

a. India to Bhutan via Iran: Bhutan can be reached only via Iran or Nepal as its adjacent countries, hence, various routes are:

I. India – Iran – Bhutan

II. India – Iran – Nepal – Bhutan

III. India – Iran – Bangladesh – Nepal – Bhutan = (3)

b. India to Bhutan via Pakistan:

India – Pakistan – Bangladesh….

Now the number of routes from Bangladesh to Bhutan are:

I. Bangladesh – Iran – Bhutan

II. Bangladesh – Iran – Nepal – Bhutan

III. Bangladesh – Nepal – Bhutan

IV. Bangladesh – Nepal – Iran – Bhutan

So, there are 4 routes from Bangladesh. Only Bangladesh can be reached from Pakistan = (4).

c. India to Bhutan via Afghanistan:

There are three main routes from Afghanistan, namely Afghanistan to Pakistan, Afghanistan to Myanmar to Pakistan and Myanmar to Bangladesh = (4)

Afghanistan to Pakistan (then Bangladesh) …….

(as explained earlier)

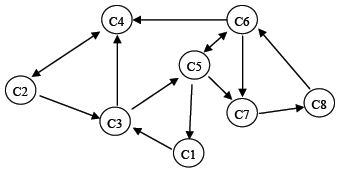
Afghanistan to Myanmar to Pakistan (then Bangladesh) = (4)

Afghanistan to Myanmar to Bangladesh = (4)

Hence, the total number of way are

3 + 4 + 4 + 4 + 4 = 19 ways.

19. (d)



To go to C8 from C2 and then return to C2 through C5 the shortest route is C2 → C3 → C5 → C7 → C8 → C6 → C5 → C6 → C4 → C2

∴ 10 + 10 + 10 + 10 + 10 + 5 + 5 + 10 + 10 = 80 ways

**Solutions for 1 – 3:**

1. (c)

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 1 | 2 | 4 |  |  |  | 2 | 4 |  |  |  | 2 | 4 |
| 5 | 1 | 6 | 7 |  |  |  | 6 | 7 |  |  |  | 6 | 7 |
| 9 | 1 | 3 | 2 |  |  |  | 3 | 2 |  |  |  |  |  |
| 6 | 1 | 8 | 4 |  |  |  | 8 | 4 |  |  |  |  |  |
| Initial  Board | | | |  | After your move (Retain right) | | | |  | After friends move (Retain upper) | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | 2 |  |  |  |  | 2 |  |
|  |  | 6 |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |
| After your move (Retain left) | | | |  | After friends move (Retain upper) | | | |

Since you choose to retain right and then left in your next move, the cells that would hence be retained contain 2,6,3,8. (look at the second grid) Hence to reduce your gain to minimum, your friend has to retain 2 at the end.

So his strategy has to be retain upper and retain upper.

2. (b)

If both of you select the moves intelligently, you would both go for maximizing your earnings.

In your first move you have to select either left or right and your friend has to then select either upper or lower. Hence the possibilities could be :

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 1 | 2 | 4 |  |  |  | 2 | 4 |  |  |  | 2 | 4 |
| 5 | 1 | 6 | 7 |  |  |  | 6 | 7 |  |  |  | 6 | 7 |
| 9 | 1 | 3 | 2 |  |  |  |  |  |  |  |  | 3 | 2 |
| 6 | 1 | 8 | 4 |  |  |  |  |  |  |  |  | 8 | 4 |
| Initial  Board | | | |  | After your move (Retain right) | | | |  | After friends move (Retain upper) | | | |

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2 | 1 |  |  |  |  |  |  |  |
| 5 | 1 |  |  |  |  |  |  |  |
|  |  |  |  |  | 9 | 1 |  |  |
|  |  |  |  |  | 6 | 1 |  |  |
| After your move (Retain left) | | | |  | After friends move (Retain upper) | | | |

|  |  |  |  |
| --- | --- | --- | --- |
| **You Move** | **Your Friend Moves** | **Integers left for your 2nd move** | **Minimum gain ensured** |
| (Retain Right) | (Retain Upper) | 2, 4, 6, 7 | 4 (after you move retain right) |
| (Retain Lower) | 3, 2, 8, 4 | 3 (after your move retain left) |
| (Retain Left) | (Retain Upper) | 2, 1, 5, 1 | 2 (after you move retain left) |
| (Retain Lower) | 9, 1, 6, 1 | 6 (after you move retain left) |

So, if you move (retain right) you ensure a minimum gain of Rs.3 and if you move (retain left) you ensure a minimum gain of Rs.2. Hence if both of you play intelligently, you would first move retain right and ensure a minimum win of Rs.3, irrespective of what your friend moves.

3. (a)

If your first move is (retain right) then the grid will look the same as in Question 1. Your friend may hence choose either (retain upper), which will leave you to choose from 2, 4, 6, 7 or he may choose (retain lower), which will leave you to choose from 3, 2, 8, 4. In case he takes the former move, you can then move (retain right) and hence force a minimum gain of 4. But in case he chooses the latter move, you can then move (retain move) and force a minimum gain of 3. In either case you can have a minimum gain of Rs.3.

**Solutions for 4 – 5:**

4. (a)

As there is no day in the week whose first letter is R, it can be concluded that Raja does not have any holidays. Since 1996 is a leap year, we can figure out that Raja has totally worked for 7 days. Let his rate of doing the job be one unit per day. So he would complete 7 units work in a week. J's situation is similar to Raja and does not have any holiday during the week. T will have twoholidays in a week (Tuesday and Thursday).

Since the rate of working for all the three of them is the same, the working pattern of J and T would be as follows.

We can see that February 25, 1996 was a Sunday, to complete 7 units, they would take 4 days.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sun. | Mon. | Tues. | Wed. | Thur. | Fri. | Sat. |
| 2 units | 2 units | 1 unit | 2 units | 1 unit | 2 units | 2 units |

5. (c)

Now Raja has worked for (5 days in February + 31 days in March + 2 days in April) = 38 days. Let us assume his rate to be the same as in the previous question, viz. one unit a day. Hence, he completes 38 units totally. In a week, T takes holiday on Tuesday and Thursday, while S takes holiday on Saturday and Sunday. We can see that their working pattern would be as follows.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Sun. | Mon. | Tues. | Wed. | Thur. | Fri. | Sat. |
| 1 units | 2 units | 1 unit | 2 units | 1 unit | 2 units | 1 units |

So in a week they work together 10 units work. Thus, in three weeks, they would complete 30 units work. It can be found out that February 25 is Sunday. So, the remaining 8 units of work can be completed only on

Friday, i.e. March 22.

**Solutions for 6 – 7:**

6. (a)

Since Amar does not wear red shirt, it has to be worn by either Akbar or Anthony. So both of them either wear red shirt or one among green or blue shirt (depending on what Amar is wearing). Now since Akbar does not wear green and Anthony does not wear blue shirt, it is confirmed that both of them wear red shirts. So Amar wears either blue or green shirt. Thus, we can see that statement (a) is not true.

7. (b)

If two of them wear the same colour, the following six

combinations will exist: since Amar does not wear red, he can either wear blue or green. In either case, the remaining two will have to wear red, Akbar does not wear green, and Anthony does not wear blue.

This gives the combinations 1 and 2 below. Similarly, the other combinations can be worked out.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Amar** | **Akbar** | **Anthony** |
| 1 | Green | Red | Red |
| 2 | Blue | Red | Red |
| 3 | Green | Red | Green |
| 4 | Green | Blue | Green |
| 5 | Blue | Blue | Green |
| 6 | Blue | Blue | Red |

Using this we can evaluate the statements. (I) is true as we can see that in all the cases, if Amar wears blue, Akbar does not wear green. (II) needs not be false always, as in combination 4, we can see that Amar does not wear blue but Akbar wears blue. (III) is also not necessarily false as in combinations 1 and 3, both Amar and Akbar do not wear blue. Statement (IV) is necessarily false since if Amar wears green and Akbar does not wear red, then combination 4 is the only combination possible and hence Anthony should wear green. So only one of the four statements must always be false.

8. (a)

It can be seen that each of the 26 players played 25 matches. Since none of the matches ended in a draw, the scores for each of the players has to be even (since a win gives 2 points). So the highest score posible for a player would be 50 and the lowest would be 0. Since all 26 of them had different scores varying between 0 and 50, the scores should indeed be all the even number between 0 and 50. And since the ranks obtained by players are in alphabetical order, it can be concluded that A scored 50, B scored 48, C scored 46 and so on and Z scored 0. Now the only way A can score 50 is, if he wins all his matches, i.e. he defeats all other players. Now B has scored 48. So he has lost only one of his matches, which incidentally is against A. He must have defeated all other players.

Similarly, C has scored 46 matches. So he must have lost two matches, (i.e. to A and B) and defeated all other players. So we conclude that a player whose name appears alphabetically higher up in the order has defeated all the players whose name appear alphabetically lower down. Hence, M should win over N.

9. (c)

Test the boxes labelled — Red and White.

Now if the ball is Red, label the box — Red

Now the box which has the label White is either Red or Red and White.

However, it cannot be Red.

Hence, it is Red and White.

The last box is White.

We started with Red & White only because the label is incorrect and it can never have balls of both the columns.

**Solutions for 10 – 12:**

|  |  |  |  |
| --- | --- | --- | --- |
| **Place of worship** | **Number of flowers before offering** | **Number of flowers offered** | **Number of flowers left** |
| 1 | *y* | *y* | *y* |
| 2 | *y* | *y* | *Y* |
| 3 | *y* | *Y* |  |
| 4 | *y* | *y* | 0 |

10. (c)

Starting from the fourth place of worship and moving

backwards, we find that number of flowers before

entering the first place of worship is *y .*

Hence, number of flowers before doubling = *y*

(but this is equal to 30)

Hence, *y* = 32

11. (c)

The minimum value of *y* so that *y* is whole number is 16.

Therefore, 16 is the minimum number of flowers that can be offered.

12. (b)

For *y* = 16, the value of *y* = 15.

Hence, the minimum number of flowers with which Roopa leaves home is 15.

13. (c)

The ratio of points for carrying shots of various subjects is:

Cover drive : Pull : Square drive : Cut

= 4 : 3 : 2 : 1

Since the points are to be maximized, the number of shots that Brendon McCullum should carry in descending order is Cover drive, Pull, Square drive and Cut.

The ratio which Brendon McCullum has to maintain is:

Cover drive : Cut ⇒ 1 : 2,

Pull : Square drive ⇒ 1 : 2.

This means that a combination of Cover drive and Cut shots in the ratio of 1 : 2 will give 6 points while a combination of Pull and Square drive shots in the ratio of 1 : 2 will give 7 points, hence, Brendon McCullum should play the following combination of shots to maximize the points; Cover drive = 1, Pull = 2, Square drive = 5 and Cut = 2, a total of 22 points.

14. (b)

|  |  |  |
| --- | --- | --- |
| **Case I** | | |
|  | **True** | **False** |
| Employee of 902 | Long legs | Fair complexion |
| Employee of 903 | Wheatish complexion | Wore a cap |
| Employee of 904 | Didn't wore a cap | Short legs |

|  |  |  |
| --- | --- | --- |
| **Case II** | | |
|  | **True** | **False** |
| Employee of 902 | Fair complexion | Long legs |
| Employee of 903 | Wore a cap | Wheatish complexion |
| Employee of 904 | Short legs | Didn't wore a cap |

Both the cases are correct, and hence we see only option (b) is correct.

**Solutions for 15 – 16:**

15. (d)

Assume Jack is of P1. Then his statement is contradictory.

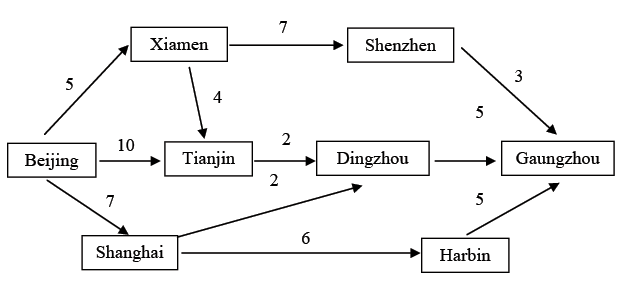
And if he is the P2, then his accepting himself as a liar does not hold good as per the qualities of P2 robot. this is an impossible statement.

16. (d)

If Paul is speaking the truth, Jack must be speaking truth.

Similarly, if Paul is lying then Jack cannot speak the truth. Hence both must be the same type and we cannot determine which type from this sentence.

**Solutions for 17 – 21:**



17. (c)

Commuter will take the route which will take minimum time.

Assume halting at every city = x minutes

Let us take Beijing → Xiamen:

Minimum time will take Beijing → Xiamen → Shenzhen → Gaungzhou

Time = 5 + 7 + 3 + 2x = 15 + 2x

Let us take Beijing → Tianjin:

Only possible route Beijing → Tianjin → Dingzhou → Gaungzhou

Time = 17 + 2x

Let us take Beijing → Shanghai:

The route which will take less time

= Beijing → Shanghai → Dingzhou → Gaungzhou

Time = 7 + 2 + 5 + 2x

= 14 + 2x

The first city that a commuter will reach is Shanghai.

18. (a)

Going by the options, if we take the halting time at Xiamen, Tianjin, Shanghai, Dingzhou and Harbin as 1, 0, 3, 4 and 0 respectively, along any route it will take the same time.

19. (a)

Going by the options, if we take the halting time as in Choice (a), the time taken along the routes –

Beijing → Xiamen → Shenzhen → Gaungzhou

Beijing → Tianjin → Dingzhou → Gaungzhou

Beijing → Shanghai → Dingzhou → Gaungzhou are same.

20. (c)

Going by the options, if we take the halting times as in choice (c), then along any route the total travel time will be 23 minutes.

21. (a)

The total halting time (in minutes) along all the routes are as follows:

Beijing → Xiamen → Shenzhen → Gaungzhou 18

Beijing → Xiamen → Tianjin → Dingzhou → Gaungzhou 22

Beijing → Shanghai → Dingzhou → Gaungzhou 17

Beijing → Shanghai → Harbin → Gaungzhou 21

Along the two routes given in choice (a), the travel time difference is three minutes.

**Solutions for 22 – 24:**

The statement given by P3 is “I don't speak truth”. If P3 always speaks the truth, he will not call himself a liar. Similarly, if P3 is a liar, then he will not speak the truth by admitting that he is a liar. Hence, P3 is the person whose statement is neither true nor false. Then, P2’s statement must be false, as only one person whose statement cannot be classified as true and false and that is P3. Hence, P1 always speaks the truth. Therefore,

P1 → always speaks the truth.

P3 → neither speaks the truth nor tells lies.

P2 → always tells lies.

22. (b)

P3 is the one whose statement cannot be classified as either true or false.

23. (c)

P2 always tells lies.

24. (a)

P1 always tells the truth.

**Solutions for 25 – 28:**

25. (b)

|  |  |  |  |
| --- | --- | --- | --- |
| **Time** | **Total** | **New Started** | **Stopped Working** |
| 10 am | 20 | 20 | 0 |
| 10:30 am | 25 | 5 | 0 |
| 11 am | 30 | 5 | 0 |
| 11:30 am | S | S – 10 | 20 |
| 12 pm | 20 |  | 5 |

When 5 spindles stop at 12 pm and considering no new spindles started at 12 pm, we still need 15 more spindles to get a number of 20 for 12 pm. Hence a maximum of 15 spindles can start at 11:30 am.

26. (a)

|  |  |  |  |
| --- | --- | --- | --- |
| **Time** | **Total** | **New Started** | **Stopped Working** |
| 10 am | 20 | 20 | 0 |
| 10:30 am | 25 | 5 | 0 |
| 11 am | 30 | 5 | 0 |
| 11:30 am | 20 | 10 | 20 |
| 12 pm | 20 | 5 | 5 |

27. (c)

A total of 20 + 10 = 30 spindles are working at 2:30 pm. These 30 account for 15% of the spindles so the total number of spindles will be 200.

28. (a)

Additional spindles turned on at 10:30 am = Total at 10:30 am – Total at 10:00 am = 25 – 20 = 5. No spindles are turned off at 10:30 am as none of them have completed 90 minutes in operation.

**Solutions for 1 – 4:**

1. (a)

FORWARD 25, BACKWARD 10 would effectively mean a FORWARD 15 i.e. n2 – n1 = 15, (if M – n1 > 25) and n2 = M – 10 (if M – n1 < 25). The only option that satisfies this is option (a). So if M = 10 and n1 = 0, then M – n1 < 25 and so n2 = 10 – 10 = 0. Hence, n1 = n2

2. (a)

BACKWARD, 5; FORWARD, 5 would effectively mean n1 = n2 (in case n1 ≥ 5) or n2 = 5 (in case n1 < 5). The only option that satisfies this is (a).

3. (b)

FORWARD, 10 ; FORWARD, 10 would effectively mean a FORWARD 20 i.e. n2 – n1 = 20, (if M – n1 ≥ 20) .or n2 =

M (if M – n1 < 20). The option that satisfies this condition is (b), as if M > 20 and n1 = 1, then M – n1 > 20, and hence n2 – n1 = 20.

4. (c)

FORWARD, 5; BACKWARD, 4, would effectively mean a FORWARD 1 i.e. n2 – n1 = 1 (if M – n1 ≥ 5) or n2 = M .

4 (if M – n1 < 5). The option that satisfies this condition is (c).

**Solutions for 5 – 6:**

5. (b)

Let us work by the rule of elimination. Option (a) cannot be true as there are many routes that satisfy the given

condition. Option (c) is also not true as we can have a route starting from D (e.g. DEBDCBAC). The route need not necessarily end at E, which is apparent from the eg. Given. Hence the correction option is (b).

6. (d)

City A is connected by 2 roads, B by 4 roads, C by 3 roads, D by 3 roads and E by 2 roads. For a city to be starting city for such a route, it has to be connected by odd number of roads. Hence the required answer is 2 viz. C and D.

**Solutions for 7 – 10:**

The situation is also shown in the following table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | **Who ate How many cookies?** | | | | **Not Eaten** | **Total** |
| **Who entered?** |  | **Swetha** | **Swarna** | **Sneha** | **Soumya** |
| Soumya | 3 | 3 | 3 | 3 | - | 12 |
| Sneha | 12 | 12 | 12 | - | 12 | 48 |
| Swarna | 24 | 24 | - | - | (27 × 2) = 48 | 96 |
| Swetha | 32 | - | - | - | (32 × 3) = 96 | 128 |
|  | Total | 71 | 39 | 15 | 3 | - | - |

7. (c)

We can see that Sneha ate 15 cookies in all.

8. (a)

Prem uncle gave 128 cookies to Swetha.

9. (d)

Swetha ate 71 cookies.

10. (c)

Swarna ate 39 cookies.

**Solutions for 11 – 12:**

|  |  |  |
| --- | --- | --- |
| Spice | – | Monday |
| Indigo | – | Tuesday |
| Go | – | Monday |
| Air India | – | Tuesday |
| Deccan | – | Tuesday |

11. (a)

Spice procession can only be allowed on Monday.

12. (d)

According to the given table, statement (IV) is not true.

**Solutions for 13 – 17:**

13. (d)

No traffic flows on the street from D to T

Now we have fuel cost on different paths as

SAT 9 + 5 = Rs. 14 + toll at junction A

SBAT 2 + 2 + 5 = Rs. 9 + toll at junction B and D

SBCT 2 + 3 + 2 = Rs. 7 + toll at junction B and C

SDCT 7 + 1 + 2 = Rs. 10 + toll at junction D and C

Now checking the option we find that toll at junction A is 0 or 1.

When toll is 0, fuel cost on SAT = 14 + 0 = Rs. 14

When toll is 1, fuel cost on SAT= 14 + 1=Rs. 15

The fuel cost on all the paths should be equal.

Option (a) ,(b) , (c), can be ruled out as in all these options toll at C and D adds up to more than Rs. 5. As fuel cost on SDCT is Rs.10 without toll, so with toll it cannot exceed Rs. 15 (i.e. toll of path SAT).

If option (d) taken, then fuel cost on all paths is Rs. 14.

14. (c)

Available routs are

SAT → Rs.14

SBAT → Rs.9

SDCT → Rs.10

SDT → Rs. 13

Now fuel cost of SAT – fuel of SDT =14 – 13 = Rs. 1. Hence, toll at junction D should be 1 more than the toll at junction A.

So, option (a) and (d) are ruled out.

Now fuel cost of SAT – fuel cost of SBAT = 14 – 9 = Rs. 5.

So, toll at junction B should be Rs. 5. Which is there in option (c).

15. (a)

Available paths considering no toll are

SAT → Rs.14

SBCT → Rs.7

SBAT → Rs. 9

SDCT → Rs. 10

SDT → Rs. 13

Fuel cost on Path SAT-fuel cost on SDT=14 – 13=Rs. 1, toll at junction D should be 1 more than the toll at junction A.

So, option (b) and (c) are ruled out.

Checking options (a) and (d).

When A = 0, paths SAT, SBAT and SDT are equally likely to be taken by a motorist.

When A = 1, cost on SAT and SBAT are not equal.

16. (d)

Available routes we

SAT → Rs.14

SBAT → Rs.9

SBCT → Rs. 7

SDCT → Rs.10

SDT → Rs. 13

Fuel cost on path SAT – fuel path SDT = 14 – 13 = Rs. 1.

So, the toll at junction D should 1 more than toll at junction A.

So, option (a) and (c) are ruled out.

Fuel cost on path SAT – fuel cost on path SBCT = 14 – 7 = Rs. 7

So, sum of toll at junction B and C should be 7 more than the toll at A. Hence only option (d) matches.

17. (c)

We have to find a path on which minimum cost is incurred and such that total traffic through B does not exceed 70%

So, option (d) is ruled out because we can send all traffic through SDCT or SDT and meet all conditions.

Option (a) is also ruled out as in that case all traffic will be passed through SBCT [not possible as traffic at B can`t be more than 70%]

Option (b) is also ruled out as it is possible only when toll at junction C is 2. In that case also all traffic will pass through B.

**Solutions for 18 – 20:**

18. (a)

We know that one of box contains balls with 9 grams weight each. Let us take 1 ball from 1st box, 2 balls from 2nd box, 3 balls from 3rd box and so on till 10 balls from 10th box. In total we have 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55 balls. Ideally the weight should have been 55 × 10 = 550 grams.

Let us say the electronic balance shows the weight as 545 grams, we can say 5 balls are defected and hence 5th box is the one with defected balls. Hence, let us say the nth box is defected, n = 550 – weight being show by the balance. So, only 1 weighing is sufficient.

19. (a)

We know that one of box contains balls with 9 grams weight each. Let us take 1 ball from 1st box, 2 balls from 2nd box, 3 balls from 3rd box and so on till 10 balls from 10th box. In total we have 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55 balls. Ideally the weight should have been 55 × 10 = 550 grams.

Let us say the electronic balance shows the weight as 555 grams, we can say 5 balls are defected and hence 5th box is the one with defected balls. Hence, let us say the nth box is defected, n = Weight being show by the balance –550. So, only 1 weighing is sufficient.

20. (a)

We know that one of box contains balls with 9 grams weight each. Let us take 1 ball from 1st box, 2 balls from 2nd box, 3 balls from 3rd box and so on till 10 balls from 10th box. In total we have 1 + 2 + 3 + 4 + 5 + 6 + 7 + 8 + 9 + 10 = 55 balls. Ideally the weight should have been 55 × 10 = 550 grams.

Let us say the electronic balance shows the weight as 555 grams, we can say 5 balls are defected and hence 5th box is the one with defected balls (weighing 11 grams). If the weight is 546 grams, we can say 4 balls are defected and defected balls with 9 grams. Hence, let us say the nth box is defected, n = |Weight being show by the balance – 550|. So, only 1 weighing is sufficient.

**Solutions for 21 – 23:**

Let us analyse the cases one by one for the person who always speaks the truth.

(T → Truth; F → False)

I. Jaspal always speaks truth:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **Medal** |
| Jaspal | T | T | Bronze |
| Narang | T | T | Silver |
| Bindra | T | F | Gold |

II. Bindra always speaks the truth:

|  |  |  |  |
| --- | --- | --- | --- |
|  | **I** | **II** | **Medal** |
| Jaspal | F | T | Gold |
| Narang | F | T | Silver |
| Bindra | T | T | Bronze |

In the above two cases, Jaspal and Narang always speaks the truth in case I. And Bindra always speaks the truth in case II.

21. (b)

In either of the cases I or II, Narang won Silver.

22. (d)

In cases I, Jaspal won Bronze and in case II, Jaspal won Gold. Hence, cannot be determined.

23. (d)

a. is true in case I; b. is true in case II;

c. is true in case II; d. is true in neither I nor II.

**Solutions for 24 – 26:**

24. (b)

We will divide the 9 balls into 3 groups:

G1 (3 balls); G2 (3 balls); G3 (3 balls)

**Case 1:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 = B2 of G3, B3 of G3 is the defected ball

**Case 2:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 > B2 of G3, B2 of G3 is the defected ball

**Case 3:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 < B2 of G3, B1 of G3 is the defected ball

**Case 4:**

Weighing 1: G1 > G2; G2 is the group with defected ball

Weighing 2: B1 of G2 = B2 of G2, B3 of G2 is the defected ball

**Case 5:**

Weighing 1: G1 > G2; G2 is the group with defected ball

Weighing 2: B1 of G2 > B2 of G2, B2 of G2 is the defected ball

**Case 6:**

Weighing 1: G1 > G2; G2 is the group with defected ball

Weighing 2: B1 of G2 < B2 of G2, B1 of G2 is the defected ball

There will be similar cases for G1 < G2, and in all those cases also we will get the defected ball in 2 weighing’s.

25. (b)

We will divide the 9 balls into 3 groups:

G1 (3 balls); G2 (3 balls); G3 (3 balls)

**Case 1:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 = B2 of B3, B3 of G3 is the defected ball

**Case 2:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 > B2 of G3, B1 of G3 is the defected ball

**Case 3:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 < B2 of G3, B2 of G3 is the defected ball

**Case 4:**

Weighing 1: G1 > G2; G1 is the group with defected ball

Weighing 2: B1 of G1 = B2 of G1, B3 of G1 is the defected ball

**Case 5:**

Weighing 1: G1 > G2; G1 is the group with defected ball

Weighing 2: B1 of G2 > B2 of G2, B1 of G1 is the defected ball

**Case 6:**

Weighing 1: G1 > G2; G1 is the group with defected ball

Weighing 2: B1 of G1 < B2 of G1, B2 of G1 is the defected ball

There will be similar cases for G1 < G2, and in all those cases also we will get the defected ball in 2 weighing’s.

26. (c)

**Case 1 – 2 weighing’s:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 = B2 of B3, B3 of G3 is the defected ball

**Case 2 – 3 weighing’s:**

Weighing 1: G1 = G2; G3 is the group with defected ball

Weighing 2: B1 of G3 > B2 of G3, This will tell either B1 or B2 is the defected ball.

Weighing 3: Take either B1 or B2 and weigh it with B3. If we take B1 and it comes out to be heavier than B3, so B1 is the defected ball and it’s heavier than the others. If B3 comes out to be equal to B1, means B2 is the defected ball and it’s lighter than the other.

**Case 3 – 3 weighing’s:**

Weighing 1: G1 > G2; Either G1 or G2 is the defected group.

Weighing 2: Check either G1 or G2 with G3. If we take G1with G3 and G1 and G3 are equal then G2 will be the group with defected ball. If G1 > G3, then G1 must be the group with defected ball. Similarly, this can be done for G2. Apart from the group we will also know the defect in that ball. If G1 = G3, then G2 is lighter than them, so the defect is light ball. If G1 > G3, means G1 is heavier than both and hence the defect is heavy ball.

Weighing 3: Take B1 and B2 of the faulty group. If they are equal then G3 is defected, If B1 and B2 are not equal then we can again point out the defected ball as we already know the defect in the ball.

**Solutions for 27 – 30:**

We can put the data about the balls in the following table:

|  |  |  |  |
| --- | --- | --- | --- |
| **Colour** | **Bags** | **Balls per bag** | **Total balls of each colour** |
| Red | 4 | 12 | 48 |
| Green | 3 | 18 | 54 |
| Blue | 2 | 25 | 50 |
| Yellow | 5 | 9 | 45 |
| White | 5 | 7 | 35 |
| **Total** | **19** |  | **232** |

In all the questions we have to see the worst case scenario to be sure of.

27. (b)

The worst case scenario will be to leave out a bag which has maximum number of balls. So we leave out the bag with 25 balls. So, far we must have picked 232 – 25 = 207 balls. As soon as we pick the next ball we will atleast one ball from each bag. So, the number of balls required is 208.

28. (a)

The worst case scenario will be to leave out the balls of the colour having maximum number of balls i.e. green balls. So, balls picked so far must be = 232 – 54 = 182. As soon as we pick another ball we will be sure of having picked one ball of each colour. So, the number of balls required is 183

29. (c)

The worst case scenario will be to leave out 1 ball each from all the bags so that none of the bags content is still complete. There are a total of 19 bags, hence the number of balls picked so far = 232 – 19 = 213. As soon as we pick the next ball we will have the one complete bag, hence the answer is 214.

30. (d)

The worst case scenario will be to leave out 1 ball each from all the colours so that none of the colours is still complete. There are a total of 5 colours, hence the number of balls picked so far = 232 – 5 = 227. As soon as we pick the next ball we will have one complete colour, so the answer is 228.

**Solutions for 31 – 34:**

31. (c)

Start with 20.

Step 1: 20

Step 2: 200 (Logic 2)

Step 3: 20000 (Logic 2)

Step 4: 200000000 (Logic 2)

Step 5: 21100 (Logic 3)

32. (d)

Such construction is not possible with the given logics.

33. (a)

Step 1: 20

Step 2: 200 (Logic 2)

Step 3: 20000 (Logic 2)

Step 4: 200000000 (Logic 2)

Step 5: 2000000 (Logic 4)

Step 6: 2000000000000 (Logic 2)

Step 7: 2111000 (Logic 3)

Step 8: 21110 (Logic 4)

34. (c)

211, 210, 200 and 201 are possible numbers that can be formed with 20.