CAT2006 Original Paper with Solutions

SECTION – I (DI)

Section – I has 25 questions

Answer Questions 1 to 5 on the basis of the information given below:

K, L, M, N, P, Q, R, S, U and W are the only ten members in a department. There is a proposal to form a team from within the members of the department, subject to the following conditions:

- A team must include exactly one among P, R, and S.
- A team must include either M or Q, but not both.
- If a team includes K, then it must also include L, and vice versa.
- If a team includes one among S, U, and W, then it must also include the other two.
- L and N cannot be members of the same team.
- L and U cannot be members of the same team.

The size of a team is defined as the number of members in the team.

1. Who cannot be a member of a team of size 3?
(1) L (2) M (3) N (4) P (5) Q

2. Who can be a member of a team of size 5?
(1) K (2) L (3) M (4) P (5) R

3. What would be the size of the largest possible team?
(1) 8 (2) 7 (3) 6
(4) 5 (5) Cannot be determined

4. What could be the size of a team that includes K?
(1) 2 or 3 (2) 2 or 4 (3) 3 or 4
(4) Only 2 (5) Only 4

5. In how many ways a team can be constituted so that the team includes N?
(1) 2 (2) 3 (3) 4
(4) 5 (5) 6

Solutions for questions 1 to 5:

The given conditions are as follows:

(i) Exactly one among P, R and S is to be included.
(ii) Exactly one among M and Q is to be included.
(iii) Either both K and L are included or neither of them is included.
(iv) Either all of S, U and W are included or none of them is included.
(v) Either exactly one among L and N is included or neither of them is included.
(vi) Either exactly one among L and U is included or neither of them is included.

1. Choice (1).
If L is in the team K will also be in the team. Exactly one among P, R and S and exactly one among M and Q are included in the team. Hence, when L is in the team the team strength will be at least four. Hence, L cannot be in the team of three.
Choices (2), (3) and (4): M, P and N is a possible team.
Choice (5) : P, Q and N is a possible team.
Choice (1)

2. Choice (1) and (2): If K is in the team, then L is also included and vice versa.
⇒ Neither U nor N is included.
When U is not included neither S nor W is included.
From (ii), only one among M and Q is included.
From (i), only one among P and R is included.
Hence, the team can be K L M P or K L M R or K L Q P or K L Q R.
Choice (3): If M is included, then Q cannot be included.
If S is included neither of R and P is included. When S is included then both U and W are included.
Since U is included L cannot be included but N can be included.
Hence, the team is M, S, U, W and N.
Choice (4) and (5) : If any one of P or R is included then S cannot be included.
⇒ U and W are also not included.
Only one among M and Q is included.
If K is included, then L is also included.
⇒ N cannot be included.
Hence, the team can be (P, M or Q), (K, L or R) (K, L and M or Q). Choice (3)

3. To have the largest possible team we should include S, U and W.
⇒ Neither P nor R is included.
Only one among M and Q is included.
Both K and L can be included.
Since, L is included neither N nor U can be included.
Hence, the maximum possible strength of the team is 5. Choice (4)

4. If K is included, then L is also included.
⇒ Both N and U are not included.
Since U is not included neither of S and W is included.
⇒ The team consists of only four members.
Choice (5)

5. If N is included, then L is not included.
⇒ K is not included.
But U may or may not be included.

Case (i) : U is included.
⇒ S and W are also included.
⇒ Neither P nor R is included.
One among M and Q is included.
Hence, the possible teams are N, U, S, W and P or N, U, S, W and Q.

Case (ii): U is not included.
⇒ Neither S nor W is included
⇒ Exactly one among P and R is included.
Exactly one among M and Q is included. Hence, the possible teams are (N, P and M) or (N, P and Q) or (N, R and M) or (N, R and Q).
Hence, the teams can be formed in six different ways. Choice (5)

Answer Questions 6 to 10 on the basis of the information given below:

In a Class X Board examination, ten papers are distributed over five Groups – PCB, Mathematics, Social Science, Vernacular and English. Each of the ten papers is evaluated out of 100. The final score of a student is calculated in the following manner. First, the Group Scores are obtained by averaging marks in the papers within the Group. The final score is the simple average of the Group Scores. The data for the top ten students are presented below. (Dipan's score in English Paper II has been intentionally removed in the table.)

Name of the student	PCB Group			Mathematics Group	Social Science Group		Vernacular Group		English Group		Final Score
	Phy	Chem.	Bio.		Hist.	Geo.	Paper - I	Paper - II	Paper - I	Paper - II	
Ayesha (G)	98	96	97	98	95	93	94	96	96	98	96.2
Ram (B)	97	99	95	97	95	96	94	94	96	98	96.1
Dipan (B)	98	98	98	95	96	95	96	94	96	??	96.0
Sagnik (B)	97	98	99	96	96	98	94	97	92	94	95.9
Sanjiv (B)	95	96	97	98	97	96	92	93	95	96	95.7
Shreya (G)	96	89	85	100	97	98	94	95	96	95	95.5
Joseph (B)	90	94	98	100	94	97	90	92	94	95	95.0
Agni (B)	96	99	96	99	95	96	82	93	92	93	94.3
Pritam (B)	98	98	95	98	83	95	90	93	94	94	93.9
Tirna (G)	96	98	97	99	85	94	92	91	87	96	93.7

Note: B or G against the name of a student respectively indicates whether the student is a boy or a girl.

6. How much did Dipan get in English Paper II?
(1) 94 (2) 96.5 (3) 97 (4) 98 (5) 99

7. Among the top ten students, how many boys scored at least 95 in at least one paper from each of the groups?
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5

8. Had Joseph, Agni, Pritam and Tirna each obtained Group Score of 100 in the Social Science Group, then their standing in decreasing order of final score would be:
(1) Pritam, Joseph, Tirna, Agni
(2) Joseph, Tirna, Agni, Pritam
(3) Pritam, Agni, Tirna, Joseph
(4) Joseph, Tirna, Pritam, Agni
(5) Pritam, Tirna, Agni, Joseph

9. Students who obtained Group Scores of at least 95 in every group are eligible to apply for a prize. Among those who are eligible, the student obtaining the highest Group Score in Social Science Group is awarded this prize. The prize was awarded to:
(1) Shreya (2) Ram (3) Ayesha
(4) Dipan (5) No one from the top ten

10. Each of the ten students was allowed to improve his/her score in exactly one paper of choice with the objective of maximizing his/her final score. Everyone scored 100 in the paper in which he or she chose to improve. After that, the topper among the ten students was:
(1) Ram (2) Agni (3) Pritam
(4) Ayesha (5) Dipan

Solutions for questions 6 to 10:

6. Average score of Dipan in PCB group is 98.
Similarly, his average scores in Mathematics, Social Science, and Vernacular groups are 95, 95.5 and 95.
Let the average score in English group be x.

$\therefore \frac{98+95+95.5+95+x}{5} = 96 \Rightarrow x = 96.5$

We got his average score in English group is 96.5
His score in paper I of English group is 96.
Let his score in paper II be y.

$\therefore \frac{96+y}{2} = 96.5 \Rightarrow y = 97$ Choice (3)

7. Here, the given condition is not satisfied for
Ram in Vernacular group
Sagnik in English group
Sanjiv in Vernacular group
Joseph in PCB group
Agni in Vernacular group
Prita, in Vernacular group. Only Dipan scored at least 95 in at least one paper from each of the groups. Choice (1)

8. Initial group score of Joseph in Social Science group is $\frac{94+97}{2} = 95.5$
Now it became 100.

$\therefore$ Final score increased by $\frac{100-95.5}{5} = 0.9$

$\Rightarrow$ Final score will be 95.9.

Student	Change in group	Increase
Agni	95.5 → 100	$\frac{4.5}{5}=0.9$
Pritam	89 → 100	$\frac{11}{5}=2.2$
Tirna	89.5 → 100	$\frac{10.5}{5}=2.1$

The final scores of Joseph, Agni, Pritam and Tirna are 95.9, 95.2, 96.1 and 95.8.
$\therefore$ Decreasing order of final scores will be Pritam Joseph, Tirna and Agni. Choice (1)

9. We have to consider the thing that if a person gets less than 95 in all the subjects, his score will be definitely less than 95. From question 8, we already checked this for all the boys. Hence, there is no need to check for the boys again.

⇒ Only Dipan got 95 in all the groups and Dipan's group score in Social Sciences group is 95.5 (total is 191). As we are looking for the topper, we will check for the girl who has more score (i.e. total) than Dipan. Only Shreya got more score than Dipan, but the given condition is not satisfied for Shreya in Vernacular group.
∴ Dipan should get the prize. Choice (4)

10. The paper should be selected such that, the increase per paper in that group must be maximum.
If there is only one subject in the group, the increase will be $\frac{(\text{increase})}{5}$.
If there are only two subjects in the group, the increase will be $\frac{(\text{increase})}{10}$.
If there are three subjects in the group, the increase will be $\frac{(\text{increase})}{15}$.
From the given persons, Dipan has an increase of 1 i.e., from Maths.
∴ The topper will be Dipan with 97. Choice (5)

Answer Questions 11 to 15 on the basis of the information given below:

Mathematicians are assigned a number called Erdös number (named after the famous mathematician, Paul Erdös). Only Paul Erdös himself has an Erdös number of zero. Any mathematician who has written a research paper with Erdös has an Erdös number of 1. For other mathematicians, the calculation of his/her Erdös number is illustrated below:

Suppose that a mathematician X has co-authored papers with several other mathematicians. From among them, mathematician Y has the smallest Erdös number. Let the Erdös number of Y be y. Then X has an Erdös number of y+1. Hence any mathematician with no co-authorship chain connected to Erdös has an Erdös number of infinity.

In a seven day long mini-conference orgainzed in memory of Paul Erdös, a close group of eight mathematicians, call them A, B, C, D, E, F, G and H, discussed some research problems. At the beginning of the conference, A was the only participant who had an infinite Erdös number. Nobody had an Erdös number less than that of F.

On the third day of the conference F co-authored a paper jointly with A and C. This reduced the average Erdös number of the group of eight mathematicians to 3. The Erdös numbers of B, D, E G and H remained unchanged with the writing of this paper. Further, no other co-authorship among any three members would have reduced the average Erdös number of the group of eight to as low as 3.

At the end of the third day, five members of this group had identical Erdös numbers while the other three had Erdös numbers distinct from each other.

On the fifth day, E co-authored a paper with F which reduced the group's average Erdös number by 0.5. The Erdös numbers of the remaining six were unchanged with the writing of this paper.
No other paper was written during the conference.

11. How many participants in the conference did not change their Erdös number during the conference?
(1) 2 (2) 3 (3) 4
(4) 5 (5) Cannot be determined

12. The person having the largest Erdös number at the end of the conference must have had Erdös number (at that time):
(1) 5 (2) 7 (3) 9
(4) 14 (5) 15

13. How many participants had the same Erdös number at the beginning of the conference?
(1) 2 (2) 3 (3) 4
(4) 5 (5) Cannot be determined

14. The Erdös number of C at the end of the conference was:
(1) 1 (2) 2 (3) 3 (4) 4 (5) 5

15. The Erdös number of E at the beginning of the conference was:
(1) 2 (2) 5 (3) 6 (4) 7 (5) 8

Solutions for questions 11 to 15:

As no person has an Erdos number less than F, either F has the least Erdos number or more than one person has the same number as F but they all have the least number.

So these are two possibilities – either F had an Erdos number 1 or 2 before the conference (as average after the third round is 3 and there is no change in Erdos number of F in the conference).

Assume F has an Erdos number of 2.
So after the third round, A and C had an Erdos number of 3 (y + 1 if Erdos number of the mathematician with the lowest Erdos number is y).

As on the fifth day, E co-authored a paper with F and the group's average reduces by 0.5. The reduction in E's Erdos number is 8 × 5 = 4 and by the same logic as above, E would end up with an Erdos number of 3 or before that he has an Erdos number of 3 + 4 = 7.

So the value of the Erdos numbers we now have at the end of the third day for the different mathematicians are

A	B	C	D	E	F	G	H
3		3		7	2		

Now we have to find the Erdos numbers for four more persons and as the total is 24 (8 × 3), the remaining four persons must have a total of 24 – (3 + 3 + 7 + 2) = 9, for which the only possibility is 2, 2, 2 and 3 which will violate the condition that at the end of the third day, five members have the same Erdos number.

∴the only possible value of Erdos number for F is 1 which will make the values at the end of the third day as (using the same logic as for F being 2).

A	B	C	D	E	F	G	H
2	2		6	1			

Now we have four more persons whose Erdos numbers add up to 13 and with the value of five numbers being equal, the only possibility is 2, 2, 2 and 7, which can be taken up by B, D, G and H in any order.

11. As A, C, E are the ones who co-authored with F and as it is given that no other co-authorship among any three members would have made the average as 3 after the third day, A, C definitely changed their Erdos number and from the explanation above E also changed his Erdos number or the remaining five persons did not change their Erdos number.
Choice (4)

12. One person among B, D, G or H had an Erdos number of 7 before the conference and his value did not change during the conference. Choice (2)

13. Three persons among B, D, G and H had the same number at the beginning while A and C became equal to them mid-way through the conference.
Choice (2)

14. The Erdos number of C at the end of the conference was 2. Choice (2)

15. The Erdos number of E at the beginning of the conference was 6. Choice (3)

Answer Questions 16 to 20 on the basis of the information given below:

Two traders, Chetan and Michael, were involved in the buying and selling of MCS shares over five trading days. At the beginning of the first day, the MCS share was priced at Rs.100, while at the end of the fifth day it was priced at Rs.110. At the end of each day, the MCS share price either went up by Rs.10, or else, it came down by Rs.10. Both Chetan and Michael took buying and selling decisions at the end of each trading day. The beginning price of MCS share on a given day was the same as the ending price of the previous day. Chetan and Michael started with the same number of shares and amount of cash, and had enough of both. Below are some additional facts about how Chetan and Michael traded over the five trading days.

- Each day if the price went up, Chetan sold 10 shares of MCS at the closing price. On the other hand, each day if the price went down, he bought 10 shares at the closing price.
- If on any day, the closing price was above Rs.110, then Michael sold 10 shares of MCS, while if it was below Rs.90, he bought 10 shares, all at the closing price.

16. If Chetan sold 10 shares of MCS on three consecutive days, while Michael sold 10 shares only once during the five days, what was the price of MCS at the end of day 3?
(1) Rs.90 (2) Rs.100 (3) Rs.110
(4) Rs.120 (5) Rs.130

17. If Chetan ended up with Rs.1300 more cash than Michael at the end of day 5, what was the price of MCS share at the end of day 4?
(1) Rs.90 (2) Rs.100 (3) Rs.110
(4) Rs.120 (5) Not uniquely determinable

18. If Michael ended up with 20 more shares than Chetan at the end of day 5, what was the price of the share at the end of day 3?
(1) Rs.90 (2) Rs.100 (3) Rs.110
(4) Rs.120 (5) Rs.130

19. If Michael ended up with Rs.100 less cash than Chetan at the end of day 5, what was the difference in the number of shares possessed by Michael and Chetan (at the end of day 5)?
(1) Michael had 10 less shares than Chetan.
(2) Michael had 10 more shares than Chetan.
(3) Chetan had 10 more shares than Michael.
(4) Chetan had 20 more shares than Michael.
(5) Both had the same number of shares.

20. What could have been the maximum possible increase in combined cash balance of Chetan and Michael at the end of the fifth day?
(1) Rs.3700 (2) Rs.4000 (3) Rs.4700
(4) Rs.5000 (5) Rs.6000

Solutions for questions 16 to 20:

Here the total increase in the price of the share is Rs.10. Hence, of the five days, there must be an increase for three of the five days and there is a decrease for two days.

16. Given that, Michael sold 10 shares only once. Hence, the price is more than 110 for only one day and on all the remaining days it is not more than 110. We can get the share price as 120 with three increases and two decreases. But as the three increases are on consecutive days, the three days can be (Day 1, Day 2, Day 3) or (Day 2, Day 3, Day 4) or (Day 3, Day 4, Day 5). But it cannot be (Day 1, Day 2, Day 3), the reason being that the price will be more than 110 on Day 2 as well as Day 3. It cannot be (Day 3, Day 4,Day 5) the reason being that the price cannot be 120 on any of the days.
∴ The increase must be on (Day 2, Day 3, Day 4).
∴ There is a decrease on Day1 and Day 5
∴ The price at the end of Day 3 is
100 – 10 + 10 + 10 = 110. Choice (3)

17. Given that Chetan ended up with Rs.1300 more than Michael at the end of Day 5. The maximum possible change in the amount with Chetan is Rs.1300, as he sells shares on three days and buys shares on the remaining two days.
∴ Michael should not have sold any shares and also he should not have bought any shares.
∴ The share price did not cross 110 or did not fall below 90 on any of the days.
∴ The price of the share at the end of Day 4 cannot be 120.
∴ It must be 100. Choice (2)

18. Chetan will sell 10 shares each for three days and buy shares for two days. Hence, if he had x shares at the beginning of Day 1, he finally had (x – 10) shares at the end of Day 5.

∴ Michael had (x + 10) shares on Day 5.
∴ He bought 10 shares on one of the five days i.e share price should be less than 90 on that day.
∴ It should be 80. Hence, the only possibility is
100 – 90 – 80 – 90 – 100 – 110
Day 1 Day 2 Day 3 Day 4 Day 5
∴ It is 90 at the end of Day 3. Choice (1)

19. If the difference in the shares is 10 or more, the difference in the amounts would be close to Rs.1000, but it is given the difference is Rs.100.
∴ The number of shares with them must be the same. The following table represents one of the possibilities where Michael ended up with Rs.100 less than Chetan, while both of them ended up with the same number of shares.

	Beginning	Ending
Day 1	100	110
Day 2	110	120
Day 3	120	110
Day 4	110	100
Day 5	100	110

Choice (5)

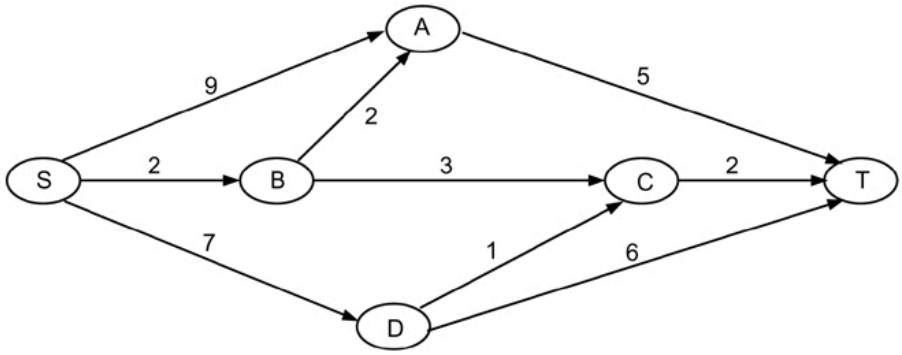
20. The maximum possible cash balance is possible, when both of them sell the maximum number of shares.
∴ That happens in the following case.

	Beginning	Ending
Day 1	100	110
Day 2	110	120
Day 3	120	130
Day 4	130	120
Day 5	120	110

The change in amount with Chetan = $(110 \times 10) + (120 \times 10) + (130 \times 10) - (120 \times 10) - (110 \times 10)$
= 1300
That with Michael = $(120 \times 10) + (130 \times 10) + (120 \times 10)$ = 3700.
Total = Rs.5000.
Choice (4)

Answer Questions 21 to 25 on the basis of the information given below :

A significant amount of traffic flows from point S to point T in the one-way street network shown below. Points A, B, C and D are junctions in the network, and the arrows mark the direction of traffic flow. The fuel cost in rupees for travelling along a street is indicated by the number adjacent to the arrow representing the street.



Motorists travelling from point S to point T would obviously take the route for which the total cost of travelling is the minimum. If two or more routes have the same least travel cost, then motorists are indifferent between them. Hence, the traffic gets evenly distributed among all the least cost routes.

The government can control the flow of traffic only by levying appropriate toll at each junction. For example, if a motorist takes the route S-A-T (using junction A alone), then the total cost of travel would be Rs.14 (i.e., Rs.9 + Rs.5) plus the toll charged at junction A.

21. If the government wants to ensure that no traffic flows on the street from D to T, while equal amount of traffic flows through junctions A and C, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:
(1) 1, 5, 3, 3 (2) 1, 4, 4, 3 (3) 1, 5, 4, 2
(4) 0, 5, 2, 3 (5) 0, 5, 2, 2

22. If the government wants to ensure that all motorists travelling from S to T pay the same amount (fuel costs and toll combined) regardless of the route they choose and the street from B to C is under repairs (and hence unusable), then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:
(1) 2, 5, 3, 2 (2) 0, 5, 3, 1 (3) 1, 5, 3, 2
(4) 2, 3, 5, 1 (5) 1, 3, 5, 1

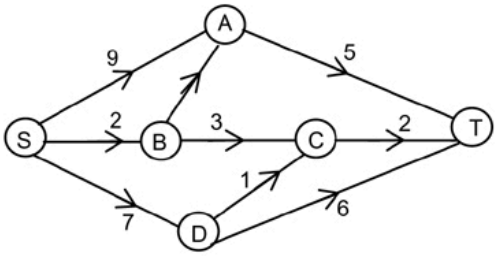
23. If the government wants to ensure that the traffic at S gets evenly distributed along streets from S to A, from S to B, and from S to D, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:
(1) 0, 5, 4, 1 (2) 0, 5, 2, 2
(3) 1, 5, 3, 3 (4) 1, 5, 3, 2
(5) 0, 4, 3, 2

24. If the government wants to ensure that all routes from S to T get the same amount of traffic, then a feasible set of toll charged (in rupees) at junctions A, B, C and D respectively to achieve this goal is:
(1) 0, 5, 2, 2 (2) 0, 5, 4, 1
(3) 1, 5, 3, 3 (4) 1, 5, 3, 2
(5) 1, 5, 4, 2

25. The government wants to devise a toll policy such that the total cost to the commuters per trip is minimized. The policy should also ensure that not more than 70 per cent of the total traffic passes through junction B. The cost incurred by the commuter travelling from point S to point T under this policy will be:

(1) Rs.7 (2) Rs.9 (3) Rs.10
(4) Rs.13 (5) Rs.14

Solutions for questions 21 to 25:



The possible routes are

Route	Total cost	Junction
S – A – T	14	A
S – B – A – T	9	A,B
S – B – C – T	7	B , C
S – D – C – T	10	C, D
S – D – T	13	D

It is given that, for each of the routes, the only way to increase the total cost is to impose tolls at the junctions. Let the tolls imposed at A, B, C, D be a, b, c, d respectively. Now, the total cost for each of the five routes will be as follows.

Route	Total cost
S – A – T	14 + a
S – B – A – T	9 + (a + b)
S – B – C – T	7 + (b + c)
S – D – C – T	10 + (c + d)
S – D – T	13 + d

21. No traffic flows from D – T. Now apply each of the options. New costs will be as follows.

Route	Option 1	Option 2	Option 3	Option 4	Option 5
S – A – T	15	15	15	14	14
S – B – A – T	15	14	15	14	14
S – B – C – T	15	15	16	14	14
S – D – C – T	16	17	16	15	14
S – D – T	16	16	15	16	15

As it is given that traffic flow at junction A is same as that at junction C.
∴ Number of routes involving A that can be used must be same as that involving C.
Further, only the routes with minimum cost can be used.
That happened in only (5), as of the routes that can be used, the number of routes involving A is two (S-A-T and S-B-A-T) and that involving C is also two (S-B-C-T and S-D-C-T) Choice (5)

22. As B – C is unusable, S – B – C – T is not possible.
From the remaining, if we apply all the options:

Route	Option 1	Option 2	Option 3	Option 4	Option 5
S – A – T	16	14	15	16	15
S – B – A – T	16	14	15	14	13
S – D – C – T	15	14	15	16	16
S – D – T	15	14	15	14	14

Both option (2) and (3) are true, as in both the cases total cost is same for each of the four routes.
Choice (2/3)

23. From the given options

Route	Option 1	Option 2	Option 3	Option 4	Option 5
S-A-T	14	14	15	15	14
S-B-A-T	14	14	15	15	13
S-B-C-T	16	14	15	15	14
S-D-C-T	15	14	16	15	15
S-D-T	14	15	16	15	15

It is very likely that option (4) is selected. But if all the five routes has the same cost, then there will be an equal flow in all the five routes i.e. 20% in each route. But then the percentage of traffic in
S-A = 20%
S-B = 40% (As there are two routes involving S-B)
S-D = 40% (For the same reason as above)
But here the given condition that traffic in S-A is equal to that in S-B, which in turn is equal to S-D is not satisfied.
As S-A = S-B = S-D
Of the routes, that can be used the number of routes involving S-A must be the same as S-B, which inturn is same as that as S-D. It happened in only option (1).
Choice (1)

24.

Route	Option 1	Option 2	Option 3	Option 4	Option 5
S-A-T	14	14	15	15	15
S-B-A-T	14	14	15	15	15
S-B-C-T	14	16	15	15	16
S-D-C-T	14	15	16	15	16
S-D-T	15	14	16	15	15

As the cost must be same for all the routes, it must be option (4).
Choice (4)

25. There must be one other route other than those involving B.
We must take S-D-C-T as the other route.
S-B-C-T, if toll at B = 3, total cost = 10
S-D-C-T, if toll at D and C is 0, total cost is 10.
∴ 10 is the least cost.
Choice (3)

SECTION – II (RC & Verbal)

Section – II has 25 questions.

Directions for Questions 26 to 30: Each of the following questions has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

26. Relations between the factory and the dealer are distant and usually strained as the factory tries to force cars on the dealers to smooth out production. Relations between the dealer and the customer are equally strained because dealers continuously adjust prices – make deals – to adjust demand with supply while maximizing profits. This becomes a system marked by a lack of long-term commitment on either side, which maximizes feelings of mistrust. In order to maximize their bargaining positions, everyone holds back information – the dealer about the product and the consumer about his true desires.

(1) As a result, 'deal making' becomes rampant, without concern for customer satisfaction.
(2) As a result, inefficiencies creep into the supply chain.
(3) As a result, everyone treats the other as an adversary, rather than as an ally.
(4) As a result, fundamental innovations are becoming scarce in the automobile industry.
(5) As a result, everyone loses in the long run.

Solution:

The passage explains the kind of differences that exist between the components in the supply chain, i.e – production to distribution to consumer. The nature of the differences result in a system lacking commitment on the part of the components, and absence of transparency in dealings. Choice 2 only speaks of certain repercussions for a mutually beneficial relationship. Choice 3 is inappropriate, as since everyone treating the other as an adversary is the present condition not the result of the relationship. Choice 1 is inappropriate since the customer (involved in deal making) would have his own satisfaction in mind. Choice 4 is not relevant to the paragraph. Choice 5 is appropriate as the passage talks of 'alack of long term commitment' which would lead to everyone losing in the long run.

Choice (5)

27. We can usefully think of theoretical models as maps, which help us navigage unfamiliar territory. The most accurate map that it is possible to construct would be of no practical use whatsoever, for it would be an exact replica, on exactly the same scale, of the place where we were. Good maps pull out the most important features and throw away a huge amount of much less valuable information. Of course, maps can be bad as well as good – witness the attempts by medieval Europe to produce a map of the world. In the same way, a bad theory, no matter how impressive it may seem in principle, does little or nothing to help us understand a problem.

(1) But good theories, just like good maps, are invaluable, even if they are simplified.
(2) But good theories, just like good maps, will never represent unfamiliar concepts in detail.
(3) But good theories, just like good maps, need to balance detail and feasibility of representation.
(4) But good theories, just like good maps, are accurate only at a certain level of abstraction.
(5) But good theories, just like good maps, are useful in the hands of a user who knows their limitations.

Solution:

The passage compares maps with theories. Good maps give only the 'most important features' and leave out less valuable information. So too are good theories. Choice 2 categorically states that good theories 'will never represent unfamiliar concepts' whereas a concept being familiar or unfamiliar depends on a person's knowledge. Choice 3 can be ruled out because the passage does not talk of balancing details with feasibility of representation. Choice 4 cannot be he answer because maps don't have to become abstract to be accurate. Choice 5 is not the answer because the para has not mentioned a user so far. Choice (1)

28. In the evolving world order, the comparative advantage of the United States lies in its military force. Diplomacy and international law have always been regarded as annoying encumbrances, unless they can be used to advantage against an enemy. Every active player in world affairs professes to seek only peace and to prefer negotiation to violence and coercion.

(1) However, diplomacy has often been used as a mask by nations which intended to use force.
(2) However, when the veil is lifted, we commonly see that diplomacy is understood as a disguise for the rule of force.
(3) However, history has shown that many of these nations do not practice what they profess.
(4) However, history tells us that peace is professed by those who intend to use violence.
(5) However, when unmasked, such nations reveal a penchant for the use of force.

Solution:

All the choices provided seem to follow from the last line of the passage. However, since the statement indicates what is professed, the contradiction would be in the intentions behind that – best expressed in choice (2). In addition, choice 2 is the only sentence that corresponds to the singular "every active player" – all the other sentences use plurals. Choice (2)

29. I am sometimes attacked for imposing 'rules'. Nothing could be further from the truth. I hate rules. All I do is report on how consumers react to different stimuli. I may say to a copywriter, "Research shows that commercials with celebrities are below average in persuading people to buy products. Are you sure you want to use a celebrity?" Call that a rule? Or I may say to an art director, "Research suggests that if you set the copy in black type on a white background, more people will read it than if you set it in white type on a black background."

(1) Guidance based on applied research can hardly qualify as "rules'.

(2) Thus, all my so called 'rules' are rooted in applied research.
(3) A suggestion perhaps, but scarcely a rule.
(4) Such principles are unavoidable if one wants to be systematic about consumer behaviour.
(5) Fundamentally it is about consumer behaviour – not about celebrities or type settings.

Solution:

The author tries to defend himself by saying that he never imposes rules. He gives as a couple of examples of his suggestions and questions whether a person would call it a 'rule'. As the passage is defensive in tone choice 3 is the most appropriate which says that he gives only suggestions.

Choice (3)

30. Age has a curvilinear relationship with the exploitation of opportunity. Initially, age will increase the likelihood that a person will exploit an entrepreneurial opportunity because people gather much of the knowledge necessary to exploit opportunities over the course of their lives, and because age provides credibility in transmitting that information to others. However, as people become older, their willingness to bear risks declines, their opportunity costs rise, and they become less receptive to new information.

(1) As a result, people transmit more information rather than experiment with new ideas as they reach an advanced age.
(2) As a result, people are reluctant to experiment with new ideas as they reach an advanced age.
(3) As a result, only people with lower opportunity costs exploit opportunity when they reach an advanced age.
(4) As a result, people become reluctant to exploit entrepreneurial opportunities when they reach an advanced age.
(5) As a result, people depend on credibility rather than on novelty as they reach an advanced age.

Solution:

The relationship between a person's age and his likelihood of exploiting new opportunities is presented in the passage. When people gain more knowledge and experience they try to exploit new opportunities. However, as they grow even older they try to avoid risks and become less receptive to new ideas. Hence at an advanced age, a person becomes reluctant to exploit new opportunities as he wants to avoid risks. Choice 2 can be eliminated as it categorically states that they are reluctant to 'experiment with new ideas'. Since the context is of 'entrepreneurial opportunity' choice 4 becomes better as the concluding line. Choice 1 can be ruled out because the focus of the passage is on exploitation of opportunity whereas this option talks of 'transmit more information' and 'experiment with new ideas'. Choice 3 says people with lower opportunity cost exploit opportunity when they became old whereas the passage says that 'as people become older ……. less receptive to new information'. Choice 5 introduces a new concept of 'credibility' which is inappropriate in the concluding line. Choice (4)

Directions for questions 31 to 35: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Number of words in this passage : 646

Our propensity to look out for regularities, and to impose laws upon nature, leads to the psychological phenomenon of dogmatic thinking or, more generally, dogmatic behaviour: we expect regularities everywhere and attempt to find them even where there are none; events which do not yield to these attempts we are inclined to treat as a kind of 'background noise'; and we stick to our expectations even when they are inadequate and we ought to accept defeat. This dogmatism is to some extent necessary. It is demanded by a situation which can only be dealt with by forcing our conjectures upon the world. Moreover, this dogmatism allows us to approach a good theory in stages, by way of approximations; if we accept defeat too easily, we may prevent ourselves from finding that we were very nearly right.

It is clear that this *dogmatic attitude*, which makes us stick to our first impressions, is indicative of a strong belief; while a critical attitude, which is ready to modify its tenets, which admits doubt and demands tests, is indicative of a weaker belief. Now according to Hume's theory, and to the popular theory, the strength of a belief should be a product of repetition; thus it should always grow with experience, and always be greater in less primitive persons. But dogmatic thinking, an uncontrolled wish to impose regularities, a manifest pleasure in rites and in repetition as such, is characteristic of primitives and children; and increasing experience and maturity sometimes create an attitude of caution and criticism rather than of dogmatism.

My logical criticism of Hume's psychological theory, and the considerations connected with it, may seem a little removed from the field of the philosophy of science. But the distinction between dogmatic and critical thinking, or the dogmatic and the critical attitude, brings us right back to our central problem. For the dogmatic attitude is clearly related to the tendency to verify our laws and schemata by seeking to apply them and to confirm them, even to the point of neglecting refutations, whereas the critical attitude is one of readiness to change them – to test them; to refute them; to falsify them, if possible. This suggests that we may identify the critical attitude with the scientific attitude, and the dogmatic attitude with the one which we have described as pseudo-scientific. It further suggests that genetically speaking the pseudo-scientific attitude is more primitive than, and prior to, the scientific attitude: that it is a pre-scientific attitude. And this primitivity or priority also has its logical aspect. For the critical attitude is not so much opposed to the dogmatic attitude as super-imposed upon it: criticism must be directed against existing and influential beliefs in need of critical revision – in other words, dogmatic beliefs. A critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically.

Thus, science must begin with myths, and with the criticism of myths; neither with the collection of observations, nor with the invention of experiments, but with the critical discussion of myths, and of magical techniques and practices. The scientific tradition is distinguished from the pre-scientific tradition in having two layers. Like the latter, it passes on its theories; but it also passes on a critical attitude towards them. The theories are passed on, not as dogmas, but rather with the challenge to discuss them and improve upon them.

The critical attitude, the tradition of free discussion of theories with the aim of discovering their weak spots so that they may be improved upon, is the attitude of reasonableness, of rationality. From the point of view here developed, all laws, all theories, remain essentially tentative, or conjectural, or hypothetical, even when we feel unable to doubt them any longer. Before a theory has been refuted we can never know in what way it may have to be modified.

31. In the context of science, according to the passage, the interaction of *dogmatic beliefs* and *critical attitude* can be best described as:
(1) A duel between two warriors in which one has to die.
(2) The effect of a chisel on a marble stone while making a sculpture.
(3) The feedshare (natural gas) in fertilizer industry being transformed into fertilizers.
(4) A predator killing its prey.
(5) The effect of fertilizers on a sapling.

Solution:

Refer to para 4, the last two sentences. It says clearly '…. the critical attitude is not so much opposed to the dogmatic attitude as super-imposed upon it…'. This clearly rules out choices 1 and 4. Choice 5 can be ruled out because a fertilizer nurtures a sapling – there is no such relationship between dogmatic belief and critical attitude. Choice 3 is ruled out because there is no transformation involved. Choice 2 is the right answer because a dogma or theory is modified by the critical attitude. The last sentence of para 4 says 'a. critical attitude needs for its raw material, as it were, theories or beliefs which are held more or less dogmatically'. Thus the dogmatic belief becomes the marble (raw material) that is chiselled by the scientific attitude.

Choice (2)

32. According to the passage, the role of a dogmatic attitude or dogmatic behaviour in the development of science is
(1) critical and important, as, without it, initial hypotheses or conjectures can never be made.
(2) positive, as conjectures arising out of our dogmatic attitude become science.
(3) negative, as it leads to pseudo-science.
(4) neutral, as the development of science is essentially because of our critical attitude.
(5) inferior to critical attitude, as a critical attitude leads to the attitude of reasonableness and rationality.

Solution:

Refer to para 5, first sentence. 'Thus, science must begin with myths, and with the criticism of myths….techniques and practices', which makes it clear that the dogmatic attitude or dogmatic behaviour is important to the development of science.

Choice (1)

33. Dogmatic behaviour, in this passage, has been associated with primitives and children. Which of the following best describes the reason why the author compares primitives with children?
(1) Primitives are people who are not educated, and hence can be compared with children, who have not yet been through school.
(2) Primitives are people who, though not modern, are as innocent as children.
(3) Primitives are people in the early stages of human evolution; similarly, children are in the early stages of their lives.
(4) Primitives are people without a critical attitude, just as children are.
(5) Primitives are people who are not civilized enough, just as children are not.

Solution:

Refer to para 2 last sentence where the comparison is made. The characteristic of primitive people and children are contrasted with increasing experience and maturity which creates 'an attitude of caution and criticism rather than of dogmatism'. Hence the focus is on critical attitude and so choice 3. Choice (4) is not the answer because it says 'human evolution' not civilization.

Choice (3)

34. Which of the following statements best supports the argument in the passage that a critical attitude leads to a weaker belief than a dogmatic attitude does?
(1) A critical attitude implies endless questioning, and, therefore, it cannot lead to strong beliefs.
(2) A critical attitude, by definition, is centred on an analysis of anomalies and "noise".
(3) A critical attitude leads to questioning everything, and in the process generates "noise" without any conviction.
(4) A critical attitude is antithetical to conviction, which is required for strong beliefs.
(5) A critical attitude leads to questioning and to tentative hypotheses.

Solution:

Refer to para 2, first sentence which says '…..critical attitude, which is ready to modify its tenets, which admits doubt and demands tests, is indicative of a weaker belief'. The word 'indicative' supports 'implies' in choice 1 and rules out 'leads to' in choice 5. Choice 4 is ruled out because 'a conviction' is not the same as belief. Choices 2 and 3 are not relevant and can be ruled out because background noise is a feature of dogmatism not critical attitude.

Choice (1)

35. According to the passage, which of the following statements best describes the difference between science and pseudo-science?

(1) Scientific theories or hypothesis are tentatively true whereas pseudo-sciences are always true.
(2) Scientific laws and theories are permanent and immutable whereas pseudo-sciences are contingent on the prevalent mode of thinking in a society.
(3) Science always allows the possibility of rejecting a theory or hypothesis, whereas pseudo-sciences seek to validate their ideas or theories.
(4) Science focuses on anomalies and exceptions so that fundamental truths can be uncovered, whereas pseudo-sciences focus mainly on general truths.
(5) Science progresses by collection of observations or by experimentation, whereas pseudo-sciences do not worry about observations and experiments.

Solution:

Refer to the para 3, sentence 3. It states clearly that the dogmatic attitude neglects refutation 'whereas the critical attitude is one of readiness to change them – to test them; to refute them; to falsify them, if possible' and the next sentence identifies the critical attitude with the scientific and the dogmatic attitude with the pseudo scientific.

Choice (3)

Directions for Questions 36 to 40: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Number of words in this passage : 814

Fifteen years after communism was officially pronounced dead, its spectre seems once again to be haunting Europe. Last month, the Council of Europe's parliamentary assembly voted to codemn the "crimes of totalitarian communist regimes," linking them with Nazism and complaining that communist parties are still "legal and active in some countries." Now Goran Lindblad, the conservative Swedish MP behind the resolution, wants to go further. Demands that European Ministers launch a continent-wide anti-communist campaign – including school textbook revisions, official memorial days, and museums – only narrowly missed the necessary two-thirds majority. Mr. Lindblad pledged to bring the wider plans back to the Council of Europe in the coming months.

He has chosen a good year for his ideological offensive: this is the 50th anniversary of Nikita Khrushchev's denunciation of Josef Stalin and the subsequent Hungarian uprising, which will doubtless be the cue for further excoriation of the communist record. Paradoxically, given that there is no communist government left in Europe outside Moldova, the attacks have if anything, become more extreme as time has gone on. A clue as to why that might be can be found in the rambling report by Mr. Lindblad that led to the Council of Europe declaration. Blaming class struggle and public ownership, he explained "different elements of communist ideology such as equality or social justice still seduce many" and "a sort of nostalgia for communism is still alive." Perhaps the real problem for Mr. Lindblad and his right-wing allies in Eastern Europe is that communism is not dead enough – and they will only be content when they have driven a stake through its heart.

The fashionable attempt to equate communism and Nazism is in reality a moral and historical nonsense. Despite the cruelties of the Stalin terror, there was no Soviet Treblinka or Sorbibor, no extermination camps built to murder millions. Nor did the Soviet Union launch the most devastating war in history at a cost of more than 50 million lives – in fact it played the decisive role in the defeat of the German war machine. Mr. Lindblad and the Council of Europe adopt as fact the wildest estimates of those "killed by communist regimes" (mostly in famines) from the fiercely contested Black Book of Communism, which also underplays the number of deaths attributable to Hitler. But, in any case, none of this explains why anyone might be nostalgic in former communist states, now enjoying the delights of capitalist restoration. The dominant account gives no sense of how communist regimes renewed themselves after 1956 or why Western leaders feared they might overtake the capitalist world well into the 1960s. For all its brutalities and failures, communism in the Soviet Union, Eastern Europe, and elsewhere delivered rapid industrialization, mass education, job security, and huge advances in social and gender equality. Its existence helped to drive up welfare standards in the West, and provided a powerful counterweight to Western global domination.

It would be easier to take the Council of Europe's condemnation of communist state crimes seriously if it had also seen fit to denounce the far bloodier record of European colonialism – which only finally came to an end in the 1970s. This was a system of racist despotism, which dominated the globe in Stalin's time. And while there is precious little connection between the ideas of fascism and communism, there is an intimate link between colonialism and Nazism. The terms *lebensraum* and *konzentrationslager* were both first used by the German colonial regime in south-west Africa (now Namibia), which committed genocide against the Herero and Nama peoples and bequeathed its ideas and personnel directly to the Nazi party.

Around 10 million Congolese died as a result of Belgian forced labour and mass murder in the early twentieth century; tens of millions perished in avoidable or enforced famines in British-ruled India; up to a million Algerians died in their was for independence, while controversy now rages in France about a new law requiring teachers to put a positive spin on colonial history. Comparable atrocities were carried out by all European colonialists, but not a word of condemnation from the Council of Europe. Presumably, European lives count for more.

No major twentieth century political tradition is without blood on its hands, but battles over history are more about the future than the past. Part of the current enthusiasm in official Western circles for dancing on the grave of communism is no doubt about relations with today's Russia and China. But it also reflects a determination to prove there is no alternative to the new global capitalist order – and that any attempt to find one is bound to lead to suffering. With the new imperialism now being resisted in the Muslim world and Latin America, growing international demands for social justice and ever greater doubts about whether the environmental crisis can be solved within the existing economic system, the pressure for alternatives will increase.

36. Among all the apprehensions that Mr. Goran Lindblad expresses against communism, which one gets admitted, although indirectly, by the author?
(1) There is nostalgia for communist ideology even if communism has been abandoned by most European nations.
(2) Notions of social justice inherent in communist ideology appeal to critics of existing systems.
(3) Communist regimes were totalitarian and marked by brutalities and large scale violence.
(4) The existing economic order is wrongly viewed as imperialistic by proponents of communism.
(5) Communist ideology is faulted because communist regimes resulted in economic failures.

Solution:

Choice 3 is the answer because the author admits indirectly that communist regimes were totalitarian and marked by brutalities and violence. Refter to para 3, line 2 'Despite the cruelties of the Stalin terror……..' or again para 4, line 2. '……. If it had also seen fit to denounce the far bloodier record of Europian colonialism……' which implies that he agrees that communist states have a bloody record. Choice 1 is not the answer because though communism has a place in the hearts of some people it can't be called a 'nostalgia' (which means sentimental longing or wistful affection for a past period). Choice (3)

37. What, according to the author, is the real reason for a renewed attack against communism?
(1) Disguising the unintended consequences of the current economic order such as social injustice and environmental crisis.
(2) Idealising the existing ideology of global capitalism.
(3) Making communism a generic representative of all historical atrocities, especially those perpetrated by the European imperialists.
(4) Communism still survives, in bits and pieces, in the minds and hearts of people.
(5) Renewal of some communist regimes has led to the apprehension that communist nations might overtake the capitalists.

Solution:

Refer to para 2, last sentence 'perhaps the real problem …..its heart'. This is the author's opinion, which makes choice 4 the right answer. Choice 1 is not the answer because the passage does not say or imply that the Council of Europe is trying to hide the failures of capitalism. Choice 2 is not the answer because it is the secondary, not primary, reason (the last para says 'it <u>also</u> reflects a determination to prove there is no alternative to the new global capitalist order'). Choice 3 is Mr. Lindblad's stand perhaps but definitely not the author's. Choice 5 is ruled out because the passage does not talk of 'Renewal of Communist regimes'.

Choice (4)

38. The author cites examples of atrocities perpetrated by Europeans colonial regimes in order to
(1) compare the atrocities committed by colonial regimes with those of communist regimes.
(2) prove that the atrocities committed by colonial regimes were more than those of communist regimes.
(3) prove that, ideologically, communism was much better than colonialism and Nizism.
(4) neutralise the arguments of Mr. Lindblad and to point out that the atrocities committed by colonial regimes were more than those of communist regimes.
(5) neutralise the arguments of Mr. Lindblad and to argue that one needs to go beyond and look at the motives of these regimes.

Solution:

The question asks the reason for citing the example of the atrocities perpetrated by European colonial regimes and that is choice 4 because the passage begins with the Swedish MP, Goran Lindblads opinion and goes on to refute what he says. Para 4, line 2 says 'far bloodier record of Europian colonialism' which clearly supports the second part of choice 4 (that the atrocities committed by colonial regimes were more than those of communist regimes). Choice 1 can be ruled out because comparison is not the focus of the passage, choices 2 and 3 can be ruled out because the author does not set out to 'prove', Choice 5 can be ruled out because the focus is not on motives.

Choice (4)

39. Why, according to the author, is Nazism closer to colonialism than it is to communism?
(1) Both colonialism and Nazism were examples of tyranny of one race over another.
(2) The genocides committed by the colonial and the Nazi regimes were of similar magnitude.
(3) Several ideas of the Nazi regime were directly imported from colonial regimes.
(4) Both colonialism and Nazism are based on the principles of imperialism.
(5) While communism was never limited to Europe, both the Nazis and the colonialists originated in Europe.

Solution:

Refer to para 4 which traces a link between colonialism and Nazism. The last sentence clearly supports choice 3.

Choice (3)

40. Which of the following cannot be inferred as a compelling reason for the silence of the Council of Europe on colonial atrocities?
(1) The Council of Europe being dominated by erstwhile colonialists.
(2) Generating support for condemning communist ideology.
(3) Unwillingness to antagonize allies by raking up an embarrassing past.
(4) Greater value seemingly placed on European lives.
(5) Portraying both communism and Nazism as ideologies to be condemned.

Solution:

The Council of Europe has remained silent on colonial atrocities. The question says which of the given choices cannot be inferred as the reason for their silence. The answer is choice 4. Para 5, ends with the words 'Presumably, European lives count for more'. This is the author's opinion. The European Council would never admit, even to themselves, that their lives are more valuable than those of the Asians or Africans. Further that they valued their lives more could be a fact – it is not a value 'seemingly' placed on their lives. The other options are logical in the context of the passage. Option 1 is true – because the European Council is dominated by erstwhile colonialists they would remain silent on colonial atrocities. Choice 3 is part of choice 1. Choice 2 is true – it is clear that they want to condemn communist ideology. Choice 5 is true – the Council equated communism with Nazism (para 3, line 1) Choice (4)

Directions for Questions 41 to 45: The passage given below is followed by a set of five questions. Choose the most appropriate answer to each question.

Number of words in this passage : 713

My aim is to present a conception of justice which generalizes and carries to a higher level of abstraction the familiar theory of the social contract. In order to do this we are not to think of the original contract as one to enter a particular society or to set up a particular form of government. Rather, the idea is that the priniciples of justice for the basic stricture of society are the object of the original agreement. They are the principles that free and rational persons concerned to further their own interests would accept in an initial position of equality. These principles are to regulate all further agreements; they specify the kinds of social cooperation that can be entered into and the forms of government that can be established. This way of regarding the principles of justice, I shall call justice as fairness. Thus, we are to imagine that those who engage in social cooperation choose together, in one joint act, the principles which are to assign basic rights and duties and to determine the division of social benefits. Just as each person must decide by rational reflection what constitutes his good, that is, the system of ends which it is rational for him to pursue, so a group of persons must decide once and for all what is to count among them as just and unjust. The choice which rational men would make in this hypothetical situation of equal liberty determines the principles of justice.

In 'justice as fairness', the original position is not an actual historical state of affairs. It is understood as a purely hypothetical situation characterized so as to lead to a certain conception of justice. Among the essential features of this situation is that no one knows his place in society, his class position or social status, nor does anyone know his fortune in the distribution of natural assets and abilities, his intelligence, strength, and the like. I shall even assume that the parties do not know their conceptions of the good or their special psychological propensities. The principles of justice are chosen behind a veil of ignorance. This ensures that no one is advantaged or disadvantaged in the choice of principles by the outcome of natural chance or the contingency of social circumstances. Since all are similarly situated and no one is able to design principles to favor his particular condition, the principles of justice are the result of a fair agreement or bargain.

Justice as fairness begins with one of the most general of all choices which persons might make together, namely, with the choice of the first principles of a conception of justice which is to regulate all subsequent criticism and reform of institutions. Then, having chosen a conception of justice, we can suppose that they are to choose a constitution and a legislature to enact laws, and so on, all in accordance with the principles of justice initially agreed upon. Our social situation is just if it is such that by this sequence of hypothetical agreements we would have contracted into the general system of rules which defines it. Moreover, assuming that the original position does determine a set of priniciples, it will then be true that whenever social institutions satisfy these principles, those engaged in them can say to one another that they are cooperating on terms to which they would agree if they were free and equal persons whose relations with respect to one another were fair. They could all view their arrangements as meeting the stipulations which they would acknowledge in an initial situation that embodies widely accepted and reasonable constraints on the choice of principles. The general recognition of this fact would provide the basis for a public acceptance of the corresponding principles of justice. No society can, of course, be a scheme of cooperation which men enter voluntarily in a literal sense; each person finds himself placed at birth in some particular position in some particular society, and the nature of this position materially affects his life prospects. Yet a society satisfying the principles of justice as fairness comes as close as a society can to being a voluntary scheme, for it meets the principles which free and equal persons would assent to under circumstances that are fair.

41. A just society, as conceptualized in the passage, can be best described as:
(1) A Utopia in which everyone is equal and no one enjoys and privilege based on their existing positions and powers.
(2) A hypothetical society in which people agree upon principles of justice which are fair.
(3) A society in which principles of justice are not based on the existing positions and powers of the individuals.
(4) A society in which principles of justice are fair to all.
(5) A hypothetical society in which principles of justice are not based on the existing positions and powers of the individuals.

Solution:

Look at the wording of the question 'A just society ……. can be best described as' can be followed by 'a society in which ….'; to follow it with 'a Utopia' or 'a hypothetical society' is contrived and not natural. Further, the word 'hypothetical' is used in the passage to talk of the situation that people should place themselves in – to arrive at fair principles – and not to describe society. So we check options 3 and 4 which begin with 'a society in which'. Of the two, choice 3 is better, because choice 4 is actually a redundancy – the 7th and 8th lines of para one equate justice and fairness and the sentence in choice 4 would therefore amount to saying that fairness is fair. Choice 3 is more relevant to the passage – not being influenced by one's power or position is crucial to the passage. Choice (3)

42. The original agreement or original position in the passage has been used by the author as:
(1) A hypothetical situation conceived to derive principles of justice which are not influenced by position, status and condition of individuals in the society.
(2) A hypothetical situation in which every individual is equal and no individual enjoys any privilege based on the existing positions and powers.
(3) A hypothetical situation to ensure fairness of agreements among individuals in society.
(4) An imagined situation in which principles of justice would have to be fair.
(5) An imagined situation in which fairness is the objective of the principles of justice to ensure that no individual enjoys any privilege based on the existing positions and powers.

Solution:

Refer to para 1, lines 3-4 '… the idea is that the principles for the basic structure of society are the object of the original agreement'. Para 2, line 1-2 says '… the original position is not an actual historical state of affairs. It is understood as a purely hypothetical situation characterized so as to lead to a certain conception of justice'. The two together support choice (1). Choice (1)

43. Which of the following best illustrates the situation that is equivalent to choosing 'the principles of justice' behind a 'veil of ignorance'?
(1) The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck, but have some possibility of returning.
(2) The principles of justice are chosen by a group of school children whose capabilities are yet to develop.
(3) The principles of justice are chosen by businessmen, who are marooned on an uninhabited island after a shipwreck and have no possibility of returning.
(4) The principles of justice are chosen assuming that such principles will govern the lives of the rule makers only in their next birth if the rule makers agree that they will be born again.
(5) The principles of justice are chosen by potential immigrants who are unaware of the resources necessary to succeed in a foreign country.

Solution:

Refer to para 2 which has the line 'The principles of justice are chosen behind a veil of ignorance'. What this implies in the passage is that when people are choosing the principles of justice they have no knowledge of their natural assets and abilities, ….intelligence, strength, and the like. This state of complete ignorance is reflected only in choice 4 – the rule makers do not know what they will be when they are born again. Choice 2 is not the answer since school children might have some knowledge (though limited in nature). Choice 5 is ruled out because potential immigrants have knowledge of their own capability, if not of the region they are going to. Choice 1 and 3 are similarly ruled out. Choice (4)

44. Why, according to the passage, do principles of justice need to be based on an original agreement?
(1) Social institutions and laws can be considered fair only if they conform to principles of justice.
(2) Social institutions and laws can be fair only if they are consistent with the principles of justice as initially agreed upon.
(3) Social institutions and laws need to be fair in order to be just.
(4) Social institutions and laws evolve fairly only if they are consistent with the principles of justice as initially agreed upon.
(5) Social institutions and laws conform to the principles of justice as initially agreed upon.

Solution:

The focus of the passage is on a just society. The principles of justice are initially agreed upon so that laws that emerge later based on these principles of justice will be fair. Thus choice 2 is the answer. Choice 1 is not the answer because it is not how laws are 'considered' but what they are. Choice 3 can be ruled out since it does not make sense (….to be fair in order to be just). Choice 4 is not the answer since the passage is not on how 'laws will evolve' (evolve fairly). Choice 5 is ruled out because the passage says subsequent laws will be 'in accordance with the principles of justice initially agreed upon', it is not that institutions will 'conform' to 'the principles of justice as initially agreed upon' since these will change with changing times. Choice (2)

45. Which of the following situations best represents the idea of justice as fairness, as argued in the passage?
(1) All individuals are paid equally for the work they do.
(2) Everyone is assigned some work for his or her livelihood.
(3) All acts of theft are penalized equally.
(4) All children are provided free education in similar schools.
(5) All individuals are provided a fixed sum of money to take care of their health.

Solution:

Only option 4 represents the idea of justice as fairness because all children are equal and so must be provided free education in similar schools. Choice (1) is not the answer because all works are not equal hence same pay is not fair. Choice 2 is irrelevant Choice (3) is not fair because there are degrees and variations in theft. Choice 5 is again not fair. Choice (4)

Directions for Questions 46 to 50: Each question has a set of four sequentially ordered statements. Each statement can be classified as one of the following.

- Facts, which deal with pieces of information that one has heard, seen or read, and which are open to discovery or verification (the answer option indicates such a statement with an 'F').
- Inferences, which are conclusions drawn about the unknown, on the basis of the known (the answer option indicates such a statement with an 'I').
- Judgements, which are opinions that imply approval or disapproval of persons, objects, situations and occurrences in the past, the present or the future (the answer option indicates such a statement with a 'J').

Select the answer option that best describes the set of four statements.

46. 1. According to all statistical indications, the Sarva Shiksha Abhiyan has managed to keep pace with its ambitious goals.
2. The Mid-day Meal Scheme has been a significant incentive for the poor to send their little ones to school, thus establishing the vital link between healthy bodies and healthy minds.
3. Only about 13 million children in the age group of 6 to 14 years are out of school.
4. The goal of universalisation of elementary education has to be a pre-requisite for the evolution and development of our country.

(1) IIFJ (2) JIIJ (3) IJFJ
(4) IJFI (5) JIFI

Solution:

In the first statements, a conclusion is drawn based on known facts. That the Sarva Shiksha Abhiyan has managed to keep pace with its ambitious goals is a conclusion drawn on the basis of statistical indications. The words "according to" clearly show that it is an inference. The words 'significant incentive' and 'vital link' clearly shows that the author's opinion is being stated; hence judgement. The third statement contains statistics that can be verified. Hence, it is a fact. In the fourth statement, the words "has to be" indicate that it is somebody's personal opinion. Choice (3)

47. 1. We should not be hopelessly addicted to an erroneous belief that corruption in India is caused by the crookedness of Indians.
2. The truth is that we have more red tape – we take eighty-nine days to start a small business, Australians take two.
3. Red tape leads to corruption and distorts a people's character.
4. Every red tape procedure is a point of contact with an official, and such contacts have the potential to become opportunities for money to change hands.

(1) JFIF (2) JFJJ (3) JIJF
(4) IFJF (5) JFJI

Solution:

In statement 1, the words "we should not be" indicate that it is somebody's personal opinion. In statement 2, the words "the truth is" indicate that it is a fact. That we take eighty-nine days to start a business and Australians take two can be verified. In statement 3, the words "leads to" indicate that it is somebody's opinion. That red tape leads to corruption and distorts a person's character cannot be verified – it is one person's personal opinion which could be opposed by another. In statement 4, the words "potential to become" indicate that it is a conclusion. That a red tape procedure is a point of contact with an official can be verified. Based on this, the conclusion, that these contacts have the potential to become opportunities for money to change hands, is drawn. Choice (5)

48. 1. So much of our day-to-day focus seems to be on getting things done, trudging our way through the tasks of living – it can feel like a treadmill that gets you nowhere; where is the childlike joy?
2. We are not doing the things that make us happy; that which brings us joy; the things that we cannot wait to do because we enjoy them so much.
3. This is the stuff that joyful living is made of – identifying your calling and committing yourself wholeheartedly to it.
4. When this happens, each moment becomes a celebration of you; there is a rush of energy that comes with feeling completely immersed in doing what you love most.

(1) IIIJ (2) IFIJ (3) JFJJ
(4) JJJJ (5) JFII

Solution:

In the first statement, the words "seems to be" indicate that it is somebody's personal opinion. In the second statement, that we are not doing the things that make us happy is just one person's opinion that could be challenged by another. In statement 3, the words "this is the stuff that joyful living is made of" indicate that is is somebody's opinion. What joyful living is made of could vary in somebody else's opinion. In statement 4, "each moment is a celebration of you" is an opinion because when something happens, each person is affected in a different way. Hence what follows after something happens is one person's personal opinion, which might differ from another's.
Choice (4)

49. 1. Inequitable distribution of all kinds of resources is certainly one of the strongest and most sinister sources of conflict.
2. Even without war, we know that conflicts continue to trouble us – they only change in character.
3. Extensive disarmament is the only insurance for our future; imagine the amount of resources that can be released and redeployed.
4. The economies of the industrialized western world derive 20% of their income from the sale of all kinds of arms.

(1) IJJI (2) JIJF (3) IIJF
(4) JIIF (5) IJIF

Solution:

In the first statement, the words "one of the" suggest that there are more reasons. That this is the strongest, is somebody's personal opinion. In another person's view something else could be the strongest reason. In the second statement, the words "we know that" indicate that the fact that conflicts continue to trouble us is the basis on which the conclusion, that they only change in character, is drawn. So it is an inference. In the third statement the words 'only insurance' shows that it is the author's opinion; hence judgement. In the last statement the words "20% of their income" indicate that it is fact. The amount they derive can be verified. Choice (2)

50. 1. Given the poor quality of service in the public sector, the HIV/AIDS affected should be switching to private initiatives that supply anti-retroviral drugs (ARVs) at a low cost.
2. The government has been supplying free drugs since 2004, and 35000 have benefited up to now – though the size of the affected population is 150 times this number.
3. The recent initiatives of networks and companies like AIDSCare Network, Emcure, Reliance-Cipla-CII, would lead to availability of much-needed drugs to a larger number of affected people.
4. But how ironic it is that we should face a perennial shortage of drugs when India is one of the world's largest suppliers of generic drugs to the developing world.

(1) JFIJ (2) JIIJ (3) IFIJ (4) IFFJ (5) JFII

Solution:

In the first statement, the word "given", which means "considering that", indicates that it is an inference. Based on the fact that quality of service in the public sector is poor, a conclusion is reached. In the second statement, the words "has been" and "is" indicate that it is a fact. In statement 3, the words "would lead" indicate that it is an inference. Based on the fact that networks and companies have taken initiatives, a conclusion is reached. In statement 4, "how ironic it is" indicates that it is one person's perception which could differ from another person's. Hence it is a personal opinion. Choice (3)

SECTION – III (Quant)

Section – III has 25 questions.

51. If a/b = 1/3, b/c = 2, c/d = 1/2, d/e = 3 and e/f = 1/4, then what is the value of abc/def?

(1) 3/8 (2) 27/8 (3) 3/4
(4) 27/4 (5) 1/4

Solution:

Let f = k we can express each unknown in terms of f

$e = \frac{f}{4}$, $d = \frac{3f}{4}$, $c = \frac{3f}{8}$, $b = \frac{3f}{4}$ and $a = \frac{f}{4}$

$$\therefore \frac{abc}{def} = \frac{\left(\frac{1}{4}\right)\left(\frac{3}{4}\right)\left(\frac{3}{8}\right)}{\left(\frac{3}{4}\right)\left(\frac{1}{4}\right)(1)} = 3/8$$ Choice (1)

52. If x = –0.5, then which of the following has the smallest value?

(1) $2^{1/x}$ (2) 1/x (3) $1/x^2$
(4) 2^x (5) $1/\sqrt{-x}$

Solution:

$2^{\frac{1}{x}}$, $\frac{1}{x^2}$, 2^x and $\frac{1}{\sqrt{-x}}$ are all positive. $\frac{1}{x}$ is negative.

$\therefore \frac{1}{x}$ is the least of the choices. Choice (2)

53. Consider a sequence where the n^{th} term, $t_n = n/(n + 2)$, n = 1, 2, …. The value of $t_3 \times t_4 \times t_5 \times \ldots \times t_{53}$ equals:

(1) 2/495 (2) 2/477 (3) 12/55
(4) 1/1485 (5) 1/2970

Solution:

t_3, t_4, t_5 …… t_{51}, t_{52}, t_{53}

are $\frac{3}{5}, \frac{4}{6}, \frac{5}{7}, \ldots\ldots\ldots \frac{51}{53}, \frac{52}{54}, \frac{53}{55}$.

$\therefore t_3 \times t_4 \times t_5 \times \ldots\ldots \times t_{53}$

$$= \left(\frac{3}{5}\right)\left(\frac{4}{6}\right)\left(\frac{5}{7}\right)\ldots\ldots\ldots\left(\frac{51}{53}\right)\left(\frac{52}{54}\right)\left(\frac{53}{55}\right)$$

$$\frac{(3)\ (4)}{(54)\ (55)} = \frac{2}{495}.$$ Choice (1)

54. Which among $2^{1/2}$, $3^{1/3}$, $4^{1/4}$, $6^{1/6}$ and $12^{1/12}$ is the largest?

(1) $2^{1/2}$ (2) $3^{1/3}$ (3) $4^{1/4}$
(4) $6^{1/6}$ (5) $12^{1/12}$

Solution:

Let us represent each number as an experimental expression in which the index is the HCF of the indices of the given expressions.

$$\text{HCF}\left(\frac{1}{2}, \frac{1}{3}, \frac{1}{4}, \frac{1}{6}, \frac{1}{12}\right) = \frac{1}{12}$$

$$2^{\frac{1}{2}} = \left(2^6\right)^{\frac{1}{12}} = 64^{\frac{1}{12}}$$

$$3^{\frac{1}{3}} = \left(3^4\right)^{\frac{1}{12}} = 81^{\frac{1}{12}}$$

$$4^{\frac{1}{4}} = \left(4^3\right)^{\frac{1}{12}} = 64^{\frac{1}{12}}$$

$$6^{\frac{1}{6}} = \left(6^2\right)^{\frac{1}{12}} = 36^{\frac{1}{12}}$$

$\therefore 3^{1/3}$ is the largest. Choice (2)

55. The length, breadth and height of a room are in the ratio 3 : 2 : 1. If the breadth and height are halved while the length is doubled, then the total area of the four walls of the room will

(1) remain the same
(2) decrease by 13.64%
(3) decrease by 15%
(4) decrease by 18.75%
(5) decrease by 30%

Solution:

If the length, breadth and height of a room are ℓ, b and h respectively. The total area of the 4 walls is A = 2h (l + b). Initially ℓ = 3k, b = 2k and h = k
∴ Initial area $A_1 = 2(5)\ K^2 = 10k^2$
After the changes, ℓ = 6k, b = k and h = k/2

∴ New area $A_2 = 2\left(\frac{1}{2}\right)(7)\ k^2 = 7k^2$

∴ There in 30% decrease in the area.

Choice (5)

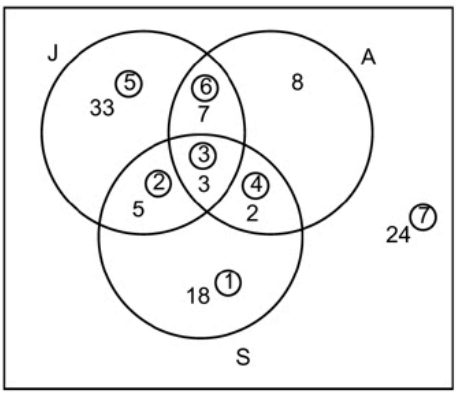
56. A survey was conducted of 100 people to find out whether they had read recent issues of Golmal, a monthly magazine. The summarized information regarding readership in 3 months is given below:

Only September: 18; July: 48;	September but not August: 23; July and August: 10;	September and July; 8;	September: 8; none of the three months: 24;

What is the number of surveyed people who have read exactly two consecutive issues (out of the three)?
(1) 7 (2) 9 (3) 12 (4) 14 (5) 17

Solution:

The data is represented in the Venn diagram below. The statements in the data are numbered from 1 to 7. The encircled numbers denote the statement from which the conclusion follows.

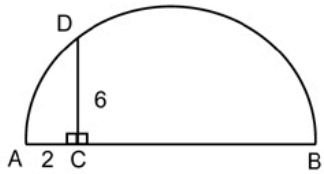


The number of people who read exactly 2 consecutive issues is 7 (July, Aug) + 2 (Aug, Sep) = 9.

Choice (2)

57. A semi-circle is drawn with AB as its diameter. From C, a point on AB, a line perpendicular to AB is drawn meeting the circumference of the semi-circle at D. Given that AC = 2 cm and CD = 6 cm, the area of the semi-circle (in sq. cm) will be:
(1) 32π (2) 50π (3) 40.5π
(4) 81π (5) undeterminable

Solution:



AC = 2, CD = 6 and ∠ACD = 90°
∴ CB = 18[CD^2 = (AC) (CB)]
Diameter AB = 20 and Radius = 10
∴ The area of the semicircle = 50 π

Choice (2)

Answer Questions 58 and 59 on the basis of the information given below:

An airline has a certain free luggage allowance and charges for excess luggage at a fixed rate per kg. Two passengers, Raja and Praja have 60 kg of luggage between them, and are charges Rs.1200 and Rs.2400 respectively for excess luggage. Had the entire luggage belonged to one of them, the excess luggage charge would have been Rs.5400.

58. What is the weight of Praja's luggage?
(1) 20 kg (2) 25 kg (3) 30 kg
(4) 35 kg (5) 40 kg

59. What is the free luggage allowance?
(1) 10 kg (2) 5 kg (3) 20 kg
(4) 25 kg (5) 30 kg

Solutions for questions 58 and 59:

Let the free luggage allowance be x kg. The data is as tabulated below.

	Raja	Praja
Free Allowance	x	x
Excess	a – x	60 – a – x

Praja pays Rs.2400 for 60 – a – x
Raja pays Rs.1200 for a – x
∴ 60 – a – x = 2(a – x)
⇒ 60 + x = 3a ----------(1)

If the entire luggage belonged to, say Praja, he would have to pay Rs.5400.

$$\therefore \frac{60 - a - x}{60 - x} = \frac{2400}{5400} = \frac{4}{9}$$

⇒ 540 – 9a – 9x = 240 – 4x
⇒ 300 – 5x = 9a ----------(2)
From (1) and (2) x = 15 and a = 25
∴ Praja's luggage is 60 – 25 = 35 kg and the free allowance in 15 kg.

58. Choice (4)

59. Correct answer is not present among choices.

Alternate Solutions for 58 & 59

Raja's excess luggage, Praja's excess luggage and combined excess luggage are in the ratio 1200 : 2400 : 5400 = 2 : 4 : 9
If Raja's luggage is clubbed with Praja's, Praja would have to pay 6 parts, he actually pays 9 parts, i.e., the free allowance is for 3 parts, but this is no longer free for Praja.
∴ (3 + 2) parts for Raja and (3 + 4) parts for Praja in 60 kg i.e., each part is 5 kg.

58. Praja's luggage is 7(5) = 35 kg Choice (4)

59. Free allowance is 3(5) or 15 kg
(Correct answer not present among choices)

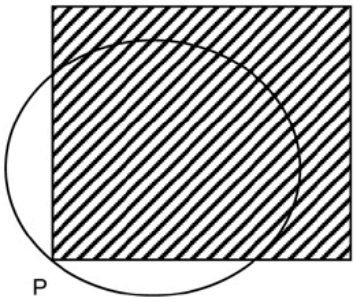
60. A group of 630 children is arranged in rows for a group photograph session. Each row contains three fewer children than the row in front of it. What number of rows is not possible?
(1) 3 (2) 4 (3) 5 (4) 6 (5) 7

Solution:

Let n be the number of rows in the arrangement of the 630 children. If n is odd, the number of children in the middle row multiplied by n is 630. Thus, an odd value of n is possible, only if n is a factor of 630. So, n = 3, 5, 7 are possible.
For n = 4, the possible arrangement is 162, 159, 156 and 153.
Hence n = 6 is the only option left out and is not possible. Choice (4)
Note: For n – 6, we get numbers which are not integers.

Answer Questions 61 and 62 on the basis of the information given below:

A punching machine is used to punch a circular hole of diameter two units from a square sheet of aluminium of width 2 units, as shown below. The hole is punched such that the circular hole touches one corner P of the square sheet and the diameter of the hole originating at P is in line with a diagonal of the square.

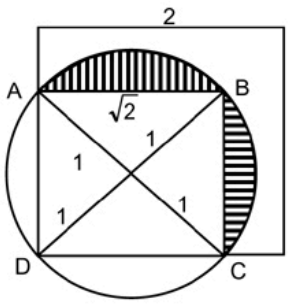


61. The proportion of the sheet area that remains after punching is:
(1) $(\pi + 2)/8$ (2) $(6 - \pi)/8$ (3) $(4 - \pi)/4$
(4) $(\pi - 2)/4$ (5) $(14 - 3\pi)/6$

62. Find the area of the part of the circle (round punch) falling outside the square sheet.
(1) $\pi/4$ (2) $(\pi - 1)/2$ (3) $(\pi - 1)/4$
(4) $(\pi - 2)/2$ (5) $(\pi - 2)/4$

Solutions for questions 61 and 62:

61.



Area of the piece that remains = Area of square – Area of semicircle ABC – Area of triangle ADC

$= 4 - \frac{\pi}{2} - \frac{1}{2}\sqrt{2}\sqrt{2} = 3 - \frac{\pi}{2} = \frac{6-\pi}{2}$

Area of complete sheet = 4.

Required ratio = $\frac{6-\pi}{8}$ Choice (2)

62. Area of semicircle ADC – Area of ΔADC = $\frac{\pi}{2} - \frac{1}{2}\sqrt{2}\sqrt{2} = \frac{\pi}{2} - 1 = \frac{\pi - 2}{2}$ Choice (4)

63. What values of x satisfy $x^{2/3} + x^{1/3} - 2 \le 0$?
(1) $-8 \le x \le 1$ (2) $-1 \le x \le 8$ (3) $1 < x < 8$
(4) $1 \le x \le 8$ (5) $-8 \le x \le 8$

Solution:

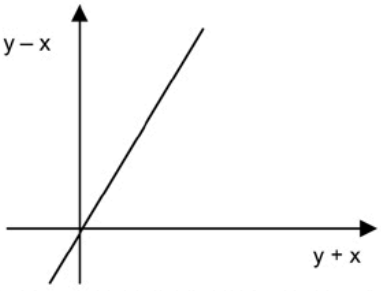
Let $x^{1/3} = y \Rightarrow x = y^3$
$y^2 + y - 2 \le 0$
$(y + 2)(y - 1) \le 0$
$\therefore -2 \le y \le 1$
$-8 \le x \le 1$ (as $x = y^3$) Choice (1)

64. Consider the set S = {1, 2 , 3 …….. 1000}. How many arithmetic progressions can be formed from the elements of S that start with 1 and end with 1000 and have at least 3 elements?
(1) 3 (2) 4 (3) 6 (4) 7 (5) 8

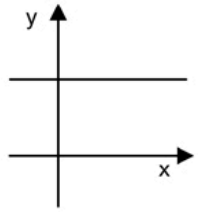
Solution:

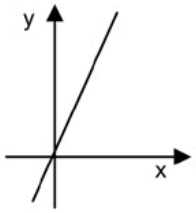
S = {1, 2, 3, ….. 1000}
We need AP's in which the first term is 1 and last term is 1000.
$\therefore$ The common difference must be a factor of $(1000 - 1) = 999 = 3^3 37^1$. There are 8 factors of 999. viz 1, 3, 9, 27, 37, 111, 333 and 999.
As we need at least 3 terms, we can take any of these values expect 999, i.e., 7 values. Choice (4)

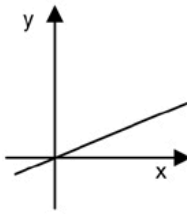
65. The graph of y – x against y + x is a s shown below. (All graphs in this question are drawn to scale and the same scale has been used on each axis.)

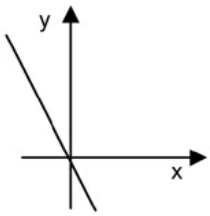


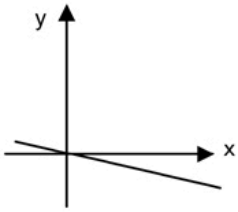
Which of the following shows the graph of y against x ?

(1) 

(2) 

(3) 

(4) 

(5) 

Solution:

The equation of the line given in the graph is
$y - x = k(y + x)$, where $k > 1$. ---------- (1)
Had the coordinate axes been the usual X – Y system, the equation would take the form $y = mx$, where $m > 1$.
On rearranging (1), we get

$$y = \left(\frac{1+k}{1-k}\right)x$$

Now $k > 1 \Rightarrow \frac{1+k}{1-k} < -1$.

Hence, the line can be of the form $y = -2x$ (or) $y = -3x$ (or) $y = -4x$ etc.,
Hence, choice (4) is appropriate. Choice (4)

66. The sum of four consecutive two-digit odd numbers, when divided by 10, becomes a perfect square. Which of the following can possibly be one of these four numbers?
(1) 21 (2) 25 (3) 41
(4) 67 (5) 73

Solution:

The last digit of each two-digit number is 1 or 3 or 5 or 7 or 9. As the sum of the four consecutive two-digit odd numbers is divisible by 10, the sum ends with a zero. This condition is only satisfied when the numbers end with 1, 3, 7 and 9.
Going from the options, if the numbers are 17, 19, 21 and 23. Their sum is divisible by 10 but the quotient is not a perfect square.
$\therefore$ Choice (1) is not possible.
Choice (2): Ruled out as a number ends with a 5.
Choice (3): Numbers are 37, 39, 41 and 43 their sum when divided by 10 is a perfect square.
$\therefore$ Choice (3) is possible. Choice (3)

67. The number of solutions of the equation $2x + y = 40$ where both x and y are positive integers and $x \le y$ is:
(1) 7 (2) 13 (3) 14 (4) 18 (5) 20

Solution:

Given, $2x + y = 40$ with $x \le y$.
Now, $y = 40 - 2x$.
As x and y are positive integers, $x \le 19$ -------- (1)
Further as $x \le y$,
$x \le 40 - 2x$
$\Rightarrow 3x \le 40 \Rightarrow x \le 13$.
Thus, we get 13 positive integer solutions for this equation. Choice (2)

68. The number of employees in Obelix Menhir Co. is a prime number and is less than 300. The ratio of the number of employees who are graduates and above, to that of employees who are not, can possibly be:
(1) 101 : 88 (2) 87 : 100 (3) 110 : 111
(4) 85 : 98 (5) 97 : 84

Solution:

The total number of employees in Obelix Menhir Co. is a prime number less than 300. So, the total number of parts in the ratio of graduates and above to those who are not is prime. Now, from the choices
$189 = 3 \times 63$
$187 = 11 \times 17$
$221 = 13 \times 17$
$183 = 3 \times 61$
$181 = 1 \times 181$
So, only 181 is prime, only choice (5) is possible. Choice (5)

69. There are 6 tasks and 6 persons. Task 1 cannot be assigned either to person 1 or to person 2; task 2 must be assigned to either person 3 or person 4. Every person is to be assigned one task. In how many ways can the assignment be done?
(1) 144 (2) 180 (3) 192
(4) 360 (5) 716

Solution:

Let $T_1, T_2, \ldots\ldots, T_6$ denote the six tasks and $P_1, P_2, \ldots\ldots, P_6$ denote the six persons, each of whom is assigned a task.
Let us first assign T_2 to P_3.
As T_1 cannot be assigned to P_1 or P_2, there are only 3 ways of assigning this task, namely P_4, P_5 or P_6.
The rest of the tasks T_3, T_4, T_5 and T_6 can be assigned in 4! ways.
Thus, we get $3 \times 4! = 72$ ways.

Similarly, on assigning T_2 to P_4, we get 72 ways.
Thus, the required number of ways is 72 + 72 = 144.
Choice (1)

70. If $\log_y x = (a.\log_z y) = (b.\log_x z) = ab$, then which of the following pairs of values for (a, b) is not possible?
(1) (–2, 1/2) (2) (1,1) (3) (0.4, 2.5)
(4) (π, $1/\pi$) (5) (2,2)

Solution:

$a \log_z y = ab$
$a \log_z y = ab \Rightarrow a = 0$ or $\log_z y = b$
$b \log_x z = ab \Rightarrow b = 0$ or $\log_x z = a$
We are looking for values of a, b that are not possible. We may assume that $a \neq 0$, $b \neq 0$.
$\therefore \log_z y = b$
$\log_x z = a$
$\Rightarrow \log_x y = ab$
But $\log_y x = ab$
$\therefore \log_x y = \log_y x = \frac{1}{\log_x y}$
$\Rightarrow \log_x y = 1$ or -1
$\Rightarrow ab = 1$ or -1
$\therefore$ (a, b) cannot be (2, 2) (from choices)
Choice (5)

71. What are the values of x and y that satisfy both the equations?
$2^{0.7x} . 3^{-1.25y} = 8\sqrt{6}/27$
$4^{0.3x} . 9^{0.2y} = 8.(81)^{1/5}$
(1) x = 2, y = 5 (2) x = 2.5, y = 6
(3) x = 3, y = 5 (4) x = 3, y = 4
(5) x = 5, y = 2

Solution:

The two equations are
$2^{0.7x} 3^{-1.25y} = 2^{3.5} 3^{-2.5}$
and $2^{0.6x} 3^{0.4y} = 2^3 3^{0.8}$
By comparing the indices of the expression on either side, in each equation we see that if x = 5 and y = 2, both equations are satisfied. Choice (5)

72. Let f(x) = max (2x + 1, 3 – 4x), where x is any real number. Then the minimum possible value of f(x) is:
(1) 1/3 (2) 1/2 (3) 2/3
(4) 4/3 (5) 5/3

Solution:

Given, f(x) = max(2x + 1, 3 – 4x)
f(x) has a minimum value when the two expressions have equal values.
So, 2x + 1 = 3 – 4x
$\Rightarrow 6x = 2$
$\Rightarrow x = \frac{1}{3}$
$\therefore$ The mimimum value of f(x) is
$$f\left(\frac{1}{3}\right) = \max\left(\frac{2}{3}+1, 3-\frac{4}{3}\right) = \max\left(\frac{5}{3},\frac{5}{3}\right) = \frac{5}{3}$$
Choice (5)

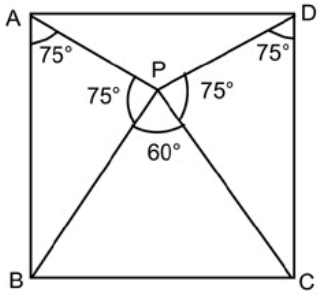
73. When you reverse the digits of the number 13, the number increases by 18. How many other two-digit numbers increase by 18 when their digits are reversed?
(1) 5 (2) 6 (3) 7 (4) 8 (5) 10

Solution:

Let 'ab' be the two-digit number satisfying the given conditions.
ab + 18 = ba
$\Rightarrow$ 10a + b + 18 = 10b + a
b – a = 2
(a, b) can be (1, 3), (2, 4), (3, 5), (4, 5) (5, 7) (6, 8) or (7, 9)
$\therefore$ 6 other two-digit numbers excluding 13 are possible. Choice (2)

74. An equilateral triangle BPC is drawn inside a square ABCD. What is the value of the angle APD in degrees?
(1) 75 (2) 90 (3) 120
(4) 135 (5) 150

Solution:



As ΔBPA and ΔCPD are isosceles and $\angle ABP = \angle DCP = 30°$
$\Rightarrow \angle BPA = \angle CPD = 75°$ and $\angle BPC = 60°$
$\angle APD = 360° - (75° + 75° + 60°) = 150°$
Choice (5)

75. Arun, Barun and Kiranmala start from the same place and travel in the same direction at speeds of 30, 40 and 60 km per hour respectively. Barun starts two hours after Arun. If Barun and Kiranmala overtake Arun at the same instant, how many hours after Arun did Kiramala start?
(1) 3 (2) 3.5 (3) 4
(4) 4.5 (5) 5

Solution:

Distance travelled by Arun in the first 2 hours = 60 km
Time taken by Barun to overtake Arun = $\frac{60}{40-30}$
= 6 hours.
Distance travelled by Barun in this time = Distance travelled by Arun up to this time = 240 km
Time taken by Kiranmala to overtake Arun = $\frac{240}{60}$
= 4 hours
$\therefore$ Kiranmala starts 2 hours after Barun who started 2 hours after Arun.
$\therefore$ Kiranmala must have started 4 hours after Arun.
Choice (3)