

## XAT 2010 - SET D - Solution Key

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### SECTION - A (Analytical Reasoning and Decision Making)

1. Consider option 1:

If Gabino, Daffy, Custard and Earl are in pen 2, then Ashlen and Blakely will be in pen 1 which is not possible according to the last condition given.

∴ Option 1 is not correct.

Consider option 2:

According to condition 3 both Ashlen and Blakely cannot be in pen 2 together.

∴ Option 2 is not correct.

Consider option 3:

In the second condition it is given that if Daffy is not kept in pen 2 then Gabino is kept in pen 1.

∴ Option 3 is not correct.

Consider option 5:

We know that if Daffy is not kept in pen 2 then Gabino is kept in pen 1.

∴ Option 5 is not correct.

Option 4 satisfies all the given conditions.

Hence, option 4.

2. If Earl shares a pen with Fala, then Earl and Fala can both be either in pen 1 or in pen 2, Now, if Earl and Fala both are in pen 1 then one of Ashlen and Blakely have to be in pen 1 as they both cannot be together in one pen.

∴ Custard has to be in pen 2.

If Earl and Fala both are in pen 2 then also one of Ashlen and Blakely have to be in pen 2.

Then Gabino and Daffy will be in pen 1 with one of Ashlen and Blakeley.

∴ Custard will be in pen 2.

∴ In both the cases Custard will be in pen 2.

Hence, option 2.

3. If Earl and Fala both are in different pens then there are two cases possible.

Case (i): Earl is in pen 1 and Fala in pen 2.

Case (ii): Fala is in pen 1 and Earl is in pen 2.

Case (i) Earl is in pen 1 and Fala is in pen 2.

Gabino and Daffy have to be together in one pen and they cannot be in pen 1 as one of Ashlen and Blakely have to be in pen 1 and pen 1 can hold 3 puppies.

∴ Gabino and Daffy will be in pen 2, and Custard has to be in pen 1.

∴ Pen 1 will have Earl, Custard and one of Ashlen and Blakely.

Pen 2 will have Fala, Gabino, Daffy and one of Ashlen and Blakely.

∴ Custard has to be in pen 1

∴ Custard cannot be in a higher-numbered pen than Fala.

Similarly in Case (ii) Fala will be in pen 1 but Custard will also be in pen 1.

∴ Custard cannot be in a higher-numbered pen than Fala.

Option 5 must not be true.

Hence, option 5.

4. The following extracts, "... as 24 airlines across the world had gone bankrupt in the year on account of rising fuel costs" as well as, "Consequently, passenger load had fallen to an average 55-60% per flight from previous year's peak of 70-75% determines 'rising ATF prices' and 'reduced passenger load' to be the reasons for Jet Airways not doing well.  
'Declining service quality' has not been mentioned in the passage.  
'Staff travelling to Dubai' has been mentioned in relation to Air India, not Jet Airways.  
Hence, the correct answer is option 1.
5. From a total loss of the airline industry of Rs10,000 crores, Jet Airlines lost Rs3,000 crores. The passage mentions Air India to be suffering losses of almost Rs 10 crore a day. That works out to Rs 3,650 crores.  
Therefore the loss to the "rest of the airlines" is [Rs 10,000 – (3,000 + 3,650)] crores.  
This works out to Rs 3,350 crores as being the loss incurred to the rest of the airlines.  
Hence, the correct answer is option 2.
6. The passage does not give data on – percentage increase in passengers due to reducing prices. We also need data to ascertain whether increased sale of tickets and by that increased occupancy rate of aircraft offsets or more than offsets decline in ticket prices.  
Hence, the correct answer is option 2.
7. If Samuel is telling the truth then exactly three of the suspects are telling the truth one of which is Samuel himself.

Consider option 1:

If we consider that Chaudhary and Datta are telling the truth, then Samuel, Chaudhary and Datta will be the three suspects who are telling the truth and the remaining suspects are lying.

∴ The statement made by Shrinivas that Nagraj fudged the accounts is not true.

∴ Datta tells the truth, Shrinivas did not fudge the accounts.

Nagrag says that Datta is lying, whereas we have considered that Datta is telling the truth.

∴ Nagrag is lying.

Jose says that Shrinivas is telling the truth but we have considered that Shrinivas is lying.

∴ Jose is also lying.

Ejaz says that Datta is lying but we have considered that Datta is telling the truth.

∴ Ejaz is lying.

Ganeshan says that Datta is lying and Panda says that Samuel is lying.

∴ Both Ganeshan and Panda are also lying.

∴ We get that only Chaudhary, Datta and Samuel are telling the truth.

∴ This case is possible.

∴ Statement in option 1 can be true.

Consider option 2:

If we consider that Nagraj fudged the accounts then Shrinivas is telling the truth.

∴ Jose is also telling the truth.

∴ Samuel, Shrinivas and Jose are the three suspects who are telling the truth and all others are lying.

∴ Datta is lying and hence Shrinivas has fudged the accounts.

But Ejaz says that Datta is lying and Shrinivas fudged the accounts which is true.

∴ We have four suspects who are telling the truth which is a contradiction to our assumption.

∴ The statement in option 2 is not true.

Similarly if we consider other options we get a contradiction making those statements false.

Hence, option 1.

8. If Panda is lying then Samuels is telling the truth, thus we have exactly three suspects who are telling the truth.

From the explanation given in the previous solution for option 2 we get that the statement Nagraj fudged the accounts is not true.

∴ Nagraj has fudged the accounts

∴ Shrinivas is telling the truth and hence Jose is also telling the truth.

∴ Statement in option 4 also cannot be true.

∴ Both the options 4 and 5 cannot be true.

Hence, option 4 & 5.

9. In condition (I) it is given that the answer that Titli produced had the same number of letters as the previous answer and one more than the subsequent answer.

∴ The answer given by Titli can be Rosebud or Silence.

It is given that Barely was the first word to be entered.

∴ The word entered after the answer given by Titli will be Burden.

∴ The order of these three words can be: Rosebud, Silence and Burden or Silence, Rosebud and Burden.

It is also given that Baadshah is not the second word.

∴ Baadshah has to be the fifth word entered.

∴ The order of answers will be:

Barely, Rosebud, Silence, Burden and Baadshah.

OR

Barely, Silence, Rosebud, Burden and Baadshah.

From condition 4 we get that Silence is not the third word.

∴ The order of answers will be:

Barely, Silence, Rosebud, Burden and Baadshah.

∴ Rosebud was the answer given by Titli.

∴ The arrangement till now can be represented in the form of table as shown below:

Order	Answer	Colleague	Number
First	Barely		
Second	Silence		
Third	Rosebud	Titli	8 across
Fourth	Burden		
Fifth	Baadshah		

One of the men gave the answer after the answer given by Titli.

And from condition 2 we get that it was not Bineet who gave the answer Burden.

∴ The answer 'Burden' was given by Mr. Easwar.

From conditions 4 and 7 we get that 'Silence' and the Fifth answer are answers to across clues.

Sheela was neither the first nor the last to come up with the answer.

∴ Sheela must have answered the second clue.

From condition 6 we get that Elsie's answer was longer than Bineet's.

∴ Elsie must have answered the fifth clue and Bineet must have answered the first clue.

It is given that Easwar did not solve 4 down.

Order	Answer	Colleague	Number
First	Barely	Bineet	4 down
Second	Silence	Sheela	across
Third	Rosebud	Titli	8 across
Fourth	Burden	Easwar	15 down
Fifth	Baadshah	Elsie	across

Now the number of the second and fifth answer is not known, only it is known that they were answers to across clues.

∴ Sheela's word was Silence.

Hence, option 2.

10. The answer given by Titli was Rosebud.

Hence, option 3.

11. Titli gave the answer to the third question.

Hence, option 3.

12. Easwar's number is 15 down.

Hence, option 4.

13. Bineet's word is Barely.

Hence, option 1.

14. There are seven bands performing on seven days. Also, there are 3 Rock bands and 3 Fusion Bands. The 3 bands of one genre cannot perform on 3 consecutive days.

Make a basic table noting down each day and then put in day for the name of the band, lead vocalist and genre of music followed by the band.

The basic table is shown below.

Day	Band	Lead	Genre/Type
Monday			
Tuesday			
Wednesday			
Thursday			
Friday			
Saturday			
Sunday			

Also, compare each genre with lead vocalist as shown below.

Genre	Lead Vocalist

Bodhi Tree's performance was not preceded by anyone else. This implies that Bodhi Tree was the last to perform i.e. on Sunday.

Sid, the lead vocalist of the rock band Cactus, performed on Monday.

Rupam, the only male lead vocalist of a fusion band was with Fish and performed on Wednesday.

Meet and Ali were lead vocalists of a rock band.

Hence, the two females, Angelina and Bony were the lead vocalists with the other two fusion bands.

Angelina was with the band Enigma and she could not perform after Thursday.

Thus, the two tables can be partially filled as shown below.

Genre	Lead Vocalist
Rock	Sid
	Meet
	Ali
Fusion	Rupam
	Angelina
	Bony

Day	Band	Lead	Genre/Type
Monday	Cactus	Sid	Rock
Tuesday			
Wednesday	Fish	Rupam	Fusion
Thursday			

Friday			
Saturday			
Sunday	Bodhi Tree		

Meet refused to perform after Angelina. Since no two bands performed on the same day, Meet had to perform before Angelina.

Now, ideally Angelina could have performed on any day from Monday to Thursday. However, as seen above, she can now perform only on Tuesday or Thursday. If Angelina performs on Tuesday, Meet will have to perform on Monday. However, Sid performs on Monday. Hence, this case is not possible. Hence, Angelina can perform only on Thursday. Therefore, Meet can perform only on Tuesday.

Note that Wednesday and Thursday now have consecutive fusion bands (Fish and Enigma). Thus, a Rock band has to perform on Friday and a Fusion band has to perform on Saturday. Boom was a rock band. Also, it did not immediately perform before or after Fish. Hence, Boom could have performed only on Friday.

Ali was the lead vocalist of a rock band. Sid and Meet are the other two lead vocalists performing on Monday and Tuesday respectively. Hence, Ali has to perform on Friday. Thus, Bony can perform only on Saturday.

The table now becomes:

Day	Band	Lead	Genre/Type
Monday	Cactus	Sid	Rock
Tuesday	Axis/Dhoom	Meet	Rock
Wednesday	Fish	Rupam	Fusion
Thursday	Enigma	Angelina	Fusion
Friday	Boom	Ali	Rock
Saturday	Dhoom/Axis	Bony	Fusion
Sunday	Bodhi Tree		

Thus, Meet cannot be the lead vocalist of Boom.  
Hence, the statement in option 5 cannot be true.

Hence, option 5.

15. From the table above, it is obvious that Boom performed on Friday and Meet performed on Tuesday.

Hence, option 3.

16. From the completed table, there are two possible sequences:

Cactus, Axis, Fish, Enigma, Boom, Dhoom, Bodhi Tree

Or

Cactus, Dhoom, Fish, Enigma, Boom, Axis, Bodhi Tree

Thus, the sequence in option 4 is possible.

Hence, option 4.

17. In this problem, there are 9 operators from 5 colleges and working from 5 cities over 6 time slots.

Thus, there cannot be a unique arrangement. There will definitely be multiple operators working from a city and in a particular time slot.

Construct a table in the following manner:

Operator	A	B	C	D	E	F	G	H	I
College									
City									
Slot									

Note the following conditions:

Each operator works continuously for 8 hours

There is at least one operator working in each slot.

All operators in a particular city start work together. This also implies that all operators from the same city are in the same time slot.

Operators operate from the city in which their college is located.

An operator can start working in any slot.

The data given is:

Operators: A, B, C, D, E, F, G, H, I

Colleges: A, S, G, B, K

City: J, P, N, H, M

Slot: 00, 04, 08, 12, 16, 20

Indira operates alone from Pune, Noida or Hyderabad.

Now, only Dogra and Falguni operate from Pune, while there are three operators from Noida who have studies in Sutanama College.

Since Indira works alone, she cannot be from Pune or Noida.

Thus, Indira works alone from Hyderabad.

Also, Abdulla and Henri operate as a two member team from the same city, which is not Mangalore.



The operator from Abhiman College will start working at 12:00 hours while those Jamshedpur will start working at 00:00 hours.

Ballal will start working 4 hours after those trained in Gutakal College.

Since Gutakal College is in Jamshedpur, he will start 4 hours after Jamshedpur i.e. at 04:00 hours.

Thus, the table finally gets filled as shown below.

Operator	A	B	C	D	E	F	G	H	I
College	G	K	S	A	S	A	S	G	B
City	J	M	N	P	N	P	N	J	H
Slot	00	04		12		12		00	

From the completed table, it is clear that only the statement in option 2 is true. i.e. Indira took training from Barala College.

Hence, option 2.

18. It is given that no operator joined at 20:00 hours.

Since every operator works continuously for 8 hours, the operators who joined at 16:00 hours must be working from 16:00 hours to 00:00 hours i.e. from 20:00 hours to 00:00 hours.

Either Indira or the group of Chandan, Eshita and Ganguli would have started work at 16:00 hours.

Indira took training from Barala College and operates from Hyderabad

The other group took training from Sutanama College and operates from Noida.

The information regarding the second group is correctly given in option 3.

All the other statements are incorrect.

Thus, it is possible that the operators working in the given shift took training from Sutanama College and operated from Noida.

Hence, option 3.

19. From the completed table in the solution to the first problem, the operators trained in Gutakal College are Abdulla and Henri, who work from Jamshedpur.

Hence, option 1.

20. There is no operator who joins at 20:00 hours.

The operators who would have started work at 12:00 hours will finish at 19:59 hours.

This implies that there has to be at least 1 operator who starts work at 16:00 hours.

Now, there are 2 sets of people: either I alone or the group of C, E and G who can start work at 16:00 hours. If one set starts at 16:00 hours, the other can start at any time apart from 20:00 hours (since no one starts at 20:00 hours). Thus, there are multiple cases possible.

Consider the case where Indira starts at 16:00 hours and the group of Chandan, Eshita and Ganguli start at 04:00 hours.

In this case, Abdulla and Falguni will be working from 00:00 to 08:00 hours and Ballal, Chandan, Eshita and Ganguli will be working from 04:00 to 12:00 hours.

Thus, there will be 6 people working between 04:00 and 08:00 hours.

Thus, the statement in option 2 becomes incorrect.

All the other statements are always true.

Hence, option 2.

21. Five operators are working between 16:00 and 20:00 hours.

Now, no one joined at 20:00 hours.

Also, Dogra and Falguni, who started work at 12:00 hours would still be working at 16:00 hours.

Thus, three people should have joined at 16:00 hours.

Since people from the same city start at the same time, these three people could only have been Eshita, Chandan and Ganguli.

These three people continued post 20:00 hours up to 00:00 hours.

Hence, the statement in option 5 is correct.

All the other statements are incorrect.

Hence, option 5.

22. The passage mentions that “Ms. Benita **might** have got LAM”. The immediate course of action for Dr. Puneet would thus be to confirm the presence of disease in her body.

Hence, the correct answer is option 2.

23. Options 1 and 5 are cursory and provide no sound logic to back up the assertion.

Option 2, although grandiose, does not try to find a win-win solution.

Option 4 expects Bhola to be reactive instead of being proactive. Bhola, as a businessman, cannot wait for the government to show the way in terms of environmental regulations.

Option 3 is a win-win solution and is the best course of action for Bhola as it takes care of both the issues- environment preservation and business.

Hence, the correct answer is option 3.

24. Both, option 1 and option 2 take the extreme stand- one on development and the other on development.

Option 3 is a somewhat feasible option- of government promoting eco-tourism but loses out to option 4 which is more comprehensive and inclusive as it brings together all stakeholders such as NGOs and the private sector.

Option 5 misses out on the ‘business’ part.

Hence, the correct answer is option 4.

25. Option 1 punishes all businesses, penalizing even those who may not be polluting the environment. Option 4 contradicts Bhola’s desire to preserve the environment.

Option 5, while being a good measure is not enough to stop environmental damage from taking place.

It is a close choice between options 2 and 3. Option 2 wins out because it mentions two steps- that of charging cess from polluters and rewarding those involved in afforestation activities- in other words rewards for good deeds and punishment for wrongdoing. Option 3 is not as comprehensive as it excludes the punishment factor.

Hence, the correct answer is option 2.

26. The issue raised by the opposition is of stopping development and causing unemployment under the guise of environment protection. For Bhola to score a quick win, he must effectively address this accusation.

Options 1,2 and 5 do not address the accusation of causing unemployment.

Option 4 does address the topic of unemployment, but in a very limited way- confined to cleaning up drives only.

Option 3 rebuts the opposition’s accusation in the most effective way- by comparing unemployment levels since the implementation of the pro-environment policies.

Hence, the correct answer is option 3.

27. Option 1 is incorrect as burning down new residences cannot be termed as 'right' under any circumstances.  
Option 3 is incorrect as it is a question of ethics involved here- not of the means- whether it be peaceful or aggressive.  
Option 4 would imply that had the burning of residences been done in a legal manner, it would have been right.  
The passage is about ethics- the actions taken by the activists are in the interests of ethical propriety. Therefore, to stop thinking about ethics altogether, as mentioned in option 5, is eliminated.  
As per the law of the land in all the countries of the world, it is unethical to damage other people's property.  
Hence, the correct answer is option 2.
28. Option 1 is incorrect. By 'forcing' Racket Club to accept all modifications related to drug testing Ranjan will not create a good image of himself as a politician nor create a long lasting positive impact.  
Aligning with Counter Racket Club will only cause discord. Therefore, option 3 can be eliminated.  
Popularising soccer in the country through endorsements by the popular players of racket makes little sense. One cannot see how players of racket will succeed in popularizing soccer and help Ranjan's image. Therefore, option 4 can be eliminated.  
Banning racket is a hugely counter-productive step since racket is the most popular game in the country. His image as a politician will certainly not be good if he was to take this step. Therefore, option 5 is eliminated.  
Option 2 is the most plausible answer option. The players want security and Ranjan, by providing security protection to the satisfaction of players, will create a good image of himself as a politician.  
Hence, the correct answer is option 2.
29. Option 1 is too devious and scheming an objective. Besides there is no guarantee that Ranjan will succeed.  
By reducing the popularity of racket, Ranjan will not gain anything. Secondly, this rationale does not answer the question stem of how Ranjan is **forced** to take a decision in favour of IRC. Option 3 is eliminated.  
Ranjan can enforce a decision in favour of IRC but, the question stem specifically asks as to what will 'force' Ranjan to take a decision in favour of IRC. This rationale does not answer the question stem effectively. Therefore, we can eliminate option 4.  
Other teams being keen to implement DTC may not force Ranjan to take a decision in favour of drug testing since 70% of revenues associated with the game are generated in the country. Therefore, the country need not follow other team's dictates. Therefore, option 5 is eliminated.  
If the next World cup is scheduled to be held in a country which has adopted drug testing, then

it follows that, in order for the country to participate, its players must be tested. Otherwise, there is a strong possibility that the country may not be allowed to take part. We must also remember that racket is the most popular game in the country and the people will be very annoyed if the country does not participate in the next world cup when the majority waited eagerly for international competitions.

Hence, the correct answer is option 2.

30. Option 1- large public gatherings will call for security.

Option 2- popular racket players included in the hit list of terrorist organizations will definitely call for security.

Internet based data stealing possibility will definitely call for cyber security.

Option 5 will also call for some security measures to be taken.

In very large public gatherings such as stadiums, it would be commonly known that all the players would be present- they would be provided with adequate security by default, as a part of team security. Therefore, racket players should not focus on this aspect.

Hence, the correct answer is option 4.

## SECTION - B (Verbal Ability and Logical Reasoning)

31. There is a clear link between sentences 3541. Sentence 3 revolves around the definition of the number two. Sentence 5 continues with 'the definition' of "two", and further talks about what the person one gives the definition to will mistakenly 'suppose'. Sentence 4 is a connector, since it mentions that one may suppose this, and then goes on to contradict it by saying perhaps he does not (suppose this). This contradiction is further elaborated in sentence 1, which says that he might make the opposite mistake.

Sentence 2 introduces the topic of defining certain kinds of nouns, including numerals. This can be followed by sentence 3 which deals with the definition of a particular number.

The sequence 23541 is present in option 2.

Hence, the correct answer is option 2.

32. Innate means 'existing in one from birth; inborn'.

Options 1, 3 and 5 are eliminated because there are not the innate reasons for the status of human beings in the later part of the 22<sup>nd</sup> century.

Option 2 is correct as per the passage but loses out to option 4. Innate means a quality that is possessed from the start. Option 2 happened much later after the birth of Artificial Intelligence so it cannot be said to be the innate reasons for the status of human beings in the later part of the 22<sup>nd</sup> century.

Option 4 was the basic cause of the status of human beings in the later part of the 22<sup>nd</sup> century. If AI had not been developed, the future of mankind would have taken a different turn.

Hence, the correct answer is option 4.

33. Option 1 can be inferred from the first paragraph- ".....we broadcast our pirate signal and hack into the matrix".

Option 3 can be inferred from the fact that humans scorched the sky to cut the machines off from solar power. They could have done it only if their own source of power was different.

Option 4 can be inferred from the last paragraph where human fields are grown to provide energy needed for machines.

Option 5 can be inferred. The entire passage is about how Morpheus and his crew are trying to stay in the real world- out of the dream created by Matrix.

Option 2 is the only one where a technical issue is raised. The passage suggests that a war has

been going on between human beings and machines since 21<sup>st</sup> century and today is 22<sup>nd</sup> century i.e. the war has been going on for some centuries and many decades. The option states 'some' decades. In the light of other options being easily inferred, we are forced to consider this distinction as being uninferable.

Hence, the correct answer is option 2.

34. According to the passage, the negative consequences among students in a business school include inability of theoretically knowledgeable graduates to apply theory to solve real world problems and the feeling of omniscience which prevents them from learning from their subordinates and colleagues. The question stem requires us to find an answer that will reduce these negative consequences.

Options 1 and 2 do not address the issue of learning from colleagues. Option 2 also does not address the issue of 'widespread use'

Option 3 assumes there are only freshers admitted to B-schools. Conversely, it solves the problems only of working professionals.

Option 5 goes to the other extreme by removing theory altogether from the curriculum whereas the passage merely states that 'widespread use' is a problem. Limited use may still be beneficial.

Option 4 tackles the root of the problem. 'Pedagogy' refers to 'the science of teaching' or 'the instructional methods' used in teaching. Modifying these methods to include theory and application in parallel is the best solution to tackle the negative consequences and ensure that learning from subordinates and colleagues is incorporated.

Hence, the correct answer is option 4.

35. The main argument in the passage is that the very expensive searches for exotic particles were hard to justify since they have nothing to do with everyday life.

Option 3 states knowledge has preceded application in all spheres of science. If this is true, then it is very important to gain knowledge first and then find an application for it later on; it is not necessary for something to be important to everyday life for it to be worth spending money on researching it. This weakens the main argument.

Option 2 strengthens rather than weakens the argument.

Option 1 is cursory and thus a weak option.

Option 5 does nothing to the main argument.

Option 4 does not address the question raised. If, funding agency is ready to spend money, it does not justify whether money should be spent at all when the usefulness of research is not known.

Hence, the correct answer is option 3.

36. Statement I is logically consistent with the passage since it has been mentioned that Silver is repetitively savage about the claims made for particle physics. Moreover, his sarcasm has also been termed as a repeated assault.

The presence or absence of relationship between everyday life and properties of protons, neutrons.. has not been established.

Statement III is not present in any of the options.

Statement IV is consistent with the 'expensive searches' mentioned in the passage.

Therefore, statements I and IV are logically consistent with the content of the paragraph.

Hence, the correct answer is option 5.

37. The passage talks about fashion with respect to those who are of a high rank or character; how the graceful manners of great people combined with the magnificence of their dress, connects in our minds and thus the qualities of genteel and magnificent, which we associate with the people, are transferred to the clothes they wear. Moreover, once they drop the fashion and it is used by people of inferior rank, it loses its grace and takes on the qualities of meanness and awkwardness associated with these people. Thus the main theme of the passage is that the qualities of the man wearing the clothes are passed on to the clothes. This idea is best expressed in the title, "The man maketh the cloth".

There is no mention in the passage about fashion models or shows. Hence, option 1 can be eliminated.

There is no criticism or calamity in the passage, therefore, 'scourge' would not be appropriate. Hence, option 2 can be eliminated.

Option 3 is the exact opposite of what has been mentioned in the passage since it says that the clothes worn reflect on the man. Hence, option 3 can be eliminated.

There is no prediction of fashion trends and character, therefore option 5 can be eliminated.

Hence, the correct answer is option 4.

38. Options 1 and 2 are contradictory to the idea mentioned in the passage that the grace of a person reflects onto his/her fashion.

Similarly, grace has been mentioned with respect to people of high rank or character, not imaginative people. Hence, option 3 can be eliminated.

The passage does not speak about fashion portraying the society. Hence, option 4 can be eliminated.

The passage talks about the graceful, easy and commanding ways of people of a high rank or character being reflected on the clothes they wear. Therefore, clothes viewed as graceful are actually a reflection of the person's rank or character.

Hence, the correct answer is option 5.

39. Options 1, 2 and 5 are incorrect as there is no mention of any individual to whole application nor any contradictions mentioned in the paragraph.

Option 3 is eliminated as it misses out on the main premise.

The first sentence of the paragraph presents a generality- Social roles conflict or co-operate depending upon circumstances. It is followed by examples which help understand the premise clearly.

Hence, the correct answer is option 4.

40. Allusion means 'a passing or casual reference; an incidental mention of something, either directly or by implication'.

Illusion means 'something that deceives by producing a false or misleading impression of reality or the state or condition of being deceived; misapprehension.'

Delusion means 'a false belief or opinion'.

Elusion means 'the act of eluding; evasion'.

Options 1, 2 and 4 are eliminated as the first blank requires the word 'allusion'.

Option 3 is eliminated as blank 3 and 4 are incorrect- 'Illusion- perception (and not delusion- false belief) created by the broker'.

Hence, the correct answer is option 5.

41. The passage has 3 types of motivation- 1. Actions undertaken for the sake of duty. 2. Personal inclination and 3. As a mean to some further end.

In the Red Cross example, there are two things to consider– 1) The blood is donated every year for a few years and 2) There is no immediate inclination nor is there any duty being fulfilled but rather the blood is being donated due to moral obligation. Therefore this is a type 3 motivation wherein actions are done in conformity with duty, yet are not done from duty, but rather as a mean to some further end.

In the voluntary organization example, there is a purely selfish reason for arranging the blood donation drives. This is a classic type 3 motivation case where ‘the action was done neither from duty nor from immediate inclination but merely for purposes of selfinterest’.

Therefore both examples fall within the same source of motivation and the actions are committed for reasons beyond duty.

This makes statements I and II to be correct.

Both the examples do not illustrate the concept of moral worth as only type 1 motivation displays the concept of moral worth. Both the examples are type 3 motivation.

Statement III is thus incorrect.

Hence, the correct answer is option 3.

42. Statement 1 is against the ideas mentioned in the passage. The passage clearly states that ‘Kantian ethics believes that the idea that moral worth of any action relies entirely on the motivation of the agent: human behaviour cannot be said to be good or bad in the light of the consequences it generates, but only with regards to what moved the agent to act in that particular way’.

Statement 2 is supported by the passage. Type 2 and type 3 motivation actions lack moral worth. In both these types, actions are committed by individuals not based on duty but rather on moral obligation or to serve self-interest.

Statement 3 is also supported by the passage. Moral obligations cause an individual to commit an action which under normal circumstances s/he would not perform. This, in turn, reduces the moral worth as the actions are performed reasons other than duty.

Hence, the correct answer is option 1.

43. ‘Proscribe’ means ‘to denounce or condemn (a thing) as dangerous or harmful; prohibit’.

Options 2, 3, 4 and 5 are eliminated as they do not fit in with the meaning of proscribe.

The book mentioned in option 1 needs to be condemned.

Hence, the correct answer is option 1.

44. Statements 3 and 5 are clearly linked. Statement 3 introduces the concept of “ostensive teaching of words” and statement 5 mentions “this ostensive teaching of words”.

Statement 2 asks what that means and this is answered in statement 1 which states that it may mean various things and then goes on to elaborate.

The 3-5 and 2-1 links are present in two of the given options. The only difference is in the placement of statement 4.

Statement 1 mentions that a picture of the object comes before the child’s mind when it hears the word. Statement 4 asks if this is the purpose of the word and mentions words as a series of sounds.

Therefore, the correct sequence is 35214.

Hence, the correct answer is option 5.

45. ‘Won’t’ means ‘will not’.

‘Wont’ means ‘accustomed, used to’.

‘Expatriate’ means ‘to enlarge in discourse or writing, be copious in description or discussion’.

Expiate means ‘to atone for, make amends or reparation for’.

‘Expatriate’ means ‘to banish (a person) from his or her native country’.

Options 3 and 5 are eliminated as ‘wont’ in blank 1 is incorrect.

Option 4 is eliminated as ‘expatriate’ in blank 3 is incorrect.

Option 2 is eliminated as it interchanges the correct words for the blanks.

Option 1 has all the words that fit in the blank appropriately.

Hence, the correct answer is option 1.

46. Statement 1 is incorrect. Singular, non replicable events i.e. death of an individual cannot be assigned numerical probability value as specified in the passage. This eliminates options 1, 3 and 5.

Statement 3 is incorrect as it contradicts the data mentioned in the passage.

Statement 2 is correct as the passage states, ‘A probability of death is attached to the class of men or to another class that can be defined in a similar way. The phrase “probability of death”, when it refers to a single person, has no meaning’.

Hence, the correct answer is option 2.

47. Options 2, 3, 4 and 5 will provide statistical data which cannot be refuted. So the author would not completely disagree with them.

Option 1 states that an outcome of the boxing match can be assigned a numerical value by assessing the current fitness levels and strengths of the boxers. This is in direct contradiction to “We can say nothing about the probability of death of an individual even if we know his condition of life and health in detail” as stated in the passage. The author would thus disagree the most with this option.

Hence, the correct answer is option 1.

48. The passage states that “A probability of death is attached to the class of men or to another class that can be defined in a similar way. The phrase “probability of death”, when it refers to a single person, has no meaning.” Option 2 states exactly that with the example of boxers.

Hence, the correct answer is option 2.

49. The idea stated by Sir Francis Bacon is to retain a man’s dignity without intruding upon the liberty of others. The author then claims that if this is the case, then not intruding on another’s liberty is impossible, implying that in order to retain one’s dignity one has to intrude upon another’s liberty.

This idea is best brought out in option 1.

Hence, the correct answer is option 1.

50. ‘Gourmet’, as a noun, refers to ‘a connoisseur of fine food and drink’. It can also be used as an adjective, meaning ‘involving high-quality or exotic ingredients and skilled preparation’.

‘Gourmand’ refers to ‘a person who is fond of good eating or gourmet food’. Thus the relation between the words is that of a person to the related process he/she is a part of.

Similarly, an ‘election’ is ‘the process of electing or the selection of a person or persons for office by vote’. An ‘elector’ is ‘the person who elects; a qualified voter’.

None of the other options are related in the same manner.

‘Aquatic’ means ‘pertaining to water’. An ‘aqueduct’ is ‘a pipe or channel for conducting water from a distance, usually by means of gravity’.

'Foliage' refers to 'the leaves of a plant'. 'Fodder' is 'the coarse food given to livestock, composed of entire plants, including leaves, stalks, and grain'.

An 'ecclesiastic' is 'a member of the clergy'. 'Earthy' refers to 'the quality of being realistic or practical'.

An 'epitaph' is 'an inscription on a tombstone in memory of the one buried there'. An 'epilogue' is 'the concluding part added to a literary work or novel'.

Hence the correct answer is option 4.

51. Options 3, 4 and 5 are eliminated as they are incorrect usages.

Option 2 is incorrect as 'pitched' is normally used in terms of setting up (a tent, camp, or the like) or throwing, flinging, hurling, or tossing.

Hence, the correct answer is option 1.

52. With "...communication...to inform the voters...", medium is the best fit.

Hence, the correct answer is option 3.

53. At first glance, it may seem that all the options are claims made by *Magix*. However, there is a logical fallacy in the paragraph. 'Indigestion' is introduced at the start as part of the possible problems faced by the audience; however, it has not been specifically mentioned in the cures claimed by *Magix*. All the other options have been mentioned: "sound, restful sleep", "soon fall asleep" and "wake up refreshed and energized".

Hence, the correct answer is option 3.

54. The paragraph states that filmmakers make great use of visuals and images instead of dialogues. Yet, many successful films have not really used visuals and were made on one set or location. The question stem requires us to identify an idea opposite to this.

Options 1, 4 and 5 add more data without strengthening or weakening the main data.

Option 2 is in sync with the main data.

Option 3, with the word 'solely' negates the idea of films made at a single set/ location. This is opposite to the ideas mentioned in the main data.

Hence, the correct answer is option 3.

55. Statement ii) has been identified as a Fact in all the answer options.

Statement i) with the word 'our' cannot be a Fact. Eliminate options 2 and 5.

Statement iii) states a possible outcome of an action and cannot be termed as a fact. Eliminate option 4.

Statement iv) uses a lot of strongly opinionated words and hardly any data- '**...may consider** this decision as a **deliberate attempt to protect some private interest.**' This makes it a more suitable Judgement than an inference.

Statement i) with 'proper allocation of resources' and 'overall development' and statement iii) with 'court decision', 'declared policy guideline' and 'government intervention in the form of an appeal' have data in them. Both these statements can be classified as inferences rather than judgements. Hence, IFIJ is the correct allocation of statements.

Hence, the correct answer is option 1.

56. The passage doesn't have any contradiction, dogmatism or exaggeration. Eliminate options 3, 4 and 5.

Although "Some words are highly inflammable" is a linguistic embellishment, it truly captures the essence of the passage. Thus, although option 2 is not incorrect, it loses out on appropriateness to option 1.

Hence, the correct answer is option 1.

57. The purists' believe in the purity of music, which resonates with 'core principles' in option 3.

Option 1 can be eliminated as the passage does not state any ideological conflict- The purists do not believe Fusion to be an ideology at all.

Option 2 can be eliminated as there is no mention of generation gap.

Option 4 is irrelevant and option 5 marginalizes the core issue by emphasizing on '**the social identity of purists.**'

Hence, the correct answer is option 3.

58. The sentence talks about children in fairs who are at risk for getting lost.

The word 'unaccompanied' is often used in the context of 'children who are not accompanied by an adult' or who are 'out on their own'.

'Lonely' means 'lacking company' and is usually associated with a depressing feeling of being alone.

'Solitary' is almost synonymous, meaning 'alone'.

'Single' means 'only one in number' and is generally used in context to being unmarried.

'Unguarded' means 'not protected'.

Hence, the correct answer is option 4.

59. A premise is defined as a statement that is assumed to be true and from which a conclusion can be drawn. According to the given argument, the increase in the number of reality shows supports the contention that channel owners are more interested in boosting revenues. For the given argument to be true, it has to be assumed that revenues can be boosted only if reality shows make more money than other types of programs.

Hence, the correct answer is option 4.

60. The question has been asked with regard to a person who possesses a scientific temperament. By definition, such a person would want any predictions to be based on the precise application of facts and principles. Therefore, an astrological forecast would not be considered scientifically accurate for such a person. This eliminates options 1, 2, 3 and 5.

The advice mentioned in the horoscope would at best be viewed by such a person as a generic principle which could apply to all persons.

Hence, the correct answer is option 4.

61. The main argument put forth by the author is: supermarkets offer bulk packages at wholesale prices which makes them a practical choice for its customers.

Options 1, 2 and 3 contain data that has not been supported by the passage.

Option 4 is contradictory to the data given.

Option 5 states that the financial savings from purchasing bulk packages may outweigh the inconvenience of not being able to buy a number of units based on the customer's need. This assumption is necessary for the author's argument that bulk purchases are a practical choice for the customer.

Hence, the correct answer is option 5.

## SECTION - C (Data Interpretation and Quantitative Ability)

62. Here, radius of the circle = 2 metres and  $\angle DOY = 30^\circ$

$$\therefore \angle BOY = 60^\circ$$

$$\text{Now, } XOBY = XO + OB + l(BY)$$

$$= 1 + 2 + \frac{2\pi r}{6}$$

$$\left( \because \angle BOY = 60^\circ = \frac{360}{6} \right)$$

$$= 3 + \frac{2 \times 2 \times 3.14}{6}$$

$$\approx 5.09$$

$$XODY = XO + OD + l(DY)$$

$$= 1 + 2 + \frac{2\pi r}{12}$$

$$= 3 + \frac{2 \times 3.14}{6}$$

$$\approx 4.04$$

$$XADY = XA + l(ADY)$$

$$= 1 + \frac{2\pi r}{3}$$

$$= 1 + \frac{4 \times 3.14}{3}$$

$$\approx 5.19$$

$$\therefore XADY : XOBY : XODY = 5.19 : 5.09 : 4.04$$

Hence, option 4.

63.  $x^2 + 4xy + 6y^2 - 4y + 4$

$$= x^2 + 4xy + 4y^2 + 2y^2 - 4y + 4$$

$$= (x + 2y)^2 + 2(y^2 - 2y + 1 + 1)$$

$$= (x + 2y)^2 + 2(y - 1)^2 + 2$$

This expression will take the minimum value when both the square terms are zero

$$\therefore (y - 1)^2 = 0$$

$$\therefore y = 1$$

and

$$(x + 2y)^2 = 0$$

$$\therefore x = -2$$

$\therefore$  The minimum value of this expression is 2.

Hence, option 3.

64. Unit digit of  $x$  can be 2, 3, 5, or 7.

As the product of all digits of  $x$  is prime,  $x$  can only be 1112, 1113, 1115 or 1117.

Hence, option 1.

65. Let there be 100 employees in Sun Metals.

$\therefore$  40 employees are general graduates.

60 employees are engineers.

$\therefore 0.75 \times 60 = 45$  engineers earn more than Rs. 5 lakh.

As 50% employees earn more than Rs. 5 lakh, according to our consideration there will be 50 employees who earn more than Rs. 5 lakhs. Among these, 45 are engineers.

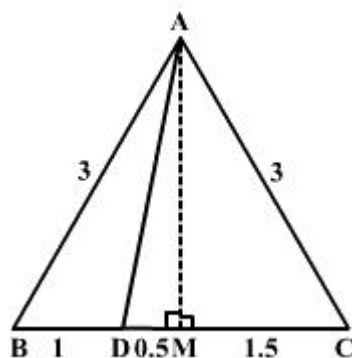
$\therefore 50 - 45 = 5$  general graduates earn more than 5 lakh.

$\therefore 35$  general graduates earn Rs. 5 lakh or less.

$\therefore$  Required proportion  $= \frac{35}{40} = \frac{7}{8}$

Hence, option 5.

66.



Let  $BD = x$

$\therefore CD = 2BD = 2x$

$\therefore BD + CD = BC = 3x = 3$

$\therefore x = 1$

$\therefore BD = 1$  and  $CD = 2$

Let M be the foot of the perpendicular from A on BC.

$\therefore BM = \frac{3}{2} = 1.5$

$\therefore DM = 1.5 - 1 = 0.5$

Length of altitude of an equilateral triangle of side  $a = \frac{\sqrt{3}}{2}a$

$\therefore AM = \frac{\sqrt{3}}{2} \times 3$

In  $\triangle AMD$ , by Pythagoras theorem

$$AD^2 = DM^2 + AM^2$$

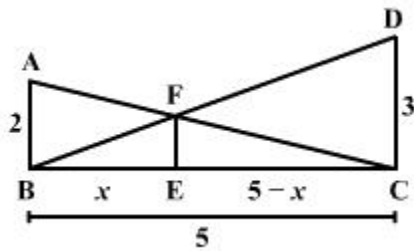
$$= (0.5)^2 + \left(\frac{3\sqrt{3}}{2}\right)^2$$

$$\therefore AD^2 = \frac{1}{4} + \frac{27}{4} = \frac{28}{4} = 7$$

$$\therefore AD = \sqrt{7}$$

Hence, option 3.

67. Let AB and DC be poles of height 2 metres and 3 metres respectively.



Let F be the point of intersection of the lines joining the top of each pole to the foot of opposite pole.

$$\therefore BC = 5 \text{ metres}$$

$$\text{Let } BE = x$$

$$\therefore EC = 5 - x$$

In  $\triangle ABC$  and  $\triangle FEC$ ,

$$\frac{AB}{FE} = \frac{BC}{EC}$$

$$\therefore \frac{2}{FE} = \frac{5}{5 - x} \quad \dots (i)$$

Similarly in  $\triangle BCD$  and  $\triangle BEF$ ,

$$\therefore \frac{3}{FE} = \frac{5}{x} \quad \dots (ii)$$

From (i) and (ii),

$$\frac{3x}{5} = \frac{2(5 - x)}{5}$$

$$\therefore 3x = 10 - 2x$$

$$\therefore 5x = 10$$

$$x = 2$$

From (i),

$$\frac{2}{FE} = \frac{5}{3}$$

$$\therefore FE = \frac{6}{5} = 1.2 \text{ metres}$$

Hence, option 1.

68. Amount of acid content in the solution = 15% of 200 = 30 litres

Let the amount of solution to be added be  $x$ .

$$\therefore \text{Proportion of acid content in the solution now} = \frac{30 + 0.3x}{200 + x}$$

When acid content is 20%, we get

$$\frac{30 + 0.3x}{200 + x} = \frac{1}{5}$$

$$\therefore 150 + 1.5x = 200 + x$$

$$\therefore 50 = 0.5x$$

$$\therefore x = 100 \text{ litres}$$

When acid content is 25%, we get

$$\frac{30 + 0.3x}{200 + x} = \frac{1}{4}$$

$$\therefore 120 + 1.2x = 200 + x$$

$$\therefore 80 = 0.2x$$

$$\therefore x = 400 \text{ litres}$$

So the solution to be added should be more than 100 litres but less than 400 litres.

Hence, option 3.

69. Profit per unit = Rs. 5000

$$\text{Expected profit is} = \sum_i x_i p_i$$

The maximum that the company can afford to pay the brand ambassador = Expected profit with a brand ambassador – Expected profit without a brand ambassador

$$= 5000[20000 \times 0.3 + 30000 \times 0.4 + 20000 \times 0.3]$$

$$= 5000 \times 24000 = \text{Rs. 12 crore}$$

$\therefore$  The maximum that the company can afford to pay its brand ambassador = Rs. 12.0 crore

Hence, option 4.

70. Let  $x$  be the new profit after escalation in cost.

Then in order to maximize the escalation in price, we consider the maximum amount that the company can pay the brand ambassador to be 9 crores.

Then,

$$x[20000 \times 0.3 + 30000 \times 0.4 + 20000 \times 0.3] = 90000000$$

$$\therefore x = 3750$$

$$\therefore \text{Escalation in cost is } 5000 - 3750 = \text{Rs. 1250}$$

Hence, option 3.

71. From conditions given, the maximum amount that the company can pay the brand ambassador

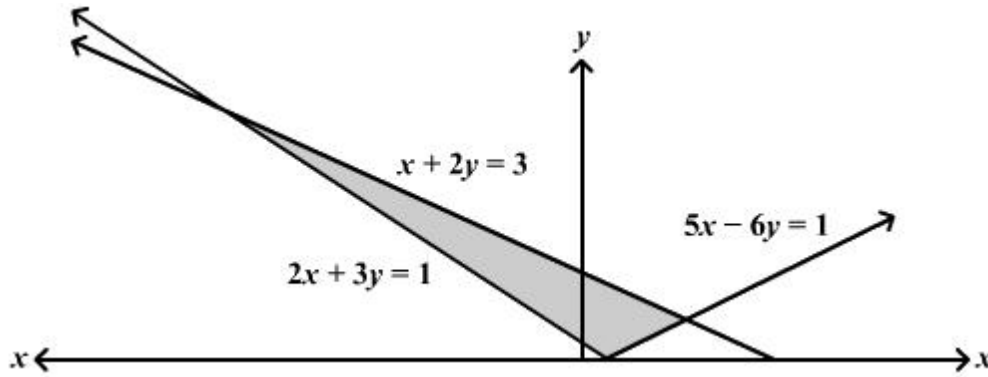
$$= 4000[20000 \times 0.3 + 30000 \times 0.4 + 20000 \times 0.3] = 9.6 \text{ crores}$$

But as the company pays the ambassador only Rs. 9 crores,

its profit will increase by Rs. 60 lakh

Hence, option 2.

72.



The given equations are:

$$2x + 3y = 1$$

$$x + 2y = 3$$

$$5x - 6y = 1$$

These three points form a triangle. Any point within the area of this triangle should satisfy the following three inequalities:

$$2x + 3y > 1 \quad \dots(i)$$

$$x + 2y < 3 \quad \dots(ii)$$

$$5x - 6y < 1 \quad \dots(iii)$$

The points that we are looking for are of the form  $(a, a^2)$

Now  $x = a$  and  $y = a^2$

Substituting these values of  $x$  and  $y$  in (i), we get,

$$a > 1/3 \text{ or } a < -1 \quad \dots(iv)$$

Similarly, substituting these values in (ii), we get,

$$-\frac{3}{2} < a < 1 \quad \dots(v)$$

Similarly, substituting these values in (iii), we get,

$$a > \frac{1}{2} \text{ or } a < \frac{1}{3} \quad \dots(vi)$$

Combining (iv), (v) and (vi), we get,

$$\therefore a \in (-3/2, -1) \cup (1/2, 1)$$

Hence, option 3.

73. Let the probability that a packet is damaged at normal speed be  $x$

$\therefore$  The probability that a packet is damaged at higher speed =  $2x$

The machine runs at higher speed for 60% of the time.

$\therefore$  From conditions we have

$$\frac{60}{100}(2x) + \frac{40}{100}(x) = 0.112$$

$$\therefore x = 0.07$$

$\therefore$  Probability that a packet is not damaged at normal speed =  $1 - 0.07 = 0.93$

Hence, option 2.

74. Coordinates of  $A_2$  and  $A_{24}$  are  $(2, -2)$  and  $(68, 31)$  respectively.

$x$ -coordinates of these points are in AP. If the first term and the common difference are  $a$  and  $d$  respectively, then

$$a + d = 2 \text{ and } a + 23d = 68$$

$$\therefore 22d = 66$$

$$\therefore d = 3$$

$$\therefore a = 2 - 3 = -1$$

Now,  $y = px + q$

For  $A_2$ ,  $-2 = 2p + q$

and for  $A_{24}$ ,  $31 = 68p + q$

$$\therefore 33 = 66p$$

$$\therefore p = 1/2 = 0.5$$

$$\therefore -2 = 1 + q$$

$$\therefore q = -3$$

Thus,  $y = x/2 - 3$  is the equation of the given line.

For  $A_8$ ,  $x$ -coordinate =  $a + 7d = -1 + 7 \times 3 = -1 + 21 = 20$

$\therefore y$ -coordinate is 7.

Hence, option 3.

75. We know that  $x_1 = a = -1$

So point  $A_1$  does not lie in the first quadrant.

For  $A_2$ ,  $y_2 = -2$

So  $A_2$  does not lie in the first quadrant.

For  $A_3$ ,  $x_3 = a + 2d = -1 + 2 \times 3 = 5$

and  $y_3 = 5/2 - 3 = -1/2$

So,  $A_3$  also does not lie in the first quadrant.

For all the other points, both  $x$  and  $y$  coordinates are positive.

So, only  $A_1$ ,  $A_2$  and  $A_3$  do not lie in the first quadrant.

Hence, option 3.

76.  $(1) = 2 = 2^1$

$(x + y) = (x) \cdot (y)$

$\therefore (2) = (1 + 1) = (1) \cdot (1) = 2 \times 2 = 4 = 2^2$

$(3) = (2 + 1) = (2) \cdot (1) = 4 \times 2 = 8 = 2^3$

$(4) = (3 + 1) = (3) \cdot (1) = 8 \times 2 = 16 = 2^4 \dots$

So we get that

$(n) = 2^n$

$\therefore \sum_{x=1}^n (x) = \sum_{x=1}^n 2^x = 1022$

$\therefore \frac{2 \times (2^n - 1)}{2 - 1} = 1022$

$\therefore 2^n - 1 = 511$

$\therefore 2^n = 512$

$\therefore n = 9$

Hence, option 2.

77. Distance between Tatanagar railway station and home = 15 km

Amarendra took 25 minutes to cover that distance.

$\therefore \text{His speed} = \frac{15 \times 60}{25} = 36 \text{ kmph}$

When Amarendra reached the station, Dharmendra was 2500 m away.

$\therefore$  Dharmendra covered 12.5 km in 25 minutes.

$\therefore \text{His speed} = \frac{12.5 \times 60}{25} = 30 \text{ kmph}$

So Dharmendra takes  $\frac{15}{30} = 0.5$  hours or 30 minutes to reach station.

Next day, if Dharmendra starts at time  $t$  from his home, he reaches station at time  $t + 30$ .

Amarendra starts 7 minutes late and takes 25 minutes to reach station.

So, he reaches station at time  $t + 7 + 25 = t + 32$

So, he reaches later than Dharmendra by 2 minutes or 120 seconds.

Hence, option 2.

78. Length of side  $S_3$  is 4 cm.

Now, length of diagonal  $S_n$  is equal to the length of side of  $S_{n+1}$ .

$$\therefore \text{Length of diagonal of } S_3 = \sqrt{4^2 + 4^2} = 4\sqrt{2}$$

$$\therefore \text{Length of side of } S_4 = 4\sqrt{2} = (\sqrt{2})^5$$

$$\text{Now, length of diagonal of } S_4 = 4\sqrt{2} \times \sqrt{2} = 8$$

$$\therefore \text{Length of side } S_5 = 8 = (\sqrt{2})^6$$

Similarly length of side  $S_6, S_7$  and  $S_8$  will be  $(\sqrt{2})^7, (\sqrt{2})^8$  and  $(\sqrt{2})^9$  respectively.

Thus, by observation, length of side of square  $S_n$  is  $(\sqrt{2})^{n+1} = 2^{\frac{n+1}{2}}$

Hence, option 4.

79. Speed of hour hand =  $0.5^\circ/\text{min}$

Speed of minute hand =  $6^\circ/\text{min}$

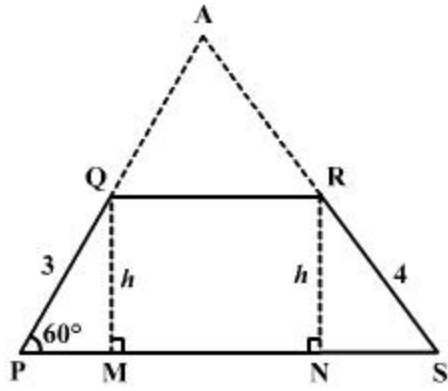
Positions of hour hand and minute hand at different times are as follows

	Hour hand	Minute hand	Distance
7:00 am	$210^\circ$	$0^\circ$	
7:45 am	$232.5^\circ$	$270^\circ$	$37.5^\circ$
7:47 am	$233.5^\circ$	$282^\circ$	$48.5^\circ$

$\therefore$  The angle formed by hour hand and minute hand changes by  $48.5 - 37.5 = 11^\circ$

Hence, option 2.

80. Consider Statement A:



$\Delta QPM$  is a 30-60-90 triangle

$$\therefore QM = h = \frac{3\sqrt{3}}{2}$$

$$RN = h = \frac{3\sqrt{3}}{2}$$

$$\therefore \angle RSN = \sin^{-1} \frac{h}{4} = \sin^{-1} \frac{3\sqrt{3}}{8}$$

$$\therefore \angle PAS = 180^\circ - \angle APS - \angle ASP$$

$\therefore$  Statement A is sufficient to answer the question.

Consider Statement B:

$$PS = 10 \text{ and } QR = 5$$

This statement is not sufficient to answer the question.

Hence, option 1.

$$81. A_{n+1} = A_n^2 + 1$$

Consider Statement A:

$$A_0 = 1$$

$$\therefore A_1 = 1^2 + 1 = 2$$

$$A_2 = 2^2 + 1 = 5$$

$$A_3 = 5^2 + 1 = 26$$

Proceeding thus, we can find  $A_{900}$  and  $A_{1000}$  and hence their GCD.

$\therefore$  Statement A is sufficient.

Consider Statement B:

$$A_1 = 2$$

$$A_2 = 2^2 + 1 = 5$$

$$A_3 = 5^2 + 1 = 26$$

Thus,  $A_{900}$  and  $A_{1000}$  and hence their GCD can be found.

$\therefore$  Statement B is also sufficient.

Hence, option 4.

82. Let  $a$  be the first term and  $r$  the common ratio of the geometric progression.

$$\therefore b = ar, c = ar^2, d = ar^3 \text{ and } e = ar^4$$

$$\text{Now, let } p = \frac{1}{\text{lcm}(a, b)} + \frac{1}{\text{lcm}(b, c)} + \frac{1}{\text{lcm}(c, d)} + \frac{1}{\text{lcm}(d, e)}$$

$$\therefore p = \frac{1}{\text{lcm}(a, ar)} + \frac{1}{\text{lcm}(ar, ar^2)} + \frac{1}{\text{lcm}(ar^2, ar^3)} + \frac{1}{\text{lcm}(ar^3, ar^4)}$$

$$= \frac{1}{ar} + \frac{1}{ar^2} + \frac{1}{ar^3} + \frac{1}{ar^4}$$

$$= \frac{r^3 + r^2 + r + 1}{ar^4}$$

To get the maximum value of the above expression, denominator has to be minimum.

So, we take  $a = 1$  and  $r = 2$

$$\therefore p = \frac{8 + 4 + 2 + 1}{1 \times 2^4} = \frac{15}{16}$$

For any other value of  $r$ ,  $p$  would be less than this. So  $15/16$  is the maximum value.

Hence, option 2.

83. Let the total sales be  $100x$ . Music CDs contribute 35%, while books contribute 50% more than music CDs.

$\therefore$  Sales of music CDs and books will be  $35x$  and  $52.5x$  respectively.

$$\therefore \text{Sales of DVD} = 100x - 35x - 52.5x = 12.5x$$

Now, they earn 40% profit on music CDs.

If the cost price of CDs is  $y_1$ , then

$$35x = 1.4y_1$$

$$\therefore y_1 = 25x$$

Similarly, if the cost price of books is  $y_2$ , then

$$52.5x = 1.25y_2$$

$$\therefore y_2 = 42x$$

Now, the total profit is 20%. If the total cost be  $y$ , then

$$1.2y = 100x$$

$$\therefore y = 83.33x$$

$$\text{So, cost of DVDs} = 83.33x - 42x - 25x = 16.33x$$

Cost of DVDs was  $16.33x$ , while its sales were  $12.5x$

$$\text{So, the loss on DVDs} = \frac{16.33x - 12.5x}{16.33x} \times 100 = 23.4\%$$

Hence, option 5.

84. *Books and More* made 50% loss in film DVDs.

$$\text{Sales of DVD} = 12.5x$$

If the cost price of DVD is  $y_1$ ,

$$12.5x = 0.5y_1$$

$$\therefore y_1 = 25x$$

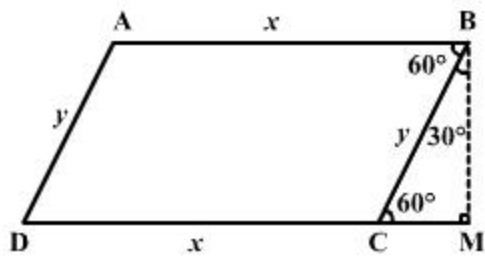
$$\therefore \text{Total cost price} = 25x + 42x + 25x = 92x$$

We had assumed the total sales to be  $100x$

$$\therefore \text{Percentage profit} = \frac{100x - 92x}{92x} \times 100 = 8.7\%$$

Hence, option 2.

85. Let  $x$  and  $y$  be the sides of the parallelogram.



$\triangle BMC$  is a 30 - 60 - 90 triangle.

$$\therefore BM = \frac{\sqrt{3}}{2} y$$

$$CM = \frac{y}{2}$$

Area of parallelogram ABCD = product of sides  $\times$  sine of included angle

$$\therefore \frac{15\sqrt{3}}{2} = xy \sin 60$$

$$\frac{15\sqrt{3}}{2} = xy \times \frac{\sqrt{3}}{2}$$

$$\therefore xy = 15 \quad \dots (i)$$

In  $\triangle BDM$ ,

$$(BD)^2 = (BM)^2 + (DM)^2$$

$$\therefore 7^2 = \left(\frac{\sqrt{3}}{2} y\right)^2 + \left(x + \frac{y}{2}\right)^2$$

$$49 = \frac{3}{4} y^2 + x^2 + xy + \frac{y^2}{4}$$

$$= y^2 + x^2 + xy$$

$$49 = x^2 + y^2 + 15$$

$$\therefore x^2 + y^2 = 34 \quad \dots (ii)$$

$$(x + y)^2 = x^2 + y^2 + 2xy = 34 + 30 = 64$$

$$\therefore x + y = 8 \quad \dots (iii)$$

$$(x - y)^2 = x^2 + y^2 - 2xy = 34 - 30 = 4$$

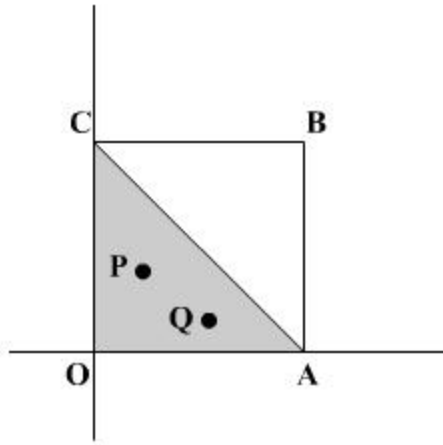
$$\therefore x - y = 2 \quad \dots (iv)$$

Solving (iii) and (iv),

$$x = 5 \text{ and } y = 3$$

$$\therefore \text{Perimeter of the parallelogram} = 2(5 + 3) = 16 \text{ cm}$$

Hence, option 3.



Given that  $P + Q = (x_1 + x_2 - x_1x_2, y_1 + y_2 - y_1y_2)$

and  $P \cdot Q = (x_1x_2, y_1 + y_2 - y_1y_2)$

Now  $P^n = P \cdot P \cdot P \dots$  ( $n$  times,  $n \gg 1$ )

Now  $x_1$  and  $y_1$  are both less than 1.

$\therefore P \cdot P = (x_1^2, y_1 + y_1 - y_1^2)$

$x_1^2 < x_1$  and  $y_1 + y_1 - y_1^2 = y_1(2 - y_1) > y_1$

For every subsequent iteration, the  $x$ -coordinate of  $P^n$  will become smaller and smaller and tend towards 0 and the  $y$ -coordinate will tend towards 1.

Thus it can be observed that  $P^n$  tends to  $(0, 1)$  for a large  $n$ .

Similarly  $Q^n$  tends to  $(0, 1)$  for a large  $n$ .

Hence  $P^n + Q^n = (0, 1) + (0, 1)$

$$= (0 + 0 - 0, 1 \times 1)$$

$$= (0, 1)$$

Hence  $P^n + Q^n$  is close to  $(0, 1)$  for very large values of  $n$ .

Hence, option 3.

87.  $nP = P + P + P + \dots$

Following a similar logic as in the first question of this set,

$nP$  and  $nQ$  will tend to  $(1, 0)$  for a large  $n$ .

$\therefore nP + nQ = (1, 0) + (1, 0)$

$$= (1 + 1 - 1, 0 \times 0)$$

$$= (1, 0)$$

Hence  $nP + nQ$  is close to  $(1, 0)$  for very large values of  $n$ .

Hence, option 2.

88. We have been given the cost as a percentage of sales revenue of both the factories

$$\text{Let } \frac{\text{Cost}}{\text{Sales Revenue}} \times 100 = x\%$$

$$\therefore \frac{\text{Profit}}{\text{Sales Revenue}} \times 100 = (100 - x)\%$$

$$\begin{aligned}\therefore \frac{\text{Profit}}{\text{Sales Revenue}} &= \frac{(100 - x)}{100} \\ \therefore \frac{\text{Profit}}{\text{Price} \times \text{Sales Quantity}} &= \frac{100 - x}{100} \\ \therefore \frac{\text{Profit}}{\text{Sales Quantity}} &= \frac{100 - x}{100} \times \text{Price} \\ \therefore \text{Profit Rate} &= \frac{100 - x}{100} \times \text{Price}\end{aligned}$$

	Profit Rate of Paharpur Cement	Profit Rate of Bahsin Cement
October-December 2008	27.78	25.36
January-March 2009	37.82	38.1
April-June 2009	30.5	43.17
July-September 2009	30.85	41.75

Hence, option 3.

#### 89. For Jan- Mar 2009,

##### **Paharpur Cement**

Sales Quantity = 543278

Cost (as a percentage of revenue) = 87.56 %

$\therefore$  Profit as a % of revenue =  $100 - 87.56 = 12.44\%$

$\therefore$  Profit =  $\frac{12.44}{100} \times 543278 \times 304 = 20545470$

Profit Rate = 37.82

##### **Bahsin Cement**

Similarly, Profit =  $\frac{100 - 91.34}{100} \times 526532 \times 440 = 20062975.3$

Profit Rate = 38.10

#### **For April - June 2009**

##### **Paharpur Cement**

Profit =  $\frac{100 - 91.03}{100} \times 340 \times 698236 = 21294801.53$

Profit rate = 30.5

##### **Bahsin Cement**

Profit =  $\frac{100 - 89.96}{100} \times 430 \times 499874 = 21580560.33$

Profit Rate = 43.17

Hence, option 5.

90. We know, cost as a percentage of total revenue

$$\therefore \frac{\text{Cost}}{\text{Sales Revenue}} \times 100 = x$$

$$\therefore \frac{\text{Cost}}{\text{Sales Revenue}} = \frac{x}{100}$$

$$\therefore \frac{\text{Profit}}{\text{Sales Revenue}} = \frac{(100 - x)}{100}$$

$$\therefore \frac{\text{Profit}}{\text{Sales Quantity} \times \text{Price}} = \frac{(100 - x)}{100}$$

$$\therefore \text{Profit} = \frac{(100 - x)}{100} \times \text{Sales Quantity} \times \text{Price}$$

Let the sales quantity of Paharpur cement for Apr - June 2009 be Rs.x

$$\begin{aligned} \therefore \text{Profit} &= \frac{(100 - 91.03)}{100} \times 340 \times x \\ &= 30.498x \end{aligned}$$

In the period Jul-Sept 2009 the sales increased by 2.25%

$$\therefore \text{Sales for Jul - Sept 2009} = 1.00225x$$

$$\therefore \text{Profit} = \frac{(100 - 90.42)}{100} \times 322 \times 1.0225x$$

$$= 31.54x \therefore \% \text{ increase in profit} = \frac{1.042}{30.498} \times 100 \approx 3.42\%$$

Hence, option 5.

91. As coupon payments on bonds A, E, B, D and C are in AP let them be  $\alpha - 2\beta, \alpha - \beta, \alpha, \alpha + \beta, \alpha + 2\beta$ .

Also, coupon payments of A = 2 × common difference

$$\Rightarrow \alpha - 2\beta = 2\beta$$

$$\Rightarrow \alpha = 4\beta$$

Hence, the coupon payment of A, E, B, D and C are  $2\beta, 3\beta, 4\beta, 5\beta$  and  $6\beta$  respectively.

Coupon payment of B =  $\frac{1}{2} \times$  the price of A

$$\Rightarrow 4\beta = \frac{1}{2} \times \left[ 2\beta \left( \frac{1}{1.25} + \frac{1}{(1.25)^2} \right) + \frac{F_A}{(1.25)^2} \right]$$

$$\Rightarrow 8\beta = 2\beta \times \frac{2.25}{(1.25)^2} + \frac{1000}{(1.25)^2} \quad (\because F_A = 1000)$$

$$\Rightarrow 12.5\beta - 4.5\beta = 1000$$

$$\Rightarrow \beta = 125$$

Hence price of A =  $8\beta$  = Rs. 1000

Hence face value of C = Rs. 1000

So, we can tabulate the current data as

	A	B	C	D	E
C	Rs. 250	Rs. 500	Rs. 750	Rs. 625	Rs. 375
F	Rs. 1000		Rs. 1000		
P	Rs. 1000				

Also maturity of C can be 2 or 3 years.

Assuming it to be 2 years, we get

$$P_C = 750 \times \left[ \frac{1}{1.25} + \frac{1}{(1.25)^2} \right] + \frac{1000}{(1.25)^2}$$

$$= \text{Rs. } 1720$$

but  $P_C > \text{Rs. } 1800$  (given)

$\therefore$  Time period for maturity of bond C is 3 years.

$$P_C = 750 \times \left[ \frac{1}{1.25} + \frac{1}{(1.25)^2} + \frac{1}{(1.25)^3} \right] + \frac{1000}{(1.25)^3}$$

$$= \text{Rs. } 1976$$

Now, since the time period for maturity of C is 3 years, the maturity period of B and E is 2 years.

Also given is  $F_B = 2F_E$

and  $P_B = 1.75 P_E$

$$\therefore 500 \left[ \frac{1}{1.25} + \frac{1}{(1.25)^2} \right] + \frac{F_B}{(1.25)^2} = 1.75 \left[ 375 \left( \frac{1}{1.25} + \frac{1}{(1.25)^2} \right) + \frac{F_E}{(1.25)^2} \right]$$

$$\Rightarrow 500 \times 2.25 + 2F_E = 656.25 \times 2.25 + 1.75F_E$$

$$\Rightarrow 0.25F_E = 156.25 \times 2.25$$

$$\Rightarrow F_E = \text{Rs. } 1406.25$$

So, we can tabulate the data found

	A	B	C	D	E
C	Rs. 250	Rs. 500	Rs. 750	Rs. 625	Rs. 375
F	Rs. 1000	Rs. 2812.50	Rs. 1000		Rs. 1406.25
P	Rs. 1000	Rs. 2520	Rs. 1976		Rs. 1440
Money earned	Rs. 1500	Rs. 3812.50	Rs. 3250		Rs. 2156.25

Hence, option 1.

92. Refer to the final table in the solution to question 91,

Since, the face value of D is the largest its price will be maximum, so it cannot be bought with rupees 2500.

So the only combination possible is A and E which will give a return of  $1500 + 2156.25 = \text{Rs. } 3656.25$

Hence, option 3.

93. Refer to the final table in the solution to question 91,

The price of bond C = Rs. 1976

Hence, option 4.

94. In the list of words arranged in a dictionary, the words starting with C will occur in the beginning.

There are  $4! = 24$  such words.

After these 24 words, the words starting with H will begin.

There are  $\frac{4!}{2} = 12$  such words (as C is repeated twice)

After these there will be 12 words starting with J.

The next two words, which are the 49<sup>th</sup> and 50<sup>th</sup> words will start with L and will be LCCHJ and LCCJH respectively.

$\therefore$  The 50<sup>th</sup> word is LCCJH.

Hence, option 3.

95. Let  $x$  and  $y$  be the number of units of A and B.

Then we have

	Number of hours		
	A	B	Total
Grinder	2	3	12
Polisher	3	2	10

We have to maximize the profit given by

$$z = 5x + 7y$$

The constraints are  $x \geq 0, y \geq 0$

$$2x + 3y \leq 120 \text{ (as there are 10 grinders)}$$

$$3x + 2y \leq 150 \text{ (as there are 15 polishers)}$$

As all resources are to be used, we have

$$2x + 3y = 120$$

$$3x + 2y = 150$$

Solving simultaneously,  $x = 42$  and  $y = 12$ .

$\therefore$  The maximum profit is  $5(42) + 7(12) = \text{Rs. } 294$

Hence, option 2.

96. Volume of tank =  $150 \times 120 \times 100$   
 $= 1800000 \text{ cm}^3$

Volume of water =  $1281600 \text{ cm}^3$

Volume of tank that is empty =  $518400 \text{ cm}^3$

Volume of each brick =  $20 \times 6 \times 4 = 480 \text{ cm}^3$

Each brick absorbs one tenth of its volume of water.

$\therefore$  We can say that in the tank, each brick occupies an effective volume of  $480 - 48 = 432 \text{ cm}^3$ .

$\therefore$  Number of bricks that can be put in the tank

$$= \frac{518400}{432} = 1200$$

Hence, option 2.

97. A fair chance of winning is more than 50% chance of winning.

$\therefore$  Probability = 0.5

We need to find a fair chance winning atleast one match.

$$\therefore 1 - \left(\frac{5}{6}\right)^n > 0.5$$

By trial and error,  $n = 4$

Hence, option 2.

98. Number of boxes of brand A, B and C are 96, 240 and 336 respectively.

Each carton should contain boxes of same brand and also an equal number of boxes.

This can happen only when each carton contains a number of boxes that is a factor of number of boxes of each brand i.e. a factor of 96, 240 and 336.

To get minimum number of cartons, number of boxes in each carton should be maximum.

So, we should take the highest common factor of 96, 240 and 336.

$$96 = 2^5 \times 3$$

$$240 = 2^4 \times 3 \times 5$$

$$\text{and } 336 = 2^4 \times 3 \times 7$$

So, the highest common factor =  $2^4 \times 3 = 48$

$$\text{So number of cartons containing boxes of brand A} = \frac{96}{48} = 2$$

$$\text{Number of cartons containing boxes of brand B} = \frac{240}{48} = 5$$

$$\text{Number of cartons containing boxes of brand C} = \frac{336}{48} = 7$$

$$\therefore \text{Total number of cartons} = 2 + 5 + 7 = 14$$

Hence, option 2.

99. For the month of January,

It is given that average consumer expenditure on roses and carnations (Rs.) = 47.4

Also the total population of the town is 70000.

∴ The total expenditure on roses and carnations =  $(47.4 \times 70000) = \text{Rs. } 3318000$

Now, it is given that the total expenditure on roses = Rs. 1136916

∴ The total expenditure on carnations =  $(3318000 - 1136916) = \text{Rs. } 2181084$

For the month of March,

It is given that average consumer expenditure on roses and carnations (Rs.) = 49.5

∴ The total expenditure on roses and carnations =  $(49.5 \times 70000) = \text{Rs. } 3465000$

Now, it is given that the total expenditure on roses = Rs. 1137915

∴ The total expenditure on carnations =  $(3465000 - 1137915) = \text{Rs. } 2327085$

∴ Percentage increase in the expenditure =  $\frac{(2327085 - 2181084)}{2181084} \times 100 = 6.69\%$

Hence, option 3.

100. For the month of January,

Total consumer expenditure on roses = Rs. 1136916

Price of roses per dozen = Rs. 99

∴ Roses sold =  $(1136916 \div 99) = 11484$  dozens

Similarly, for the month of July,

Roses sold = 8253 dozens

∴ Percentage decrease in the sales =  $\frac{(11484 - 8253)}{11484} \times 100 = 28.13\%$

Hence, option 2.

101. From the solution to question 99, we have,

For the month of January,

The total expenditure on carnations = Rs. 2181084

Carnations sold = 13848 dozens

∴ Price of carnations =  $(2181084 \div 13848) = \text{Rs. } 157.5$  per dozen

Similarly, for the month of December,

The total expenditure on carnations = Rs. 2970312

Carnations sold = 18859 dozens

∴ Price of carnations = Rs. 157.5 per dozen

Thus, the price did not change.

Hence, option 5.