

Answers:

Verbal Ability	LRDI	Quantitative Aptitude
1.B	35.C	67.D
2.C	36.B	68.A
3.C	37.D	69.C
4.A	38.C	70.A
5.B	39.7	71.D
6.B	40.6	72.12
7.B	41.A	73.32
8.D	42.A	74.40
9.B	43.4	75.15
10.A	44.4	76.C
11.B	45.A	77.D
12.C	46.D	78.D
13.A	47.D	79.121000
14.D	48.C	80.A
15.C	49.D	81.502
16.B	50.B	82.198
17.B	51.C	83.D
18.A	52.B	84.52
19.B	53.A	85.A

20.B	54.B	86.D
21.D	55.C	87.54
22.B	56.4	88.D
23.D	57.3	89.C
24.B	58.A	90.A
25.D	59.C	91.C
26.2	60.A	92.C
27.5	61.A	93.D
28.C	62.C	94.C
29.1324	63.D	95.D
30.4	64.A	96.10
31.A	65.13	97.A
32.4213	66.14	98.60
33.2413		99.5
34.1432		100.B

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Explanations:

VARC

1.B

We can infer that the author adopts a cautionary tone in the passage. He warns that quantification of happiness might be useful in certain contexts but making measuring happiness the primary goal can lead to unwanted consequences. He warns that happiness will become a personal project if we take the metrics too seriously. Therefore, the author is likely to recommend economists to incorporate the research findings cautiously and hence, option B is the right answer.

2. C

In the penultimate paragraph, the author mentions "Where happiness indicators were once used as a basis to reform society, challenging the obsession with money that G.D.P. measurement entrenches, they are increasingly used as a basis to transform or discipline individuals". He states that wearable technologies shift the focus on the person for his depression. In the last paragraph, the author mentions how these technologies are helping in disciplining individuals to be happy rather than addressing the cause of depression. Therefore, option C is the right answer.

3.C

In the last paragraph, the author mentions that since 1970s, depression is viewed as the defect of the individual rather than as the effect of his circumstances. He feels that this approach puts the person under pressure since being depressed is being viewed as the fault of the individual. The author does not view the shift in a positive light. Only option C captures the fact that the development was a detrimental step and hence, option C is the right answer.

4.A

The primary intention of the author is to warn about the trend of collecting data to monitor emotions and in turn promote happiness as an overarching goal. He says that such a practice will lead to adoption of intrusive methods and make happiness a personal project to be worked on. If it is proved that less data is being collected than earlier, it will weaken the very basis of the author's arguments. Options B and C indicate a trend that the author is warning about. Therefore, we can eliminate these 2 options. Option D states that individuals worldwide are using technologies to monitor their well-being. The author's argument is not that such technologies should not be used. He just states that proliferation of such technologies, especially when used by

external parties like nations and corporations, might put people under greater stress. Therefore, we can eliminate option D as well. Option A states that stakeholders are moving away from collecting data. This statement goes against the warning issued by the author. Therefore, option A will undermine the author's arguments the most and hence, option A is the right answer.

5.B

The author does not consider happiness indicators to be the gold standard of happiness. Therefore, we cannot say that Dubai is on its way to becoming one of the happiest cities in the world just because it tries to discipline its citizens to be happy. Nowhere has it been mentioned that Dubai collaborates with Facebook or incentivises companies that promote worker welfare. Cities such as Dubai, which has pledged to become the "happiest city in the world," dream up ever-more elaborate and intrusive ways of collecting data on well-being – to the point where there is now talk of using CCTV cameras to monitor facial expressions in public spaces. We can infer that Dubai comes up with new intrusive ways of collecting data on the well-being of its citizens. Therefore, option B is the right answer.

6.B

Through the passage, the author explains how the ways elephants behave is similar to the trauma related response evoked in individuals. He explains how the elephant society is affected by the human activity and the impact of the same on the brain development of young elephants. The primary purpose of the passage is not to draw an analogy between elephants and humans in any way. Therefore, we can eliminate options A and D. Option C states that the relationship between elephants and human has changed from one of coexistence to one of hostility. Though this point is true, it is not the central theme of the passage. The author places much emphasis on how the elephant behaviour can be explained as a species-wide trauma response and hence, option B is the right answer.



7.B

The author uses strong comparison in the given line. The author has not mentioned that the elephant society, which is like a fabric, is frayed by human activities. He uses the term 'the fabric of elephant society' and this comparison is called a metaphor. We can eliminate option A since it fails to capture the fact that a comparison has been used. Option D states that the line is an ode to the fragility of elephant society today. Option D fails to capture the fact that human activities are wrecking the social structure of elephants. Option C states that the line is an exaggeration to bolster Bradshaw's claims. The author is not exaggerating the facts to substantiate Bradshaw's claims. He tries to capture the effects of human activities on the elephant society metaphorically. Therefore, option B is the right answer.

8.D

The author explains how elephants are profoundly social creatures like humans and how human activities are putting elephants under stress. Then, he explains how the recent elephant behaviour is similar to post traumatic stress syndrome observed in humans. Options A, B, and C can be inferred. The author expresses apprehension that young calves are raised by inexperienced elephant mothers and this, in turn, affects the brain development of the calves. Nowhere has it been mentioned that elephant mothers are developing newer ways of rearing their calves. Therefore, option D is the right answer.

9.B

In the first paragraph of the passage, the author uses the line "Now, I use the term 'violence' because of the intentionality associated with it". Therefore, we can infer that the author specifically uses the term violence to emphasize that the actions of the

elephants on humans are deliberate just like those of humans on elephants. Therefore, option B is the right answer.

10.A

The author tries to establish that the elephant behaviour is similar to stress related response induced in humans. From the tone of the passage, we can infer that the author is concerned about the elephants. He does not adopt a detached view point. The passage tries to evoke empathy from the audience and has not been written as a science research paper. Options B, C, and D do not address the issue at hand. They are not steps towards addressing elephant aggression. Only option A proposes a method to treat the elephants and hence, option A is the right answer.

11.B

In the penultimate paragraph, the author uses the line "[T]he greatest success of Keep America Beautiful has been to shift the onus of environmental responsibility onto the public while simultaneously becoming a trusted name in the environmental movement". From the tone of the line, we can infer that the author believes that the sole purpose of 'Keep America Beautiful' was to shift the blame on the consumers. Therefore, option B is the right answer.

12.C

The author believes that the corporates are responsible for the plastic menace. He states that recycling the plastics or targeting the consumers are ineffective to tackle the problem. Encouraging individuals to recycle more will never solve the problem of a massive production of single-use plastic that should have been avoided in the first place. In the last paragraph, the author recommends responsible use of plastics. Therefore, he is unlikely to support a complete ban on single use plastics as well. The author holds the corporates squarely responsible for the plastic menace. Therefore, the author is most likely to suggest passing regulations targeted at the producers rather than at the consumers. Therefore, option C is the right answer.

13.A

In the third paragraph, the author mentions that plastics get absorbed in the water and some animals mistake plastic for their natural food and consume them. Therefore, we

can infer options B and C. In the same paragraph, the author explains how plastics we use for a few minutes will stay on the planet for millions of years. Therefore, we can infer option D as well. The author has not mentioned about air pollution caused while recycling the plastics anywhere in the passage.

Therefore, option A is the right answer.

14. D

The author believes that plastic production should be restricted. He finds asking consumers to stop using plastics or recycling plastics to be inadequate measures. The author uses the analogy to drive home the point that focusing on consumer behaviour will be totally incommensurate to tackle plastic pollution. Therefore, option D is the right answer.

15. C

The author uses the term 'lie' to emphasize that the fact that the consumers are made to believe that they are responsible for the plastic menace. Through out the passage, the author explains how the corporates tricked people into believing that the blame lies on them for using the plastics. Therefore, option C is the right answer.

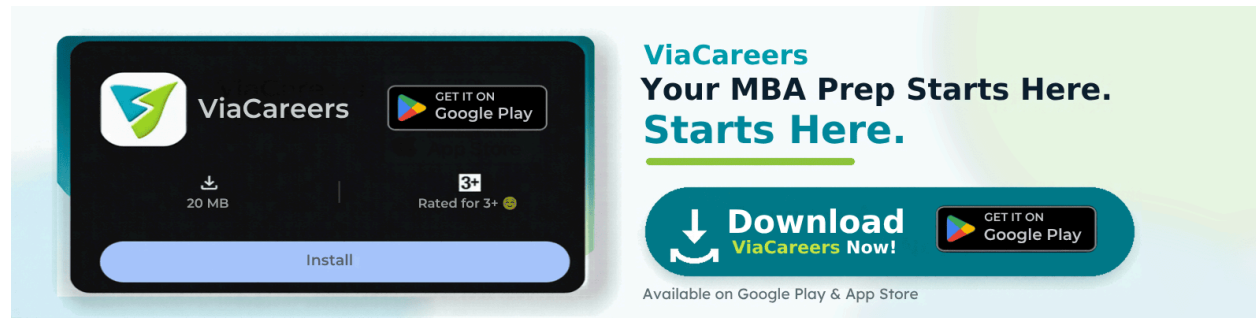
16. B

The author mentions "All these tugs represent the influence of developmental factors, including epigenetics, antibodies and hormones passed on by parents, as well as the ecological legacies and culture they bequeath". Option A misses 'developmental factors' and 'antibodies'. Option C misses 'ecological legacies'. Option D misses 'developmental factors'. Option B is the most comprehensive one among the given options and hence, it is the right answer.

17. B

The primary purpose of the passage is not to establish the scientific superiority of Wilson's theory over that of Darwin's and Mendel's theories. The author begins the passage with an example that the theory of natural selection fails to explain. Then, he explains about 'Epigenetic inheritance' and elaborates on how epigenetic inheritance explains the transmission of acquired characteristics. Therefore, the author's main argument is that Darwin's theory cannot fully explain evolution and hence, option B is the

right answer.



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18.A

The main message of the passage is that natural selection cannot fully explain evolution. Therefore, any argument that attacks this message is most likely to weaken the author's arguments. A study indicating the sole influence of natural selection and inheritance on evolution will question the legitimacy of the theory epigenetic inheritance' and hence, option A is the right answer.

19.B

The author uses the Emory University experiment to show that acquired characteristics can be passed on from one generation to another. In the second paragraph, the author explains how the acquired characteristics (fear in this case) should not have been passed according to the theory of natural selection. Option A is too narrow in scope. The author uses fear as an example of acquired characteristic. Therefore, option B is the right answer.

20.B

By the term "mood music", the author intends to convey that the war set the stage for the Independence and partition of the country. He does not mean that the war was an allied effort and India's contribution to the war was merely supportive. The author mentions that the political trajectory in both the countries has been against the popular remembrance of war. He states that the countries were focused on building a non-colonial identity and the war narrative did not fit in well in the picture.

21.D

The author uses the phrase "mood music" to indicate that (the contribution of Indians

to) the Second World War is not given the importance it deserves. The author does not state that the war led to the rivalry. Though he mentions the ill-effects of the war on India, he does not refer to them when he uses the term "mood music". He feels that the war is largely seen as a warmer to the Independence and partition of the country. Therefore, option D is the right answer.

22.B

In the fourth paragraph, the author states "This led the United States to take considerable interest in the country's future". We can infer that India's strategic location led to US's interests towards India and hence, we can eliminate option A. In the first line of the second paragraph, the author mentions that the Second World War played a crucial role in the independence of India. In the sixth paragraph, the author mentions that the war was achieved at great human cost. He states that the Bengal famine was the most extreme manifestation of the human costs of the war. In the fifth paragraph, the author states "In a stunning reversal of its long-standing financial relationship with Britain, India finished the war as one of the largest creditors to the imperial power". From this line, we can infer that India lent its resources to Britain, not the other way around. Therefore, option B is an incorrect interpretation of the given sentence and hence, option B is the right answer.

23.D

In the second paragraph, the author mentions "Rather, it accurately reflected the fact that both academic history and popular memory have yet to come to terms with India's Second World War". The author states that the act was not merely absent-minded. Therefore, the author considers the omission to be reflective of India's academic and popular views and hence, option D is the right answer.

24.B

The author states that the new war memorial to commemorate various soldiers who lost their lives since independence will be built near India gate, a World War I memorial. The author regrets the fact that the contribution of Indian soldiers to World War II is being air brushed out of existence. The author laments the fact that the nation fails to recognize the sacrifice of the Indian soldiers who served in the World War II and

hence, option B is the right answer.

25.D

Let us note down the important points. Professions approach structures and institutionalizes knowledge but knowledge production is restricted to the select members of the community. It prevents the non-professional actors from offering their ideas. Options A, B, and C do not capture the negative aspects of the professions approach at all. They just focus on the advantages offered by the approach but the given paragraph places a huge emphasis on the limitations of the approach as well. Only option D captures both the advantage offered by the approach and its limitations. Therefore, option D is the right answer.

26. 2

On reading the sentences, we can infer that the author draws an analogy between translators and bumblebees

in the paragraph.

1 should be the opening sentence since it introduces the fact that the paragraph is going to be about the similarities of translators and bumblebees. After sentence 1, the author should have explained how they are analogous.

5 states that the French entomologist August Magnan pronounced the flight of bumblebees to be aerodynamically impossible. Sentence 3 talks about similar statements made about translations. Sentence 4 should be the last sentence since it concludes by saying that both translators and bees have continued their work unaware of these deliberations. Sentences 1 5 3 4 can be put together into a coherent paragraph.

Sentence 2 does not add any valuable information to the topic of discussion. The author does not use the fact that the factoid (impossibility of the flight of the bumblebee) has been disproved to support his argument.

Sentence 2 should be the one out of context and hence, 2 is the correct answer.



27.5

On reading the sentences, we can infer that the paragraph revolves around the displacement of people in Bengal due to erosion. 3 should be the opening sentence since it introduces the topic of discussion -displacement in Bengal. 3 should be followed by sentence 2 since it elaborates that the displacement is due to the shifting of the course of the Ganges and the erosion. We have to decide the pair between 5, 4, and 1. Sentence 4 is definitely a part of the paragraph since it fits well with both the sentences. Also, it states an important detail - the displacement is spread out over a period of time and hence, remains invisible. Since the displacement is not rapid, its magnitude is not significant. Sentences 4 and 1 form a pair and hence, sentence 5 is the one out of context.

28.C

Let us note down the main points of the given paragraph: The given paragraph describes how the study of landscape gained prominence and became an independent genre. Renaissance artists facilitated the development of the field as an independent genre. Let us evaluate the options one by one. Option A states that understanding of the organism in Europe led to a similar approach towards the understanding of landscape. Though this option is true, it fails to capture the fact that the field evolved as an independent genre with the help of Renaissance artists. Option B states that Landscape became a major subject of art at the turn of the sixteenth century. Again, option B fails to capture the role played by the Renaissance artists. Option D states that Renaissance artists were responsible for the study of landscape as a subject of art. The paragraph mentions that the artists facilitated in the transformation of the field into an independent genre. Option D establishes a strong relationship and holds Renaissance artists 'responsible' for the study of landscape 'as a subject of art'. The parts within the

quotes disregard the fact that the artists just aided the process. They were not solely responsible for the development. Therefore, we can eliminate option D. Only option C captures the fact that the renaissance artists 'aided' in the development of the study of landscapes as an independent genre and hence, option C is the right answer.

29. 1324

On reading the sentences, we can infer that the paragraph is about the difficulty in implementing impartiality and objectivity. Sentence 3 states that Twitter's website says that algorithm shows tweets that are likely to suit the taste of the user and much more. Sentence 2 continues sentence 3 by stating that the catch lies in the term 'much more'. Also, it criticizes how catering to the taste of the user forces him into a bubble. Sentence 2 should be followed by sentence 4 since it states the implications of the term 'much more' and how it makes believing in the impartiality and objectivity of twitter hard. Sentences 324 form a group. The entire group has been provided as an illustration to explain how hard it is to implement impartiality and objectivity. Therefore, sentence 1 should be the opening sentence. Sentences 1324 form a coherent paragraph. Hence, 1324 is the correct answer.

30 .4

All sentences except sentence 4 talk about how time inconsistency prevents people from immunizing their children. Sentence 4 states that the cost of immunization acts as a deterrent which is not in line with the other 4 sentences. 1 should be the opening sentence since it is a general statement introducing time inconsistency. Sentence 1 should be followed by sentence 3 since explains how time inconsistency, in itself, acts as a deterrent in the specific case of immunization. Sentences 2 and 5 form a pair. Sentence 2 states how people should be fooling themselves to postpone their child's immunization. Sentence 5 explains how they should be fooling themselves to not get their child immunized.



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Sentences 1325 can be put together into a coherent paragraph. Therefore, 4 is the correct answer.

31. A

The author mentions that artificial embryo twinning is 'low tech' to introduce the topic. Then, he explains how the process is exactly similar to the process of development of twins. He states that the process mimics the natural development of twins. He has not highlighted any of the differences between the 2 processes. Let us evaluate the options. Option C states that artificial embryo twinning is 'low tech' unlike the natural development of twins. The author makes no such comparison in the paragraph and hence, option C can be eliminated. Option D states that the twins are formed during fertilization but the paragraph mentions that the twins are formed after the process of fertilization (i.e, after the sperm and the egg join). Option B fails to capture the fact that the twins are 'genetically' identical. Also, it states that the artificial twinning process is 'close to' the natural development of twins. Though this option is not incorrect, option A is worded in a better way. Option A states that the process is mimetic of the natural development of the twins (emphasizing that no difference has been highlighted), the twins are genetically identical and the process is similar to the process of development of twins after fertilization. Therefore, option A is the right answer.

32.4213

Sentence 4 should be the opening sentence since it sets the scene and introduces the person suffering from cancer. Sentence 2 states that the viola player and her physician did not know what it was. 'It' refers to the lump on the finger. Sentence 1 should follow sentence 2 since it states what the eventual diagnosis was. The GP did not know what the lump was and later it was identified to be skin cancer. Sentence 1 states that all seemed well after the treatment, implying it was not. Sentence 3 should be the last

sentence since it states that the cancer had spread to her lungs. Sentences 4213 form a coherent paragraph and hence, 4213 is the right answer.

33.2413

2 should be the opening sentence since it sets the context for the discussion. It states that democracy and high levels of inequality are not compatible. Sentence 2 should be followed by sentence 4 since it states that very rich people will always try to buy power. The author is not surprised by this fact. Sentence 1 should follow sentence 4 since it states what the really unexpected thing is. The author states that we have a new group of people, 'the unwitting enablers'. Sentence 3 should follow sentence 4 since it elaborates on the nature of the unwitting enablers. Sentences 2413 form a coherent paragraph and hence, 2413 is the right answer.

34.14321

should be the opening sentence since it sets the context. Sentence 1 states that the woodland's canopy receives most of the sunshine that falls on the trees. Sentence 4 continues sentence 1 by stating that thousands of insects fly above the canopy in the sunlight. The insects fall prey to the swifts and swallows. We have to decide whether the order of the remaining 2 sentences is 32 or 23.

Sentence 3 states that swifts are agile flyers, adapted to chasing flying insects. Sentence 3 states that flying insects form the staple diet of the swifts. Sentence 2 states that swifts do not confine themselves to woodlands and hunt wherever they can find insects. Therefore, sentence 3 should precede sentence 2 (We cannot introduce that insects form the staple diet after stating that swifts hunt wherever they can find flying insects).

Sentences 1432 form a coherent paragraph.

Therefore, 1432 is the correct answer.

LRDI

Explanation [35 - 38]:

There are 8 students in total - 4 male and 4 female. There are 3 institutes X, Y, and Z. 3

students are from institute X, 3 students are from institute Y, and 2 students are from institute Z. No student majors and minors in the same subject. It has been given that both the students from institute Z are female. Also, it has been given that both the male students from institute Y minor in Finance. Therefore, the third student from institute Y should be female. Institute X should also have 2 male and 1 female student.

College	X			Y			Z	
Gender	M	M	F	M	M	F	F	F
Name								
Major								
Minor								

Both the male students from Y minor in Finance, while the female student from Y majors in Operations. Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.

College	X			Y			Z	
Gender	M	M	F	M	M	F	F	F
Name	Chetan			Barun				
Major	Finance			Ops		Ops		
Minor				Finance	Finance			



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It has been given that one female student and 2 male students major in finance. We

know that the male student from Y minors in finance. Therefore, he cannot major in finance. Therefore, both the male students from X should major in finance.

Daisy and Amit are from the same institute. Therefore, Daisy cannot be from institute Z (since Amit is a male student and both the students from Z are female). Daisy minors in operations. The girl from institute Y majors in Operations. Therefore, Daisy cannot be from institute Y as well. Daisy and Amit should be from institute X. 3 female students minor in marketing. Therefore, all girls except Daisy should minor in marketing.

It has been given that one female student and 2 male students major in finance. We know that the male student from Y minors in finance. Therefore, he cannot major in finance. Therefore, both the male students from X should major in finance.

Daisy and Amit are from the same institute. Therefore, Daisy cannot be from institute Z (since Amit is a male student and both the students from Z are female). Daisy minors in operations. The girl from institute Y majors in Operations. Therefore, Daisy cannot be from institute Y as well. Daisy and Amit should be from institute X. 3 female students minor in marketing. Therefore, all girls except Daisy should minor in marketing.

College	X			Y			Z	
Gender	M	M	F	M	M	F	F	F
Name	Chetan	Amit	Daisy	Barun				
Major	Finance	Finance		Ops		Ops		
Minor			Ops	Finance	Finance	Marketing	Marketing	Marketing

Adriana and Deb are from the same institute. Therefore, both of them should be from institute Y. Bandita and Chitra should be from institute Z.

Only one male student majors in Operations. We know that Barun is the student. Two male students major in Finance. We know that Amit and Chetan major in finance. Therefore, Deb should major in Marketing.

College	X			Y			Z	
Gender	M	M	F	M	M	F	F	F
Name	Chetan	Amit	Daisy	Barun	Deb	Adriana	Bandita	Chitra
Major	Finance	Finance		Ops	Marketing	Ops		
Minor			Ops	Finance	Finance	Marketing	Marketing	Marketing

35.C

Bandita and Chitra are from institute Z. Therefore, option C is the right answer.

36.B

Deb minors in Finance. Therefore, option B is the right answer.

37.D

Amit majors in finance. Therefore, option D is the right answer.

38.C

If Chitra majors in finance, Bandita cannot major in finance (only one female student majors in finance). She cannot major in marketing as well (since she has a minor degree in marketing). Therefore, Bandita should major in operations and hence, option C is the right answer.

39.7

It has been given that the customer gives 500 rupee notes as her preferred denomination. Therefore, the number of 500 rupee notes dispensed must be greater than the number of the notes of other denominations dispensed. If Rs.3500 is dispensed as 500 rupee notes (7 notes), the remaining 1500 rupees should be dispensed using Rs.100 and Rs.200 notes. The minimum number of notes of other denomination required in this case will be $8(7 \times 200 + 1 \times 100)$. Therefore, at least Rs.4000 should be dispensed as 500 rupee notes.

Case (1):

Rs.4000 is dispensed using 500 rupee notes, 8 five hundred rupee notes will be dispensed.

The remaining 1000 rupees cannot be fully dispensed as 100 rupee notes (since 10 notes will be required).

If 800 rupees is dispensed as 100 rupee notes, then 9 notes will be required to dispense 1000 rupees

$(8 \times 100 + 200)$.

Therefore, we can eliminate these 2 cases.

If 600 rupees is dispensed using 100 rupee notes, then a minimum of 8 notes will be required to dispense 1000 rupees $(6 \times 100 + 2 \times 200)$. Therefore, we can eliminate this



case as well.

If 400 rupees is dispensed using 100 rupee notes, then 7 notes will be required $(4 \times 100 + 3 \times 200)$. This is a valid case.

If 200 rupees is dispensed using 100 rupee notes, then 6 notes will be required $(2 \times 100 + 4 \times 200)$. This is a valid case.

1000 rupees can be dispensed using 5 notes of Rs.200.

Therefore, there are 3 valid cases.

Case (2):

Rs.4500 is dispensed using 500 rupee notes. 9 five hundred rupee notes will be

dispensed in this case.

The remaining 500 rupees can be dispensed as 100 rupee notes (5 notes) or a combination of 100 rupee and 200 rupee notes.

$$200*a + 100*b = 500$$

'a' can take 0, 1, and 2.

Therefore, there are 3 valid cases.

Case (3):

5000 rupees is dispensed using 10 five hundred rupee notes.

There is only 1 valid case.

Total number of valid cases = 3+3+1 = 7.

Therefore, 7 is the right answer.

40. 6

If a customer gives 500 rupee notes as her preferred denomination, the number of 500 rupee notes dispensed must be greater than the number of the notes of other denominations dispensed.

If Rs.3500 is dispensed as 500 rupee notes (7 notes), the remaining 1500 rupees should be dispensed using Rs.100 and Rs.200 notes. The minimum number of notes of other denomination required in this case will be 8

$(7*200 + 1*100)$. Therefore, at least Rs.4000 should be dispensed as 500 rupee notes.

Case (1):

Rs.4000 is dispensed using 500 rupee notes, 8 five hundred rupee notes will be dispensed. The remaining 1000 rupees cannot be fully dispensed as 100 rupee notes (since 10 notes will be required). If 800 rupees is dispensed as 100 rupee notes, then 9 notes will be required to dispense 1000 rupees

$(8 \times 100 + 200)$.

Therefore, we can eliminate these 2 cases.

If 600 rupees is dispensed using 100 rupee notes, then a minimum of 8 notes will be required to dispense 1000 rupees $(6 \times 100 + 2 \times 200)$. Therefore, we can eliminate this case as well.

If 400 rupees is dispensed using 100 rupee notes, then 7 notes will be required $(4 \times 100 + 3 \times 200)$. This is a valid case.

If 200 rupees is dispensed using 100 rupee notes, then 6 notes will be required $(2 \times 100 + 4 \times 200)$. This is a valid case.

1000 rupees can be dispensed using 5 notes of Rs.200.

Therefore, there are 3 valid cases.

Case (2):

Rs.4500 is dispensed using 500 rupee notes. 9 five hundred rupee notes will be dispensed in this case.

The remaining 500 rupees can be dispensed as 100 rupee notes (5 notes) or a combination of 100 rupee and 200 rupee notes.

$$200*a + 100*b = 500$$

'a' can take 0, 1, and 2.

Therefore, there are 3 valid cases.



Case (3):

5000 rupees is dispensed using 10 five hundred rupee notes.

There is only 1 valid case.

It has been given that the ATM could serve only 10 customers with a stock of fifty 500 rupee notes. We have to find the maximum number of customers who could have given Rs.500 as their preference.

The least number of 500 rupee notes required to serve a customer who has given Rs.500 as the preference is 8. Using 50 five hundred rupee notes, we can serve $[50/8] = 6$ customers. Therefore, 6 is the correct answer.

41.A

It has been given that the customer has to receive 20 notes at the maximum. Also, we have restriction on the number of 500 rupee notes (fifty) but we do not have any restriction on the number of notes of other denominations. Therefore, in order to serve the maximum number of customers, we have to minimize the number of 500 rupee notes dispensed as much as possible. If no 500 rupee note is dispensed, then a minimum of 25 notes will be required (25 200 rupee notes). If one 500 rupee note is dispensed, then a minimum of one 100 rupee note and twenty two 200 rupee notes will be required. The total number of notes required = $1 + 1 + 22 = 24$. Therefore, we can eliminate this case. If two 500 rupee notes are dispensed, then a minimum of 20 two hundred rupee notes will be required. We can eliminate this case as well since the number of notes required is greater than 20. If three 500 rupee notes are dispensed, then a minimum of 1 hundred rupee note and 17 two hundred rupee notes will be required. The number of notes required in this case is $3 + 1 + 17 = 21$. Therefore, we can eliminate this case as well. If four 500 rupee notes are dispensed, then a minimum of 15 two hundred rupee notes will be required. Total number of notes required in this case is $4 + 15 = 19 < 20$. Therefore, this is a valid case. The least number of 500 rupee notes with which we can serve a customer such that the total number of notes dispensed does not exceed 20 is 4. Therefore, a maximum of $[50/4] = 12$ customers can be served with 50 five hundred rupee notes and hence, option A is the right answer.

42. A

It has been given that the total number of notes dispensed is the smallest possible. Therefore, we have to minimize the number of notes dispensed in each of the 2 cases given.

The least number of notes required to serve a customer who has given 500 rupees as his preference is 10.

50 customers who have given 500 rupee notes as their preference have to be served. We will require $50 \times 10 = 500$ notes for this purpose.

Let us consider the case when a customer has given Rs.100 as his preference.

As we have seen, minimum number of notes will be required when we maximize the number of five hundred rupee notes as much as possible.

If Rs.4000 is dispensed using 500 rupee notes, the remaining 1000 rupees can be dispensed using ten 100 rupee notes. In this case, the number of 100 rupee notes (10) is greater than the number of 500 rupee notes (8).

This is a valid case. We have to find if we can reduce the number of notes required any further. We cannot increase the number of 500 rupee notes to 9 since only 5 hundred rupee notes can be dispensed, violating the condition that the customer has given 100 as his preferred denomination.

If we replace two 100 rupee notes with one 200 rupee note, then the number of 100 rupee notes will become 6.

The number of 500 rupee notes (8) exceeds the number of 100 rupee note (6). Therefore, dispensing 4000 rupees using 500 rupee notes and the rest using 100 rupee notes represents the optimum condition.

The minimum number of notes required to serve 1 customer = 8 (five hundred notes) + 10 (hundred notes) = 18
Number of five hundred notes required to serve 50 customers = $8 \times 50 = 400$

Therefore, the total number of notes required = $400 + 500 = 900$.

Therefore, option A is the right answer.

43.4

Let us use 1 to denote the first number that we fill. We have to fill as many squares with 1 as possible. If we start with the top-left square, we can fill 4 squares with the number 1.

1		1
1		1

Now, we can fill number 2 only in 2 of the 5 squares available.

1	2	1
1	2	1

The 3 squares available now are adjacent to each other. Therefore, we will require at least 2 numbers to fill these squares.

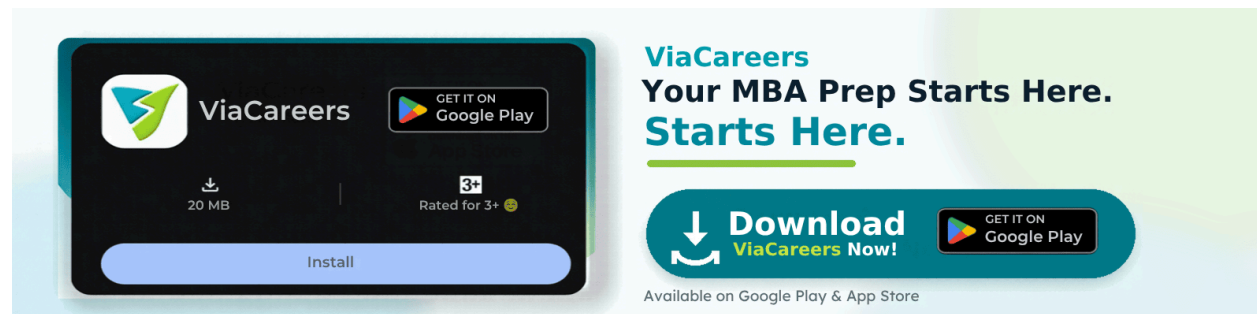
1	2	1
3	4	3
1	2	1

We need a minimum of 4 numbers to fill a 3x3 square matrix such that no 2 adjacent

cells contain the same number. Therefore, 4 is the correct answer.

44.4

Let us consider a 5x5 matrix. Let us start with the top left square and fill number 1 in as many squares as possible.



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1		1		1
1		1		1
1		1		1

We have to use a second number, 2 to fill the gap between two 1s.

1	2	1	2	1
1	2	1	2	1
1	2	1	2	1

All the cells in row 2 and row 4 are adjacent to the cells containing numbers 1 and 2. Therefore, rows 2 and 4 should be filled with a new set of numbers. We need at least 2 numbers to fill a row such that the adjacent cells do not contain the same number (by alternating the numbers in the consecutive cells). Rows 2 and 4 are completely isolated from each other and hence, the same set of numbers can be used to fill both the rows.

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

As we can see, a minimum of 4 numbers are required to fill a 5x5 matrix. Therefore, 4 is

the correct answer.

45.A

Let us consider a 5x5 matrix. Let us start with the top left square and fill number 1 in as many squares as possible.

1		1		1
1		1		1
1		1		1

We have to use a second number, 2 to fill the gap between two 1s.



1	2	1	2	1
1	2	1	2	1
1	2	1	2	1

All the cells in row 2 and row 4 are adjacent to the cells containing numbers 1 and 2. Therefore, rows 2 and 4 should be filled with a new set of numbers. We need at least 2 numbers to fill a row such that the adjacent cells do not contain the same number (by alternating the numbers in the consecutive cells). Rows 2 and 4 are completely isolated from each other and hence, the same set of numbers can be used to fill both the rows.

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

4 numbers are required to fill a 5x5 matrix. It has been given that we are allowed to

make 1 mistake - One pair of adjacent cells can contain the same number. In the arrangement given above, we can alter any value along the edge to satisfy this condition. For example, the 2 in the bottom-most row can be changed to 4. Still, the number of numbers required to fill the matrix will be 4.

Another way to approach this problem is as follows: We know that a minimum of 4 numbers are required to fill a 5x5 matrix. If we are allowed to make a mistake, then the number of numbers required should either remain the same or go down. 4 is the smallest value among the given options. Therefore, we can be sure that even if we are allowed to make a mistake, 4 numbers will be required to fill the matrix and hence, option A is the right answer.

46.D

It has been given that all the cells adjacent to a cell must have different numerals. Let us start filling the matrix from the central square since the central square has the maximum number of squares adjacent to it (8) and it will be easier to work around the central 9 squares. A minimum of 9 numbers will be required to fill the central 9 squares.

	2	3	4	
	9	1	5	
	8	7	6	

Now we have to fill the remaining squares. Let us start with the top left square. We have to check whether the 9 numbers will be sufficient to fill all the squares such that no 2 squares adjacent to a square have the same number. We can use any of the 3 numbers



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4, 5, and 6 to fill the top left square since none of the numbers in the second column are adjacent to these numbers.

Let us assume that we use 4 to fill the top left square. Now, one of the cells with the number 4 has become adjacent to the cell with number 2 and no other cell adjacent to cell with number 2 (in the second row and second column) can have 4 as its neighbour. Similarly, we can fill the first row with numbers 8 and 7.

4	7	8		
5	2	3	4	
6	9	1	5	
	8	7	6	

In essence, we are trying to create a gird around each of the numbers in the corners of the inner 3x3 matrix such that no 2 cells adjacent to a cell have the same number. Filling the other cells similarly, we get the following matrix as one of the possible cases.

4	7	8	6	7
5	2	3	4	9
6	9	1	5	2
3	8	7	6	8
2	5	4	3	9

We need a minimum of 9 numbers to fill a 5x5 matrix such that for any cell, no 2 cells adjacent to it contain the same value. Therefore, option D is the right answer.

47.D

Let us draw the table and fill all absolute information present.

Pumps	Contamination level
P1	
P2	
P3	
P4	
P5	
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

In statement 3, it is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.

In statement 1, it is given that contamination levels at three pumps among P1 - P5 were recorded as high. This

is only possible when pumps 1, 3 and 5 have high level of contamination. Also, P6 was the only pump among

P1 - P10 where the contamination level was recorded as low. Therefore, we can say that pumps 2 and 4 have

medium level of contamination.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	



It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that High contamination was recorded in only first 15 pumps. Therefore, we can say that the maximum number of pumps that can have high contamination level is '8'. (Consecutive pumps don't have same contamination level except one case)

Also, it is given that the number of pumps where high contamination levels were

recorded was twice the number of pumps where low contamination levels were recorded. Hence, we can say that the number of pumps that have high contamination level is an even number less than or equal to '8'.

If the number of high contamination level pumps is '6', then there will be only '3' pumps with low contamination level. Consequently, we will need 11 ($20 - 6 - 3$) pumps with medium contamination level which is not possible

since the number of pumps of a single type can't exceed 10. (Consecutive pumps don't have same contamination level except one case)

Therefore, we can say that the number of pumps that have high contamination level = 8

The number of pumps that have low contamination level = $8/2 = 4$

Also, the number of pumps that have medium contamination level = $20 - 8 - 4 = 12$

It is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded. If P7 and P8 recorded medium contamination level then there can be at max 7 pumps (P1, P3, P5, P9, P11, P13, P15) with high contamination level. Hence, we can say that pumps P7 and P8 recorded High contamination level. Therefore, we can uniquely determine the contamination level till P10.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that these 5 pumps recorded low and medium contamination level. There are two cases possible.

Case 1: When there were 3 Low and 2 Medium contaminated level recorded in pumps P16 - P20.

3 Low contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

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Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	High
P15	Medium
P16	Low
P17	Medium
P18	Low
P19	Medium
P20	Low

Case 2: When there were 2 Low and 3 Medium contaminated level recorded in pumps P16 - P20.

3 Medium contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level
P1	High	P1	High	P1	High	P1	High	P1	High
P2	Medium	P2	Medium	P2	Medium	P2	Medium	P2	Medium
P3	High	P3	High	P3	High	P3	High	P3	High
P4	Medium	P4	Medium	P4	Medium	P4	Medium	P4	Medium
P5	High	P5	High	P5	High	P5	High	P5	High
P6	Low	P6	Low	P6	Low	P6	Low	P6	Low
P7	High	P7	High	P7	High	P7	High	P7	High
P8	High	P8	High	P8	High	P8	High	P8	High
P9	Medium	P9	Medium	P9	Medium	P9	Medium	P9	Medium
P10	High	P10	High	P10	High	P10	High	P10	High
P11	Low	P11	Medium	P11	Medium	P11	Medium	P11	Medium
P12	Medium	P12	Low	P12	High	P12	High	P12	High
P13	High	P13	High	P13	Low	P13	Medium	P13	Medium
P14	Medium	P14	Medium	P14	Medium	P14	Low	P14	High
P15	High	P15	High	P15	High	P15	High	P15	Low
P16	Medium	P16	Medium	P16	Medium	P16	Medium	P16	Medium
P17	Low	P17	Low	P17	Low	P17	Low	P17	Low
P18	Medium	P18	Medium	P18	Medium	P18	Medium	P18	Medium
P19	Low	P19	Low	P19	Low	P19	Low	P19	Low
P20	Medium	P20	Medium	P20	Medium	P20	Medium	P20	Medium

Let us check the options one by one. (Option:A) The contamination level at P20 was recorded as medium. This need not be true as we can see that in Case 1 at P20 low contamination level is recorded. (Option:B) The contamination level at P13 was recorded as low. This need not be true as we can see that in Case 2(a), at P13 high contamination level is recorded. (Option:C) The contamination level at P12 was recorded as high. This need not be true as we can see that in Case 2(a), at P12 medium contamination level is recorded. (Option:D) The contamination level at P10 was recorded as high.. This is true for all cases. Hence, we can say that option D is the correct answer.

48.C

Let us draw the table and fill all absolute information present.

Pumps	Contamination level
P1	
P2	
P3	
P4	
P5	
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	



In statement 3, it is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.

In statement 1, it is given that contamination levels at three pumps among P1 - P5 were recorded as high. This is only possible when pumps 1, 3 and 5 have high level of contamination. Also, P6 was the only pump among

P1 - P10 where the contamination level was recorded as low. Therefore, we can say that

pumps 2 and 4 have medium level of contamination.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that High contamination was recorded in only first 15 pumps. Therefore, we can say that the maximum number of pumps that can have high contamination level is '8'. (Consecutive pumps don't have same contamination level except one case)

Also, it is given that the number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded. Hence, we can say that the number of pumps that have high contamination level is an even number less than or equal to '8'.

If the number of high contamination level pumps is '6', then there will be only '3' pumps with low contamination level. Consequently, we will need 11 (20 - 6 - 3) pumps with

medium contamination level which is not possible since the number of pumps of a single type can't exceed 10. (Consecutive pumps don't have same contamination level except one case)

Therefore, we can say that the number of pumps that have high contamination level = 8

The number of pumps that have low contamination level = $8/2 = 4$

Also, the number of pumps that have medium contamination level = $20 - 8 - 4 = 12$ It is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded. If P7 and P8 recorded medium contamination level then there can be at max 7 pumps (P1, P3, P5, P9, P11, P13, P15) with high contamination level. Hence, we can say that pumps P7 and P8 recorded High contamination level. Therefore, we can uniquely determine the contamination level till P10.

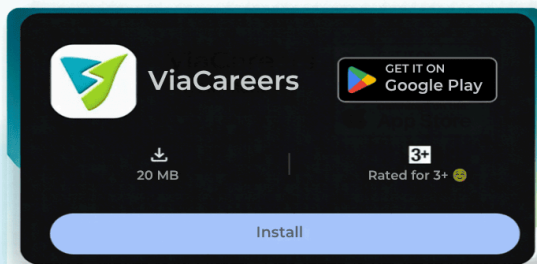
Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that these 5 pumps recorded low and medium contamination level. There are two cases possible.

Case 1: When there were 3 Low and 2 Medium contaminated level recorded in pumps P16 - P20.

3 Low contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	High
P15	Medium
P16	Low
P17	Medium
P18	Low
P19	Medium
P20	Low



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Case 2: When there were 2 Low and 3 Medium contaminated level recorded in pumps P16 - P20.

3 Medium contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Low
P12	Medium
P13	High
P14	Medium
P15	High
P16	Medium
P17	Low
P18	Medium
P19	Low
P20	Medium

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	Low
P13	High
P14	Medium
P15	High
P16	Medium
P17	Low
P18	Medium
P19	Low
P20	Medium

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Low
P14	Medium
P15	High
P16	Medium
P17	Low
P18	Medium
P19	Low
P20	Medium

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	Low
P15	High
P16	Medium
P17	Low
P18	Medium
P19	Low
P20	Medium

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	High
P15	Low
P16	Medium
P17	Low
P18	Medium
P19	Low
P20	Medium

We know that medium contamination level was recorded at exactly 8 pumps. Hence, option C is the correct answer.

49.D

Let us draw the table and fill all absolute information present.

Pumps	Contamination level
P1	
P2	
P3	
P4	
P5	
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

In statement 3, it is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.

In statement 1, it is given that contamination levels at three pumps among P1 - P5 were recorded as high. This is only possible when pumps 1, 3 and 5 have high level of contamination. Also, P6 was the only pump among

P1 - P10 where the contamination level was recorded as low. Therefore, we can say that pumps 2 and 4 have medium level of contamination.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that High contamination was recorded in only first 15 pumps. Therefore, we can say that the maximum number of pumps that can have high contamination level is '8'. (Consecutive pumps don't have same contamination level except one case)



Also, it is given that the number of pumps where high contamination levels were

recorded was twice the number of pumps where low contamination levels were recorded. Hence, we can say that the number of pumps that have high contamination level is an even number less than or equal to '8'.

If the number of high contamination level pumps is '6', then there will be only '3' pumps with low contamination level. Consequently, we will need 11 ($20 - 6 - 3$) pumps with medium contamination level which is not possible

since the number of pumps of a single type can't exceed 10. (Consecutive pumps don't have same contamination level except one case)

Therefore, we can say that the number of pumps that have high contamination level = 8

The number of pumps that have low contamination level = $8/2 = 4$

Also, the number of pumps that have medium contamination level = $20 - 8 - 4 = 12$

It is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded. If P7 and P8 recorded medium contamination level then there can be at max 7 pumps (P1, P3, P5, P9, P11, P13, P15) with high contamination level. Hence, we can say that pumps P7 and P8 recorded High contamination level. Therefore, we can uniquely determine the contamination level till P10.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

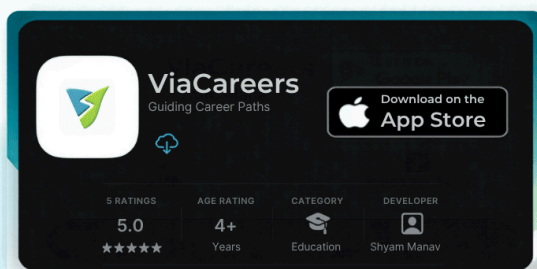
It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that these 5 pumps recorded low and medium contamination level. There are two cases possible.

Case 1: When there were 3 Low and 2 Medium contaminated level recorded in pumps P16 - P20.

3 Low contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	High
P15	Medium
P16	Low
P17	Medium
P18	Low
P19	Medium
P20	Low

Case 2: When there were 2 Low and 3 Medium contaminated level recorded in pumps P16 - P20.



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3 Medium contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level
P1	High	P1	High	P1	High	P1	High	P1	High
P2	Medium	P2	Medium	P2	Medium	P2	Medium	P2	Medium
P3	High	P3	High	P3	High	P3	High	P3	High
P4	Medium	P4	Medium	P4	Medium	P4	Medium	P4	Medium
P5	High	P5	High	P5	High	P5	High	P5	High
P6	Low	P6	Low	P6	Low	P6	Low	P6	Low
P7	High	P7	High	P7	High	P7	High	P7	High
P8	High	P8	High	P8	High	P8	High	P8	High
P9	Medium	P9	Medium	P9	Medium	P9	Medium	P9	Medium
P10	High	P10	High	P10	High	P10	High	P10	High
P11	Low	P11	Medium	P11	Medium	P11	Medium	P11	Medium
P12	Medium	P12	Low	P12	High	P12	High	P12	High
P13	High	P13	High	P13	Low	P13	Medium	P13	Medium
P14	Medium	P14	Medium	P14	Medium	P14	Low	P14	High
P15	High	P15	High	P15	High	P15	High	P15	Low
P16	Medium	P16	Medium	P16	Medium	P16	Medium	P16	Medium
P17	Low	P17	Low	P17	Low	P17	Low	P17	Low
P18	Medium	P18	Medium	P18	Medium	P18	Medium	P18	Medium
P19	Low	P19	Low	P19	Low	P19	Low	P19	Low
P20	Medium	P20	Medium	P20	Medium	P20	Medium	P20	Medium

We can see that in case 2(a) the contamination level at P11 was recorded as low. Let us check all the option one by one.

(Option : A) The contamination level at P12 was recorded as high. This statement is incorrect as we can see in the table, the contamination level at P12 was recorded as medium.

(Option : B) The contamination level at P15 was recorded as medium. This statement is incorrect as we can see in the table, the contamination level at P15 was recorded as High.

(Option : C) The contamination level at P18 was recorded as low. This statement is incorrect as we can see in the table, the contamination level at P18 was recorded as Medium.

(Option : D) The contamination level at P14 was recorded as medium. This statement is correct as we can see in the table, the contamination level at P14 was recorded as Medium. Hence, we can say that option D is the correct answer.

50.B

Let us draw the table and fill all absolute information present.

Pumps	Contamination level
P1	
P2	
P3	
P4	
P5	
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

In statement 3, it is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.

In statement 1, it is given that contamination levels at three pumps among P1 - P5 were recorded as high. This is only possible when pumps 1, 3 and 5 have high level of contamination. Also, P6 was the only pump among P1 - P10 where the contamination level was recorded as low. Therefore, we can say that pumps 2 and 4 have medium level of contamination.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	
P8	
P9	
P10	
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that High contamination was recorded in only first 15 pumps. Therefore, we can say that the maximum number of pumps that can have high contamination level is '8'. (Consecutive pumps don't have same contamination level except one case)

Also, it is given that the number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded. Hence, we can say that the number of pumps that have high contamination level is an even number less than or equal to '8'.



If the number of high contamination level pumps is '6', then there will be only '3' pumps with low contamination level. Consequently, we will need 11 ($20 - 6 - 3$) pumps with medium contamination level which is not possible since the number of pumps of a single type can't exceed 10. (Consecutive pumps don't have same contamination level except one case)

Therefore, we can say that the number of pumps that have high contamination level = 8

The number of pumps that have low contamination level = $8/2 = 4$

Also, the number of pumps that have medium contamination level = $20 - 8 - 4 = 12$

It is given that P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded. If P7 and P8 recorded medium contamination level then there can be at max 7 pumps (P1, P3, P5, P9, P11, P13, P15) with high contamination level. Hence, we can say that pumps P7 and P8 recorded High contamination level. Therefore, we can uniquely determine the contamination level till P10.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	
P12	
P13	
P14	
P15	
P16	
P17	
P18	
P19	
P20	

It is given that High contamination levels were not recorded at any of the pumps P16 - P20. Therefore, we can say that these 5 pumps recorded low and medium contamination level. There are two cases possible.

Case 1: When there were 3 Low and 2 Medium contaminated level recorded in pumps P16 - P20.

3 Low contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.

Pumps	Contamination level
P1	High
P2	Medium
P3	High
P4	Medium
P5	High
P6	Low
P7	High
P8	High
P9	Medium
P10	High
P11	Medium
P12	High
P13	Medium
P14	High
P15	Medium
P16	Low
P17	Medium
P18	Low
P19	Medium
P20	Low

Case 2: When there were 2 Low and 3 Medium contaminated level recorded in pumps P16 - P20.

3 Medium contamination level must have recorded in P16, P18 and P20. We can fill the table as follows.



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Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level	Pumps	Contamination level
P1	High	P1	High	P1	High	P1	High	P1	High
P2	Medium	P2	Medium	P2	Medium	P2	Medium	P2	Medium
P3	High	P3	High	P3	High	P3	High	P3	High
P4	Medium	P4	Medium	P4	Medium	P4	Medium	P4	Medium
P5	High	P5	High	P5	High	P5	High	P5	High
P6	Low	P6	Low	P6	Low	P6	Low	P6	Low
P7	High	P7	High	P7	High	P7	High	P7	High
P8	High	P8	High	P8	High	P8	High	P8	High
P9	Medium	P9	Medium	P9	Medium	P9	Medium	P9	Medium
P10	High	P10	High	P10	High	P10	High	P10	High
P11	Low	P11	Medium	P11	Medium	P11	Medium	P11	Medium
P12	Medium	P12	Low	P12	High	P12	High	P12	High
P13	High	P13	High	P13	Low	P13	Medium	P13	Medium
P14	Medium	P14	Medium	P14	Medium	P14	Low	P14	High
P15	High	P15	High	P15	High	P15	High	P15	Low
P16	Medium	P16	Medium	P16	Medium	P16	Medium	P16	Medium
P17	Low	P17	Low	P17	Low	P17	Low	P17	Low
P18	Medium	P18	Medium	P18	Medium	P18	Medium	P18	Medium
P19	Low	P19	Low	P19	Low	P19	Low	P19	Low
P20	Medium	P20	Medium	P20	Medium	P20	Medium	P20	Medium

We can see that in case 1 the contamination level at P15 was recorded as medium. Let us check all the option one by one.

(Option :A) Contamination levels at P13 and P17 were recorded as the same. From the table, we can see that the contamination levels at P13 and P17 were recorded as medium. Hence, we can say that this statement is correct.

(Option :B) Contamination levels at P11 and P16 were recorded as the same. From the table, we can see that the contamination levels at P11 was recorded as Medium whereas at P16 it was recorded as Low. Hence, we can say that this statement is incorrect. Thus, option B is the correct answer.

Explanation [51 - 54]:

We have been given details about the quarterly sales figures. Also, we have been given details about the sales figures every month. Some of the data are missing and some additional conditions have been given in the question. Let us try to complete the pie chart as much as possible with the data available to us.

It is known that the sales figures during the three months of the second quarter (April, May, June) of 2016 for man arithmetic progression. We know that the sales in April is 40. Let the sales in May be $40+x$ and the sales in June be $40+2x$. We know that the total sales in Q2 is 150. $\Rightarrow 40 + 40 + x + 40 + 2x = 150$
 $3x = 30$
 $x = 10$

Therefore, sales in May 2016 = $40 + 10 = 50$ Sales in June 2016 = $40 + 20 = 60$

Similarly, it has been given that the sales in October, November, and December 2016 form an arithmetic progression. Sales in October = 100 Sales in Q4 = 360 Let the sales in November be $100 + y$ and the sales in December be $100 + 2y$. $100 + 100 + y + 100 + 2y = 360$
 $300 + 3y = 360 \Rightarrow y = 20$

Sales in November 2016 = 120 and Sales in December 2016 = 140

Sales in Q1 of 2016 = Sum of the sales in the months of January, February, and March 2016

$$= 80 + 60 + 100$$

$$= 240$$

Sales in Q3 of 2016 = Sum of the sales in the months of July, August, and September 2016

$$= 75 + 120 + 55$$

$$= 250$$

Sales in Q1 of 2017 = $120 + 100 + 160 = 380$

Sales in Q2 of 2017 = $65 + 75 + 60 = 200$

We know that sales in Q3 of 2017 = 220

Let the sales in August of 2017 be 'a'.

$$60 + 70 + a = 220 \Rightarrow a = 90$$

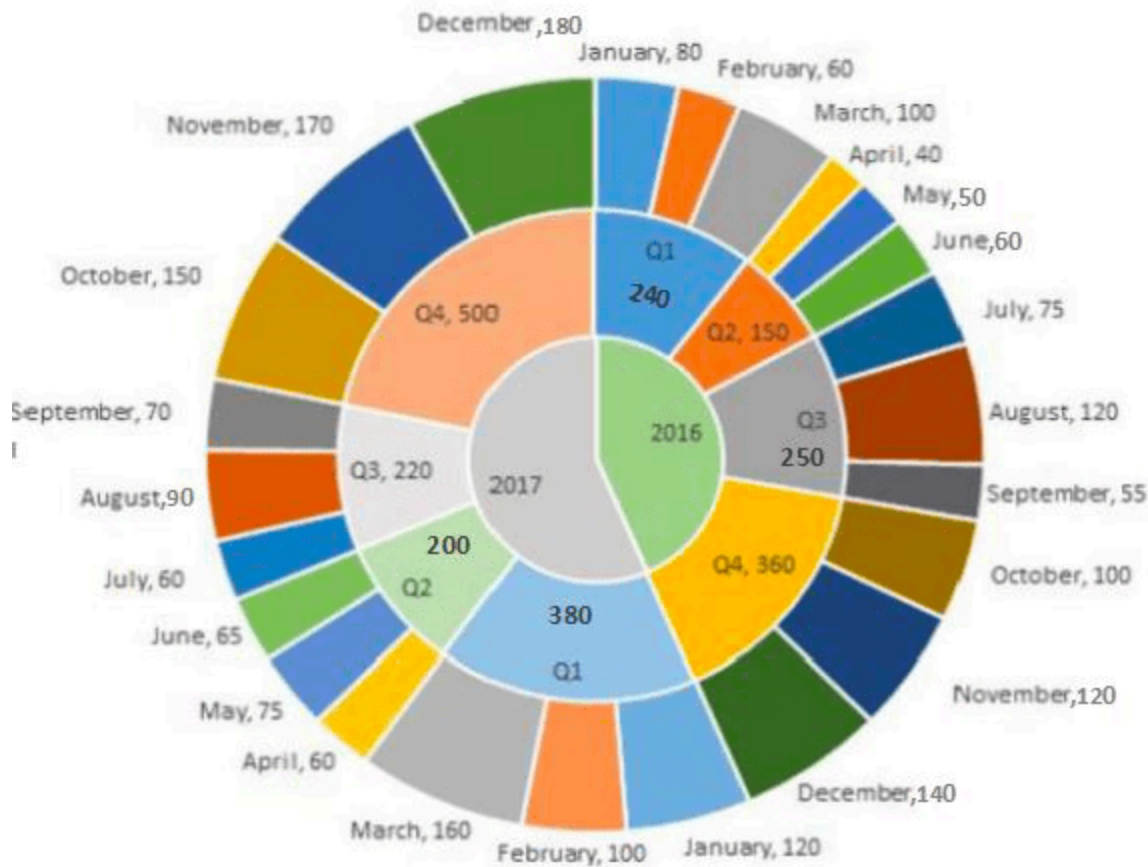
Sales in August 2017 = 90

We know that sales in Q4 of 2017 = 500

Let the sales in December of 2017 be 'd'.

$$150 + 170 + d = 500 \Rightarrow d = 180$$

Sales in December 2017 = 180



51.C

Sales in December 2016 = 140
 Sales in December 2017 = 180
 Percentage change = $\frac{180 - 140}{140} = \frac{40}{140} = 28.57\%$

Therefore, option C is the right answer.

52.B

Among the given 4 options, we have to find the quarter in which the increase in sale from the previous quarter was the highest.Q2:

Sales in 2017 = 200

Sales in 2016 = 150

Q1:

Sales in 2017 = 380

Sales in 2016 = 240

Q3:

Sales in 2017 = 220

Sales in 2016 = 250

Q4:

Sales in 2017 = 500

Sales in 2016 = 360

We can eliminate Q3 since the sales has decreased.

Growth in Q2 sales = $50/150 = 1/3 = 33.33\%$

Growth in Q1 sales = $(380-240)/240 = 140/240 = 58.33\%$

Growth in Q4 sales = $(500-360)/360 = 140/360$

$140/240 > 140/360$

Therefore, Q1 has recorded the highest growth in sales and hence, option B is the right answer.

53.A

Q2 of 2017:

Sales in Q2 of 2017 = 200

Sales in Q1 of 2017 = 380

% decrease = $180/380$

Q4 of 2017:

We can eliminate this option since the sales has increased in Q4 of 2017 as compared to the previous quarter.

Q2 of 2016:

Sales in Q2 of 2016 = 150
Sales in Q1 of 2016 = 240
% decrease = $90/240$
Q1 of 2017: Sales in

Q1 of 2017 has increased as compared to sales in the previous quarter. We can eliminate this option as well. $180/380$ is very close to 50%. $90/240$ is closer to 33.33%.

Therefore, option A is the right answer.

54.B

March of 2017: Sales in March of 2017 = 160
Sales in February of 2017 = 100
increase = $60/100 = 60\%$

October of 2017:

Sales in October of 2017 = 150

Sales in September of 2017 = 70

As we can see, the sales has increased by more than 100%.

March of 2016:

Sales in March of 2016 = 100

Sales in February of 2016 = 60

% increase in sales is less than 100%.

October of 2016:

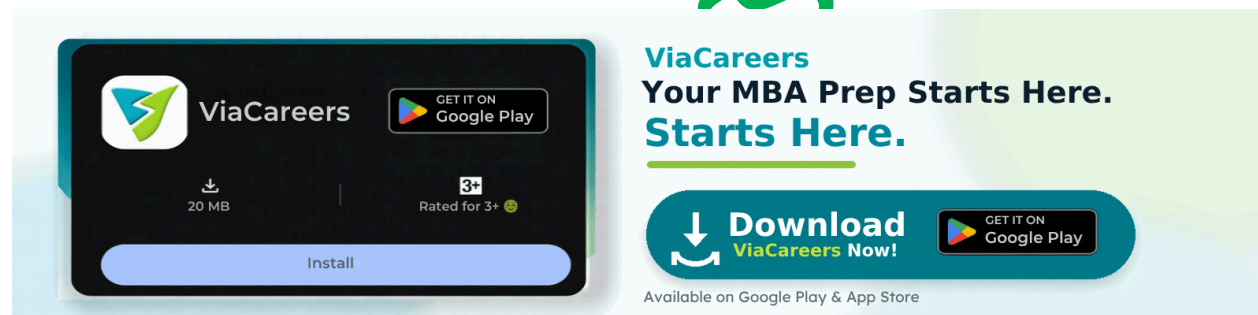
Sales in October of 2016 = 100

Sales in September of 2016 = 55

% increase is less than 100%

As we can see, the percentage increase in sale as compared to the previous month was highest in October of

2017 among the given options. Therefore, option B is the right answer.



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55.C

Let us draw a table according to the information given.

	Research	Teaching	Administration	Total
Bureaucrats				
Educationalists				
Politicians				
Total				24

It is given that the numbers of bureaucrats in the research and teaching committees are

equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee. Let '4x' be the number of bureaucrats in Administration committee. The number of educationalists in the teaching committee is less than the number of educationalists in the research committee.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists				
Politicians				
Total				24

The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees. Let us assume that 'y' is the number of educationalists in the research committee and 'd' be the difference in the number of educationalists in Research and teaching committees.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians				
Total				24

60% of the politicians are in the administration committee, and 20% are in the teaching committee. Let '5z' be the number of total number of politicians.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians	z	z	3z	5z
Total				24

We can say that

$$10x + 3y + 5z = 24$$

We can see that each of x , y and z has to be a natural number integer. If $x > 1$, then both y and z can't take any

natural number.

Hence, we can say that $x = 1$.

At $x = 1$, $3y + 5z = 14$. If $y = 1$ or 2 , z is not an integer.

At $x = 1$ and $y = 3$, $z = 1$ which is the only possible solution.

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	3-d	3+d	9
Politicians	1	1	3	5
Total				24

We can see that 'd' can assume two possible values. $d = 1$ or 2 .



	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	2/1	4/5	9
Politicians	1	1	3	5
Total	7	6/5	11/12	24

Let us check the option one by one.

Option A: In the teaching committee the number of educationalists is equal to the number of politicians. We can see that in the teaching committee the number of educationalists can be equal to the number of politicians

when both the numbers are '1'. Hence, this statement can be correct.

Option B: In the administration committee the number of bureaucrats is equal to the number of educationalists.

We can see that in the administration committee the number of bureaucrats can be equal to the number of

educationalists when both the numbers are '4'. Hence, this statement can be correct.

Option C: The size of the research committee is less than the size of the teaching committee. We can see the maximum size of teaching committee can be '6' which is less than the size of the research committee. Hence, the sentence is incorrect.

Option D: The size of the research committee is less than the size of the administration committee. We can see the minimum size of Administration committee can be '11' which is more than the size of the research committee. Hence, this statement is correct.

Therefore, we can say that option C is the correct answer.

56.4

Let us draw a table according to the information given.

	Research	Teaching	Administration	Total
Bureaucrats				
Educationalists				
Politicians				
Total				24

It is given that the numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee. Let '4x' be the number of bureaucrats in Administration committee.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists				
Politicians				
Total				24

The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees. Let us assume that 'y' is the number of educationalists in the research committee and 'd' be the difference in the number of educationalists in Research and teaching committees.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians				
Total				24

60% of the politicians are in the administration committee, and 20% are in the teaching committee. Let '5z' be the number of total number of politicians.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians	z	z	3z	5z
Total				24

We can say that

$$10x + 3y + 5z = 24$$

We can see that each of x, y and z has to be a natural number integer. If $x > 1$, then both y and z can't take any natural number.

Hence, we can say that $x = 1$.

At $x = 1$, $3y + 5z = 14$. If $y = 1$ or 2 , Z is not an integer.

At $x = 1$ and $y = 3$, $z = 1$ which is the only possible solution.

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	3-d	3+d	9
Politicians	1	1	3	5
Total				24

We can see that 'd' can assume two possible values. $d = 1$ or 2 .



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	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	2/1	4/5	9
Politicians	1	1	3	5
Total	7	6/5	11/12	24

From the table, we can see that the number of bureaucrats in the administration committee = 4.

57.3

Let us draw a table according to the information given.

	Research	Teaching	Administration	Total
Bureaucrats				
Educationalists				
Politicians				
Total				24

It is given that the numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee. Let '4x' be the number of bureaucrats in Administration committee.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists				
Politicians				
Total				24

The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees. Let us assume that 'y' is the number of educationalists in the research committee and 'd' be the difference in the number of educationalists in Research and teaching committees.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians				
Total				24

60% of the politicians are in the administration committee, and 20% are in the teaching committee. Let '5z' be the number of total number of politicians.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians	z	z	3z	5z
Total				24

We can say that

$$10x + 3y + 5z = 24$$

We can see that each of x , y and z has to be a natural number integer. If $x > 1$, then both y and z can't take any natural number.

Hence, we can say that $x = 1$.

At $x = 1$, $3y + 5z = 14$. If $y = 1$ or 2 , z is not an integer.



At $x = 1$ and $y = 3$, $z = 1$ which is the only possible solution.

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	3-d	3+d	9
Politicians	1	1	3	5
Total				24

We can see that 'd' can assume two possible values. $d = 1$ or 2 .

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	2/1	4/5	9
Politicians	1	1	3	5
Total	7	6/5	11/12	24

From the table, we can see that the number of educationalists in the research committee = 3.

58.A

Let us draw a table according to the information given.

	Research	Teaching	Administration	Total
Bureaucrats				
Educationalists				
Politicians				
Total				24

It is given that the numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee. Let '4x' be the number of bureaucrats in Administration committee.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists				
Politicians				
Total				24

The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees. Let us assume that 'y' is the number of educationalists in the research committee and 'd' be the difference in the number of educationalists in Research and teaching committees.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians				
Total				24

60% of the politicians are in the administration committee, and 20% are in the teaching committee. Let '5z' be the number of total number of politicians.

	Research	Teaching	Administration	Total
Bureaucrats	3x	3x	4x	10x
Educationalists	y	y-d	y+d	3y
Politicians	z	z	3z	5z
Total				24

We can say that

$$10x + 3y + 5z = 24$$

We can see that each of x, y and z has to be a natural number integer. If $x > 1$, then both y and z can't take any natural number.

Hence, we can say that $x = 1$.

At $x = 1$, $3y + 5z = 14$. If $y = 1$ or 2 , Z is not an integer.

At $x = 1$ and $y = 3$, $z = 1$ which is the only possible solution.

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	3-d	3+d	9
Politicians	1	1	3	5
Total				24

We can see that 'd' can assume two possible values. $d = 1$ or 2 .

	Research	Teaching	Administration	Total
Bureaucrats	3	3	4	10
Educationalists	3	2/1	4/5	9
Politicians	1	1	3	5
Total	7	6/5	11/12	24

From the table, we can not uniquely determine the size of the teaching committee. Hence, option A is the correct answer.



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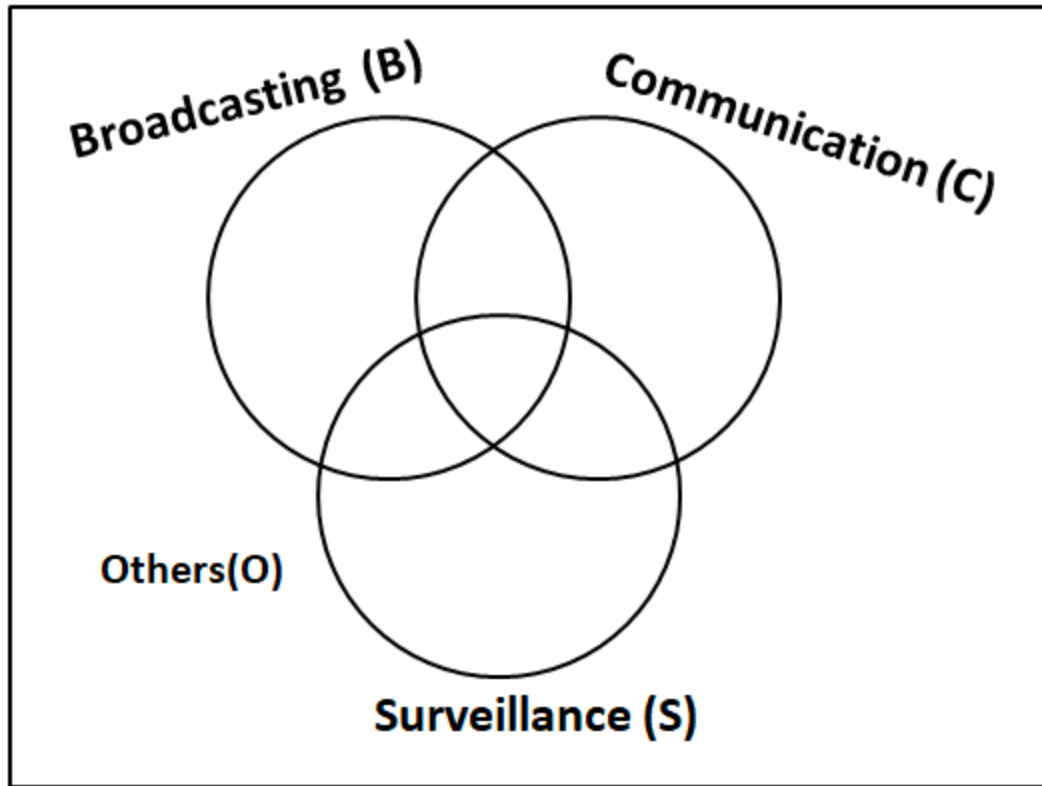
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Explanation [59 - 62]:

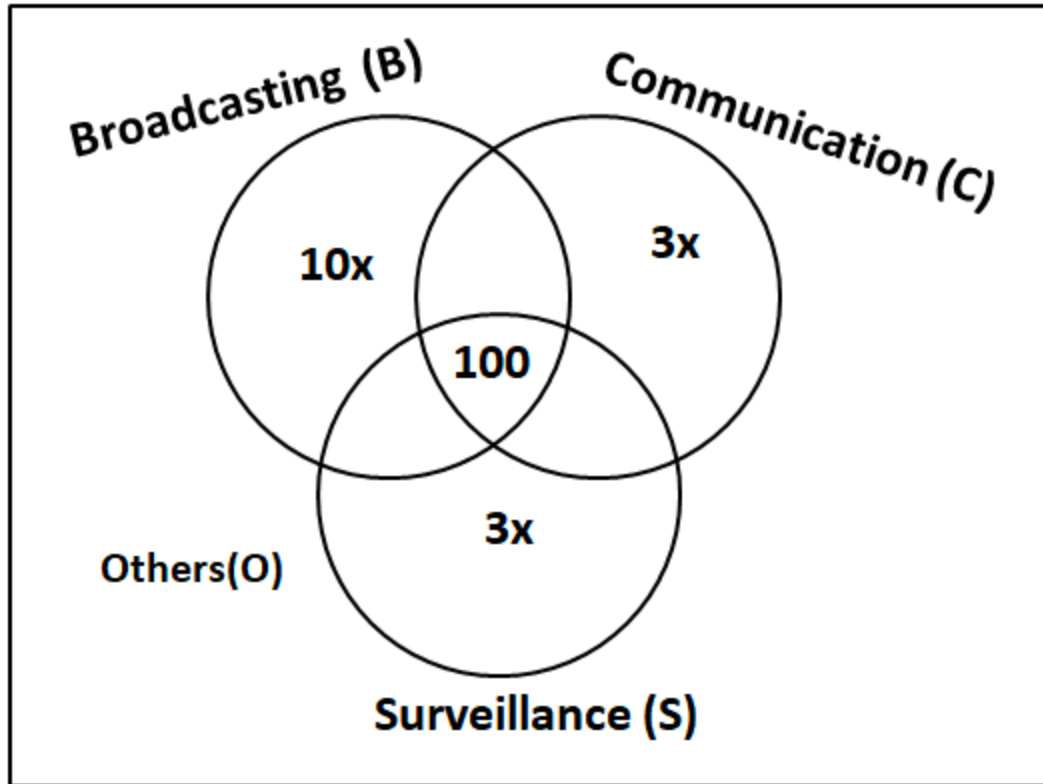
It is given that a satellite serving either B, or C, or S does not serve O. So we can say that it's basically 3satellites broadcasting (B), communication (C), surveillance (S) which can have intersections. Those satellites which are not part of any category are placed in others. We can draw the Venn diagram as follows.

59.C

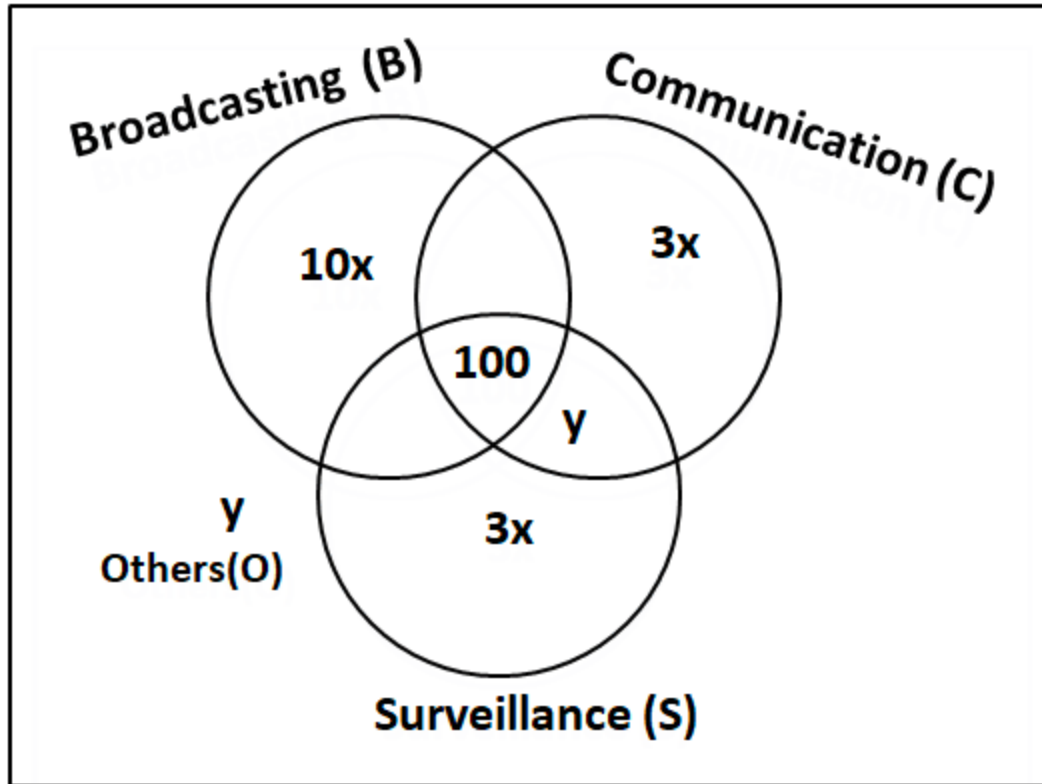


1. The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.
2. The number of satellites serving all three of B, C, and S is 100.
3. The number of satellites exclusively serving C is the same as the number of satellites exclusively serving S. This number is 30% of the number of satellites exclusively serving B.
4. The number of satellites serving O is the same as the number of satellites serving both C and S but not B.

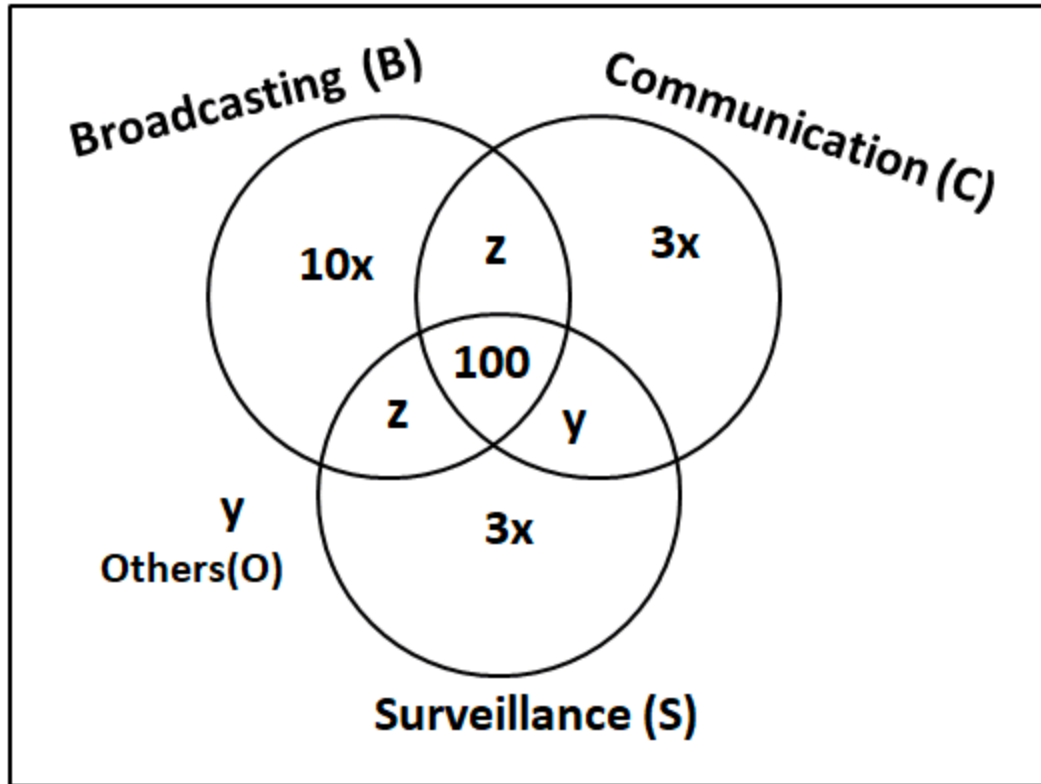
Let '10x' be the number of satellites exclusively serving B. Then, the number of satellites exclusively serving C and S = $0.30 \times 10x = 3x$



Let 'y' be the number of satellites serving others(O).



Let 'z' be the number of satellites serving B, C but not S. Since the numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1. Therefore, we can say that number of satellites serving B, S but not C = z.



It is given that

$$10x + 2z + 2y + 6x + 100 = 1600$$

$$8x + z + y = 750 \dots (1)$$

The numbers of satellites serving B, C, and S (though maybe not exclusively) are in the ratio 2:1:1.

$$\Rightarrow \frac{10x + 2z + 100}{z + 100 + 3x + y} = \frac{2}{1}$$

$$\Rightarrow 10x + 2z + 100 = 2(z + 100 + 3x + y)$$

$$\Rightarrow 4x = 100 + 2y$$

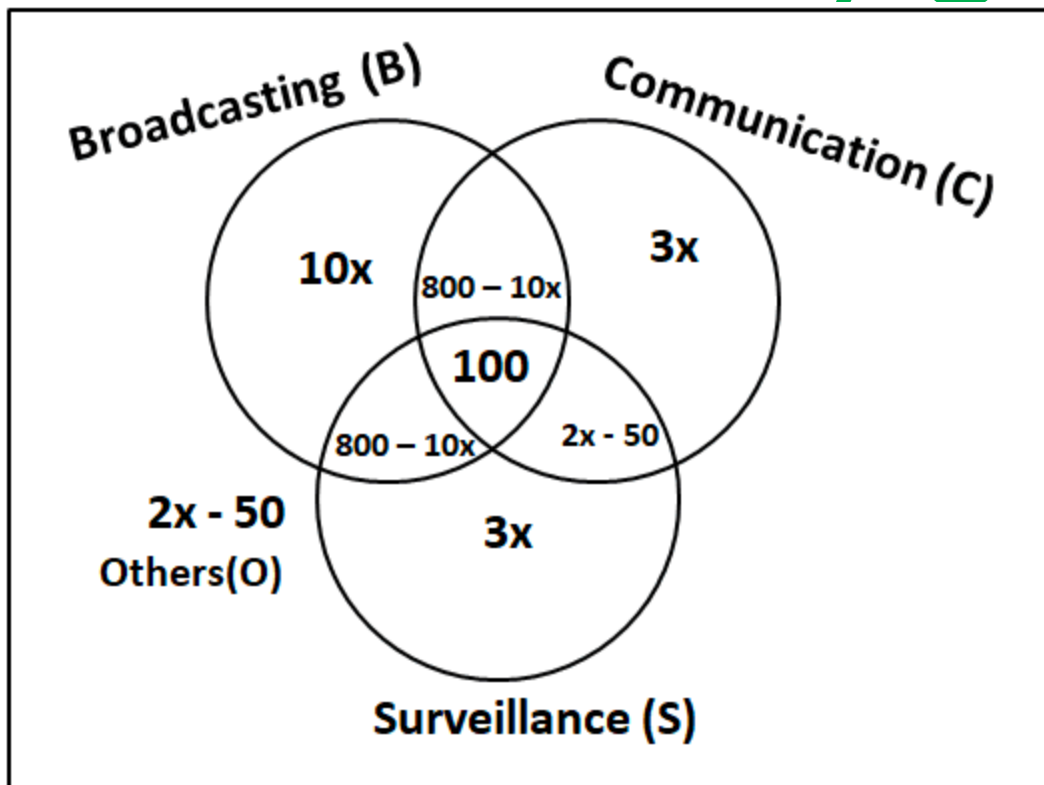
$$\Rightarrow 2x = 50 + y$$

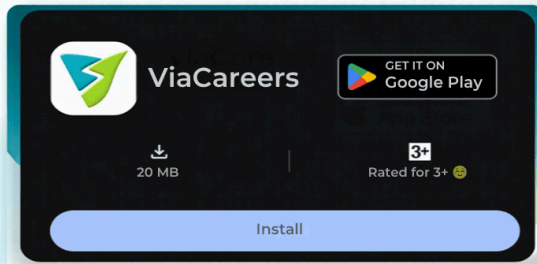
$$\Rightarrow y = 2x - 50 \dots (2)$$

We can substitute this in equation (1)

$$\Rightarrow 8x + z + 2x - 50 = 750$$

$$\Rightarrow z = 800 - 10x \dots (3)$$





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Let us define boundary condition for x ,

$$\Rightarrow 2x - 50 \geq 0$$

$$\Rightarrow x \geq 25$$

Also, $800 - 10x \geq 0$

$$\Rightarrow x \leq 80$$

Therefore, we can say that $x \in [25, 80]$.

The number of satellites serving C = $800 - 10x + 100 + 3x + 2x - 50 = 850 - 5x$

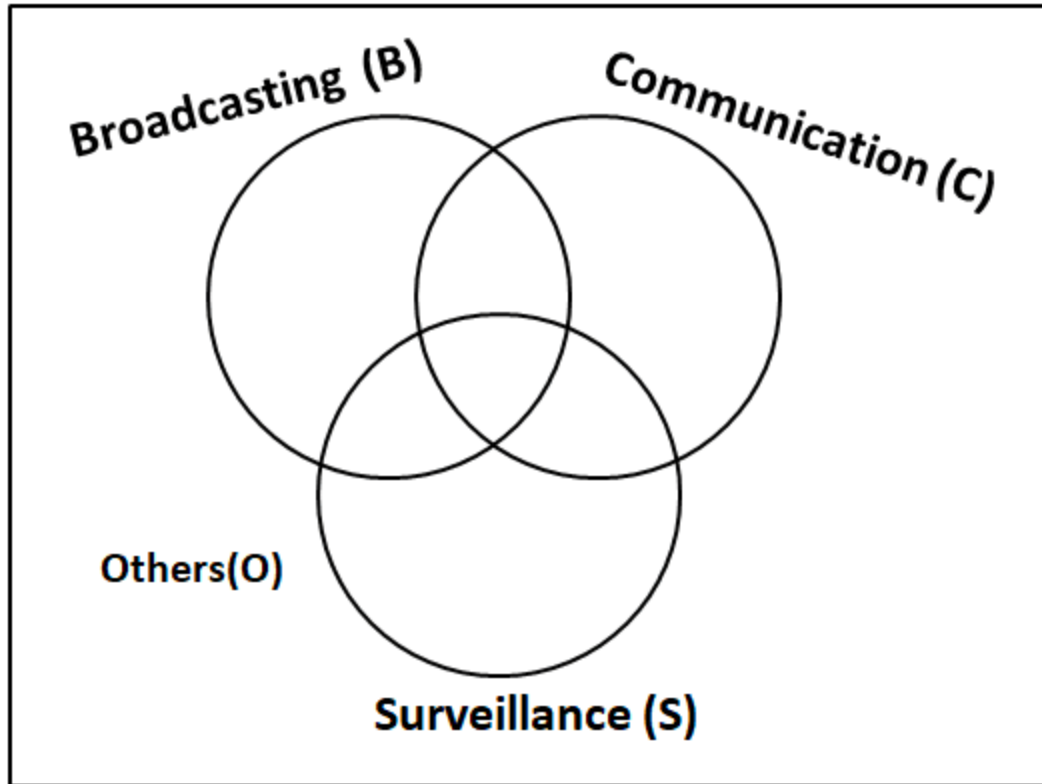
At $x = 25$, The number of satellites serving C = $850 - 5x = 850 - 5 \cdot 25 = 725$

At $x = 80$, The number of satellites serving C = $850 - 5x = 850 - 5 \cdot 80 = 450$

Hence, we can say that the number of satellites serving C must be between 450 and 725. Hence, option C is the correct answer.

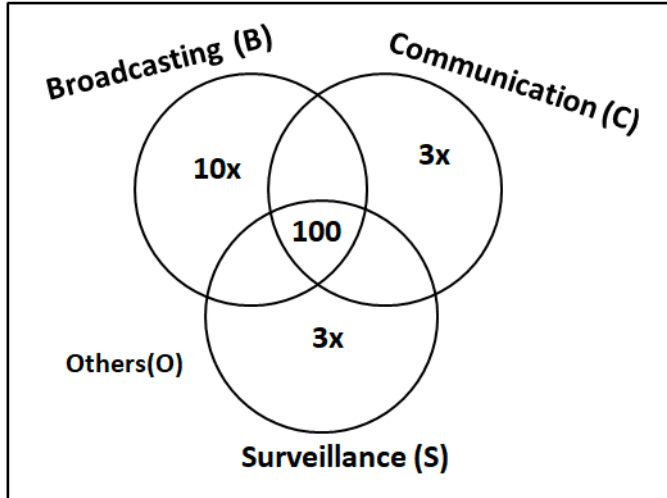
60.A

It is given that a satellite serving either B, or C, or S does not serve O. So we can say that it's basically 3 satellites broadcasting (B), communication (C), surveillance (S) which can have intersections. Those satellites which are not part of any category are placed in others. We can draw the Venn diagram as follows.

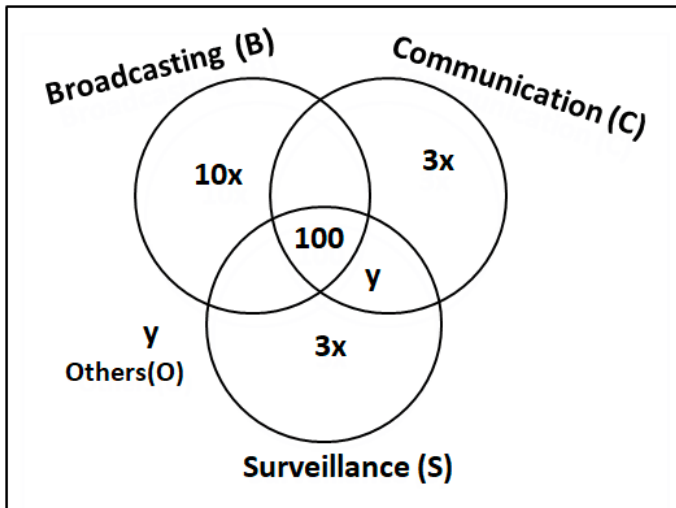


1. The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.
2. The number of satellites serving all three of B, C, and S is 100.
3. The number of satellites exclusively serving C is the same as the number of satellites exclusively serving S. This number is 30% of the number of satellites exclusively serving B.
4. The number of satellites serving O is the same as the number of satellites serving both C and S but not B.

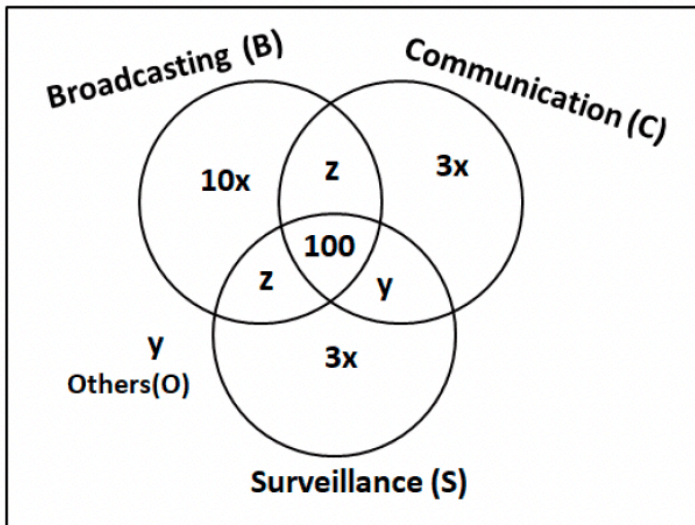
Let '10x' be the number of satellites exclusively serving B. Then, the number of satellites exclusively serving C and S = $0.30 \times 10x = 3x$



Let 'y' be the number of satellites serving others(O).



Let 'z' be the number of satellites serving B, C but not S. Since the numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1. Therefore, we can say that number of satellites serving B, S but not C = z.



It is given that

$$\Rightarrow 10x + 2z + 2y + 6x + 100 = 1600$$

$$\Rightarrow 8x + z + y = 750 \dots (1)$$

The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.

$$\Rightarrow \frac{10x + 2z + 100}{z + 100 + 3x + y} = \frac{2}{1}$$

$$\Rightarrow 10x + 2z + 100 = 2(z + 100 + 3x + y)$$

$$\Rightarrow 4x = 100 + 2y$$

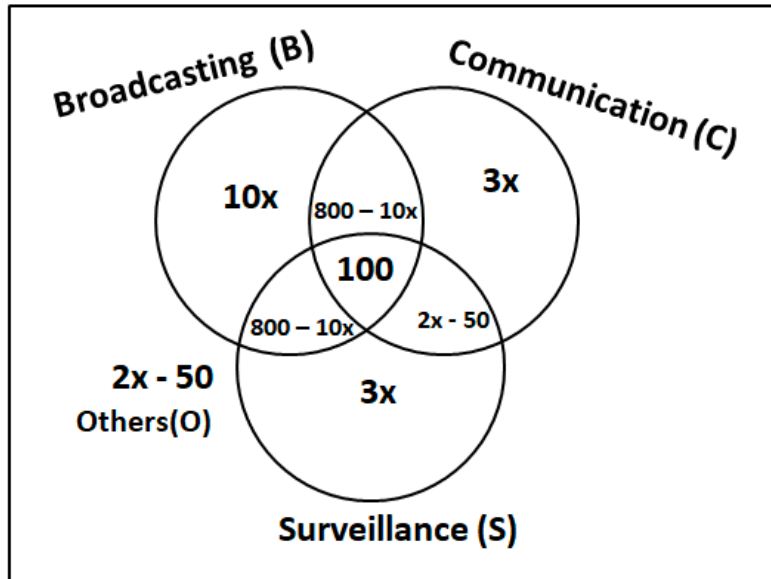
$$\Rightarrow 2x = 50 + y$$

$$\Rightarrow y = 2x - 50 \dots (2)$$

We can substitute this in equation (1)

$$\Rightarrow 8x + z + 2x - 50 = 750$$

$$\Rightarrow z = 800 - 10x \dots (3)$$



Let us define boundary condition for x ,

$$= 2x - 50 \geq 0$$

$$\Rightarrow x \geq 25$$

$$\text{Also, } 800 - 10x \geq 0$$

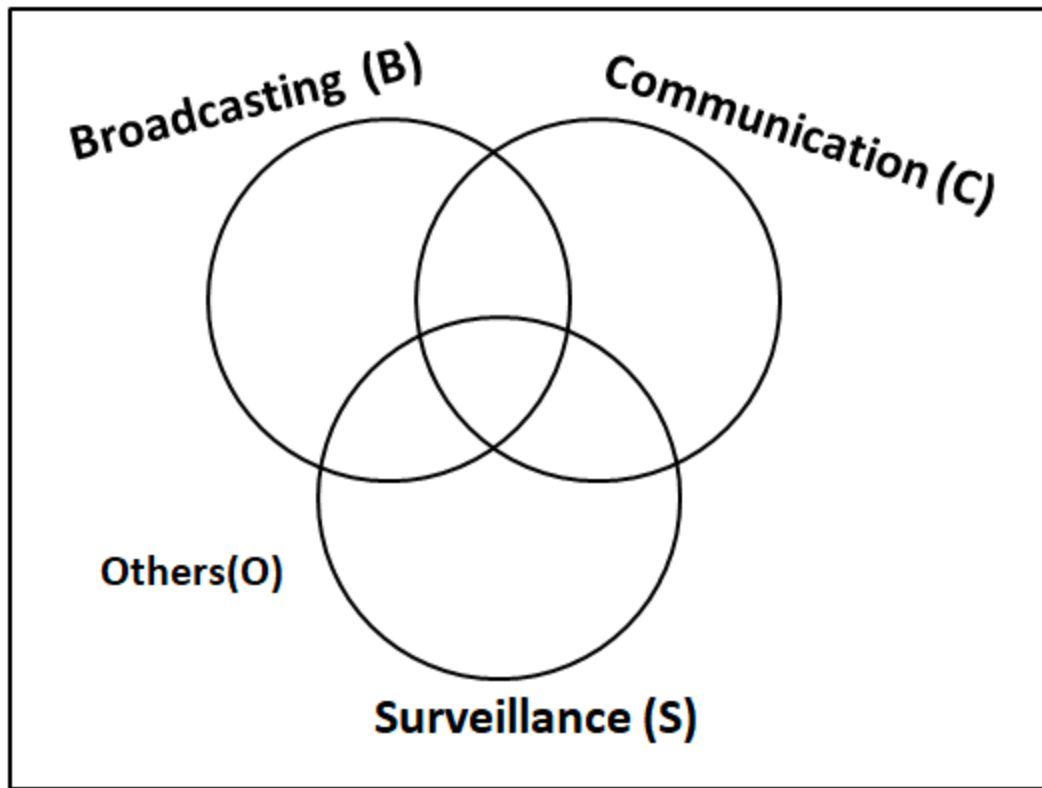
$$\Rightarrow x \leq 80$$

Therefore, we can say that $x \in [25, 80]$.

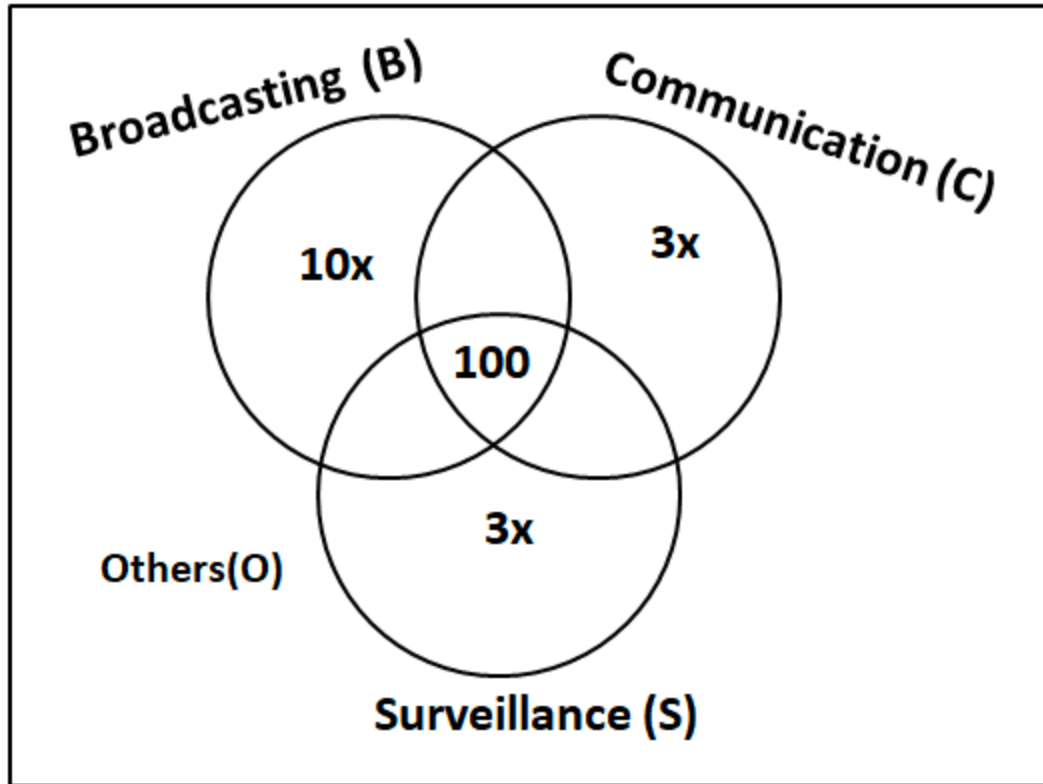
The number of satellites serving B exclusively = $10x$. This will be the minimum when ' x ' is the minimum.

At $x_{\min} = 25$ The number of satellites serving B exclusively = $10 \times 25 = 250$. Hence, option A is the correct answer.

61.A



1. The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.
2. The number of satellites serving all three of B, C, and S is 100.
3. The number of satellites exclusively serving C is the same as the number of satellites exclusively serving S. This number is 30% of the number of satellites exclusively serving B.
4. The number of satellites serving O is the same as the number of satellites serving both C and S but not B. Let '10x' be the number of satellites exclusively serving B. Then, the number of satellites exclusively serving C and S = $0.30 \times 10x = 3x$



Let 'y' be the number of satellites serving others(O).

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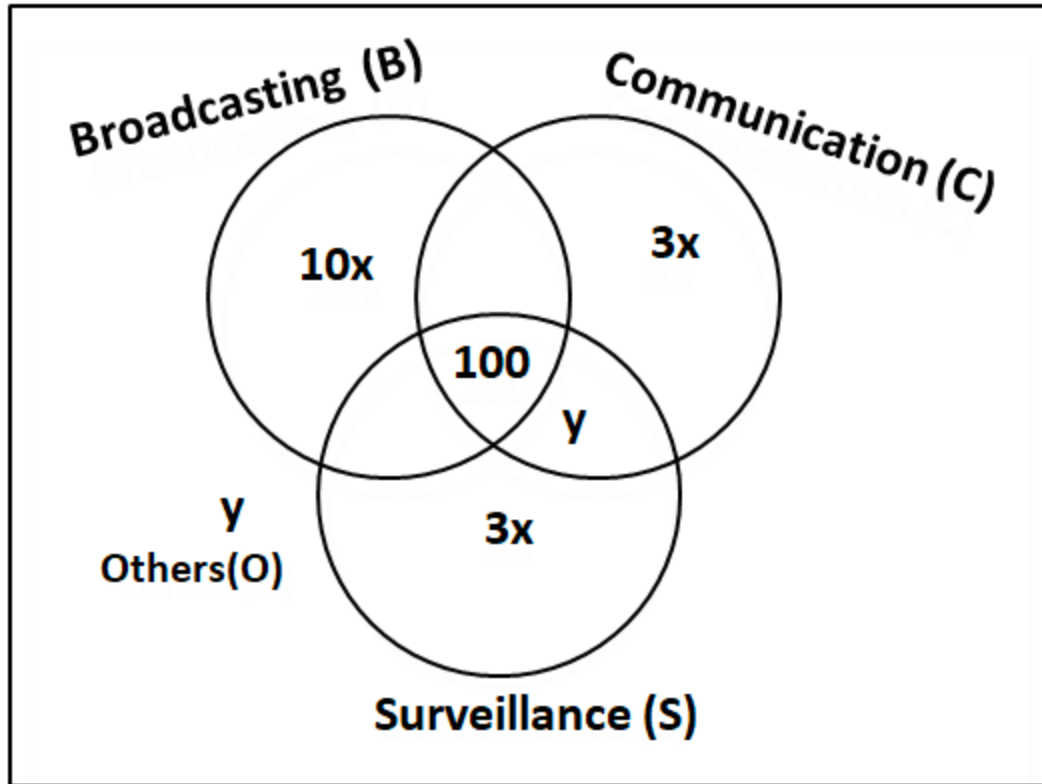
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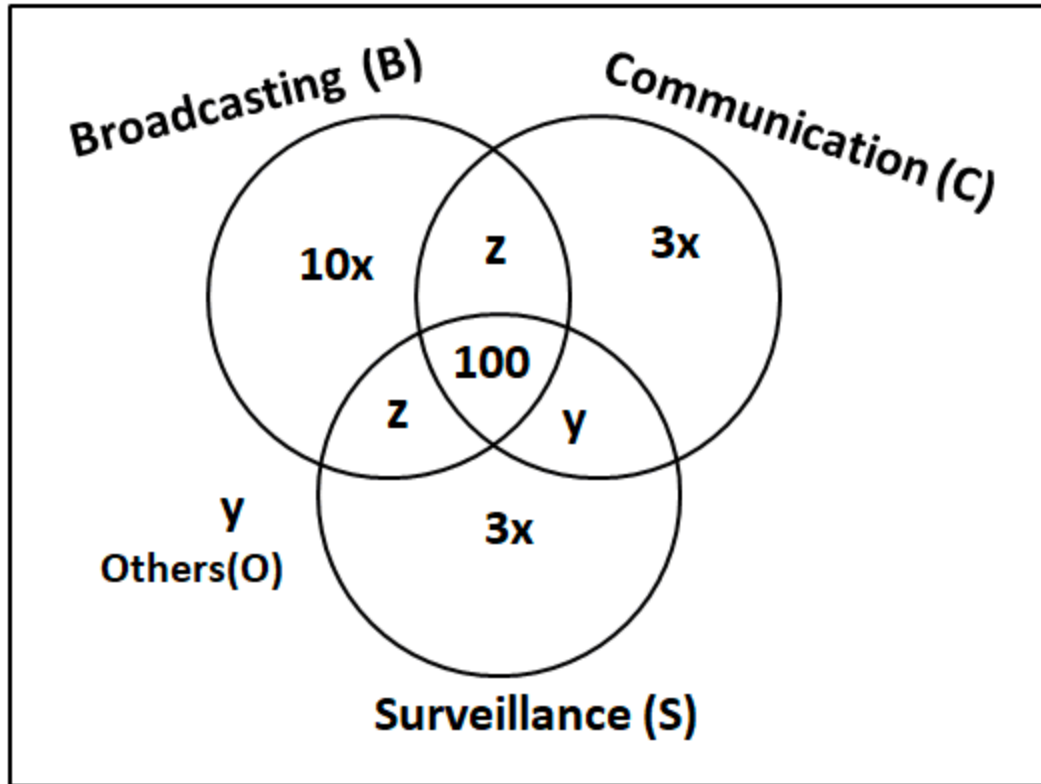
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Let 'z' be the number of satellites serving B, C but not S. Since the numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1. Therefore, we can say that number of satellites serving B, S but not C = z.



It is given that

$$\Rightarrow 10x + 2z + 2y + 6x + 100 = 1600$$

$$\Rightarrow 8x + z + y = 750 \dots (1)$$

The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.

$$\Rightarrow \frac{10x + 2z + 100}{z + 100 + 3x + y} = \frac{2}{1}$$

$$\Rightarrow 10x + 2z + 100 = 2(z + 100 + 3x + y)$$

$$\Rightarrow 4x = 100 + 2y$$

$$\Rightarrow 2x = 50 + y$$

$$\Rightarrow y = 2x - 50 \dots (2)$$

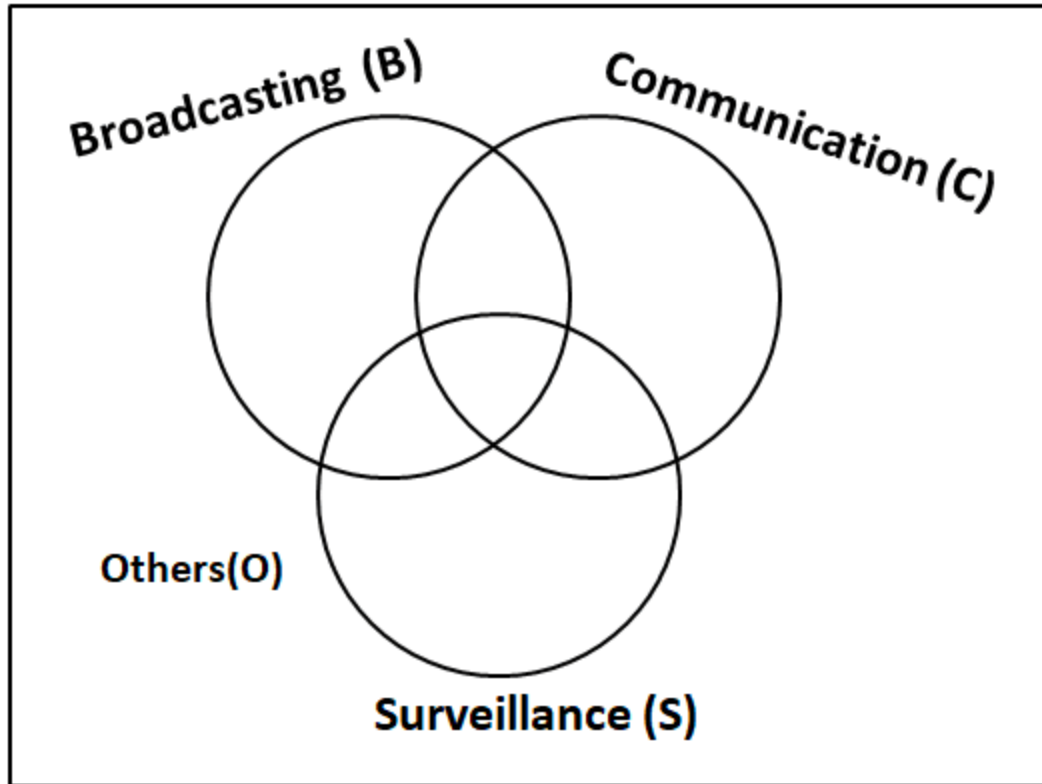
We can substitute this in equation (1)

$$\Rightarrow 8x + z + 2x - 50 = 750$$

$$\Rightarrow z = 800 - 10x \dots (3)$$

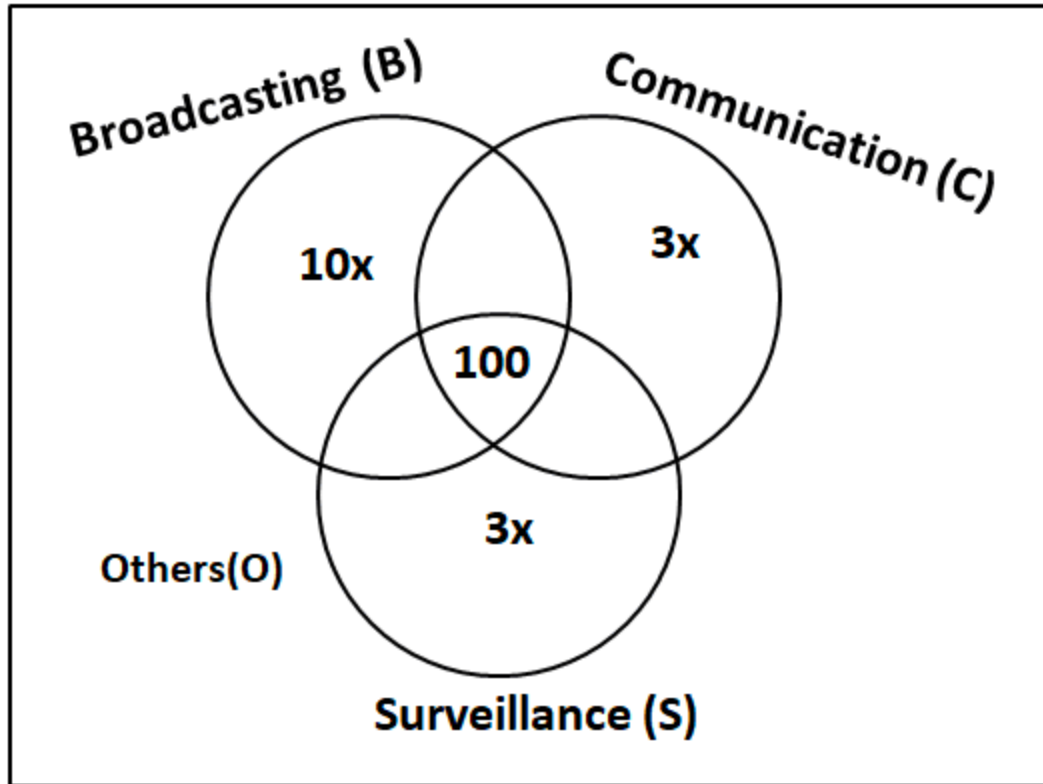


62. C

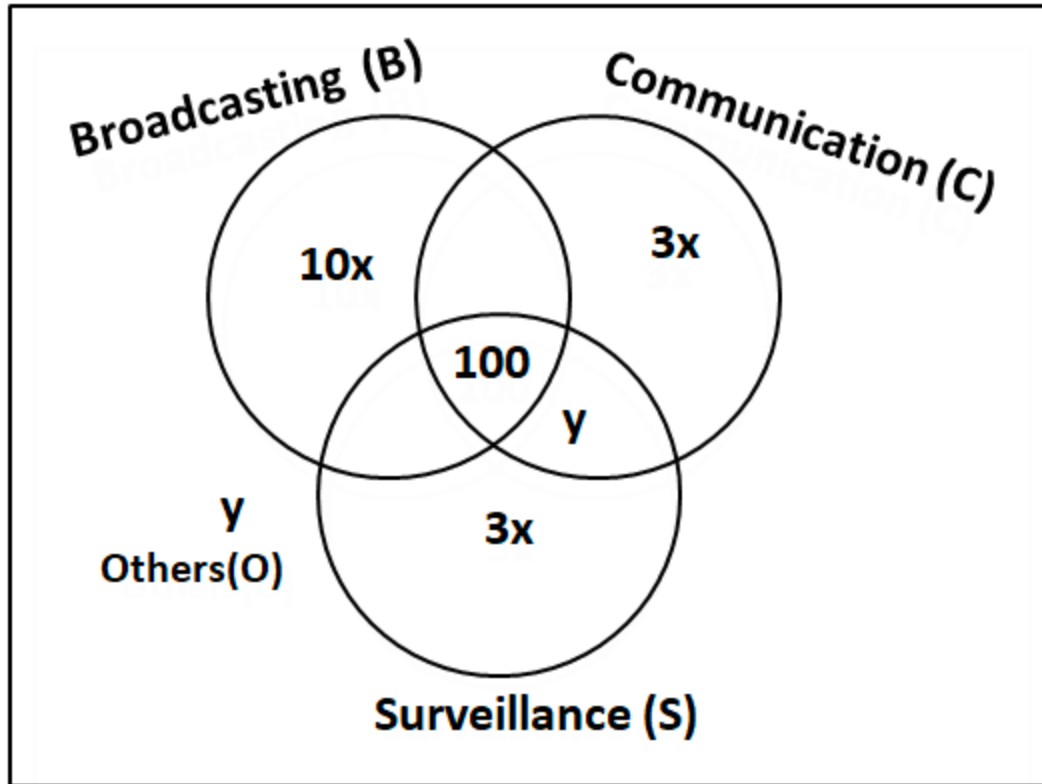


1. The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1. 2. The number of satellites serving all three of B, C, and S is 100. 3. The number of satellites exclusively serving C is the same as the number of satellites exclusively serving S. This number is 30% of the number of satellites exclusively serving B. 4. The number of satellites serving O is the same as the number of satellites serving both C and S but not B.

Let '10x' be the number of satellites exclusively serving B. Then, the number of satellites exclusively serving C and S = $0.30 \times 10x = 3x$



Let 'y' be the number of satellites serving others(O).



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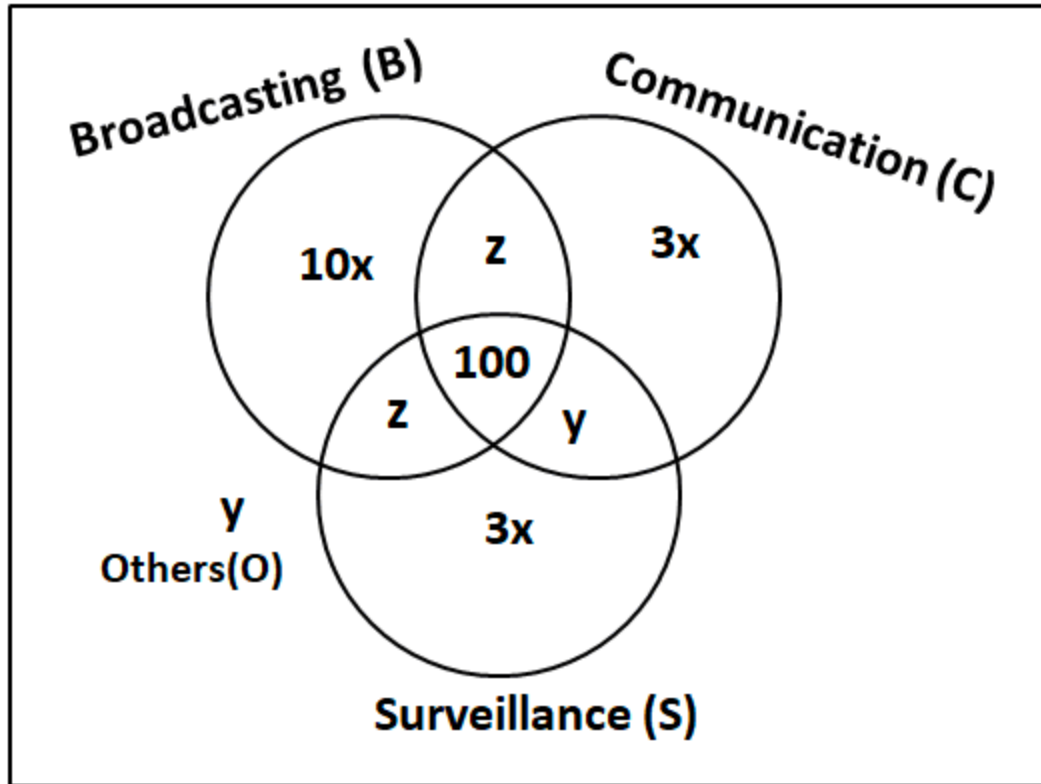
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Let 'z' be the number of satellites serving B, C but not S. Since the numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1. Therefore, we can say that number of satellites serving B, S but not C = z.



It is given that

$$\Rightarrow 10x + 2z + 2y + 6x + 100 = 1600$$

$$\Rightarrow 8x + z + y = 750 \dots (1)$$

The numbers of satellites serving B, C, and S (though may be not exclusively) are in the ratio 2:1:1.

$$\Rightarrow \frac{10x + 2z + 100}{z + 100 + 3x + y} = \frac{2}{1}$$

$$\Rightarrow 10x + 2z + 100 = 2(z + 100 + 3x + y)$$

$$\Rightarrow 4x = 100 + 2y$$

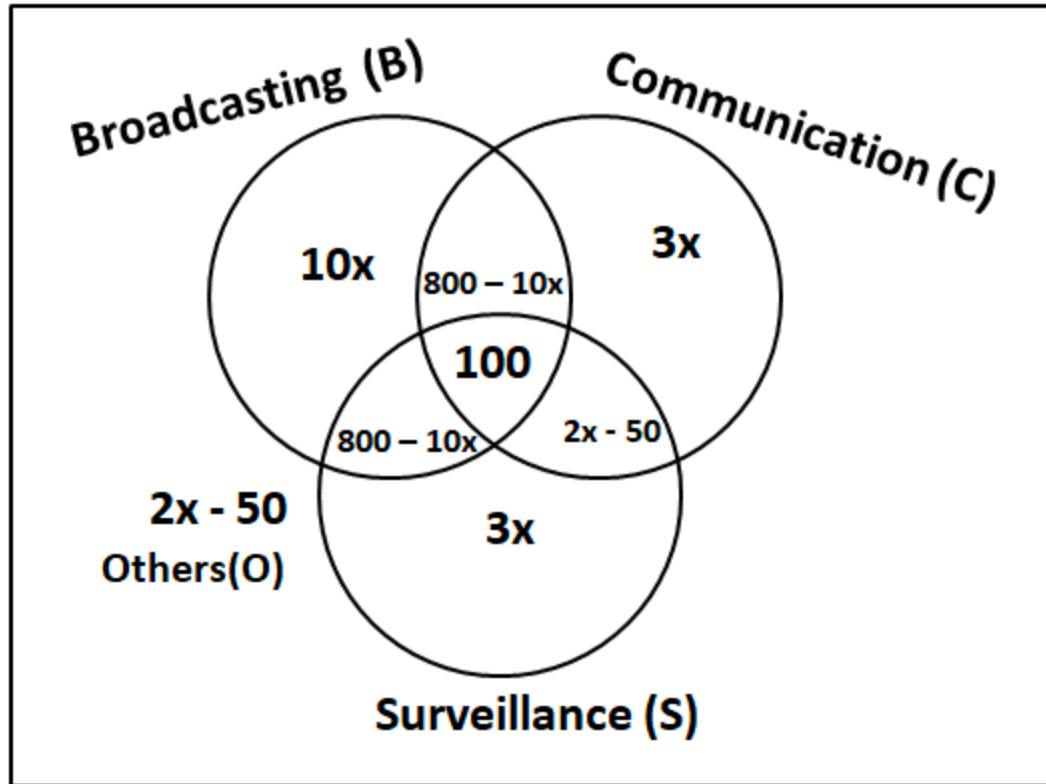
$$\Rightarrow 2x = 50 + y$$

$$\Rightarrow y = 2x - 50 \dots (2)$$

We can substitute this in equation (1)

$$\Rightarrow 8x + z + 2x - 50 = 750$$

$$\Rightarrow z = 800 - 10x \dots (3)$$



Let us define boundary condition for x ,

$$\Rightarrow 2x - 50 \geq 0$$

$$\Rightarrow x \geq 25$$

Also, $800 - 10x \geq 0$

$$\Rightarrow x \leq 80$$

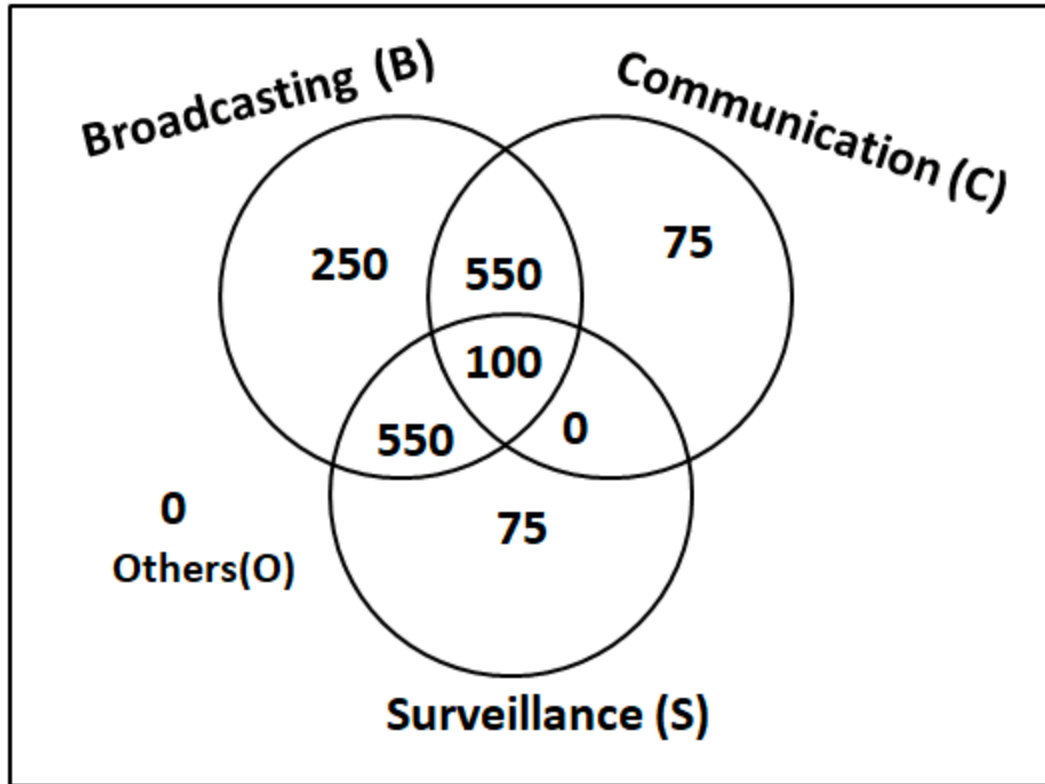
Therefore, we can say that $x \in [25, 80]$.

It is given that the number of satellites serving at least two among B, C, and S is 1200.

$$\Rightarrow 800 - 10x + 800 - 10x + 2x - 50 + 100 = 1200$$

$$\Rightarrow 18x = 450$$

$$\Rightarrow x = 25$$



We can determine number of satellites in each of the following category. Hence, option C is definitely false. Therefore, we can say that option C is incorrect.



Explanation [63 - 66]:

It is given that Indu and Jatin both scored 100% in exactly one section. We can say that Jatin scored 100% marks in DI. Therefore, Jatin's composite score = $2 \times 20 + 16 + 14 = 70$

It is given that Jatin's composite score was 10 more than Indu's. Therefore, we can say that Indu's composite score = $70 - 10 = 60$.

Indu also scored 100% in exactly one section.

Case 1: Indu scored 100% marks in DI.

If Indu scored 100% marks in DI, then Indu's score in GA = $60 - 2 \times 20 - 8 = 12$ which is less than 70% of maximum possible marks. Indu already has less than 70% in WE, therefore we Indu can't be recruited. Hence, we can reject this case.

Consequently, we can say that Indu scored 100% marks in WE. Therefore, Indu's score in DI = $\frac{60 - 8 - 20}{2} = 16$

It is also given that Danish, Harini, and Indu had scored the same marks the in GA.

Candidate	Marks out of 20			Composite score
	DI	WE	GA	
Ajay	8		16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14		6	
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

We are given that, among the four recruited, Geeta had the lowest composite score.

Maximum composite score that Geeta can get = $2 \times 14 + 6 + 20 = 54$ (Assuming 100% marks in WE). Since, Geeta was recruited at a composite score of 54 or less we can say that Ester was definitely recruited.

It is given that no two candidates had the same composite score. We can see that Chetna's composite score is 54. Hence, Geeta can't have a composite score of 54. Therefore, we can say that Geeta's composite score is 53 or less.

We already know the four people (Jatin, Indu, Geeta, Ester) which were recruited. Hence, we can say that Danish was rejected at a composite score of 51. Hence, we can say that Geeta's composite score is 52 or more.

Consequently, we can say that Geeta's composite score is either 52 or 53. Therefore we can say that Geeta scored either 18 $\{52 - (2 \times 14 + 6)\}$ or 19 $\{53 - (2 \times 14 + 6)\}$ marks in WE.

Candidate	Marks out of 20			Composite score
	DI	WE	GA	
Ajay	8		16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	18/19	6	52/53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

Ajay was the unique highest scorer in WE.

Case 1: Geeta scored 19 marks in WE.

We can say that if Geeta scored 19 marks in WE, then Ajay scored 20 marks in DI. In that case Ajay's composite score = $2 \times 8 + 20 + 16 = 52$. Which is a possible case.

Case 2: Geeta scored 18 marks in WE.

We can say that if Geeta scored 18 marks in WE, then Ajay can score either 19 or 20 marks in DI.

If Ajay scored 20 marks in DI then in that case Ajay's composite score = $2 \times 8 + 20 + 16 = 52$ which will be same as Geeta's composite score. Hence, we can say that in this case Ajay can't score 20 marks.

If Ajay scored 19 marks in DI then in that case Ajay's composite score = $2 \times 8 + 19 + 16 = 51$ which will be same as Danish's composite score. Hence, we can say that in this case Ajay can't score 19 marks.

Therefore, we can say that case 2 is not possible at all.

Candidate	Marks out of 20			Composite score
	DI	WE	GA	
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

63.D

Let us check all the statement one by one. Statement 1: Jatin's composite score was more than that of Danish. We can see that this statement is correct. Statement 2: Indu scored less than Chetna in DI. We can see that Indu scored 16 marks in DI whereas Chetna scored 19 marks in DI. Hence, we can say that this statement is also correct. Statement 3: Jatin scored more than Indu in GA. We can see that Jatin scored 14 marks in GA whereas Indu scored 20 marks in GA. Hence, we can say that this statement is incorrect. Hence, we can say that option D is the correct answer.

64.A

Let us check all the statement one by one. Option A: Bala scored same as Jatin in DI. We can say that Bala scored 20 marks in DI. In that Bala's composite score = $2 \times 20 + 9 + 11 = 60$ which is same as Indu's composite score. Therefore, we can say that this is a false statement. Hence, option A is the correct answer.

65.13

It is given that all the candidates except Ajay and Danish had different marks in DI and Bala's composite score was less than Chetna's composite score. Let us assume that Bala scored 'x' marks in DI.

$$= 2 \times x + 9 + 11 < 54$$

$$= x < 17$$

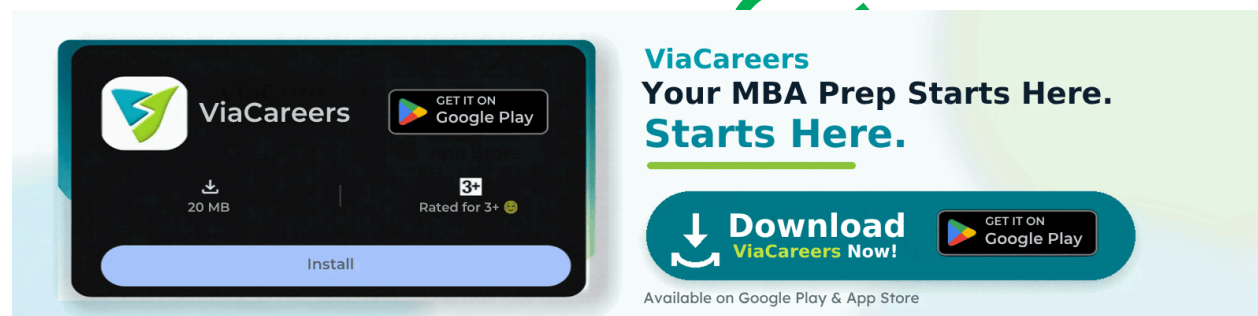
We can see that Bala's score will be less than 17. Bala's maximum score in DI will be the largest possible number less than 17 which is not same as any other candidate's score in DI. From the table we can see that 16, 15 and 14 are already taken by Indu, Falak and Geeta respectively. Therefore, we can say that Bala can score a maximum of 13 marks in DI.

66.14

Ajay was the unique highest scorer in WE. Case 1: Geeta scored 19 marks in WE. We can say that if Geeta scored 19 marks in WE, then Ajay scored 20 marks in DI. In that case Ajay's composite score = $2 \times 8 + 20 + 16 = 52$. Which is a possible case.

Case 1: Geeta scored 18 marks in WE.

We can say that if Geeta scored 18 marks in WE, then Ajay can score either 19 or 20 marks in DI.



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If Ajay scored 20 marks in DI then in that case Ajay's composite score = $2 \times 8 + 20 + 16 = 52$ which will be same as Geeta's composite score. Hence, we can say that in this case Ajay can't score 20 marks.

If Ajay scored 19 marks in DI then in that case Ajay's composite score = $2 \times 8 + 19 + 16 = 51$ which will be same as Danish's composite score. Hence, we can say that in this case Ajay can't score 19 marks.

Therefore, we can say that case 2 is not possible at all.

Candidate	Marks out of 20			Composite score
	DI	WE	GA	
Ajay	8	20	16	52
Bala		9	11	
Chetna	19	4	12	54
Danish	8	15	20	51
Ester	12	18	16	58
Falak	15	7	10	47
Geeta	14	19	6	53
Harini	5		20	
Indu	16	8	20	60
Jatin	20	16	14	70

It is given that all the candidates scored different marks in WE.

We can see that Ajay, Geeta and Ester has already scored 20, 19 and 18 marks in WE. Therefore, Harini can score a maximum of 17 marks in WE. If Harini's score in WE is 17, then Harini's composite score = $2 \times 5 + 17 + 20 =$

47 which is same as Falak's composite score. Hence, we can say that Harini can't score 17 marks in WE. Jatin and Danish have already scored 16 and 15 marks respectively.

Therefore, we can say that the maximum marks that Harini could have scored in WE = 14.

QUANT

67. D

Given that: $2^x = 3^{\log_5 2}$

$$\Rightarrow 2^x = 2^{\log_5 3}$$

$$\Rightarrow x = \log_5 3$$

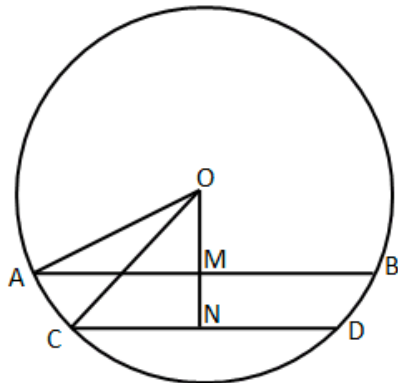
$$\Rightarrow x = \log_5 \frac{3 * 5}{5}$$

$$\Rightarrow x = \log_5 5 + \log_5 \frac{3}{5}$$

$$\Rightarrow x = 1 + \log_5 \frac{3}{5}. \text{ Hence, option D is the correct answer.}$$

68.A

Given that two parallel chords on the same side of a diameter have lengths 4 cm and 6 cm.



In the diagram we can see that $AB = 6$ cm, $CD = 4$ cm and $MN = 1$ cm.

We can see that M and N are the mid points of AB and CD respectively.

$AM = 3$ cm and $CN = 2$ cm. Let 'OM' be x cm.

In right angle triangle AMO,

$$AO^2 = AM^2 + OM^2$$

$$\Rightarrow AO^2 = 3^2 + x^2 \dots (1)$$

In right angle triangle CNO,

$$CO^2 = CN^2 + ON^2$$

$$\Rightarrow CO^2 = 2^2 + (OM + MN)^2$$

$$\Rightarrow CO^2 = 2^2 + (x + 1)^2 \dots (2)$$

We know that both AO and CO are the radius of the circle. Hence $AO = CO$

Therefore, we can equate equation (1) and (2)

$$3^2 + x^2 = 2^2 + (x + 1)^2$$

$$\Rightarrow x = 2 \text{ cm}$$

Therefore, the radius of the circle

$$AO = \sqrt{AM^2 + OM^2}$$

$$\Rightarrow AO = \sqrt{3^2 + 2^2} = \sqrt{13}. \text{ Hence, option A is the correct answer.}$$



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69. C

Let the efficiency of humans be 'h' and the efficiency of robots be 'r'.

In the first case,

$$\text{Total work} = (15h + 5r) * 30 \dots\dots (i)$$

In the second case,

$$\text{Total work} = (5h + 15r) * 60 \dots\dots (ii)$$

On equating (i) and (ii), we get

$$(15h + 5r) * 30 = (5h + 15r) * 60$$

$$\text{Or, } 15h + 5r = 10h + 30r$$

$$\text{Or, } 5h = 25r$$

$$\text{Or, } h = 5r$$

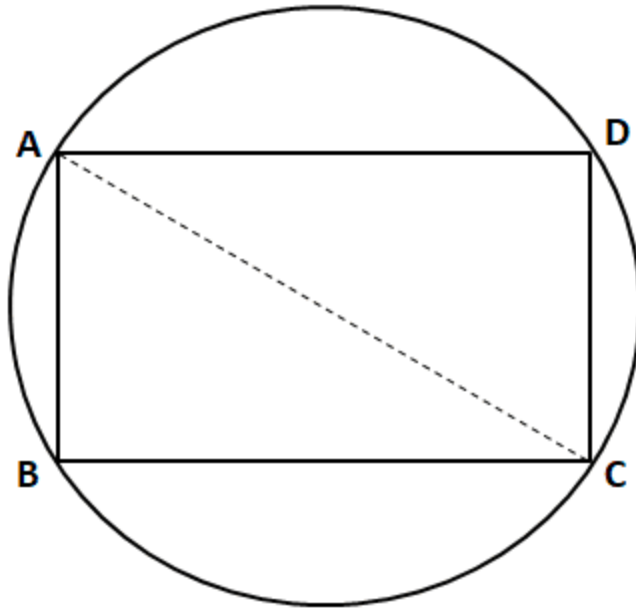
$$\text{Total work} = (15h + 5r) * 30 = (15h + h) * 30 = 480h$$

$$\text{Time taken by 15 humans} = \frac{480h}{15h} \text{ days} = 32 \text{ days.}$$

Hence, option C is the correct answer.

70. A

Let ABCD be a rectangle inscribed in a circle of radius 13 cm. Which one of the following pairs can represent, in cm, the possible length and breadth of ABCD?



We know that AC is the diameter and $\angle ABC = 90^\circ$. $AC = 2 \times 13 = 26$ cm

In right angle triangle ABC,

$$AC^2 = AB^2 + BC^2$$

$$\Rightarrow AB^2 + BC^2 = 26^2$$

$$\Rightarrow AB^2 + BC^2 = 676$$

Let us check with the options.

Option (A): $24^2 + 10^2 = 676$. Hence, this is a possible answer.

Option (B): $25^2 + 9^2 = 706 \neq 676$. Hence, this is an incorrect pair.

Option (C): $25^2 + 10^2 = 725 \neq 676$. Hence, this is an incorrect pair.

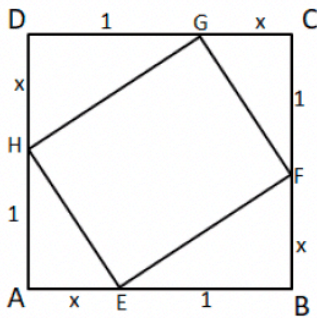
Option (D): $24^2 + 12^2 = 720 \neq 676$. Hence, this is an incorrect pair.

Therefore, we can say that option A is the correct answer.



71.D

It is given that EFGH is also a square whose area is 62.5% of that of ABCD. Let us assume that E divides AB in $x : 1$. Because of symmetry we can see that points F, G and H divide BC, CD and DA in $x : 1$. Let us assume that ' $x+1$ ' is the length of side of square ABCD.



Area of square ABCD = $(x + 1)^2$ sq. units.

Therefore, area of square EFGH = $\frac{62.5}{100} * (x + 1)^2 = \frac{5(x + 1)^2}{8} \dots (1)$

In right angle triangle EBF,

$$EF^2 = EB^2 + BF^2$$

$$\Rightarrow EF = \sqrt{1^2 + x^2}$$

Therefore, the area of square EFGH = $EF^2 = x^2 + 1 \dots (2)$

By equating (1) and (2),

$$x^2 + 1 = \frac{5(x + 1)^2}{8}$$

$$\Rightarrow 8x^2 + 8 = 5x^2 + 10x + 5$$

$$\Rightarrow 3x^2 - 10x + 3 = 0$$

$$\Rightarrow (x - 3)(3x - 1) = 0$$

$$\Rightarrow x = 3 \text{ or } 1/3$$

The ratio of length of EB to that of CG = $1 : x$

EB : CG = $1 : 3$ or $3 : 1$. Hence, option D is the correct answer.



72.12

Let the distance between A and B be $4x$. Length of BP is thrice the length of AP. $\Rightarrow AP = x$

and BP = $3x$

Let the speed of car 1 be s and the speed of car 2 be $0.5s$. Car 2 reaches P one hour (60 minutes) after Car 1 reaches P. $\Rightarrow x/s + 60 = 3x/0.5s \Rightarrow x/s + 60 = 6x/s \Rightarrow 5x/s = 60 \Rightarrow x/s = 12$

Time taken by car 1 in reaching P from A = $x/s = 12$ minutes. Therefore, 12 is the correct answer.

73. 32

$$f(x) = \min(2x^2, 52 - 5x)$$

The maximum possible value of this function will be attained at the point in which $2x^2$ is equal to $52 - 5x$.

$$2x^2 = 52 - 5x$$

$$2x^2 + 5x - 52 = 0$$

$$(2x + 13)(x - 4) = 0$$

$$\Rightarrow x = -\frac{13}{2} \text{ or } x = 4$$

It has been given that x is a positive real number. Therefore, we can eliminate the case $x = -\frac{13}{2}$.

$x = 4$ is the point at which the function attains the maximum value. 4 is not the maximum value of the function.

Substituting $x = 4$ in the original function, we get, $2x^2 = 2 * 4^2 = 32$.

$$f(x) = 32.$$

Therefore, 32 is the right answer.

74.40

We know that one of the 3 numbers is 37.

Let the product of the other 2 numbers be x .

It has been given that $73x - 37x = 720$

$$36x = 720$$

$$x = 20$$

Product of 2 real numbers is 20.

We have to find the minimum possible value of the sum of the squares of the 2 numbers.

Let $x = a \cdot b$

It has been given that $a \cdot b = 20$

The least possible sum for a given product is obtained when the numbers are as close to each other as possible.

Therefore, when $a = b$, the value of a and b will be $\sqrt{20}$.

$$\text{Sum of the squares of the 2 numbers} = 20 + 20 = 40.$$

Therefore, 40 is the correct answer.

75.15

Train T starts at 3 PM and train S starts at 4 PM. Let the speed of train T be t . $\Rightarrow$ Speed of train S = $0.75t$.

When the trains meet, train T would have traveled for one more hour than train S. Let us assume that the 2 trains meet x hours after 3 PM. Train S would have traveled for $x - 1$ hours.

$$\text{Distance traveled by train T} = xt \quad \text{Distance traveled by train S} = (x - 1) \cdot 0.75t = 0.75xt - 0.75t$$

We know that train T has traveled three fifths of the distance. Therefore, train S should have traveled two-fifths the distance between the 2 cities. $\Rightarrow \frac{xt}{(0.75xt - 0.75t)} = \frac{3}{2}$

$$2xt = 2.25xt - 2.25t$$

$$0.25x = 2.25$$

$x = 9$ hours.

Train T takes 9 hours to cover three-fifths the distance. Therefore, to cover the entire distance, train T will take

$9 \times (5/3) = 15$ hours.

Therefore, 15 is the correct answer.



76.C

The selling price of the mixture is Rs.40/kg.

Let a be the price of 1 kg of tea A in the mixture and b be the price per kg of tea B.

It has been given that the profit is 10% if the 2 varieties are mixed in the ratio 3:2

Let the cost price of the mixture be x.

It has been given that $1.1x = 40$

$$x = 40/1.1$$

Price per kg of the mixture in ratio 3:2 = $\frac{3a+2b}{5}$

$$\frac{3a+2b}{5} = \frac{40}{1.1}$$

$$3.3a + 2.2b = 200 \text{ ---(1)}$$

The profit is 5% if the 2 varieties are mixed in the ratio 2:3.

Price per kg of the mixture in ratio 2:3 = $\frac{2a+3b}{5}$

$$\frac{2a+3b}{5} = \frac{40}{1.05}$$

$$2.1a + 3.15b = 200 \text{ ---(2)}$$

Equating (1) and (2), we get,

$$3.3a + 2.2b = 2.1a + 3.15b$$

$$1.2a = 0.95b$$

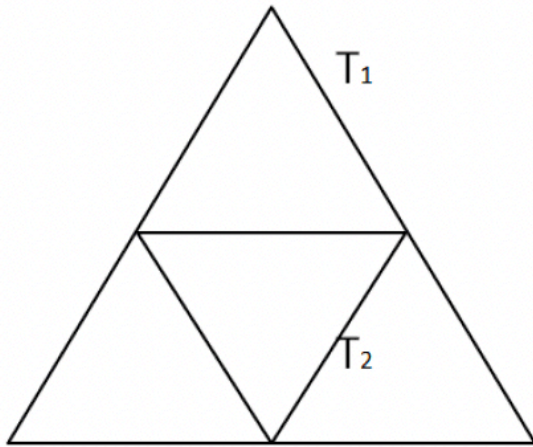
$$\frac{a}{b} = \frac{0.95}{1.2}$$

$$\frac{a}{b} = \frac{19}{24}$$

Therefore, option C is the right answer.

77.D

We can see that T is formed by using the mid points of T . Hence, we can say that area of triangle of T will be (1/4)th of the area of triangle T .



$$\text{Area of triangle } T_1 = \frac{\sqrt{3}}{4} * (24)^2 = 144\sqrt{3} \text{ sq. cm}$$

$$\text{Area of triangle } T_2 = \frac{144\sqrt{3}}{4} = 36\sqrt{3} \text{ sq. cm}$$

$$\text{Sum of the area of all triangles} = T_1 + T_2 + T_3 + \dots$$

$$\Rightarrow T_1 + T_1/4 + T_1/4^2 + \dots$$

$$\Rightarrow \frac{T_1}{1 - 0.25}$$

$$\Rightarrow \frac{4}{3} * T_1$$

$$\Rightarrow \frac{4}{3} * 144\sqrt{3}$$

$$\Rightarrow 192\sqrt{3}$$

Hence, option D is the correct answer.

78. D

Given that: $\log_{12} 81 = p$

$$\Rightarrow \log_{81} 12 = \frac{1}{p}$$

$$\Rightarrow \log_3 3 * 4 = \frac{4}{p}$$

$$\Rightarrow 1 + \log_3 4 = \frac{4}{p}$$

Using Componendo and Dividendo,

$$\Rightarrow \frac{1 + \log_3 4 - 1}{1 + \log_3 4 + 1} = \frac{4 - p}{4 + p}$$

$$\Rightarrow \frac{\log_3 4}{2 + \log_3 4} = \frac{4 - p}{4 + p}$$

$$\Rightarrow \frac{\log_3 4}{\log_3 9 + \log_3 4} = \frac{4 - p}{4 + p}$$

$$\Rightarrow \frac{\log_3 4}{\log_3 36} = \frac{4 - p}{4 + p}$$

$$\Rightarrow 3 * \frac{4 - p}{4 + p} = \frac{3 \log_3 4}{\log_3 36}$$

$$\Rightarrow 3 * \frac{4 - p}{4 + p} = \frac{\log_3 64}{\log_3 36}$$

$$\Rightarrow 3 * \frac{4 - p}{4 + p} = \log_{36} 64$$

$$\Rightarrow 3 * \frac{4 - p}{4 + p} = \log_{6^2} 8^2 = \log_6 8. \text{ Hence, option D is the correct answer.}$$



79.121000

We have to equate the installments and the amount due either at the time of borrowing or at the time when the entire loan is repaid. Let us bring all values to the time frame in which all the dues get settled, i.e, by the end of 2years.

John borrowed Rs. 2,10,000 from the bank at 10% per annum. This loan will amount to $2,10,000 \times 1.1 \times 1.1 = \text{Rs.} 2,54,100$ by the end of 2 years. Let the amount paid as installment every year be Rs.x.

John would pay the first installment by the end of the first year. Therefore, we have to calculate the interest on this amount from the end of the first year to the end of the second year. The loan will get settled the moment the second installment is paid. $\Rightarrow 1.1x + x = 2,54,100$
 $2.1x = 2,54,100 \Rightarrow x = \text{Rs. } 1,21,000$.

Therefore, 121000 is the correct answer.

80.A

Let us assume that A can complete 'a' units of work in a day and B can complete 'b' units of work in a day. A works alone till half the work is completed. A and B work together for 4 days and B works alone to complete the last 5% of the work. $\Rightarrow$ A and B in 4 days can complete 45% of the work. Let us assume the total amount of work to be done to be 100 units. $4a + 4b = 45$ ----- (1) B needs 25% more time than A to finish a job. $\Rightarrow 1.25 \times b = a$ ----- (2) Substituting (2) in (1), we get, $5b + 4b = 45$
 $9b = 45 \Rightarrow b = 5$ units/day

B alone can finish the job in $100/5 = 20$ days.

Therefore, option A is the right answer.

81.502

It has been given that the digits in the number should appear in the ascending order. Therefore, there is only 1 possible arrangement of the digits once they are selected to form a number. There are 9 numbers (1,2,3,4,5,6,7,8,9) in total.

2 digit numbers can be formed in $9C_2$ ways.

3 digit numbers can be formed in $9C_3$ ways.....

9 digit number can be formed in $9C_9$ ways.

$$\begin{aligned} \text{We know that } nC_0 + nC_1 + nC_2 + \dots + nC_n &= 2^n \\ \Rightarrow 9C_0 + 9C_1 + 9C_2 + \dots + 9C_9 &= 2^9 \\ 9C_0 + 9C_1 + \dots + 9C_9 &= 512 \end{aligned}$$

We have to subtract $9C_0$ and $9C_1$ from both the sides of the equations since we cannot form single digit numbers.

$$\begin{aligned} \Rightarrow 9C_2 + 9C_3 + \dots + 9C_9 &= 512 - 1 - 9 \\ 9C_2 + 9C_3 + \dots + 9C_9 &= 502 \end{aligned}$$

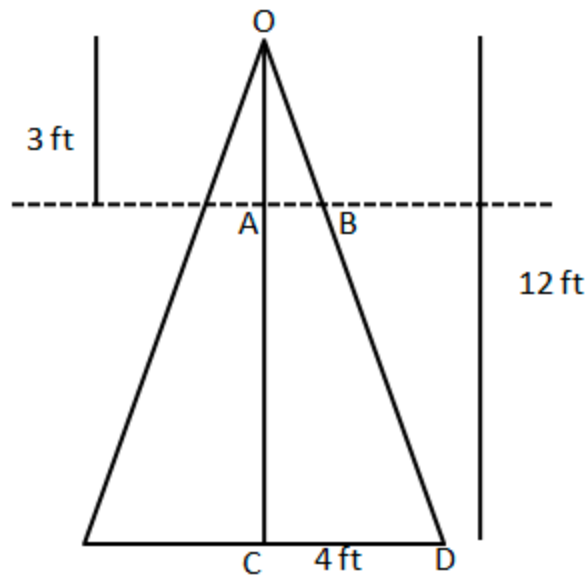
Therefore, 502 is the right answer.



82.198

We are given that diameter of base = 8 ft. Therefore, the radius of circular base = $8/2 = 4$

ft



In triangle OAB and OCD

$$\frac{OA}{AB} = \frac{OC}{CD}$$

$$\Rightarrow AB = \frac{3 * 4}{12} = 1 \text{ ft.}$$

Therefore, the volume of remaining part = Volume of entire cone - Volume of smaller cone



$$\begin{aligned} &\Rightarrow \frac{1}{3} * \pi * 4^2 * 12 - \frac{1}{3} * \pi * 1^2 * 3 \\ &\Rightarrow \frac{1}{3} * \pi * 189 \\ &\Rightarrow \frac{22}{7 * 3} * 189 \\ &\Rightarrow 198 \text{ cubic ft} \end{aligned}$$

83.D

Let the number of marbles with Raju and Lalitha initially be $4x$ and $9x$.

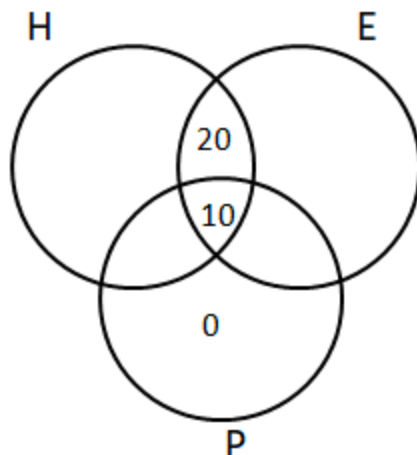
Let the number of marbles that Lalitha gave to Raju be a . It has been given that $(4x+a)/(9x-a) = 5/6$
 $24x + 6a = 45x - 5a$
 $11a = 21x$
 $a/x = 21/11$

Fraction of original marbles given to Raju by Lalitha = $a/9x$ (Since Lalitha had $9x$ marbles initially).
 $a/9x = 21/99 = 7/33$.

Therefore, option D is the right answer.

84.52

Let us draw a Venn diagram using the information present in the question.

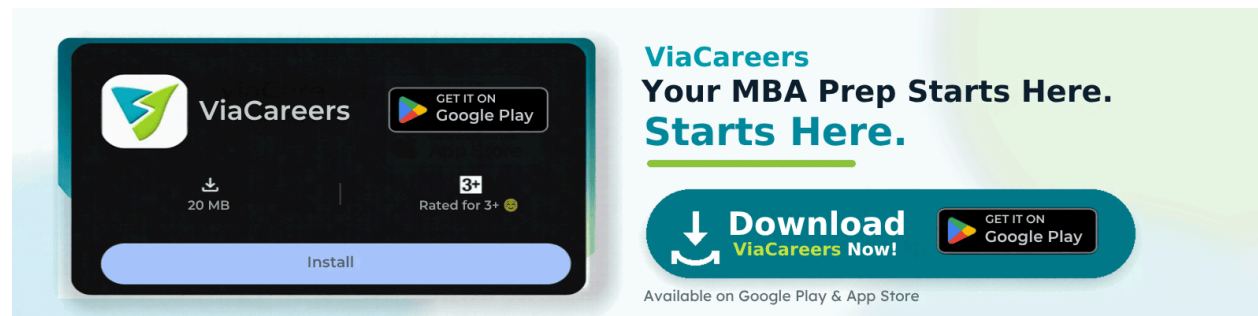


It is given that the number of students studying H equals that studying E. Let 'x' be the

total number of students who studied H, and H and P but not E. We can also say that the same will be the number of students who studied E, and E and P but not H. Therefore, $x + 20 + 10 + x = 74$ $x = 22$ Hence, the number of students studying H = $22 + 10 + 20 = 52$

85.A

Let the price of peanuts be Rs. $100x$ per kg



The banner features the ViaCareers app interface on the left, showing the app icon, name, size (20 MB), and a '3+' rating. To the right, it says 'ViaCareers Your MBA Prep Starts Here. Starts Here.' with a 'Download ViaCareers Now!' button and a 'GET IT ON Google Play' badge. Below the button, it states 'Available on Google Play & App Store'.

Then, the price of walnuts = Rs. $300x$ per kg

Cost price of peanuts for the shopkeeper = Rs. $110x$ per kg

Cost price of walnuts for the shopkeeper = Rs. $360x$ per kg

Total cost incurred to the shopkeeper while buying = Rs. $(8 * 110x + 16 * 360x)$ = Rs. $6640x$

Since, 5kg walnut and 3kg peanuts are lost in transit, the shopkeeper will be remained with $(16-5)+(8-3)=16$ kgs of nuts

Total selling price that the shopkeeper got = Rs. $(166 * 16)$ = Rs. 2656 Profit = 25%

So, cost price = Rs. 2124.80

Therefore, $6640x = 2124.80$

On solving, we get $x = 0.32$

Therefore, price of walnuts = Rs. $(300 * 0.32)$ = Rs. 96 per kg.

Hence, option A is the correct answer

86.D

It has been given that among 200 students, 105 like pizza and 134 like burger. The question asks us to find out the number of students who can be liking only burgers among the given values. The least number of students who like only burger will be obtained when everyone who likes pizza likes burger too. In this case, 105 students will like pizza and burger and $134 - 105 = 29$ students will like only burger. Therefore, the number of students who like only burger cannot be less than 29. The maximum number of students who like only burger will be obtained when we try to separate the 2 sets as much as possible. There are 200 students in total. 105 of them like pizza. Therefore, the remaining 95 students can like only burger and $134 - 95 = 39$ students can like both pizza and burger. As we can see, the number of students who like burger cannot exceed 95. The number of students who like only burger should lie between 29 and 95 (both the values are included). 93 is the only value among the given options that satisfies this condition and hence, option D is the right answer.

87. 54

$$f(x+2) = f(x) + f(x+1)$$

As we can see, the value of a term is the sum of the 2 terms preceding it.

It has been given that $f(11) = 91$ and $f(15) = 617$.

We have to find the value of $f(10)$.

$$\text{Let } f(10) = b$$

$$f(12) = b + 91$$

$$f(13) = 91 + b + 91 = 182 + b$$

$$f(14) = 182 + b + 91 + b = 273 + 2b$$

$$f(15) = 273 + 2b + 182 + b = 455 + 3b$$

It has been given that $455 + 3b = 617$

$$3b = 162$$

$$\Rightarrow b = 54$$

Therefore, 54 is the correct answer.

88.D

The possible average age of people whose ages are below 51 years will be maximum if the average age of number of people aged 51 years and above is minimum. Hence, we can say that there are 30 people have same age 51 years.

Let 'x' be the maximum average age of people whose ages are below 51.

Then we can say that,

$$\frac{51 * 30 + 39 * x}{30 + 39} = 38$$

$$\Rightarrow 1530 + 39x = 2622$$

$$\Rightarrow x = 1092/39 = 28$$

Hence, we can say that option D is the correct answer.

89.C

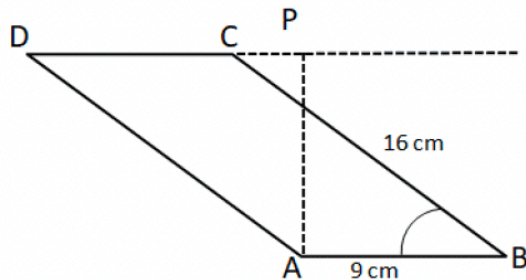
Let the price of paint B be x. Price of paint A = x+8. We know that the amount of paint B in the mixture does not exceed the amount of paint A. Therefore, paint B can at the maximum compose 50% of the mixture. The seller sells 10 litres of paint at Rs. 264 earning a profit of 10%. $\Rightarrow$ The cost price of 10 litres of the paint mixture = Rs. 240. Therefore, the cost of 1 litre of the mixture = Rs. 24.

We have to find the highest possible cost of paint B. When we increase the cost of paint B, the cost of paint A will increase too. If the cost price of the mixture is closer to the cost of paint B, then the amount of paint B present in the mixture should be greater than the amount of paint A present in the mixture. The highest possible cost of paint B will be obtained when the volumes of paint A and paint B in the mixture are equal. $\Rightarrow (x+x+8)/2 = 24 \Rightarrow 2x+8 = 48 \Rightarrow 2x = 40 \Rightarrow x = 20$

Therefore, option C is the right answer.

90. A

In a parallelogram ABCD of area 72 sq cm, the sides CD and AD have lengths 9 cm and 16 cm, respectively. Let P be a point on CD such that AP is perpendicular to CD. Then the area, in sq cm, of triangle APD is



Given that area of parallelogram = 72 sq cm

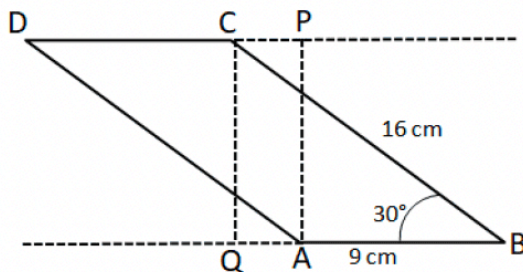
Area of triangle ABC = $\frac{1}{2}$ * area of parallelogram

$$(1/2) * AB * BC * \sin ABC = \frac{1}{2} * 72$$

$$\sin ABC = \frac{1}{2}$$

$$\angle ABC = 30^\circ$$

Let us draw a perpendicular CQ from C to AB.



$\angle B = \angle D = 30^\circ$ (opposite angles in a parallelogram)

$\angle QCB = \angle DAP = 60^\circ$ (Sum of angles in a triangle = 180)

In triangles APD and CQB, $AP = CQ$, $AD = CB$ (opposite sides of a parallelogram), $\angle QCB = \angle DAP = 60^\circ$

Hence APD and CQB are congruent triangles using SAS property.

Therefore, we can say that area of triangle APD = area of triangle CQB

In right angle triangle CQB,

$$QB = CB \cos 30^\circ = 16 * \frac{\sqrt{3}}{2} = 8\sqrt{3} \text{ cm}$$

$$CQ = CB \sin 30^\circ = 16 * \frac{1}{2} = 8 \text{ cm}$$

$$\text{Therefore, area of triangle CQB} = \frac{1}{2} * CQ * QB = \frac{1}{2} * 8 * 8\sqrt{3} = 32\sqrt{3}$$

Hence, we can say that area of triangle APD = $32\sqrt{3}$.

91. C

Given that $U^2 + (U - 2V - 1)^2 = -4V(U + V)$

$$\Rightarrow U^2 + (U - 2V - 1)(U - 2V - 1) = -4V(U + V)$$

$$\Rightarrow U^2 + (U^2 - 2UV - U - 2UV + 4V^2 + 2V - U + 2V + 1) = -4V(U + V)$$

$$\Rightarrow U^2 + (U^2 - 4UV - 2U + 4V^2 + 4V + 1) = -4V(U + V)$$

$$\Rightarrow 2U^2 - 4UV - 2U + 4V^2 + 4V + 1 = -4UV - 4V^2$$

$$\Rightarrow 2U^2 - 2U + 8V^2 + 4V + 1 = 0$$

$$\Rightarrow 2[U^2 - U + \frac{1}{4}] + 8[V^2 + \frac{V}{2} + \frac{1}{16}] = 0$$

$$\Rightarrow 2(U - \frac{1}{2})^2 + 8(V + \frac{1}{4})^2 = 0$$

Sum of two square terms is zero i.e. individual square term is equal to zero.

$$U - \frac{1}{2} = 0 \text{ and } V + \frac{1}{4} = 0$$

$$U = \frac{1}{2} \text{ and } V = -\frac{1}{4}$$

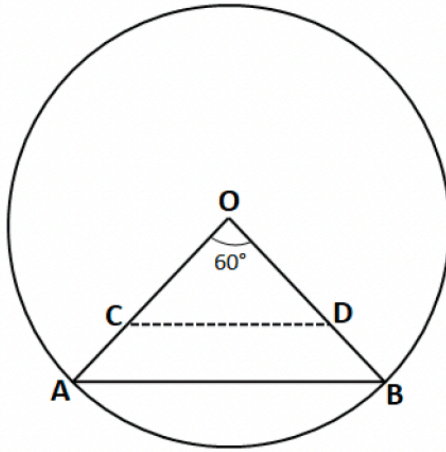
Therefore, $U + 3V = \frac{1}{2} + \frac{-1 * 3}{4} = \frac{-1}{4}$. Hence, option C is the correct answer.

92. C

It is given that radius of the circle = 1 cm

Chord AB subtends an angle of 60° on the centre of the given circle. R be the region bounded by the radii OA, OB and the arc AB.

$$\text{Therefore, } R = \frac{60^\circ}{360^\circ} \times \text{Area of the circle} = \frac{1}{6} \times \pi \times (1)^2 = \frac{\pi}{6} \text{ sq. cm}$$



It is given that $OC = OD$ and area of triangle OCD is half that of R. Let $OC = OD = x$.

$$\text{Area of triangle COD} = \frac{1}{2} \times OC \times OD \times \sin 60^\circ$$

$$\frac{\pi}{6 \times 2} = \frac{1}{2} \times x \times x \times \frac{\sqrt{3}}{2}$$

$$\Rightarrow x^2 = \frac{\pi}{3\sqrt{3}}$$

$$\Rightarrow x = \left(\frac{\pi}{3\sqrt{3}}\right)^{\frac{1}{2}} \text{ cm. Hence, option C is the correct answer.}$$

93. **D**

Let the time taken by Partha to cover 60 km be x hours.
 Narayan will cover 60 km in $x-4$ hours.

$$\text{Speed of Partha} = \frac{60}{x}$$

$$\text{Speed of Narayan} = \frac{60}{x-4}$$

Partha reaches the mid-point of A and B two hours before Narayan reaches B.

$$\Rightarrow \frac{30}{\frac{60}{x}} + 2 = \frac{60}{\frac{60}{(x-4)}}$$

$$\frac{x}{2} + 2 = x - 4$$

$$\frac{x+4}{2} = x - 4$$

$$x + 4 = 2x - 8$$

$$x = 12$$

Partha will take 12 hours to cross 60 km.

$$\Rightarrow \text{Speed of Partha} = \frac{60}{12} = 5 \text{ Kmph.}$$

Therefore, option D is the right answer.

94. **C**

Let $x = a$, $y = ar$ and $z = ar^2$

It is given that, $5x$, $16y$ and $12z$ are in AP.

$$\text{so, } 5x + 12z = 32y$$

On replacing the values of x , y and z , we get

$$5a + 12ar^2 = 32ar$$

$$\text{or, } 12r^2 - 32r + 5 = 0$$

$$\text{On solving, } r = \frac{5}{2} \text{ or } \frac{1}{6}$$

For $r = \frac{1}{6}$, $x < y < z$ is not satisfied.

$$\text{So, } r = \frac{5}{2}$$

Hence, option C is the correct answer.

95. D

Given that $x^{2018}y^{2017} = \frac{1}{2} \dots (1)$

$x^{2016}y^{2019} = 8 \dots (2)$

Equation (2)/ Equation (1)

$$\frac{y^2}{x^2} = \frac{8}{1/2}$$

$$\frac{y}{x} = 4 \text{ or } -4$$

Case 1: When $\frac{y}{x} = 4$

$$x^{2018}(4x)^{2017} = \frac{1}{2}$$

$$x^{2018+2017}(2)^{4034} = \frac{1}{2}$$

$$x^{4035} = \frac{1}{(2)^{4035}}$$

$$x = \frac{1}{2}$$

Since, $\frac{y}{x} = 4, \Rightarrow y = 2$

Therefore, $x^2 + y^3 = \frac{1}{4} + 8 = \frac{33}{4}$

Case 2: When $\frac{y}{x} = -4$

$$x^{2018}(-4x)^{2017} = \frac{1}{2}$$

$$x^{2018+2017}(2)^{4034} = \frac{-1}{2}$$

$$x^{4035} = \frac{1}{(-2)^{4035}}$$

$$x = \frac{-1}{2}$$

Since, $\frac{y}{x} = -4, \Rightarrow y = 2$

Therefore, $x^2 + y^3 = \frac{1}{4} + 8 = \frac{33}{4}$. Hence, option D is the correct answer.

96.10

Let the efficiency of filling pipes be 'x' and the efficiency of draining pipes be '-y'. In the first case, Capacity of tank = $(6x - 5y) * 6$(i) In the second case, Capacity of tank = $(5x - 6y) * 60$(ii) On equating (i) and (ii), we get $(6x - 5y) * 6 = (5x - 6y) * 60$ or, $6x - 5y = 50x - 60y$ or, $44x = 55y$ or, $4x = 5y$ or, $x = 1.25y$

Capacity of the tank = $(6x - 5y) * 6 = (7.5y - 5y) * 6 = 15y$

Net efficiency of 2 filling and 1 draining pipes = $(2x - y) = (2.5y - y) = 1.5y$

Time required = $\frac{15y}{1.5y}$ hours = 10 hours.

Hence, 10 is the correct answer.

97. A

$$\log_2(5 + \log_3 a) = 3$$

$$\Rightarrow 5 + \log_3 a = 8$$

$$\Rightarrow \log_3 a = 3$$

$$\text{or } a = 27$$

$$\log_5(4a + 12 + \log_2 b) = 3$$

$$\Rightarrow 4a + 12 + \log_2 b = 125$$

Putting $a = 27$, we get

$$\log_2 b = 5$$

$$\text{or, } b = 32$$

$$\text{So, } a + b = 27 + 32 = 59$$

Hence, option A is the correct answer.



98.60

Let the total number of tests be 'n' and the average by 'A'

Total score = $n \cdot A$

When 1st 10 tests are excluded, decrease in total value of scores = $(nA - 20 \cdot 10) = (nA - 200)$

Also, $(n - 10)(A + 1) = (nA - 200)$

On solving, we get $10A - n = 190$(i)

When last 10 tests are excluded, decrease in total value of scores = $(nA - 30 \cdot 10) = (nA - 300)$

Also, $(n - 10)(A - 1) = (nA - 300)$ On solving, we get $10A + n = 310$(ii) From (i) and (ii), we get $n = 60$

Hence, 60 is the correct answer.

99.5

At $x = 0$, $2^x = 1$ which is in the given range $[0.25, 200]$

$2^x + 2 = 1 + 2 = 3$ Which is divisible by 3. Hence, $x = 0$ is one possible solution.

At $x = 1$, $2^x = 2$ which is in the given range $[0.25, 200]$

$2^x + 2 = 2 + 2 = 4$ Which is divisible by 4. Hence, $x = 1$ is one possible solution.

At $x = 2$, $2^x = 4$ which is in the given range $[0.25, 200]$

$2^x + 2 = 4 + 2 = 6$ Which is divisible by 3. Hence, $x = 2$ is one possible solution.

At $x = 3$, $2^x = 8$ which is in the given range $[0.25, 200]$

$2^x + 2 = 8 + 2 = 10$ Which is not divisible by 3 or 4. Hence, $x = 3$ can't be a solution.

At $x = 4$, $2^x = 16$ which is in the given range $[0.25, 200]$

$2^x + 2 = 16 + 2 = 18$ Which is divisible by 3. Hence, $x = 4$ is one possible solution.

At $x = 5$, $2^x = 32$ which is in the given range $[0.25, 200]$

$2^x + 2 = 32 + 2 = 34$ Which is not divisible by 3 or 4. Hence, $x = 5$ can't be a solution.

At $x = 6$, $2^x = 64$ which is in the given range $[0.25, 200]$

$2^x + 2 = 64 + 2 = 66$ Which is divisible by 3. Hence, $x = 6$ is one possible solution.

At $x = 7$, $2^x = 128$ which is in the given range $[0.25, 200]$

$2^x + 2 = 128 + 2 = 130$ Which is not divisible by 3 or 4. Hence, $x = 7$ can't be a solution.

At $x = 8$, $2^x = 256$ which is not in the given range $[0.25, 200]$. Hence, x can't take any value greater than 7.

Therefore, all possible values of $x = \{0, 1, 2, 4, 6\}$. Hence, we can say that ' x ' can take 5 different integer values.

100.B

Total marks = N

Pass marks = 45% of N = 0.45N

Marks obtained = 36

It is given that, obtained marks is 68% less than that pass marks $\Rightarrow$ the obtained marks

is 32% of the pass marks. So, $0.32 * 0.45N = 360$ on solving, we get $N = 250$

Hence, option B is the correct answer.

