

CAT 2023 Slot - 2 VARC

DIRECTIONS for questions 1 - 4: The passage below is accompanied by a set of questions. Choose the best answer to each question.

The Positivists, anxious to stake out their claim for history as a science, contributed the weight of their influence to the cult of facts. First ascertain the facts, said the positivists, then draw your conclusions from them.....This is what may [be] called the common-sense view of history. History consists of a corpus of ascertained facts. The facts are available to the historian in documents, inscriptions, and so on...[Sir George Clark] contrasted the "hard core of facts" in history with the surrounding pulp of disputable interpretation forgetting perhaps that the pulpy part of the fruit is more rewarding than the hard core.....It recalls the favourite dictum of the great liberal journalist C. P. Scott: "Facts are sacred, opinion is free." . . .

What is a historical fact?..... According to the common-sense view, there are certain basic facts which are the same for all historians and which form, so to speak, the backbone of history—the fact, for example, that the Battle of Hastings was fought in 1066. But this view calls for two observations. In the first place, it is not with facts like these that the historian is primarily concerned. It is no doubt important to know that the great battle was fought in 1066 and not in 1065 or 1067, and that it was fought at Hastings and not at Eastbourne or Brighton. The historian must not get these things wrong. But [to] praise a historian for his accuracy is like praising an architect for using well-seasoned timber or properly mixed concrete in his building. It is a necessary condition of his work, but not his essential function. It is precisely for matters of this kind that the historian is entitled to rely on what have been called the "auxiliary sciences" of history—archaeology, epigraphy, numismatics, chronology, and so forth....

The second observation is that the necessity to establish these basic facts rests not on any quality in the facts themselves, but on an apriori decision of the historian. In spite of C. P. Scott's motto, every journalist knows today that the most effective way to influence opinion is by the selection and arrangement of the appropriate facts. It used to be said that facts speak for themselves. This is, of course, untrue. The facts speak only when the historian calls on them: it is he who decides to which facts to give the floor, and in what order or context. . . . The only reason why we are interested to know that the battle was fought at Hastings in 1066 is that historians regard it as a major historical event..... Professor Talcott Parsons once called [science] "a selective system of cognitive orientations to reality." It might perhaps have been put more simply. But history is, among other things, that. The historian is necessarily selective. The belief in a hard core of historical facts existing objectively and independently of the interpretation of the historian is a preposterous fallacy, but one which it is very hard to eradicate.

1. According to this passage, which one of the following statements best describes the significance of archaeology for historians?
 - A. Archaeology helps historians to interpret historical facts.
 - B. Archaeology helps historians to ascertain factual accuracy.
 - C. Archaeology helps historians to carry out their primary duty.
 - D. Archaeology helps historians to locate the oldest civilisations in history
2. All of the following, if true, can weaken the passage's claim that facts do not speak for themselves, EXCEPT:

- A. the truth value of a fact is independent of the historian who expresses it.
 - B. facts, like truth, can be relative: what is fact for person X may not be so for person Y.
 - C. a fact, by its very nature, is objective and universal, irrespective of the context in which it is placed.
 - D. the order in which a series of facts is presented does not have any bearing on the production of meaning.
3. If the author of the passage were to write a book on the Battle of Hastings along the lines of his/her own reasoning, the focus of the historical account would be on:
- A. providing a nuanced interpretation by relying on the auxiliary sciences.
 - B. producing a detailed timeline of the various events that led to the Battle.
 - C. exploring the socio-political and economic factors that led to the Battle.
 - D. deriving historical facts from the relevant documents and inscriptions.
4. All of the following describe the “common-sense view” of history, EXCEPT:
- A. history can be objective like the sciences if it is derived from historical facts.
 - B. real history can be found in ancient engravings and archival documents.
 - C. history is like science: a selective system of cognitive orientations to reality.
 - D. only the positivist methods can lead to credible historical knowledge.

DIRECTIONS for questions 5 - 8: The passage below is accompanied by a set of questions. Choose the best answer to each question.

Over the past four centuries liberalism has been so successful that it has driven all its opponents off the battlefield. Now it is disintegrating, destroyed by a mix of hubris and internal contradictions, according to Patrick Deneen, a professor of politics at the University of Notre Dame.....Equality of opportunity has produced a new meritocratic aristocracy that has all the aloofness of the old aristocracy with none of its sense of noblesse oblige. Democracy has degenerated into a theatre of the absurd. And technological advances are reducing ever more areas of work into meaningless drudgery. “The gap between liberalism’s claims about itself and the lived reality of the citizenry” is now so wide that “the lie can no longer be accepted,” Mr Deneen writes. What better proof of this than the vision of 1,000 private planes whisking their occupants to Davos to discuss the question of “creating a shared future in a fragmented world”? . . .

Deneen does an impressive job of capturing the current mood of disillusionment, echoing left- wing complaints about rampant commercialism, right-wing complaints about narcissistic and bullying students, and general worries about atomisation and selfishness. But when he concludes that all this adds up to a failure of liberalism, is his argument convincing?....He argues that the essence of liberalism lies in freeing individuals from constraints. In fact, liberalism contains a wide range of intellectual traditions which provide different answers to the question of how to trade off the relative claims of rights and responsibilities, individual expression and social ties..... liberals experimented with a range of ideas from devolving power from the centre to creating national education systems.

Mr. Deneen’s fixation on the essence of liberalism leads to the second big problem of his book: his failure to recognise liberalism’s ability to reform itself and address its internal problems. The late 19th century saw America suffering from many of the problems that are reappearing today, including the creation of a business aristocracy, the rise of vast companies, the corruption of politics and the sense that society was dividing into winners and losers. But a wide variety of reformers,

working within the liberal tradition, tackled these problems head on. Theodore Roosevelt took on the trusts. Progressives cleaned up government corruption. University reformers modernised academic syllabuses and built ladders of opportunity. Rather than dying, liberalism reformed itself.

Mr. Deneen is right to point out that the record of liberalism in recent years has been dismal. He is also right to assert that the world has much to learn from the premodern notions of liberty as self-mastery and self-denial. The biggest enemy of liberalism is not so much atomisation but old-fashioned greed, as members of the Davos elite pile their plates ever higher with perks and share options. But he is wrong to argue that the only way for people to liberate themselves from the contradictions of liberalism is “liberation from liberalism itself”. The best way to read “Why Liberalism Failed” is not as a funeral oration but as a call to action: up your game, or else.

5. The author of the passage faults Deneen’s conclusions for all of the following reasons, EXCEPT:

- A. its failure to note historical instances in which the process of declining liberalism has managed to reverse itself.
- B. its extreme pessimism about the future of liberalism today and predictions of an ultimate decline.
- C. its repeated harking back to premodern notions of liberty.
- D. its very narrow definition of liberalism limited to individual freedoms.

6. The author of the passage refers to “the Davos elite” to illustrate his views on:

- A. the unlikelihood of a return to the liberalism of the past as long as the rich continue to benefit from the decline in liberal values.
- B. the way the debate around liberalism has been captured by the rich who have managed to insulate themselves from economic hardships.
- C. the fact that the rise in liberalism had led to a greater interest in shared futures from unlikely social classes.
- D. the hypocrisy of the liberal rich, who profess to subscribe to liberal values while cornering most of the wealth

7. All of the following statements are evidence of the decline of liberalism today, EXCEPT:

- A. “And technological advances are reducing ever more areas of work into meaningless drudgery.”
- B. “The gap between liberalism’s claims about itself and the lived reality of the citizenry’ is now so wide that ‘the lie can no longer be accepted,’....”
- C. “Democracy has degenerated into a theatre of the absurd.”
- D. “... the creation of a business aristocracy, the rise of vast companies....”

8. The author of the passage is likely to disagree with all of the following statements, EXCEPT:

- A. the essence of liberalism lies in greater individual self-expression and freedoms.
- B. claims about liberalism’s disintegration are exaggerated and misunderstand its core features.
- C. if we accept that liberalism is a dying ideal, we must work to find a viable substitute.

D. liberalism was the dominant ideal in the past century, but it had to reform itself to remain so.

DIRECTIONS for questions 9 - 12: The passage below is accompanied by a set of questions. Choose the best answer to each question.

The Second Hand September campaign, led by Oxfam . . . seeks to encourage shopping at local organisations and charities as alternatives to fast fashion brands such as Primark and Boohoo in the name of saving our planet. As innocent as mindless scrolling through online shops may seem, such consumers are unintentionally—or perhaps even knowingly—contributing to an industry that uses more energy than aviation. . . .

Brits buy more garments than any other country in Europe, so it comes as no shock that many of those clothes end up in UK landfills each year: 300,000 tonnes of them, to be exact. This waste of clothing is destructive to our planet, releasing greenhouse gasses as clothes are burnt as well as bleeding toxins and dyes into the surrounding soil and water. As ecologist Chelsea Rochman bluntly put it, “The mismanagement of our waste has even come back to haunt us on our dinner plate.”

It’s not surprising, then, that people are scrambling for a solution, the most common of which is second-hand shopping. Retailers selling consigned clothing are currently expanding at a rapid rate If everyone bought just one used item in a year, it would save 449 million lbs of waste, equivalent to the weight of 1 million Polar bears. “Thrifting” has increasingly become a trendy practice. London is home to many second-hand, or more commonly coined ‘vintage’, shops across the city from Bayswater to Brixton.

So, you’re cool and you care about the planet; you’ve killed two birds with one stone. But do people simply purchase a second-hand item, flash it on Instagram with #vintage and call it a day without considering whether what they are doing is actually effective?

According to a study commissioned by Patagonia, for instance, older clothes shed more microfibres. These can end up in our rivers and seas after just one wash due to the worn material, thus contributing to microfibre pollution. To break it down, the amount of microfibres released by laundering 100,000 fleece jackets is equivalent to as many as 11,900 plastic grocery bags, and up to 40 per cent of that ends up in our oceans. So where does this leave second-hand consumers? [They would be well advised to buy] high-quality items that shed less and last longer [as this] combats both microfibre pollution and excess garments ending up in landfills.

. . .

Luxury brands would rather not circulate their latest season stock around the globe to be sold at a cheaper price, which is why companies like ThredUP, a US fashion resale marketplace, have not yet caught on in the UK. There will always be a market for consignment but there is also a whole generation of people who have been taught that only buying new products is the norm; second-hand luxury goods are not in their psyche. Ben Whitaker, director at Liquidation Firm B-Stock, told Prospect that unless recycling becomes cost-effective and filters into mass production, with the right technology to partner it, “high-end retailers would rather put brand before sustainability.”

9. Based on the passage, we can infer that the opposite of fast fashion, ‘slow fashion’, would most likely refer to clothes that:

A. do not shed microfibres.

B. do not bleed toxins and dyes.

- C. are sold by genuine vintage stores.
- D. are of high quality and long lasting.

10. The act of “thrifting”, as described in the passage, can be considered ironic because it:

- A. offers luxury clothing at cut-rate prices.
- B. is not cost-effective for retailers.
- C. is an anti-consumerist attitude.
- D. has created environmental problems.

11. The central idea of the passage would be undermined if:

- A. second-hand stores sold only high-quality clothes.
- B. clothes were not thrown and burnt in landfills.
- C. Primark and Boohoo recycled their clothes for vintage stores.
- D. customers bought all their clothes online.

12. According to the author, companies like ThredUP have not caught on in the UK for all of the following reasons EXCEPT that:

- A. luxury brands want to maintain their brand image.
- B. the British don't buy second-hand clothing.
- C. recycling is currently not financially attractive for luxury brands.
- D. luxury brands do not like their product to be devalued.

DIRECTIONS for questions 13 - 16: The passage below is accompanied by a set of questions. Choose the best answer to each question.

Umberto Eco, an Italian writer, was right when he said the language of Europe is translation. Netflix and other deep-pocketed global firms speak it well. Just as the EU employs a small army of translators and interpreters to turn intricate laws or impassioned speeches of Romanian MEPs into the EU's 24 official languages, so do the likes of Netflix. It now offers dubbing in 34 languages and subtitling in a few more. . . .

The economics of European productions are more appealing, too. American audiences are more willing than before to give dubbed or subtitled viewing a chance. This means shows such as “Lupin”, a French crime caper on Netflix, can become global hits. In 2015, about 75% of Netflix's original content was American; now the figure is half, according to Ampere, a media-analysis company. Netflix has about 100 productions under way in Europe, which is more than big public broadcasters in France or Germany. . . .

Not everything works across borders. Comedy sometimes struggles. Whodunits and bloodthirsty maelstroms between arch Romans and uppity tribesmen have a more universal appeal. Some do it better than others. Barbarians aside, German television is not always built for export, says one executive, being polite. A bigger problem is that national broadcasters still dominate. Streaming services, such as Netflix or Disney+, account for about a third of all viewing hours, even in markets where they are well-established. Europe is an ageing continent. The generation of teens staring at phones is outnumbered by their elders who prefer to gawp at the box.

In Brussels and national capitals, the prospect of Netflix as a cultural hegemon is seen as a threat. “Cultural sovereignty” is the watchword of European executives worried that the Americans will eat their lunch. To be fair, Netflix content

sometimes seems stuck in an uncanny valley somewhere in the mid-Atlantic, with local quirks stripped out. Netflix originals tend to have fewer specific cultural references than shows produced by domestic rivals, according to Enders, a market analyst. The company used to have an imperial model of commissioning, with executives in Los Angeles cooking up ideas French people might like. Now Netflix has offices across Europe. But ultimately the big decisions rest with American executives. This makes European politicians nervous.

They should not be. An irony of European integration is that it is often American companies that facilitate it. Google Translate makes European newspapers comprehensible, even if a little clunky, for the continent's non-polyglots. American social-media companies make it easier for Europeans to talk politics across borders. (That they do not always like to hear what they say about each other is another matter.) Now Netflix and friends pump the same content into homes across a continent, making culture a cross-border endeavour, too. If Europeans are to share a currency, bail each other out in times of financial need and share vaccines in a pandemic, then they need to have something in common—even if it is just bingeing on the same series. Watching fictitious northern and southern Europeans tear each other apart 2,000 years ago beats doing so in reality.

13. The author sees the rise of Netflix in Europe as:

- A. a looming cultural threat.
- B. a unifying force.
- C. filling an entertainment gap.
- D. an economic threat.

14. Which one of the following research findings would weaken the author's conclusion in the final paragraph?

- A. Research shows there is a wide variance in the popularity and viewing of Netflix shows across different EU countries.
- B. Research shows that Netflix has been gradually losing market share to other streaming television service providers.
- C. Research shows that Netflix hits produced in France are very popular with North American audiences.
- D. Research shows that older women across the EU enjoy watching romantic comedies on Netflix, whereas younger women prefer historical fiction dramas.

15. Based on information provided in the passage, all of the following are true, EXCEPT:

- A. European television productions have the potential to become global hits.
- B. national broadcasters dominate in the EU in terms of total television viewing hours.
- C. only half of Netflix's original programming in the EU is now produced in America.
- D. Netflix has been able to transform itself into a truly European entity.

16. Based only on information provided in the passage, which one of the following hypothetical Netflix shows would be most successful with audiences across the EU?

- A. An Italian comedy show hosted by an international star.
- B. An original German TV science fiction production.
- C. A murder mystery drama set in North Africa and France.

D. A trans-Atlantic romantic drama set in Europe and America.

17. DIRECTIONS for the question: There is a sentence missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: Dualism was long held as the defining feature of developing countries in contrast to developed countries, where frontier technologies and high productivity were assumed to prevail.

Paragraph: ____ (1) ____ . At the core of development economics lies the idea of 'productive dualism': that poor countries' economies are split between a narrow 'modern' sector that uses advanced technologies and a larger 'traditional' sector characterized by very low productivity. ____ (2) ____ . While this distinction between developing and advanced economies may have made some sense in the 1950s and 1960s, it no longer appears to be very relevant. A combination of forces have produced a widening gap between the winners and those left behind. ____ (3) ____ . Convergence between poor and rich parts of the economy was arrested and regional disparities widened. ____ (4) ____ . As a result, policymakers in advanced economies are now grappling with the same questions that have long preoccupied developing economies: mainly how to close the gap with the more advanced parts of the economy.

A. Option 1 B. Option 2 C. Option 3 D. Option 4

18. DIRECTIONS for the question: There is a sentence missing in the paragraph below. Look at the paragraph and decide in which blank (option 1, 2, 3, or 4) the following sentence would best fit.

Sentence: And probably much earlier, moving the documentation for kissing back 1,000 years compared to what was acknowledged in the scientific community.

Paragraph: Research has hypothesised that the earliest evidence of human lip kissing originated in a very specific geographical location in South Asia 3,500 years ago. ____ (1) ____ . From there it may have spread to other regions, simultaneously accelerating the spread of the herpes simplex virus 1. According to Dr Troels Pank Arbøll and Dr Sophie Lund Rasmussen, who in a new article in the journal Science draw on a range of written sources from the earliest Mesopotamian societies, kissing was already a well-established practice 4,500 years ago in the Middle East. ____ (2) ____ . In ancient Mesopotamia, people wrote in cuneiform script on clay tablets. ____ (3) ____ . Many thousands of these clay tablets have survived to this day, and they contain clear examples that kissing was considered a part of romantic intimacy in ancient times. ____ (4) ____ . "Kissing could also have been part of friendships and family members' relations," says Dr Troels Pank Arbøll, an expert on the history of medicine in Mesopotamia.

A. Option 1 B. Option 2 C. Option 3 D. Option 4

19. DIRECTIONS for the question: Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. The banning of Northern Lights could be considered a precursor to censoring books for "moral", world view or religious reasons.

2. Attempts to ban books are attempts to silence authors who have summoned immense courage in telling their stories.
3. Now the banning and challenging of books in the US has escalated to an unprecedented level.
4. The widely acclaimed fantasy novel Northern Lights was banned in some parts of the US, and was the second most challenged book in the US.
5. The American Library Association documented an unparalleled number of reported book challenges in 2022, about 2,500 unique titles.

20. DIRECTIONS for the question: Five jumbled up sentences (labelled 1, 2, 3, 4 and 5), related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd sentence and key in the number of that sentence as your answer.

1. Self-care particularly links to loneliness, behavioural problems, and negative academic outcomes.
2. "Latchkey children" refers to children who routinely return home from school to empty homes and take care of themselves for extended periods of time.
3. Although self-care generally points to negative outcomes, it is important to consider that the bulk of research has yet to track long-term consequences.
4. In research and practice, the phrase "children in self-care" has come to replace latchkey in an effort to more accurately reflect the nature of their circumstances.
5. Although parents might believe that self-care would be beneficial for development, recent research has found quite the opposite.

21. DIRECTIONS for the question: The four sentences (labelled 1,2,3 and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of four numbers as your answer.

1. Like the ants that make up a colony, no single neuron holds complex information like self-awareness, hope or pride.
2. Although the human brain is not yet understood enough to identify the mechanism by which emergence functions, most neurobiologists agree that complex interconnections among the parts give rise to qualities that belong only to the whole.
3. Nonetheless, the sum of all neurons in the nervous system generate complex human emotions like fear and joy, none of which can be attributed to a single neuron.
4. Human consciousness is often called an emergent property of the human brain.

22. DIRECTIONS for the question: The four sentences (labelled 1,2,3 and 4) given in this question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentence and key in this sequence of four numbers as your answer.

1. Contemporary African writing like 'The Bottled Leopard' voices this theme using two children and two backgrounds to juxtapose two varying cultures.
2. Chukwuemeka Ike explores the conflict, and casts the Western tradition as condescending, enveloping and unaccommodating towards local African practice.
3. However, their views contradict the reality, for a rich and sustaining local African cultural ethos exists for all who care, to see and experience.
4. Western Christian concepts tend to deny or feign ignorance about the existence of a genuine and enduring indigenous African tradition.

23. DIRECTIONS for the question: The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Heat waves are becoming longer, frequent and intense due to climate change. The impacts of extreme heat are unevenly experienced; with older people and young children, those with pre-existing medical conditions and on low incomes significantly more vulnerable. Adaptation to heatwaves is a significant public policy concern. Research conducted among at-risk people in the UK reveals that even vulnerable people do not perceive themselves as at risk of extreme heat; therefore, early warnings of extreme heat events do not perform as intended. This suggests that understanding how extreme heat is narrated is very important. The news media play a central role in this process and can help warn people about the potential danger, as well as about impacts on infrastructure and society.

- A. Heatwaves pose an enormous risk; the media plays a pivotal role in alerting people to this danger.
- B. Protection from heat waves is important but current reports and public policies seem ineffective.
- C. People are vulnerable to heatwaves caused due to climate change, measures taken are ineffective.
- D. News stories help in warning about heatwaves, but they have to become more effective.

24. DIRECTIONS for the question: The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

People spontaneously create counterfactual alternatives to reality when they think “if only” or “what if” and imagine how the past could have been different. The mind computes counterfactuals for many reasons. Counterfactuals explain the past and prepare for the future, they implicate various relations including causal ones, and they affect intentions and decisions. They modulate emotions such as regret and relief, and they support moral judgments such as blame. The ability to create counterfactuals develops throughout childhood and contributes to reasoning about other people's beliefs, including their false beliefs.

- A. People create counterfactual alternatives to reality for various reasons, including reasoning about other people's beliefs.
- B. Counterfactual thinking helps to reverse past and future actions and reason out false beliefs.
- C. Counterfactual alternatives to reality are created for a variety of reasons and is part of one's developmental process.
- D. Counterfactuals help people to prepare for the future by understanding intentions and making decisions.

CAT 2023 Slot - 2 DILR

DIRECTIONS for questions 1 - 5: Read the information given below and answer the question that follows.

Odsville has five firms – Alfloo, Bzygoo, Czechy, Drjbna and Elavalaki. Each of these firms was founded in some year and also closed down a few years later.

Each firm raised Rs. 1 crore in its first and last year of existence. The amount each firm raised every year increased until it reached a maximum, and then decreased until the firm closed down. No firm raised the same amount of money in two consecutive years. Each annual increase and decrease was either by Rs. 1 crore or by Rs. 2 crores.

The table below provides partial information about the five firms.

Firm	First year of existence	Last year of existence	Total amount raised (Rs. Crores)
Alfloo	2009	2016	21
Bzygoo	2012	2015	
Czechy	2013		9
Drjbna	2011	2015	10
Elavalaki	2010		13

1. For which firm(s) can the amounts raised by them be concluded with certainty in each year?

- A. Only Drjbna
- B. Only Czechy
- C. Only Czechy and Drjbna
- D. Only Bzygoo and Czechy and Drjbna

2. What best can be concluded about the total amount of money raised in 2015?

- A. It is either Rs. 8 crores or Rs. 9 crores.
- B. It is exactly Rs. 8 crores.
- C. It is either Rs. 7 crores or Rs. 8 crores or Rs. 9 crores.
- D. It is either Rs. 7 crores or Rs. 8 crores.

3. What is the largest possible total amount of money (in Rs. crores) that could have been raised in 2013?

4. If Elavalaki raised Rs. 3 crores in 2013, then what is the smallest possible total amount of money (in Rs. crores) that could have been raised by all the companies in 2012?

- A. 11
- B. 9
- C. 12
- D. 10

5. If the total amount of money raised in 2014 is Rs. 12 crores, then which of the following is not possible?

- A. Alfloo raised the same amount of money as Bzygoo in 2014.
- B. Bzygoo raised more money than Elavalaki in 2014.
- C. Alfloo raised the same amount of money as Drjbna in 2013.
- D. Bzygoo raised the same amount of money as Elavalaki in 2013.



DIRECTIONS for questions 6 - 10: Read the information given below and answer the question that follows.

Three participants – Akhil, Bimal and Chatur participate in a random draw competition for five days. Every day, each participant randomly picks up a ball numbered between 1 and 9. The number on the ball determines his score on that day. The total score of a participant is the sum of his scores attained in the five days. The total score of a day is the sum of participants' scores on that day. The 2-day average on a day, except on Day 1, is the average of the total scores of that day and of the previous day. For example, if the total scores of Day 1 and Day 2 are 25 and 20, then the 2-day average on Day 2 is calculated as 22.5. Table 1 gives the 2-day averages for Days 2 through 5.

Table 1: 2-day averages for Days 2 through 5			
Day 2	Day 3	Day 4	Day 5
15	15.5	16	17

Participants are ranked each day, with the person having the maximum score being awarded the minimum rank (1) on that day. If there is a tie, all participants with the tied score are awarded the best available rank. For example, if on a day Akhil, Bimal, and Chatur score 8, 7 and 7 respectively, then their ranks will be 1, 2 and 2 respectively on that day. These ranks are given in Table 2.

Table 2: Ranks of participants on each day					
	Day 1	Day 2	Day 3	Day 4	Day 5
Akhil	1	2	2	3	3
Bimal	2	3	2	1	1
Chatur	3	1	1	2	2

The following information is also known.

- Chatur always scores in multiples of 3. His score on Day 2 is the unique highest score in the competition. His minimum score is observed only on Day 1, and it matches Akhil's score on Day 4.
- The total score on Day 3 is the same as the total score on Day 4.
- Bimal's scores are the same on Day 1 and Day 3.

6. What is Akhil's score on Day 1?

- A. 7 B. 5 C. 6 D. 8

7. Who attains the maximum total score?

- A. Akhil B. Cannot be determined C. Bimal D. Chatur

8. What is the minimum possible total score of Bimal?

9. If the total score of Bimal is a multiple of 3, what is the score of Akhil on Day 2?

- A. 5 B. 4 C. Cannot be determined D. 6

10. If Akhil attains a total score of 24, then what is the total score of Bimal?

DIRECTIONS for questions 11 - 15: Read the information given below and answer the question that follows.

There are nine boxes arranged in a 3×3 array as shown in Tables 1 and 2. Each box contains three sacks. Each sack has a certain number of coins, between 1 and 9, both inclusive.

The average number of coins per sack in the boxes are all distinct integers. The total number of coins in each row is the same. The total number of coins in each column is also the same.

Table 1

	1 st column n	2 nd column n	3 rd column n
1 st row		9	6
2 nd row	2		
3 rd row	8		

Table 2

	1 st column n	2 nd column n	3 rd column n
1 st row	1**	2*	2*
2 nd row	1**	0*	3*
3 rd row	3*	2**	0**

Table 1 gives information regarding the median of the numbers of coins in the three sacks in a box for some of the boxes. In Table 2 each box has a number which represents the number of sacks in that box having more than 5 coins. That number is followed by a * if the sacks in that box satisfy exactly one among the following three conditions, and it is followed by ** if two or more of these conditions are satisfied.

- The minimum among the numbers of coins in the three sacks in the box is 1.
 - The median of the numbers of coins in the three sacks is 1.
 - The maximum among the numbers of coins in the three sacks in the box is 9.
- What is the total number of coins in all the boxes in the 3rd row?
A. 15 B. 45 C. 36 D. 30
 - How many boxes have at least one sack containing 9 coins?
A. 3 B. 8 C. 4 D. 5
 - For how many boxes are the average and median of the numbers of coins contained in the three sacks in that box the same?
 - How many sacks have exactly one coin?
 - In how many boxes do all three sacks contain different numbers of coins?

DIRECTIONS for questions 16 - 20: Read the information given below and answer the question that follows.

Anjali, Bipasha, and Chitra visited an entertainment park that has four rides. Each ride lasts one hour and can accommodate one visitor at one point. All rides begin at 9 am and must be completed by 5 pm except for Ride-3, for which the last ride has to be completed by 1 pm.

Ride gates open every 30 minutes, e.g. 10 am, 10:30 am, and so on. Whenever a ride gate opens, and there is no visitor inside, the first visitor waiting in the queue buys the ticket just before taking the ride. The ticket prices are Rs. 20, Rs. 50, Rs. 30 and Rs. 40 for Rides 1 to 4, respectively. Each of the three visitors took at least

one ride and did not necessarily take all rides. None of them took the same ride more than once. The movement time from one ride to another is negligible, and a visitor leaves the ride immediately after the completion of the ride. No one takes a break inside the park unless mentioned explicitly.

The following information is also known.

1. Chitra never waited in the queue and completed her visit by 11 am after spending Rs. 50 to pay for the ticket(s).
2. Anjali took Ride-1 at 11 am after waiting for 30 mins for Chitra to complete it. It was the only ride where Anjali waited.
3. Bipasha began her first of three rides at 11:30 am. All three visitors incurred the same amount of ticket expense by 12:15 pm.
4. The last ride taken by Anjali and Bipasha was the same, where Bipasha waited 30 mins for Anjali to complete her ride. Before standing in the queue for that ride, Bipasha took a 1-hour coffee break after completing her previous ride.

16. What was the total amount spent on tickets (in Rs.) by Bipasha?

- A. 100 B. 120 C. 110 D. 90

17. Which were all the rides that Anjali completed by 2:00 pm?

- A. Ride-1 and Ride-4
 B. Ride-1, Ride-2, and Ride-4
 C. Ride-1, Ride-2, and Ride-3
 D. Ride-1 and Ride-3

18. Which ride was taken by all three visitors?

- A. Ride-4 B. Ride-2 C. Ride-3 D. Ride-1

19. How many rides did Anjali and Chitra take in total?

20. What was the total amount spent on tickets (in Rs.) by Anjali?

CAT 2023 Slot - 2 Quant

DIRECTIONS for the question: Solve the following question and mark the best possible option.

- Any non-zero real numbers x, y such that $y \neq 3$ and $\frac{x}{y} < \frac{x+3}{y-3}$, will satisfy the condition:
 - $\frac{x}{y} < \frac{y}{x}$
 - If $y > 10$, then $-x > y$
 - If $y < 0$, then $-x < y$
 - If $x < 0$, then $-x < y$
- For any natural numbers m, n , and k , such that k divides both $m + 2n$ and $3m + 4n$, k must be a common divisor of
 - $2m$ and $3n$
 - $2m$ and n
 - m and n
 - m and $2n$
- The sum of all possible values of x satisfying the equation $2^{4x^2} - 2^{2x^2+x+16} + 2^{2x+30} = 0$, is
 - $3/2$
 - $5/2$
 - $1/2$
 - 3
- Let a, b, m and n be natural numbers such that $a > 1$ and $b > 1$. If $a^m b^n = 144^{145}$, then the largest possible value of $n - m$ is
 - 289
 - 580
 - 579
 - 290
- Let k be the largest integer such that the equation $(x - 1)^2 + 2kx + 11 = 0$ has no real roots. If y is a positive real number, then the least possible value of $\frac{k}{4y} + 9y$ is
- The number of positive integers less than 50, having exactly two distinct factors other than 1 and itself, is
- For some positive real number x , if $\log_{\sqrt{3}}(x) + \frac{\log_x(25)}{\log_x(0.008)} = \frac{16}{3}$, then the value of $\log_3(3x^2)$ is
- Pipes A and C are fill pipes while Pipe B is a drain pipe of a tank. Pipe B empties the full tank in one hour less than the time taken by Pipe A to fill the empty tank. When pipes A, B and C are turned on together, the empty tank is filled in two hours. If pipes B and C are turned on together when the tank is empty and Pipe B is turned off after one hour, then Pipe C takes another one hour and 15 minutes to fill the remaining tank. If Pipe A can fill the empty tank in less than five hours, then the time taken, in minutes, by Pipe C to fill the empty tank is
 - 60
 - 75
 - 120
 - 90
- Minu purchases a pair of sunglasses at Rs.1000 and sells to Kanu at 20% profit. Then, Kanu sells it back to Minu at 20% loss. Finally, Minu sells the same pair of sunglasses to Tanu. If the total profit made by Minu from all her transactions is Rs. 500, then the percentage of profit made by Minu when she sold the pair of sunglasses to Tanu is

- A. 31.25% B. 26% C. 52% D. 35.42%

10. In a company, 20% of the employees work in the manufacturing department. If the total salary obtained by all the manufacturing employees is one-sixth of the total salary obtained by all the employees in the company, then the ratio of the average salary obtained by the manufacturing employees to the average salary obtained by the non-manufacturing employees is

- A. 5: 4 B. 4: 5 C. 5: 6 D. 6: 5

11. Ravi is driving at a speed of 40 km/h on a road. Vijay is 54 meters behind Ravi and driving in the same direction as Ravi. Ashok is driving along the same road from the opposite direction at a speed of 50 km/h and is 225 meters away from Ravi. The speed, in km/h, at which Vijay should drive so that all the three cross each other at the same time, is

- A. 61.6 B. 64.4 C. 67.2 D. 58.8

12. The price of a precious stone is directly proportional to the square of its weight. Sita has a precious stone weighing 18 units. If she breaks it into four pieces with each piece having distinct integer weight, then the difference between the highest and lowest possible values of the total price of the four pieces will be 288000. Then, the price of the original precious stone is

- A. 972000 B. 1296000 C. 1620000 D. 1944000

13. Anil borrows Rs 2 lakhs at an interest rate of 8% per annum, compounded half-yearly. He repays Rs 10320 at the end of the first year and closes the loan by paying the outstanding amount at the end of the third year. Then, the total interest, in rupees, paid over the three years is nearest to

- A. 33130 B. 45311 C. 51311 D. 40991

14. Jayant bought a certain number of white shirts at the rate of Rs 1000 per piece and a certain number of blue shirts at the rate of Rs 1125 per piece. For each shirt, he then set a fixed market price which was 25% higher than the average cost of all the shirts. He sold all the shirts at a discount of 10% and made a total profit of Rs 51000. If he bought both colors of shirts, then the maximum possible total number of shirts that he could have bought is

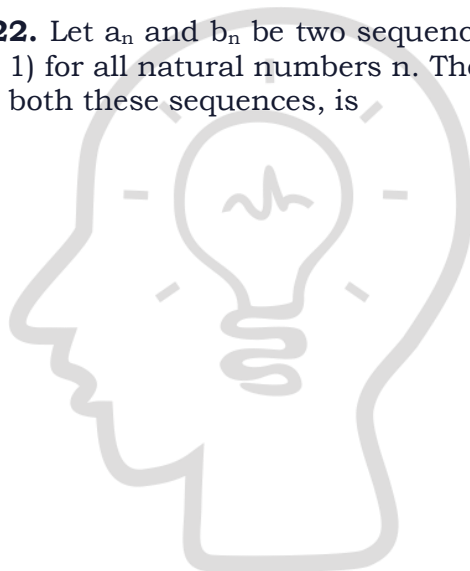
15. If certain amount of money is divided equally among n person, each one receives Rs 352. However, if two persons receive Rs 506 each and the remaining amount is divided equally among the other persons, each of them received less than or equal to Rs 330. Then, the maximum possible value of n is

16. A container has 40 liters of milk. Then, 4 liters are removed from the container and replaced with 4 liters of water. This process of replacing 4 liters of the liquid in the container with an equal volume of water is continued repeatedly. The smallest number of times of doing this process, after which the volume of milk in the container becomes less than that of water, is

17. A triangle is drawn with its vertices on the circle C such that one of its sides is a diameter of C and the other two sides have their lengths in the ratio $a: b$. If the radius of the circle is r , then the area of the triangle is

- A. $\frac{abr^2}{a^2+b^2}$ B. $\frac{abr^2}{2(a^2+b^2)}$ C. $\frac{2abr^2}{a^2+b^2}$ D. $\frac{4abr^2}{a^2+b^2}$

- 18.** In a rectangle ABCD, $AB = 9$ cm and $BC = 6$ cm. P and Q are two points on BC such that the areas of the figures ABP, APQ, and AQCD are in geometric progression. If the area of the figure AQCD is four times the area of triangle ABP, then BP: PQ: QC is
 A. 1: 1: 2 B. 2: 4: 1 C. 1: 2: 1 D. 1: 2: 4
- 19.** The area of the quadrilateral bounded by the Y-axis, the line $x = 5$, and the lines $|x - y| - |x - 5| = 2$, is
- 20.** Let both the series $a_1, a_2, a_3, \dots$ and $b_1, b_2, b_3, \dots$ be in arithmetic progression such that the common differences of both the series are prime numbers. If $a_5 = b_9$, $a_{19} = b_{19}$ and $b_2 = 0$, then a_{11} equals
 A. 79 B. 84 C. 83 D. 86
- 21.** If $p^2 + q^2 - 29 = 2pq - 20 = 52 - 2pq$, then the difference between the maximum and minimum possible value of $(p^3 - q^3)$ is
 A. 486 B. 378 C. 189 D. 243
- 22.** Let a_n and b_n be two sequences such that $a_n = 13 + 6(n - 1)$ and $b_n = 15 + 7(n - 1)$ for all natural numbers n. Then, the largest three-digit integer that is common to both these sequences, is



QUANTIFIERS
 CAT
 ACADEMY

Solutions

VARC

1. Correct Answer: B

The question tests the ability to identify the specific role assigned to archaeology in the passage. Here, the author distinguishes between the historian's primary task of interpretation and the supporting role played by "auxiliary sciences" such as archaeology.

The correct answer is **B) Archaeology helps historians to ascertain factual accuracy.**

The author explains that historians must ensure the correctness of basic factual details such as dates, locations, and events. To establish these facts accurately, historians rely on "auxiliary sciences" like archaeology, epigraphy, chronology, and numismatics. The passage clearly states that these sciences assist historians in verifying foundational facts. Thus, archaeology's significance lies in helping historians ascertain factual accuracy.

The comparison used by the author is important here: praising a historian merely for factual accuracy is like praising an architect for using properly mixed concrete. Accuracy is necessary, but it is not the historian's main intellectual contribution. This reinforces the idea that archaeology provides technical support in establishing facts.

Now let us examine why the other options are incorrect:

Option A) Archaeology helps historians to interpret historical facts.

This is incorrect because the passage does not assign archaeology the role of interpretation. Interpretation is presented as the historian's central function, whereas archaeology is categorized as an "auxiliary science" that helps establish factual correctness.

Option C) Archaeology helps historians to carry out their primary duty.

This is a partially true but inaccurate option. The passage specifically says that establishing factual accuracy is only a "necessary condition" and not the historian's "essential function" or primary duty. Therefore, archaeology supports the groundwork of history, not its primary intellectual task.

Option D) Archaeology helps historians to locate the oldest civilisations in history.

This option introduces information not mentioned in the passage. The discussion is not about discovering ancient civilizations but about verifying historical facts and supporting historical accuracy.

Hence, **Option B** is the most precise and well-supported answer based on the passage.

2. Correct Answer: B

This is an EXCEPT question, which means we must identify the option that does **not** weaken the author's claim. The central argument of the passage is that facts do not independently "speak for themselves"; rather, historians select, arrange, and interpret facts, thereby shaping meaning.

The correct answer is **B) facts, like truth, can be relative: what is fact for person X may not be so for person Y.**

This option actually supports the author's position instead of weakening it. The passage argues that facts gain significance through interpretation and selection by historians. If facts themselves can vary according to perspective, as Option B

suggests, then this further strengthens the idea that facts are not entirely objective or self-explanatory. Therefore, this option does not weaken the claim and is correctly the answer to this EXCEPT question.

Now let us examine why the other options weaken the author's argument:

Option A) the truth value of a fact is independent of the historian who expresses it.

This weakens the passage because the author claims historians influence meaning through selection and interpretation. If the truth of a fact remains completely independent of the historian, then facts possess objective authority on their own, contradicting the author's stance.

Option C) a fact, by its very nature, is objective and universal, irrespective of the context in which it is placed.

This directly challenges the passage. The author argues that context and arrangement matter greatly because facts "speak only when the historian calls on them." If facts remain objective regardless of context, then interpretation becomes less important, weakening the passage's core argument.

Option D) the order in which a series of facts is presented does not have any bearing on the production of meaning.

The passage explicitly emphasizes that historians decide "in what order or context" facts are presented. If order has no effect on meaning, then the historian's role in shaping interpretation becomes insignificant. Hence, this option also weakens the author's claim.

Therefore, **Option B** is the only choice that does not weaken the passage and instead aligns with its central idea.

3. Correct Answer: C

This question tests whether we understand the author's larger view of history and the historian's role. Throughout the passage, the author argues against the simplistic belief that history is merely a collection of objective facts. Instead, the historian's real task is interpretation — selecting facts and explaining their significance within a broader context.

The correct answer is **C) exploring the socio-political and economic factors that led to the Battle.**

The author repeatedly emphasizes that merely establishing dates, places, and factual details is not the historian's "essential function." Those factual foundations can be handled with the help of "auxiliary sciences" such as archaeology and chronology. What truly matters is interpretation — understanding why events happened, what forces shaped them, and how historians give meaning to facts through analysis and context.

Therefore, if the author were writing about the Battle of Hastings, the focus would not simply be on listing facts about the battle, but on examining the larger socio-political and economic circumstances surrounding it. This approach reflects the interpretive and analytical nature of history that the author advocates.

Now let us examine the other options:

Option A) providing a nuanced interpretation by relying on the auxiliary sciences.

This option is partly attractive because it mentions "interpretation." However, the passage clearly states that auxiliary sciences are mainly used for verifying factual accuracy, not for providing interpretation. The historian's main contribution lies beyond these technical aids. Hence, this option misrepresents the role of auxiliary sciences.

Option B) producing a detailed timeline of the various events that led to the Battle.

A timeline focuses mainly on chronology and sequencing of facts. While such information may be useful, the author argues that history is not merely about compiling factual details. The emphasis should be on interpretation and significance, not just documentation of events.

Option D) deriving historical facts from the relevant documents and inscriptions.

This option reflects the “positivist” or common-sense view criticized in the passage — the idea that history consists primarily of collecting facts from documents and inscriptions. The author explicitly challenges this narrow understanding of history. Thus, **Option C** best captures the author’s conception of what meaningful historical writing should involve.

4. Correct Answer: C

This question asks us to identify the statement that does **not** describe the “common-sense view” of history discussed in the passage. In other words, we need the option that is inconsistent with or contrary to that view.

The passage explains that the “common-sense view” treats history as an objective collection of facts, much like science. According to this perspective, historians first establish facts from documents and records and then derive conclusions from them. The author, however, criticizes this approach for ignoring the role of interpretation and selection in history.

The correct answer is **C) history is like science: a selective system of cognitive orientations to reality.**

This statement does not represent the “common-sense view”; rather, it reflects the author’s own nuanced understanding of history. The phrase comes from the discussion of Talcott Parsons’ definition of science as “a selective system of cognitive orientations to reality.” The author uses this idea to emphasize that historians actively select and organize facts. This directly opposes the common-sense belief that facts exist independently and objectively.

Now let us examine the remaining options:

Option A) history can be objective like the sciences if it is derived from historical facts.

This accurately reflects the common-sense or positivist view described in the opening paragraph. The positivists believed history could achieve scientific objectivity through factual accuracy.

Option B) real history can be found in ancient engravings and archival documents.

The passage explicitly mentions that facts are available to historians in “documents, inscriptions, and so on.” This aligns closely with the common-sense belief that history is fundamentally based on recorded facts preserved in sources.

Option D) only the positivist methods can lead to credible historical knowledge.

While the passage may not state this in exactly these words, it is consistent with the positivist approach described. The common-sense view places heavy emphasis on factual verification and scientific methods as the basis of reliable history.

Therefore, **Option C** is the only statement that does not describe the “common-sense view” and instead represents the author’s critique of it.

5. Correct Answer: C

This question asks us to identify the option that is **not** presented as a criticism of Deneen's conclusions by the author of the passage. In other words, we need the statement that the author does **not** fault Deneen for.

The correct answer is **C) its repeated harking back to premodern notions of liberty.**

In fact, the author explicitly agrees with Deneen on this point. The final paragraph states that "Mr Deneen is right to assert that the world has much to learn from the premodern notions of liberty as self-mastery and self-denial." Since the author endorses this aspect of Deneen's argument, it cannot be considered a criticism. Hence, Option C is the correct answer.

Now let us examine why the other options are valid criticisms made by the author:

Option A) its failure to note historical instances in which the process of declining liberalism has managed to reverse itself.

This is clearly one of the author's objections. The passage argues that Deneen ignores liberalism's historical ability to reform itself. The author cites examples from late nineteenth-century America, where liberal systems successfully addressed issues like corruption, monopolies, and inequality through internal reforms.

Option B) its extreme pessimism about the future of liberalism today and predictions of an ultimate decline.

The author believes Deneen exaggerates liberalism's collapse. Although the author acknowledges current problems within liberalism, he does not accept that liberalism is doomed. Instead, he sees Deneen's book as a "call to action" rather than a "funeral oration." This shows disagreement with Deneen's pessimistic conclusions.

Option D) its very narrow definition of liberalism limited to individual freedoms.

The passage directly criticizes Deneen for reducing liberalism merely to the idea of freeing individuals from constraints. The author argues that liberalism actually contains many intellectual traditions balancing rights, responsibilities, individual freedom, and social ties.

Therefore, **Option C** is the only option that the author does not use to fault Deneen's conclusions.

6. Correct Answer: D

This question tests the ability to infer the author's purpose behind a specific example used in the passage. The reference to the "Davos elite" is meant to highlight a contradiction between what certain wealthy liberal groups claim to believe and how they actually behave.

The correct answer is **D) the hypocrisy of the liberal rich, who profess to subscribe to liberal values while cornering most of the wealth.**

The passage sarcastically refers to "1,000 private planes whisking their occupants to Davos to discuss the question of 'creating a shared future in a fragmented world.'" This image is deliberately ironic. The author is criticizing wealthy global elites who publicly advocate ideals such as equality, collective welfare, and social responsibility while simultaneously enjoying enormous privilege and accumulating wealth. The example is meant to expose this hypocrisy within contemporary liberalism.

The final paragraph strengthens this interpretation by stating that "members of the Davos elite pile their plates ever higher with perks and share options." This clearly suggests greed and self-interest hidden beneath liberal rhetoric.

Now let us examine why the other options are less suitable:

Option A) the unlikelihood of a return to the liberalism of the past as long as the rich continue to benefit from the decline in liberal values.

This idea goes beyond what the passage states. The author criticizes present-day liberal elites but does not specifically discuss the impossibility of returning to an earlier form of liberalism.

Option B) the way the debate around liberalism has been captured by the rich who have managed to insulate themselves from economic hardships.

While the passage does show that elites are disconnected from ordinary people's struggles, the focus is not on their control of the debate itself. The central emphasis is their hypocrisy and greed rather than intellectual domination of the discourse.

Option C) the fact that the rise in liberalism had led to a greater interest in shared futures from unlikely social classes.

This option completely misreads the tone of the passage. The reference to Davos is ironic and critical, not appreciative or optimistic. The author is not praising elite concern for "shared futures."

Therefore, **Option D** most accurately captures the author's intention behind mentioning the "Davos elite."

7. Correct Answer: A

This is an EXCEPT question, so we must identify the option that is **not** presented in the passage as evidence of the decline of liberalism.

The passage discusses several symptoms of liberalism's current crisis, such as inequality, political absurdity, disillusionment among citizens, and the concentration of power in elite groups. However, not every negative development mentioned is directly tied to the decline of liberalism itself.

The correct answer is **A) "And technological advances are reducing ever more areas of work into meaningless drudgery."**

Although this statement appears in the passage, it is not presented as direct evidence of the decline of liberalism. Instead, it refers to the dehumanizing effects

of technological progress on work. This is more of a broader social and economic problem associated with modernity and technological advancement, rather than a direct indicator of liberalism's collapse. Hence, this is the exception.

Now let us examine why the other options are clearly linked to the decline of liberalism in the passage:

Option B) "The gap between liberalism's claims about itself and the lived reality of the

citizenry' is now so wide that 'the lie can no longer be accepted.'"

This statement directly expresses public disillusionment with liberalism. The passage presents it as evidence that liberalism has failed to fulfill its promises, making it a central indicator of decline.

Option C) "Democracy has degenerated into a theatre of the absurd."

The degeneration of democracy is explicitly cited as a symptom of liberalism's deterioration. The phrase reflects the author's criticism of how political systems under liberalism have become ineffective and absurd.

Option D) "... the creation of a business aristocracy, the rise of vast companies"

The passage uses these developments to describe growing inequality and concentration of power, problems associated with liberalism's failures. These are clearly presented as evidence of systemic decline.

Therefore, **Option A** is the only statement that does not directly function as evidence of the decline of liberalism in the context of the passage.

8. Correct Answer: D

This is an EXCEPT question. We need to identify the statement that the author would most likely **agree with**, while disagreeing with the others.

The passage argues that although liberalism currently faces serious problems, declaring its death is premature. The author believes liberalism has historically shown the ability to reform itself and adapt to changing circumstances.

The correct answer is **D) liberalism was the dominant ideal in the past century, but it had to reform itself to remain so.**

This statement closely matches the author's position. The passage explicitly mentions that liberalism survived earlier crises by reforming itself. The author cites examples from late nineteenth-century America, where liberal societies responded to corruption, monopolies, and inequality through reforms led by Theodore Roosevelt, Progressives, and university reformers. The idea that liberalism maintains its dominance through self-correction is central to the author's argument.

Now let us examine why the author would disagree with the other options:

Option A) the essence of liberalism lies in greater individual self-expression and freedoms.

The author directly criticizes Deneen for defining liberalism too narrowly as merely the removal of constraints on individuals. According to the passage, liberalism includes multiple traditions balancing rights, duties, individual freedoms, and social obligations. Hence, the author would disagree with this oversimplified definition.

Option B) claims about liberalism's disintegration are exaggerated and misunderstand its core features.

At first glance, this may seem close to the author's view. However, the passage does acknowledge that liberalism is facing genuine and serious problems. The author

does not dismiss concerns entirely as exaggerations; instead, he argues that liberalism can still reform itself. Thus, this option overstates the author's position.

Option C) if we accept that liberalism is a dying ideal, we must work to find a viable substitute.

The author clearly disagrees with this idea. He rejects Deneen's claim that society needs "liberation from liberalism itself." Instead of abandoning liberalism, the author advocates improving and reforming it from within.

Therefore, **Option D** is the only statement the author is likely to agree with.

9. Correct Answer: D

This question tests the ability to infer meaning from the passage rather than identify a directly stated fact. The author contrasts the harmful effects of fast fashion with more sustainable alternatives, especially in the discussion on second-hand clothing and durable garments.

The correct answer is **D) are of high quality and long lasting.**

The passage explicitly suggests that consumers should buy "high-quality items that shed less and last longer." This recommendation is presented as a way to combat both microfibre pollution and excessive clothing waste ending up in landfills. Since "fast fashion" refers to cheaply made, rapidly consumed, disposable clothing, its opposite — "slow fashion" — would logically involve durable, high-quality clothes designed for long-term use.

The key idea here is sustainability through longevity. Slow fashion reduces waste by encouraging people to buy fewer but better-quality garments.

Now let us examine why the other options are less appropriate:

Option A) do not shed microfibres.

The passage mentions microfibre pollution as one environmental concern associated with older clothes. However, it never suggests that completely eliminating microfibre shedding defines slow fashion. The emphasis is broader — on durability and reduced waste.

Option B) do not bleed toxins and dyes.

The passage discusses toxins and dyes released from discarded clothing in landfills, but this is only one environmental issue linked to fashion waste. Slow fashion is not specifically defined in terms of toxin-free clothing.

Option C) are sold by genuine vintage stores.

The passage talks about vintage and second-hand shopping becoming trendy, but slow fashion is not limited to where clothes are sold. The central idea is sustainability through quality and longevity, not simply purchasing from vintage stores.

Therefore, **Option D** best captures the implied meaning of "slow fashion" based on the passage.

10. Correct Answer: D

This question tests the understanding of irony in the context of the passage. Irony arises when something intended to solve a problem unexpectedly ends up contributing to the same or another problem.

The correct answer is **D) has created environmental problems.**

The passage initially presents thrifting, or buying second-hand clothes, as an environmentally responsible alternative to fast fashion. It reduces waste, promotes reuse, and is often associated with sustainability. However, the author then introduces an ironic twist through the Patagonia study, which states that older clothes shed more microfibres during washing. These microfibres pollute rivers and oceans, contributing to environmental damage.

Thus, an activity promoted as eco-friendly may itself generate environmental problems. This contradiction creates the irony referred to in the question.

Now let us examine why the other options are incorrect:

Option A) offers luxury clothing at cut-rate prices.

While thrifting may sometimes provide cheaper access to luxury or branded clothing, this is not ironic in the context of the passage. The author's focus is on environmental consequences, not pricing advantages.

Option B) is not cost-effective for retailers.

The passage briefly discusses why luxury retailers resist resale markets, but it never suggests that thrifting is ironic because it is financially inefficient for sellers.

Option C) is an anti-consumerist attitude.

Thrifting may indeed appear less consumerist than fast fashion, but the passage does not identify this as ironic. In fact, the criticism is that people may continue consuming excessively even while presenting themselves as environmentally conscious.

Therefore, **Option D** most accurately captures the irony highlighted in the passage: an environmentally conscious practice unintentionally contributing to environmental harm.

11. Correct Answer: A

This question asks us to identify the option that would weaken or undermine the central argument of the passage. The passage primarily discusses the environmental harm caused by fast fashion and examines second-hand shopping as a possible solution — while also acknowledging its limitations.

The correct answer is **A) second-hand stores sold only high-quality clothes.**

The passage presents second-hand shopping as a broad and accessible alternative to fast fashion. However, it also points out a complication: older clothes can shed microfibres and contribute to pollution. To address this, the author recommends buying “high-quality items that shed less and last longer.”

If second-hand stores sold only high-quality clothes, one of the major concerns raised in the passage — namely the environmental damage caused by low-quality older garments shedding microfibres — would largely disappear. In that case, second-hand shopping would become a far more effective and uncomplicated solution, thereby weakening the passage's nuanced argument that even sustainable alternatives have environmental drawbacks.

Now let us examine why the other options do not undermine the central idea as effectively:

Option B) clothes were not thrown and burnt in landfills.

This would certainly reduce environmental damage, but it does not challenge the passage's overall discussion about the fashion industry, consumer behavior, and the complexities of sustainability. It merely removes one harmful consequence.

Option C) Primark and Boohoo recycled their clothes for vintage stores.

This option actually supports the broader sustainability movement discussed in the passage. Recycling and resale would align with the idea of reducing waste rather than undermining the passage's argument.

Option D) customers bought all their clothes online.

The passage criticizes fast fashion and wasteful consumption, not online shopping itself. Buying clothes online does not directly challenge the central discussion about sustainability and environmental impact.

Therefore, **Option A** most effectively undermines the passage's central concern by removing the key criticism associated with second-hand clothing.

12. Correct Answer: B

This is an EXCEPT question. We need to identify the option that is **not** given or implied in the passage as a reason why companies like ThredUP have failed to gain popularity in the UK.

The correct answer is **B) the British don't buy second-hand clothing.**

The passage never claims that British consumers avoid second-hand clothing altogether. In fact, earlier parts of the passage explicitly state that "thrifting" and vintage shopping have become trendy, especially in cities like London. Therefore, this statement contradicts the broader discussion and is not presented as a reason for ThredUP's lack of success in the UK.

Now let us examine why the other options are supported by the passage:

Option A) luxury brands want to maintain their brand image.

The passage strongly implies this. It states that "high-end retailers would rather put brand before sustainability." This suggests that luxury brands are concerned about preserving exclusivity and image, which discourages resale circulation.

Option C) recycling is currently not financially attractive for luxury brands.

The passage mentions that "unless recycling becomes cost-effective and filters into mass production," luxury retailers are unlikely to support it. This clearly indicates that financial unattractiveness is one reason resale models struggle.

Option D) luxury brands do not like their product to be devalued.

The passage notes that luxury brands "would rather not circulate their latest season stock around the globe to be sold at a cheaper price." This directly reflects a fear of devaluation and dilution of exclusivity.

Therefore, **Option B** is the only option not supported by the passage and is thus the correct answer.

13. Correct Answer: B

This question tests the ability to identify the author's overall attitude toward Netflix's growing influence in Europe. While the passage acknowledges certain concerns about cultural dominance, the author's final position is largely positive.

The correct answer is **B) a unifying force.**

The author argues that platforms like Netflix help create shared cultural experiences across European countries. In the concluding paragraph, the author states that Netflix and similar companies "pump the same content into homes across a continent, making culture a cross-border endeavour." The passage further suggests that if Europeans are expected to cooperate politically and economically, they also need common cultural experiences — "even if it is just bingeing on the same series."

Thus, Netflix is ultimately presented as a force promoting cultural integration and unity within Europe.

Now let us examine why the other options are incorrect:

Option A) a looming cultural threat.

This reflects the concerns of some European politicians and executives mentioned in the passage, who fear "cultural hegemony." However, the author explicitly dismisses these fears by saying, "They should not be." Therefore, this is not the author's own view.

Option C) filling an entertainment gap.

The passage does discuss Netflix's expansion and popularity, but the central emphasis is not on entertainment shortages. The author focuses more on cultural integration and shared experiences across borders.

Option D) an economic threat.

Although Netflix competes with domestic broadcasters, the passage does not frame its rise primarily as an economic danger. The discussion centers more on cultural influence and European integration.

Therefore, **Option B** best captures the author's perspective that Netflix acts as a cultural and unifying force across Europe.

14. Correct Answer: A

This question asks us to identify the finding that would weaken the author's conclusion in the final paragraph. The author's main conclusion is that platforms like Netflix help create a shared cultural experience across Europe, thereby strengthening European integration and unity.

The correct answer is **A) Research shows there is a wide variance in the popularity and viewing of Netflix shows across different EU countries.**

If viewers across Europe are actually watching very different content with little overlap in preferences, then Netflix would not be functioning as a strong unifying cultural force. The author's argument depends on the assumption that Europeans are increasingly sharing common cultural experiences through the same shows and streaming platforms. Evidence of major differences in viewing habits across countries would directly weaken that conclusion.

Now let us examine why the other options do not weaken the author's argument as effectively:

Option B) Research shows that Netflix has been gradually losing market share to other streaming television service providers.

This concerns Netflix's business performance rather than the author's larger argument about cross-border cultural integration. Even if Netflix loses some market share, streaming platforms in general could still continue creating shared cultural experiences.

Option C) Research shows that Netflix hits produced in France are very popular with North American audiences.

This actually strengthens the idea that streaming content can cross cultural and national boundaries successfully. It supports, rather than weakens, the notion of cultural integration through media.

Option D) Research shows that older women across the EU enjoy watching romantic comedies on Netflix, whereas younger women prefer historical fiction dramas.

Differences in taste across age groups do not weaken the author's claim about European cultural integration. Shared viewing habits can still exist despite demographic variations in preferences.

Therefore, **Option A** most directly challenges the author's conclusion that Netflix creates a common cultural space across Europe.

15. Correct Answer: D

This is an EXCEPT question, so we need to identify the statement that is **not supported** by the passage.

The correct answer is **D) Netflix has been able to transform itself into a truly European entity.**

The passage clearly suggests the opposite. Although Netflix has expanded significantly across Europe and opened offices in different European countries, the author points out that “ultimately the big decisions rest with American executives.” The passage also mentions that Netflix content can feel culturally “mid-Atlantic,” with local quirks removed. This indicates that Netflix has not fully become a genuinely European organization in terms of identity or control.

Now let us examine why the other options are supported by the passage:

Option A) European television productions have the potential to become global hits.

The passage explicitly mentions examples such as *Lupin*, a French Netflix series that became a global success. This clearly supports the statement.

Option B) national broadcasters dominate in the EU in terms of total television viewing hours.

The passage states that streaming services account for only about one-third of viewing hours, even in well-established markets. This implies that national broadcasters still dominate overall viewing.

Option C) only half of Netflix’s original programming in the EU is now produced in America.

The passage notes that in 2015 around 75% of Netflix’s original content was American, but now the figure has fallen to about half. Therefore, this statement accurately reflects the information given.

Thus, **Option D** is the only statement not supported by the passage and is therefore the correct answer.

16. Correct Answer: C

This question tests the ability to apply the author’s observations about audience preferences across Europe. The passage discusses which types of shows travel well across borders and which struggle to attract international audiences.

The correct answer is **C) A murder mystery drama set in North Africa and France.**

The passage explicitly states that while comedy often struggles across borders, “whodunits and bloodthirsty maelstroms” have a more universal appeal. In addition, the author cites the success of *Lupin*, a French crime drama on Netflix that became a global hit. A murder mystery drama combining international settings like North Africa and France would therefore fit the type of content most likely to appeal widely across European audiences.

Now let us examine why the other options are less suitable:

Option A) An Italian comedy show hosted by an international star.

The passage specifically notes that comedy “sometimes struggles” across borders because humor is often culturally specific. Even an international celebrity may not overcome this limitation.

Option B) An original German TV science fiction production.

Although science fiction can have broad appeal, the passage indirectly suggests that German television is “not always built for export.” This makes the option less convincing compared to a universally appealing crime drama.

Option D) A trans-Atlantic romantic drama set in Europe and America.

The passage criticizes some Netflix productions for seeming culturally “mid-Atlantic,” with local quirks stripped away. This kind of trans-Atlantic blending is presented more as a weakness than a strength.

Therefore, **Option C** best matches the type of content the passage suggests would succeed widely across the EU.

17. Correct Answer: B

This is a sentence placement question, where the key is to maintain the logical flow and coherence of ideas in the paragraph. The paragraph discusses the concept of “productive dualism” in development economics and then explains how this distinction between developing and developed economies has become less relevant over time.

The correct answer is **B) Option 2**.

Let us understand the flow carefully.

The sentence before Blank (2) reads:

“At the core of development economics lies the idea of ‘productive dualism’: that poor countries’ economies are split between a narrow ‘modern’ sector that uses advanced technologies and a larger ‘traditional’ sector characterized by very low productivity.”

The given sentence continues this exact idea:

“Dualism was long held as the defining feature of developing countries in contrast to developed countries, where frontier technologies and high productivity were assumed to prevail.”

Notice the strong thematic continuity. The paragraph first introduces the idea of productive dualism, and the missing sentence elaborates on how this dualism was traditionally seen as a distinguishing characteristic of developing nations. This creates a smooth transition into the next sentence:

“While this distinction between developing and advanced economies may have made some sense in the 1950s and 1960s, it no longer appears to be very relevant.”

The phrase “this distinction” in the next sentence directly refers to the contrast established in the missing sentence between developing and developed economies. Therefore, placing the sentence at Blank (2) creates the most coherent progression of ideas.

Now let us see why the other options do not fit as well:

Option 1: Starting the paragraph with the missing sentence would be awkward because the concept of “dualism” has not yet been introduced or explained. The reader would lack context.

Option 3: By this point, the paragraph has already shifted toward discussing widening inequality and divergence. Inserting the sentence here would interrupt the flow and take the discussion backward.

Option 4: The final portion focuses on advanced economies now facing problems similar to developing countries. The missing sentence about the traditional understanding of dualism would feel disconnected and misplaced here.

Hence, **Option 2** is the most logical and coherent placement for the sentence.

18. Correct Answer: B

This is a sentence placement question that tests logical flow and contextual continuity. The key is to identify where the given sentence fits naturally in terms of meaning, chronology, and references.

The correct answer is **B) Option 2**.

Let us examine the paragraph carefully.

The opening sentence states:

“Research has hypothesised that the earliest evidence of human lip kissing originated in a very specific geographical location in South Asia 3,500 years ago.” The discussion here establishes the earlier accepted timeline for the origin of kissing.

Later, the paragraph says:

“According to Dr Troels Pank Arbøll and Dr Sophie Lund Rasmussen... kissing was already a well-established practice 4,500 years ago in the Middle East.”

The missing sentence is:

“And probably much earlier, moving the documentation for kissing back 1,000 years compared to what was acknowledged in the scientific community.”

This sentence perfectly follows the statement about kissing existing 4,500 years ago because it directly compares the new evidence with the previously accepted estimate of 3,500 years. The phrase “moving the documentation back 1,000 years” logically connects the two timelines.

Thus, placing the sentence at Blank (2) creates a smooth and meaningful progression:

Earlier belief → new discovery → implication of pushing history back by 1,000 years.

Now let us examine why the other options are unsuitable:

Option 1: The sentence after Blank (1) begins with “From there,” clearly referring back to “South Asia” mentioned in the previous sentence. Inserting the given sentence here would disrupt this direct geographical reference and weaken the flow.

Option 3: At this point, the paragraph shifts to explaining cuneiform writing and clay tablets in Mesopotamia. The missing sentence about revising historical timelines would interrupt that explanatory sequence.

Option 4: The sentence following Blank (4) discusses kissing as part of friendships and family relations. The missing sentence about historical dating would not connect logically with this idea.

Therefore, **Option 2** is the most coherent and contextually appropriate placement for the sentence.

19. Correct Answer: 2

This Para jumble question tests the ability to identify the sentence that does not fit into the central theme and logical flow of the paragraph.

The coherent paragraph formed by the remaining four sentences focuses specifically on the **rise of book banning and censorship in the United States**, using *Northern Lights* as an example and concluding with evidence from the American Library Association.

Let us see how the coherent flow develops:

Sentence 4 introduces a specific case: *Northern Lights* being banned and challenged in parts of the US.

Sentence 1 logically follows by interpreting this banning as a precursor to broader censorship based on morality, religion, or worldview.

Sentence 3 then broadens the discussion by stating that book banning in the US has now escalated dramatically.

Sentence 5 provides supporting evidence for this escalation through statistical data from the American Library Association.

Thus, the sequence **4–1–3–5** creates a clear and cohesive paragraph centered on the increasing phenomenon of censorship and book challenges in the US.

Now let us examine Sentence 2:

“Attempts to ban books are attempts to silence authors who have summoned immense courage in telling their stories.”

While this sentence is related to the broader topic of book banning, it shifts the focus toward the emotional and moral dimension of authors' courage and freedom of expression. The rest of the paragraph, however, is more factual and thematic, discussing censorship trends, examples, and statistics. Sentence 2 does not connect smoothly with the logical progression of the other four sentences. Therefore, **Sentence 2** is the odd one out.

20. Correct Answer: 3

This Para jumble question requires us to identify the sentence that does not fit into the most coherent paragraph formed by the other four sentences.

The central theme of the coherent set is the concept of "latchkey children" or "children in self-care" and the negative developmental outcomes associated with such circumstances.

Let us see how the four connected sentences fit together:

Sentence 2 introduces the term "latchkey children" and explains who they are.

Sentence 4 naturally follows by stating that the phrase "children in self-care" is now preferred in research and practice.

Sentence 5 then discusses how parents may believe self-care is beneficial, but research suggests otherwise.

Sentence 1 supports this claim by specifying the negative outcomes associated with self-care, such as loneliness, behavioural issues, and poor academic performance.

Thus, these four sentences create a smooth logical progression:

definition → updated terminology → mistaken belief → actual negative consequences.

Now let us examine **Sentence 3**:

"Although self-care generally points to negative outcomes, it is important to consider that the bulk of research has yet to track long-term consequences."

This sentence introduces a qualification or cautionary note about the limits of current research. While related to the topic, it shifts the discussion toward research methodology and long-term evidence, disrupting the otherwise direct and focused flow about definitions and negative impacts.

Moreover, the paragraph formed by the other four sentences is complete and coherent without this qualification.

Therefore, **Sentence 3** is the odd one out.

21. Correct Answer: 4132

This Para jumble question tests the ability to identify the logical flow of ideas and the relationship between introductory concepts, examples, and explanations.

The paragraph revolves around the idea of **human consciousness as an emergent property** arising from the interaction of neurons in the brain.

Let us examine the correct sequence step by step.

Sentence 4 → Opening Statement

"Human consciousness is often called an emergent property of the human brain."

This sentence is the ideal opener because it introduces the central concept of the paragraph: *emergence*. Since the remaining sentences explain and elaborate on this idea, Sentence 4 naturally comes first.

Sentence 1 → Explanation through Analogy

"Like the ants that make up a colony, no single neuron holds complex information like self-awareness, hope or pride."

After introducing emergence, the paragraph explains it using an analogy. The comparison with ants in a colony helps illustrate how individual neurons alone do not possess complex qualities.

Sentence 1 → Continuation of the Same Idea

“Nonetheless, the sum of all neurons in the nervous system generate complex human emotions like fear and joy, none of which can be attributed to a single neuron.”

The word “Nonetheless” creates a contrast with Sentence 1:

individual neurons do not possess complex emotions, yet collectively they generate consciousness and emotions.

Thus, Sentence 3 logically follows Sentence 1.

Sentence 2 → Concluding Scientific Explanation

“Although the human brain is not yet understood enough to identify the mechanism by which emergence functions, most neurobiologists agree that complex interconnections among the parts give rise to qualities that belong only to the whole.”

This sentence works best as the conclusion because it broadens the discussion scientifically. It summarizes the idea of emergence and explains the consensus among neurobiologists regarding how complex interconnections produce qualities belonging to the whole system.

Hence, the correct sequence is:

4 → 1 → 3 → 2

Therefore, the final answer is **4132**.

22. Correct Answer: 4312

The correct sequence is 4-3-1-2.

Sentence 4 lays the groundwork by bringing in the clash between Western Christian ideas and indigenous African tradition, giving us the context the rest of the paragraph builds on.

From there, Sentence 3 fits next since it opens with "However...", signaling a pushback against what's been said in Sentence 4 by pointing to a rich indigenous African cultural ethos that exists independently. That contrast makes Sentence 3 a natural follow-up to Sentence 4.

As for Sentence 1 and Sentence 2, Sentence 1 brings in an example of contemporary African writing that engages with this conflict, introducing a specific book. Sentence 2 then builds on this by naming Chukwuemeka Ike and adding detail about how his work explores the same conflict - so it only makes sense once the book has already been introduced in Sentence 1, since we can infer Ike is its author. That means Sentence 2 has to come after Sentence 1, not before, since you'd want to introduce the example first and elaborate on it afterward.

Putting it all together, the logical order is 4-3-1-2.

23. Correct Answer: A

This summary question tests the ability to identify the central idea of the passage while avoiding options that are either too narrow, incomplete, or distorted.

The passage discusses three interconnected ideas:

- climate change is making heatwaves more severe,
- vulnerable groups are especially at risk,
- and the media plays an important role in communicating these dangers effectively.

The correct answer is **A) Heatwaves pose an enormous risk; the media plays a pivotal role in alerting people to this danger.**

This option successfully captures both the main problem and the proposed solution emphasized in the passage. The passage highlights that heatwaves are becoming more intense and dangerous due to climate change, especially for vulnerable populations. It then stresses the importance of how heatwaves are “narrated” and the key role played by the news media in warning people and shaping public understanding.

Now let us examine why the other options are weaker:

Option B) Protection from heat waves is important but current reports and public policies seem ineffective.

This option is only partially correct. While the passage does mention that early warnings are not fully effective, it does not broadly criticize public policy or media reports as ineffective. The focus is more on people’s perception of risk and the importance of communication.

Option C) People are vulnerable to heatwaves caused due to climate change, measures taken are ineffective.

This option oversimplifies the passage and overemphasizes the failure of existing measures. The passage does not say all measures are ineffective; rather, it points out that warnings may fail because vulnerable people do not see themselves as at risk.

Option D) News stories help in warning about heatwaves, but they have to become more effective.

This option narrows the passage too much by focusing mainly on news stories. It ignores the broader context of climate change, vulnerability, and uneven impacts of heatwaves.

Therefore, **Option A** best captures the overall essence of the passage in a balanced and comprehensive manner.

24. Correct Answer: C

This summary question tests the ability to identify the broad central idea of the passage rather than focusing on just one aspect of it.

The passage explains the concept of **counterfactual thinking** — imagining alternatives to reality through thoughts such as “if only” and “what if.” It then discusses the many functions of such thinking, including explaining the past, preparing for the future, influencing emotions and moral judgments, and contributing to cognitive development during childhood.

The correct answer is **C) Counterfactual alternatives to reality are created for a variety of reasons and is part of one's developmental process.**

This option best captures the two major themes of the passage:

1. Counterfactual thinking serves multiple psychological and cognitive functions.
2. The ability develops progressively during childhood as part of human development.

Thus, it provides the most balanced and comprehensive summary of the passage.

Now let us examine why the other options are weaker:

Option A) People create counterfactual alternatives to reality for various reasons, including reasoning about other people's beliefs.

This option captures the “various reasons” aspect correctly, but it underplays the important developmental dimension discussed in the final sentence of the passage.

Option B) Counterfactual thinking helps to reverse past and future actions and reason out false beliefs.

This option is inaccurate because counterfactual thinking does not literally “reverse” actions. It only involves imagining alternative possibilities. The wording distorts the meaning of the passage.

Option D) Counterfactuals help people to prepare for the future by understanding intentions and making decisions.

This option focuses too narrowly on future preparation and decision-making. The passage discusses many additional functions, such as emotions, blame, causal reasoning, and childhood cognitive development.

Therefore, **Option C** best captures the full essence of the passage in a concise and balanced manner.



CAT 2023 Slot - 2 DILR

Solutions

1. Correct Answer - C

Explanation:

Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease

was either of Rs 1 crore or by Rs 2 crores.

Let us consider for Alfloo,

First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016

Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively

Solving, $1 + a + b + c + d + e + f + 1 = 21$

$\Rightarrow a + b + c + d + e + f = 19$

Now, even if we consider minimum annual increase and decrease annually,

The values can be a = 2, b = 3, c = 4 or 5, d = 5 or 4, e = 3 and f = 2

Now for Bzygoo,

First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015

The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively

Thus, the total amount raised by Bzygoo = Rs 7 crores

Now for Czechy,

First year of existence, 2013 = Rs 1 crore

Total amount raised = Rs 9 crores

Now, if we consider Year 2016 as the last year of existence

The possible values of amount raised for

Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1

The possible sum = Rs 7 crores (maximum)

So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1

Thus, the total amount raised = Rs 9 crores

Now for Drjbna,

First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015

Total amount raised = Rs 10 crores

The only possible value of amount raised for

Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2

Now for Elavalaki,

Total amount raised = Rs 13 crores

First year of existence, 2011 = Rs 1 crore but last year of existence is not given

Considering the minimum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015 =

1 (such that Year 2015 is the last year of existence)

Considering the maximum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is

the last year of existence)

The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	–	–	–	–	–	1
2010	2	–	–	–	1	1	3
2011	3	–	–	1	2	3	6/7
2012	4/5	1	–	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	–	7/8
2016	1	–	2	–	–	–	3
2017	–	–	1	–	–	–	1
Total (crores)	21	7	9	10	13	13	60

The amount raised by only firms Czechy and Drjbna can be concluded with certainty in each year.

2. Correct Answer - D

Explanation:

Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease was either of Rs 1 crore or by Rs 2 crores.

Let us consider for Alfloo,

First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016

Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively

Solving, $1 + a + b + c + d + e + f + 1 = 21$

$\Rightarrow a + b + c + d + e + f = 19$

Now, even if we consider minimum annual increase and decrease annually,

The values can be a = 2, b = 3, c = 4 or 5, d = 5 or 4, e = 3 and f = 2

Now for Bzygoo,

First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015

The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively

Thus, the total amount raised by Bzygoo = Rs 7 crores

Now for Czechy,

First year of existence, 2013 = Rs 1 crore

Total amount raised = Rs 9 crores

Now, if we consider Year 2016 as the last year of existence

The possible values of amount raised for

Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1

The possible sum = Rs 7 crores (maximum)

So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1

Thus, the total amount raised = Rs 9 crores

Now for Drjbna,

First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015

Total amount raised = Rs 10 crores

The only possible value of amount raised for

Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2

Now for Elavalaki,

Total amount raised = Rs 13 crores

First year of existence, 2011 = Rs 1 crore but last year of existence is not given

Considering the minimum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015 =

1 (such that Year 2015 is the last year of existence)

Considering the maximum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is

the last year of existence)

The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	–	–	–	–	–	1
2010	2	–	–	–	1	1	3
2011	3	–	–	1	2	3	6/7
2012	4/5	1	–	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	–	7/8
2016	1	–	2	–	–	–	3
2017	–	–	1	–	–	–	1
Total (crores)	21	7	9	10	13	13	60

The total amount of money raised in 2015 can be either Rs. 7 crores or Rs. 8 crores

3. Correct Answer - 17

Explanation:

Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease was either of Rs 1 crore or by Rs 2 crores.

Let us consider for Alfloo,

First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016

Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively

Solving, $1 + a + b + c + d + e + f + 1 = 21$

$\Rightarrow a + b + c + d + e + f = 19$

Now, even if we consider minimum annual increase and decrease annually,

The values can be a = 2, b = 3, c = 4 or 5, d = 5 or 4, e = 3 and f = 2

Now for Bzygoo,

First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015

The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively

Thus, the total amount raised by Bzygoo = Rs 7 crores

Now for Czechy,

First year of existence, 2013 = Rs 1 crore

Total amount raised = Rs 9 crores

Now, if we consider Year 2016 as the last year of existence

The possible values of amount raised for

Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1

The possible sum = Rs 7 crores (maximum)

So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1

Thus, the total amount raised = Rs 9 crores

Now for Drjbna,

First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015

Total amount raised = Rs 10 crores

The only possible value of amount raised for

Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2

Now for Elavalaki,

Total amount raised = Rs 13 crores

First year of existence, 2011 = Rs 1 crore but last year of existence is not given

Considering the minimum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015

= 1 (such that Year 2015 is the last year of existence)

Considering the maximum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is

the last year of existence)

The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	–	–	–	–	–	1
2010	2	–	–	–	1	1	3
2011	3	–	–	1	2	3	6/7
2012	4/5	1	–	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	–	7/8
2016	1	–	2	–	–	–	3
2017	–	–	1	–	–	–	1
Total (crores)	21	7	9	10	13	13	60

The largest possible total amount of money that could have been raised in 2013 = Rs. 17 crores

4. Correct Answer - A

Explanation:

Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease was either of Rs 1 crore or by Rs 2 crores.

Let us consider for Alfloo,

First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016

Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively

Solving, $1 + a + b + c + d + e + f + 1 = 21$

$$\Rightarrow a + b + c + d + e + f = 19$$

Now, even if we consider minimum annual increase and decrease annually,

The values can be $a = 2$, $b = 3$, $c = 4$ or 5 , $d = 5$ or 4 , $e = 3$ and $f = 2$

Now for Bzygoo,

First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015

The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively

Thus the total amount raised by Bzygoo = Rs 7 crores

Now for Czechy,

First year of existence, 2013 = Rs 1 crore

Total amount raised = Rs 9 crores

Now, if we consider Year 2016 as the last year of existence

The possible values of amount raised for

Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1

The possible sum = Rs 7 crores (maximum)

So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1

Thus, the total amount raised = Rs 9 crores

Now for Drjbna,

First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015

Total amount raised = Rs 10 crores

The only possible value of amount raised for

Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2

Now for Elavalaki,

Total amount raised = Rs 13 crores

First year of existence, 2011 = Rs 1 crore but last year of existence is not given

Considering the minimum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015 =

1 (such that Year 2015 is the last year of existence)

Considering the maximum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is

the last year of existence)

The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	–	–	–	–	–	1
2010	2	–	–	–	1	1	3
2011	3	–	–	1	2	3	6/7
2012	4/5	1	–	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	–	7/8
2016	1	–	2	–	–	–	3
2017	–	–	1	–	–	–	1
Total (crores)	21	7	9	10	13	13	60

If Elavalaki raised Rs. 3 crores in 2013, then Elavalaki raised Rs. 4 crores in 2014

Hence, the smallest possible total amount of money raised in 2012 = $4 + 1 + 2 + 4 =$ Rs. 11 crores

5. Correct Answer - D

Explanation:

Given that each firm raised Rs 1 crore in its first and last year. Also, each annual increase and decrease was either of Rs 1 crore or by Rs 2 crores.

Let us consider for Alfloo,

First year of existence, 2009 = Rs 1 crore = Last year of existence, 2016

Let amount raised in 2010, 2011, 2012, 2013, 2014, 2015 be a, b, c, d, e and f respectively

Solving, $1 + a + b + c + d + e + f + 1 = 21$

$\Rightarrow a + b + c + d + e + f = 19$

Now, even if we consider minimum annual increase and decrease annually,

The values can be $a = 2, b = 3, c = 4$ or $5, d = 5$ or $4, e = 3$ and $f = 2$

Now for Bzygoo,

First year of existence, 2012 = Rs 1 crore = Last year of existence, 2015

The possibilities for the amount raised in 2013 = 2 or 3 and in 2014 = 3 or 2 respectively

Thus the total amount raised by Bzygoo = Rs 7 crores

Now for Czechy,

First year of existence, 2013 = Rs 1 crore

Total amount raised = Rs 9 crores

Now, if we consider Year 2016 as the last year of existence

The possible values of amount raised for

Year 2014 = 2 or 3, Year 2015 = 3 or 2 and Year 2016 = 1

The possible sum = Rs 7 crores (maximum)

So, the last year of existence for the firm Czechy has to be 2017 with only possible values

Year 2013 = 1, Year 2014 = 2, Year 2015 = 3, Year 2016 = 2 and Year 2017 = 1

Thus, the total amount raised = Rs 9 crores

Now for Drjbna,

First year of existence, 2011 = Rs 1 crore = Last year of existence, 2015

Total amount raised = Rs 10 crores

The only possible value of amount raised for

Year 2012 = 2, Year 2013 = 4 and Year 2014 = 2

Now for Elavalaki,

Total amount raised = Rs 13 crores

First year of existence, 2011 = Rs 1 crore but last year of existence is not given

Considering the minimum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 2, Year 2012 = 3 or 4, Year 2013 = 4 or 3, Year 2014 = 2 and Year 2015 =

1 (such that Year 2015 is the last year of existence)

Considering the maximum amounts the possible values of amount raised for

Year 2010 = 1, Year 2011 = 3, Year 2012 = 5, Year 2013 = 3, Year 2014 = 1 (such that Year 2014 is

the last year of existence)

The rest of the information can be gathered as follows-

Year/Firm	Alfloo	Bzygoo	Czechy	Drjbna	Elavalaki		Total (crores)
2009	1	–	–	–	–	–	1

QUANTIFIERS CAT ACADEMY

2010	2	–	–	–	1	1	3
2011	3	–	–	1	2	3	6/7
2012	4/5	1	–	2	3/4	5	10/11/12/13
2013	5/4	2/3	1	4	4/3	3	14/15/16/17
2014	3	3/2	2	2	2	1	10/11/12
2015	2	1	3	1	1	–	7/8
2016	1	–	2	–	–	–	3
2017	–	–	1	–	–	–	1
Total (crores)	21	7	9	10	13	13	60

If total amount raised in 2014 = Rs. 12 crores

⇒ amount raised by Bzygoo in 2014 = Rs. 3 crores

⇒ amount raised by Bzygoo in 2013 = Rs 2 crores

Also, amount raised by Elavalaki in 2013 = Rs 3 crore or Rs 4 crores

Hence, Bzygoo raised the same amount of money as Elavalaki in 2013, it is not possible



6. Correct Answer - A

Explanation:

Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a, b, c, d and e respectively.

As per the Table 1,

$$a + b = 15 \times 2 = 30, b + c = 15.5 \times 2 = 31, c + d = 16 \times 2 = 32 \text{ and } d + e = 17 \times 2 = 34$$

Point 2, total score on Day 3 = total score on Day 4

$$\Rightarrow c = d = 16 \text{ (each)}$$

$$\Rightarrow e = 34 - 16 = 18, b = 31 - 16 = 15 \text{ and } a = 30 - 15 = 15$$

Point 1, Chatur score on any day = 3, 6 or 9

The only possibility of his Day 2 score being unique highest = 9

His only minimum score on Day 1 = 3

$$\Rightarrow \text{Chatur's score on Day 3, Day 4 and Day 5} = 6 \text{ (each)}$$

Also, Akhil's Day 4 score = Chatur's Day 1 score = 3

$$\Rightarrow \text{Bimal's Day 4 score} = 16 - (3 + 6) = 7$$

Now being same rank,

Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)

Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5

$$\Rightarrow \text{Akhil's Day 1 score} = 15 - (5 + 3) = 7$$

Now for Day 2, let the score of Akhil = p and Bimal = q

$$\text{Solving, } p + q + 9 = 15 \Rightarrow p + q = 6$$

Since, the rank of Akhil is 2 and Bimal is 3

Possible values of p = 4 or 5 and q = 2 or 1

Now for Day 5, let the score of Akhil = x and Bimal = y

$$\text{Solving, } x + y + 6 = 18 \Rightarrow x + y = 12$$

Since, the rank of Akhil is 3 and Bimal is 1

Possible value of x = 5 or 4 and y = 7 or 8

(y cannot be 9 as that being unique highest)

The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

Akhil's score on Day 1 = 7

7. Correct Answer - D

Explanation:

Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a, b, c, d and e respectively.

As per the Table 1,

$$a + b = 15 \times 2 = 30, b + c = 15.5 \times 2 = 31, c + d = 16 \times 2 = 32 \text{ and } d + e = 17 \times 2 = 34$$

Point 2, total score on Day 3 = total score on Day 4

$$\Rightarrow c = d = 16 \text{ (each)}$$

$$\Rightarrow e = 34 - 16 = 18, b = 31 - 16 = 15 \text{ and } a = 30 - 15 = 15$$

Point 1, Chatur score on any day = 3, 6 or 9

The only possibility of his Day 2 score being unique highest = 9

His only minimum score on Day 1 = 3
 $\Rightarrow$ Chatur's score on Day 3, Day 4 and Day 5 = 6 (each)
 Also, Akhil's Day 4 score = Chatur's Day 1 score = 3
 $\Rightarrow$ Bimal's Day 4 score = $16 - (3 + 6) = 7$
 Now being same rank,
 Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)
 Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5
 $\Rightarrow$ Akhil's Day 1 score = $15 - (5 + 3) = 7$
 Now for Day 2, let the score of Akhil = p and Bimal = q
 Solving, $p + q + 9 = 15 \Rightarrow p + q = 6$
 Since, the rank of Akhil is 2 and Bimal is 3
 Possible values of p = 4 or 5 and q = 2 or 1
 Now for Day 5, let the score of Akhil = x and Bimal = y
 Solving, $x + y + 6 = 18 \Rightarrow x + y = 12$
 Since, the rank of Akhil is 3 and Bimal is 1
 Possible value of x = 5 or 4 and y = 7 or 8
 (y cannot be 9 as that being unique highest)
 The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

Chatur attains the maximum possible score

8. Correct Answer - 25

Explanation:

Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a, b, c, d and e respectively.

As per the Table 1,

$$a + b = 15 \times 2 = 30, b + c = 15.5 \times 2 = 31, c + d = 16 \times 2 = 32 \text{ and } d + e = 17 \times 2 = 34$$

Point 2, total score on Day 3 = total score on Day 4

$$\Rightarrow c = d = 16 \text{ (each)}$$

$$\Rightarrow e = 34 - 16 = 18, b = 31 - 16 = 15 \text{ and } a = 30 - 15 = 15$$

Point 1, Chatur score on any day = 3, 6 or 9

The only possibility of his Day 2 score being unique highest = 9

His only minimum score on Day 1 = 3

$$\Rightarrow \text{Chatur's score on Day 3, Day 4 and Day 5} = 6 \text{ (each)}$$

Also, Akhil's Day 4 score = Chatur's Day 1 score = 3

$$\Rightarrow \text{Bimal's Day 4 score} = 16 - (3 + 6) = 7$$

Now being same rank,

Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)

Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5

$$\Rightarrow \text{Akhil's Day 1 score} = 15 - (5 + 3) = 7$$

Now for Day 2, let the score of Akhil = p and Bimal = q

$$\text{Solving, } p + q + 9 = 15 \Rightarrow p + q = 6$$

Since, the rank of Akhil is 2 and Bimal is 3

Possible values of p = 4 or 5 and q = 2 or 1

Now for Day 5, let the score of Akhil = x and Bimal = y

Solving, $x + y + 6 = 18 \Rightarrow x + y = 12$

Since, the rank of Akhil is 3 and Bimal is 1

Possible value of $x = 5$ or 4 and $y = 7$ or 8

(y cannot be 9 as that being unique highest)

The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

The minimum possible total score of Bimal = 25

9. Correct Answer - B

Explanation:

Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a , b , c , d and e respectively.

As per the Table 1,

$a + b = 15 \times 2 = 30$, $b + c = 15.5 \times 2 = 31$, $c + d = 16 \times 2 = 32$ and $d + e = 17 \times 2 = 34$

Point 2, total score on Day 3 = total score on Day 4

$\Rightarrow c = d = 16$ (each)

$\Rightarrow e = 34 - 16 = 18$, $b = 31 - 16 = 15$ and $a = 30 - 15 = 15$

Point 1, Chatur score on any day = 3, 6 or 9

The only possibility of his Day 2 score being unique highest = 9

His only minimum score on Day 1 = 3

$\Rightarrow$ Chatur's score on Day 3, Day 4 and Day 5 = 6 (each)

Also, Akhil's Day 4 score = Chatur's Day 1 score = 3

$\Rightarrow$ Bimal's Day 4 score = $16 - (3 + 6) = 7$

Now being same rank,

Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)

Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5

$\Rightarrow$ Akhil's Day 1 score = $15 - (5 + 3) = 7$

Now for Day 2, let the score of Akhil = p and Bimal = q

Solving, $p + q + 9 = 15 \Rightarrow p + q = 6$

Since, the rank of Akhil is 2 and Bimal is 3

Possible values of $p = 4$ or 5 and $q = 2$ or 1

Now for Day 5, let the score of Akhil = x and Bimal = y

Solving, $x + y + 6 = 18 \Rightarrow x + y = 12$

Since, the rank of Akhil is 3 and Bimal is 1

Possible value of $x = 5$ or 4 and $y = 7$ or 8

(y cannot be 9 as that being unique highest)

The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

If the total score of Bimal is a multiple of 3, the only possibility = 27
 $\Rightarrow$ Bimal's Day 2 score = 2 $\Rightarrow$ Akhil's Day 2 score = 4

10. Correct Answer - 26

Explanation:

Let the total score of Day 1, Day 2, Day 3, Day 4 and Day 5 of all the participants be a, b, c, d and e respectively.

As per the Table 1,

$a + b = 15 \times 2 = 30$, $b + c = 15.5 \times 2 = 31$, $c + d = 16 \times 2 = 32$ and $d + e = 17 \times 2 = 34$

Point 2, total score on Day 3 = total score on Day 4

$\Rightarrow c = d = 16$ (each)

$\Rightarrow e = 34 - 16 = 18$, $b = 31 - 16 = 15$ and $a = 30 - 15 = 15$

Point 1, Chatur score on any day = 3, 6 or 9

The only possibility of his Day 2 score being unique highest = 9

His only minimum score on Day 1 = 3

$\Rightarrow$ Chatur's score on Day 3, Day 4 and Day 5 = 6 (each)

Also, Akhil's Day 4 score = Chatur's Day 1 score = 3

$\Rightarrow$ Bimal's Day 4 score = $16 - (3 + 6) = 7$

Now being same rank,

Akhil's Day 3 score = Bimal's Day 3 score = 5 (each)

Point 3, Bimal's Day 1 score = Bimal's Day 3 score = 5

$\Rightarrow$ Akhil's Day 1 score = $15 - (5 + 3) = 7$

Now for Day 2, let the score of Akhil = p and Bimal = q

Solving, $p + q + 9 = 15 \Rightarrow p + q = 6$

Since, the rank of Akhil is 2 and Bimal is 3

Possible values of p = 4 or 5 and q = 2 or 1

Now for Day 5, let the score of Akhil = x and Bimal = y

Solving, $x + y + 6 = 18 \Rightarrow x + y = 12$

Since, the rank of Akhil is 3 and Bimal is 1

Possible value of x = 5 or 4 and y = 7 or 8

(y cannot be 9 as that being unique highest)

The rest of the information can be gathered as follows-

	Day 1	Day 2	Day 3	Day 4	Day 5	Total
Akhil	7	4/5	5	3	5/4	23/24/25
Bimal	5	2/1	5	7	7/8	27/26/25
Chatur	3	9	6	6	6	30
Total	15	15	16	16	18	80

If Akhil's total score = 24 $\Rightarrow$ Bimal's total score = 26. Answer is 26

11. Correct Answer - B

Explanation:

Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be = $1 + 1 + 9 = 11$, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.

For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus, as mentioned in Table 2, two sacks have more than 5 coins and exactly one condition (iii) satisfies. So, the third sack must

contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack = 3, such that the average coins in the box = $(3 + 9 + 9)/3 = 7$

For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins = 2, so, exactly two conditions (i and iii) satisfy. Also, only one sack contains more than 5 coins. Thus, the average coins in the box = $1 + 2 + 9 = 12/3 = 4$

For 3rd row, 1st column, median number of coins in the box = 8, all three sacks contain more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins = 9. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box = $(7 + 8 + 9)/3 = 8$

For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box = $(1 + 8 + 9)/3 = 6$

Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 = 45, so the sum of each row and each column = 15, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be = 45

The sum for 1st row, 1st column = $45 - (12 + 36) = 9$

Only possible average = $(1 + 1 + 7)/3 = 3$ satisfying other given conditions as well

The sum of 2nd row, 2nd column = $45 - (21 + 18) = 6$

Only possible average = $(1 + 2 + 3)/3 = 2$ satisfying other given conditions as well

The sum of 1st row, 3rd column = $45 - (9 + 21) = 15$

Only possible average = $(1 + 6 + 8)/3 = 5$ satisfying other given conditions as well

The sum of 2nd row, 3rd column = $45 - (12 + 6) = 27$

Only possible average = $(9 + 9 + 9)/3 = 9$ satisfying other given conditions as well

The sum of 3rd row, 3rd column = $45 - (24 + 18) = 3$

Only possible average = $(1 + 1 + 1)/3 = 1$ satisfying other given conditions as well

The rest of the information can be gathered as follows-

	1 st column	2 nd column	3 rd column	Total
1 st row	Sum = $1 + 1 + 7 = 9$ Average = 3	Sum = $3 + 9 + 9 = 21$ Average = 7	Sum = $1 + 6 + 8 = 15$ Average = 5	45
2 nd row	Sum = $1 + 2 + 9 = 12$ Average = 4	Sum = $1 + 2 + 3 = 6$ Average = 2	Sum = $9 + 9 + 9 = 27$ Average = 9	45
3 rd row	Sum = $7 + 8 + 9 = 24$ Average = 8	Sum = $1 + 8 + 9 = 18$ Average = 6	Sum = $1 + 1 + 1 = 3$ Average = 1	45
Total	45	45	45	

The total number of coins in all the boxes in the 3rd row = 45

12. Correct Answer - D

Explanation:

Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be = $1 + 1 + 9 = 11$, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.

For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus, as mentioned in Table 2, two sacks have more

than 5 coins and exactly one condition (iii) satisfies. So, the third sack must contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack = 3, such that the average coins in the box = $(3 + 9 + 9)/3 = 7$

For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins = 2, so, exactly two conditions (i and iii) satisfy. Also, only one sack contains more than 5 coins. Thus, the average coins in the box = $1 + 2 + 9 = 12/3 = 4$

For 3rd row, 1st column, median number of coins in the box = 8, all three sacks contain more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins = 9. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box = $(7 + 8 + 9)/3 = 8$

For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box = $(1 + 8 + 9)/3 = 6$

Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 = 45, so the sum of each row and each column = 15, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be = 45

The sum for 1st row, 1st column = $45 - (12 + 36) = 9$

Only possible average = $(1 + 1 + 7)/3 = 3$ satisfying other given conditions as well

The sum of 2nd row, 2nd column = $45 - (21 + 18) = 6$

Only possible average = $(1 + 2 + 3)/3 = 2$ satisfying other given conditions as well

The sum of 1st row, 3rd column = $45 - (9 + 21) = 15$

Only possible average = $(1 + 6 + 8)/3 = 5$ satisfying other given conditions as well

The sum of 2nd row, 3rd column = $45 - (12 + 6) = 27$

Only possible average = $(9 + 9 + 9)/3 = 9$ satisfying other given conditions as well

The sum of 3rd row, 3rd column = $45 - (24 + 18) = 3$

Only possible average = $(1 + 1 + 1)/3 = 1$ satisfying other given conditions as well

The rest of the information can be gathered as follows-

	1 st column	2 nd column	3 rd column	Total
1 st row	Sum = $1 + 1 + 7 = 9$ Average = 3	Sum = $3 + 9 + 9 = 21$ Average = 7	Sum = $1 + 6 + 8 = 15$ Average = 5	45
2 nd row	Sum = $1 + 2 + 9 = 12$ Average = 4	Sum = $1 + 2 + 3 = 6$ Average = 2	Sum = $9 + 9 + 9 = 27$ Average = 9	45
3 rd row	Sum = $7 + 8 + 9 = 24$ Average = 8	Sum = $1 + 8 + 9 = 18$ Average = 6	Sum = $1 + 1 + 1 = 3$ Average = 1	45
Total	45	45	45	

The boxes having at least one sack containing 9 coins = 5

(1st row, 2nd column), (2nd row, 1st column), (2nd row, 3rd column), (3rd row, 1st column) and (3rd row, 2nd column)

13. Correct Answer - 4

Explanation:

Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be = $1 + 1 + 9 = 11$, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.

For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus, as mentioned in Table 2, two sacks have more than 5 coins and exactly one condition (iii) satisfies. So, the third sack must contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack = 3, such that the average coins in the box = $(3 + 9 + 9)/3 = 7$

For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins = 2, so, exactly two conditions (i and iii) satisfy. Also, only one sack contains more than 5 coins. Thus, the average coins in the box = $1 + 2 + 9 = 12/3 = 4$

For 3rd row, 1st column, median number of coins in the box = 8, all three sacks contain more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins = 9. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box = $(7 + 8 + 9)/3 = 8$

For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box = $(1 + 8 + 9)/3 = 6$

Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 = 45, so the sum of each row and each column = 15, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be = 45

The sum for 1st row, 1st column = $45 - (12 + 36) = 9$

Only possible average = $(1 + 1 + 7)/3 = 3$ satisfying other given conditions as well

The sum of 2nd row, 2nd column = $45 - (21 + 18) = 6$

Only possible average = $(1 + 2 + 3)/3 = 2$ satisfying other given conditions as well

The sum of 1st row, 3rd column = $45 - (9 + 21) = 15$

Only possible average = $(1 + 6 + 8)/3 = 5$ satisfying other given conditions as well

The sum of 2nd row, 3rd column = $45 - (12 + 6) = 27$

Only possible average = $(9 + 9 + 9)/3 = 9$ satisfying other given conditions as well

The sum of 3rd row, 3rd column = $45 - (24 + 18) = 3$

Only possible average = $(1 + 1 + 1)/3 = 1$ satisfying other given conditions as well

The rest of the information can be gathered as follows-

	1 st column	2 nd column	3 rd column	Total
1 st row	Sum = $1 + 1 + 7 = 9$ Average = 3	Sum = $3 + 9 + 9 = 21$ Average = 7	Sum = $1 + 6 + 8 = 15$ Average = 5	45
2 nd row	Sum = $1 + 2 + 9 = 12$ Average = 4	Sum = $1 + 2 + 3 = 6$ Average = 2	Sum = $9 + 9 + 9 = 27$ Average = 9	45
3 rd row	Sum = $7 + 8 + 9 = 24$ Average = 8	Sum = $1 + 8 + 9 = 18$ Average = 6	Sum = $1 + 1 + 1 = 3$ Average = 1	45
Total	45	45	45	

14. Correct Answer - 9

Explanation:

Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be = $1 + 1 + 9 = 11$, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.

For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus, as mentioned in Table 2, two sacks have more than 5 coins and exactly one condition (iii) satisfies. So, the third sack must contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack = 3, such that the average coins in the box = $(3 + 9 + 9)/3 = 7$

For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins = 2, so, exactly two conditions (i and iii) satisfy. Also, only one sack contains more than 5 coins. Thus, the average coins in the box = $1 + 2 + 9 = 12/3 = 4$

For 3rd row, 1st column, median number of coins in the box = 8, all three sacks contain more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins = 9. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box = $(7 + 8 + 9)/3 = 8$

For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box = $(1 + 8 + 9)/3 = 6$

Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 = 45, so the sum of each row and each column = 15, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be = 45

The sum for 1st row, 1st column = $45 - (12 + 36) = 9$

Only possible average = $(1 + 1 + 7)/3 = 3$ satisfying other given conditions as well

The sum of 2nd row, 2nd column = $45 - (21 + 18) = 6$

Only possible average = $(1 + 2 + 3)/3 = 2$ satisfying other given conditions as well

The sum of 1st row, 3rd column = $45 - (9 + 21) = 15$

Only possible average = $(1 + 6 + 8)/3 = 5$ satisfying other given conditions as well

The sum of 2nd row, 3rd column = $45 - (12 + 6) = 27$

Only possible average = $(9 + 9 + 9)/3 = 9$ satisfying other given conditions as well

The sum of 3rd row, 3rd column = $45 - (24 + 18) = 3$

Only possible average = $(1 + 1 + 1)/3 = 1$ satisfying other given conditions as well

The rest of the information can be gathered as follows-

	1 st column	2 nd column	3 rd column	Total
1 st row	Sum = $1 + 1 + 7 = 9$ Average = 3	Sum = $3 + 9 + 9 = 21$ Average = 7	Sum = $1 + 6 + 8 = 15$ Average = 5	45
2 nd row	Sum = $1 + 2 + 9 = 12$ Average = 4	Sum = $1 + 2 + 3 = 6$ Average = 2	Sum = $9 + 9 + 9 = 27$ Average = 9	45
3 rd row	Sum = $7 + 8 + 9 = 24$ Average = 8	Sum = $1 + 8 + 9 = 18$ Average = 6	Sum = $1 + 1 + 1 = 3$ Average = 1	45
Total	45	45	45	

Number of sacks having exactly one coin = 9

15. Correct Answer - 5

Explanation:

Firstly, if all the given three conditions satisfy, the sum of number of coins in the box could be $= 1 + 1 + 9 = 11$, but that is not giving the average as distinct integer. Thus, either exactly one condition satisfies or exactly two conditions satisfy.

For 1st row, 2nd column box, the median number of coins is 9, so the maximum number of coins is also 9. Thus, as mentioned in Table 2, two sacks have more than 5 coins and exactly one condition (iii) satisfies. So, the third sack must contain coins less than or equal to 5. Also, the average number of coins per sack in any box is a distinct integer, so the only value that satisfies the coins in third sack $= 3$, such that the average coins in the box $= (3 + 9 + 9)/3 = 7$

For 2nd row, 1st column box, given that two or more conditions satisfies, but since the median number of coins $= 2$, so, exactly two conditions (i and iii) satisfy. Also, only one sack contains more than 5 coins. Thus, the average coins in the box $= 1 + 2 + 9 = 12/3 = 4$

For 3rd row, 1st column, median number of coins in the box $= 8$, all three sacks contain more than 5 coins and only 1 condition satisfies. So, that condition must be (iii) condition i.e. the maximum coins $= 9$. Also, to make average an integer, the number of coins in third sack must be 7. The average number of coins in the box $= (7 + 8 + 9)/3 = 8$

For 3rd row, 2nd column, two conditions satisfies and two sacks contain more than 5 coins. Thus, the conditions that satisfy must be (i) and (iii). So, the only possible average in the box $= (1 + 8 + 9)/3 = 6$

Now, since for each and each column the total is same, so the average is also the same. Sum of distinct integers from 1 to 9 $= 45$, so the sum of each row and each column $= 15$, which is also the average of the boxes for each row and each column. Hence, the sum of number of coins in each row and each column must be $= 45$

The sum for 1st row, 1st column $= 45 - (12 + 36) = 9$

Only possible average $= (1 + 1 + 7)/3 = 3$ satisfying other given conditions as well

The sum of 2nd row, 2nd column $= 45 - (21 + 18) = 6$

Only possible average $= (1 + 2 + 3)/3 = 2$ satisfying other given conditions as well

The sum of 1st row, 3rd column $= 45 - (9 + 21) = 15$

Only possible average $= (1 + 6 + 8)/3 = 5$ satisfying other given conditions as well

The sum of 2nd row, 3rd column $= 45 - (12 + 6) = 27$

Only possible average $= (9 + 9 + 9)/3 = 9$ satisfying other given conditions as well

The sum of 3rd row, 3rd column $= 45 - (24 + 18) = 3$

Only possible average $= (1 + 1 + 1)/3 = 1$ satisfying other given conditions as well

The rest of the information can be gathered as follows-

	1 st column	2 nd column	3 rd column	Total
1 st row	Sum = $1 + 1 + 7 = 9$ Average = 3	Sum = $3 + 9 + 9 = 21$ Average = 7	Sum = $1 + 6 + 8 = 15$ Average = 5	45
2 nd row	Sum = $1 + 2 + 9 = 12$ Average = 4	Sum = $1 + 2 + 3 = 6$ Average = 2	Sum = $9 + 9 + 9 = 27$ Average = 9	45
3 rd row	Sum = $7 + 8 + 9 = 24$ Average = 8	Sum = $1 + 8 + 9 = 18$ Average = 6	Sum = $1 + 1 + 1 = 3$ Average = 1	45
Total	45	45	45	

Number of boxes having all three sacks contain different number of coins = 5
(1st row, 3rd column), (2nd row, 1st column), (2nd row, 2nd column), (3rd row, 1st column) and (3rd row, 2nd column)

16. Correct Answer - C

Explanation:

Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.

From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)

From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively

From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm

Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)

So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50

Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)

Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm

From point 4, the last ride taken by Anjali and Bipasha was the same

Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned

So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali

So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm

But that is not possible as she took a 1-hour coffee break after completing her second ride.

Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively

Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm

The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm to 1:30 pm	10 am to 11 am
Ride-2	50	1 pm to 2 pm	11:30 am to 12:30 pm	–
Ride-3	30	12 pm to 1 pm	–	9 am to 10 am
Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	–
Total Spending		Rs 140	Rs 110	Rs 50

The total amount spent on tickets by Bipasha = Rs 110

17. Correct Answer - C

Explanation:

Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.

From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)

From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively

From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm

Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)

So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50

Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)

Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm

From point 4, the last ride taken by Anjali and Bipasha was the same

Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned

So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali

So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm

But that is not possible as she took a 1-hour coffee break after completing her second ride.

Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively

Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm

The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm to 1:30 pm	10 am to 11 am
Ride-2	50	1 pm to 2 pm	11:30 am to 12:30 pm	–
Ride-3	30	12 pm to 1 pm	–	9 am to 10 am
Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	–
Total Spending		Rs 140	Rs 110	Rs 50

18. Correct Answer - D

Explanation:

Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.

From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)

From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively

From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm

Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)

So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50

Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)

Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm

From point 4, the last ride taken by Anjali and Bipasha was the same

Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned

So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali

So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm

But that is not possible as she took a 1-hour coffee break after completing her second ride.

Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively

Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm

The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm	10 am to 11 am

		pm	to 1:30 pm	am
Ride-2	50	1 pm to 2 pm	11:30 am to 12:30 pm	–
Ride-3	30	12 pm to 1 pm	–	9 am to 10 am
Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	–
Total Spending		Rs 140	Rs 110	Rs 50

Ride-1 was taken by all three visitors

19. Correct Answer - 6

Explanation:

Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.

From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)

From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively

From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm

Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)

So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50

Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)

Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm

From point 4, the last ride taken by Anjali and Bipasha was the same

Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned

So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali

So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm

But that is not possible as she took a 1-hour coffee break after completing her second ride.

Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively

Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm

The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm to 1:30 pm	10 am to 11 am
Ride-2	50	1 pm to 2 pm	11:30 am to	–

			12:30 pm	
Ride-3	30	12 pm to 1 pm	–	9 am to 10 am
Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	–
Total Spending		Rs 140	Rs 110	Rs 50

Total rides taken by Anjali and Chitra = 4 + 2 = 6

20. Correct Answer - 140

Explanation:

Since the time slot varies for different visitors as well as rides, so let's arrange the data with respect to rides vs visitors and fill the time slot and corresponding spending accordingly.

From point 1, Chitra spend Rs 50 and completed her rides by 11 am without any wait, so she must have taken 2 rides Ride-1 (Rs 20) and Ride-3 (Rs 30)

From point 2, Anjali took Ride-1 at 11 am after waiting for Chitra to complete, so Chitra took Ride-3 from 9 am to 10 am and Ride-1 from 10 am to 11 am respectively

From point 3, Bipasha first of three rides is from 11:30 am to 12:30 pm

Also, by 12:15 pm, all three have spent same amount = Rs 50 each (same as Chitra's complete spending by 11 am)

So, Bipasha's ride from 11:30 am to 12:30 am must be Ride 2 amounting Rs 50

Also, Anjali's second ride must be Ride-3 from 12 pm to 1 pm (without any wait and total spending of Rs 50 by 12:15 pm)

Also, Bipasha's other two rides cannot be Ride-3 as it should be completed by 1 pm

From point 4, the last ride taken by Anjali and Bipasha was the same

Let's say Anjali's last ride was Ride-4 from 1 pm to 2 pm just after Ride-3 taken from 12 pm to 1 pm as Anjali never took a break mentioned

So, for Bipasha's last ride, she could have reached 1:30 pm and taken the Ride-4 from 2 pm to 3 pm after 30 mins wait for Anjali

So, Bipasha's second ride could be Ride-1 from 12:30 pm to 1:30 pm

But that is not possible as she took a 1-hour coffee break after completing her second ride.

Thus, this is only possible if Anjali took Ride-2 from 1 pm to 2 pm and her last ride is Ride-4 from 2 pm to 3 pm respectively

Such that Bipasha's second ride is Ride-1 from 12:30 pm to 1:30 pm and then 1-hour coffee break from 1:30 pm to 2:30 pm and then 30 min wait for Anjali from 2:30 pm to 3 pm and finally the last ride, Ride-4 from 3 pm to 4 pm

The rest of the information can be gathered as follows-

Ride	Price (Rs)	Anjali	Bipasha	Chitra
Ride-1	20	11 am to 12 pm	12:30 pm to 1:30 pm	10 am to 11 am
Ride-2	50	1 pm to 2 pm	11:30 am to 12:30 pm	–
Ride-3	30	12 pm to 1 pm	–	9 am to 10 am

Ride-4	40	2 pm to 3 pm	3 pm to 4 pm	–
Total Spending		Rs 140	Rs 110	Rs 50

The total amount spent by Anjali = Rs 140



Quant

1. Correct Answer - C

Explanation:

We have, $\frac{x}{y} < \frac{x+3}{y-3}$

$$\Rightarrow \frac{x}{y} - \frac{x+3}{y-3} < 0$$

$$\Rightarrow \frac{-3(x+y)}{y(y-3)} < 0 \Rightarrow \frac{x+y}{y(y-3)} > 0 \dots\dots\dots (1)$$

Three cases arise:

Case 1: When $y < 0$ then y & $y - 3$ both are negative

From (1), $x + y > 0$

So, when $y < 0$ then $y > -x$

which is correct

Case 2: When $0 < y < 3$ then $y > 0$ but $y - 3 < 0$

So, from (1), $x + y < 0$

So, when $0 < y < 3$ then $x + y < 0$

Case 3: When $y > 3$, then both $y > 0$ and $y - 3 > 0$

So, from (1), $x + y > 0$

So, when $y > 3$ then $x + y > 0$

2. Correct Answer - D

Explanation:

Since k divides $(m + 2n)$, k must also divide $(2m + 4n)$

Also, k divides $(3m + 4n) \Rightarrow k$ divides $(m + 2m + 4n)$

So, k must divide m as well

Again, k divides $(m + 2n)$, k must also divide $(3m + 6n)$

Also, k divides $(3m + 4n) \Rightarrow k$ divides $(3m + 6n - 2n)$

So, k must divide $2n$ as well

Hence, k must be a common divisor of m and $2n$

3. Correct Answer - C

Explanation:

Given equation can be written as

$$(2^{2x^2})^2 - 2 \cdot 2^{2x^2} \cdot 2^{x+15} + (2^{x+15})^2 = 0 \dots\dots\dots (1)$$

As we know, $(a - b)^2 = a^2 - 2ab + b^2$.

So, the above equation reduces to

$$(2^{2x^2} - 2^{x+15})^2 = 0$$

$$\Rightarrow 2^{2x^2} = 2^{x+15}$$

$$\Rightarrow 2x^2 = x + 15$$

$$\Rightarrow 2x^2 - x - 15 = 0$$

$$\Rightarrow 2x^2 - 6x + 5x - 15 = 0$$

$$\Rightarrow (2x + 5)(x - 3) = 0$$

$$\Rightarrow x = -5/2 \text{ or } 3$$

$$\text{Required sum} = -5/2 + 3 = 1/2.$$

4. Correct Answer - C

Explanation:

$$a^m \times b^n = 144^{145} = (2^4 \times 3^2)^{145} = 2^{580} \times 3^{290}$$

$$\Rightarrow a^m \times b^n = (3^{290})^1 \times 2^{580}$$

To maximise $(n - m)$, n has to be maximum and m has to be minimum

The maximum possible value of $n = 580$ when $b = 2$ and the minimum possible value of $m = 1$ when a

$$= 3^{290}$$

$$\text{Hence, maximum value of } (n - m) = 580 - 1 = 579$$

5. Correct Answer - 6

Explanation:

$$\text{We have, } (x - 1)^2 + 2kx + 11 = 0$$

$$\Rightarrow x^2 - 2x + 1 + 2kx + 11 = 0$$

$$\Rightarrow x^2 + x(2k - 2) + 12 = 0$$

Since roots are not real,

$$(2k - 2)^2 - 4 \times 1 \times 12 < 0$$

$$\Rightarrow 4k^2 + 4 - 8k - 48 < 0$$

$$\Rightarrow 4k^2 - 8k - 44 < 0$$

$$\Rightarrow k^2 - 2k - 11 < 0$$

$$\Rightarrow k^2 - 2k + 1 - 12 < 0$$

$$\Rightarrow (k - 1)^2 < 12$$

So, the largest integral value of $k = 4$ which satisfies the above inequality.

Now, since k and y are positive numbers, So, $AM \geq GM$.

$$\frac{k}{4y} + 9y \geq 2 \sqrt{\frac{k}{4y} \cdot 9y}$$

$$\Rightarrow \frac{k}{4y} + 9y \geq 2 \sqrt{\frac{9k}{4}}$$

$$\Rightarrow \frac{k}{4y} + 9y \geq 3\sqrt{k}$$

$$\text{Now } k = 4. \text{ So, } \frac{k}{4y} + 9y \geq 3\sqrt{4} \text{ i.e. } 6.$$

Hence, the required answer is 6

6. Correct Answer - 15

Explanation:

Since the required number has exactly 4 factors

So, the number should be either in the form of p^3 or $p \times q$, where p and q are prime numbers

For p^3 , possible numbers < 50 are 2^3 and 3^3 , 2 such numbers are possible

For $p \times q$, possible numbers < 50 are 2×3 , 2×5 , 2×7 , 2×11 , 2×13 , 2×17 , 2×19 , 2×23 ,

3×5 , 3×7 , 3×11 , 3×13 , 5×7 . So, 13 such numbers are there. Hence, in total, there are 15 such numbers

7. Correct Answer - 7

Explanation:

$$\text{Given } \log_{\sqrt{3}} x + \frac{\log_x 5^2}{\log_x 5^{-3}} = \frac{16}{3} \text{ (because } 5^2 = 25 \text{ and } 0.008 = 5^{-3})$$

$$\Rightarrow 2\log_3 x + \frac{2\log_x 5}{(-3)\log_x 5} = \frac{16}{3}$$

$$\Rightarrow 2\log_3 x - \frac{2}{3} = \frac{16}{3}$$

$$\Rightarrow 2\log_3 x = \frac{16}{3} + \frac{2}{3} = 6$$

$$\Rightarrow \log_3 x = 3 \Rightarrow x = 27$$

$$\text{Now, } \log_3(3x^2) = \log_3(3 \times 27 \times 27) = \log_3 3^7 = 7.$$

8. Correct Answer - D

Explanation:

Let time taken by inlet pipe A = a hrs.

Then time taken by outlet pipe B = (a - 1) hrs.

Then time taken by outlet pipe C = c hrs.

When all pipes work together, tank gets filled in 2 hrs.

$$\text{So, } \frac{1}{a} + \frac{1}{c} - \frac{1}{a-1} = \frac{1}{2} \dots\dots (1)$$

When B & C are turned on together and pipe B is turned off after one hour, then pipe C takes another

1.25 hours to fill the tank.

$$\frac{2.25}{c} - \frac{1}{a-1} = 1 \Rightarrow \frac{9}{4c} - \frac{1}{a-1} = 1 \dots\dots\dots (2)$$

Also, $a < 5$. Solving (1) & (2):

$$\text{From (1): } \frac{1}{c} = \frac{1}{2} - \frac{1}{a} + \frac{1}{a-1}$$

$$\text{So, } \frac{9}{4c} = \frac{9}{4} \left(\frac{1}{2} - \frac{1}{a} + \frac{1}{a-1} \right)$$

$$\text{Putting this in (2): } \frac{9}{4} \left(\frac{1}{2} - \frac{1}{a} + \frac{1}{a-1} \right) - \frac{1}{a-1} = 1$$

$$\Rightarrow \frac{9}{8} - \frac{9}{4a} + \frac{9}{4(a-1)} - \frac{1}{a-1} = 1$$

$$\Rightarrow \frac{9}{8} - \frac{9}{4a} + \frac{9-4}{4(a-1)} = 1 \Rightarrow \frac{9}{8} - \frac{9}{4a} + \frac{5}{4(a-1)} = 1$$

$$\Rightarrow \frac{9}{4a} - \frac{5}{4(a-1)} = \frac{1}{8} \Rightarrow \frac{9a-9-5a}{4a(a-1)} = \frac{1}{8}$$

$$\Rightarrow \frac{4a-18}{4a(a-1)} = \frac{1}{8} \Rightarrow 8a-18 = a^2 - a$$

$$\Rightarrow a^2 - 9a + 18 = 0 \Rightarrow a = 6, 3 \text{ but } a < 5$$

So, $a = 3$.

$$\text{Put } a = 3 \text{ in (1): } \frac{1}{3} + \frac{1}{c} - \frac{1}{2} = \frac{1}{2}$$

$$\Rightarrow \frac{1}{c} - \frac{1}{6} = \frac{1}{2}$$

$$\Rightarrow \frac{1}{c} = \frac{1}{2} + \frac{1}{6} = \frac{4}{6} = \frac{2}{3} \Rightarrow c = \frac{3}{2} \text{ hrs} = 1.5 \text{ hrs} = 90 \text{ mins.}$$

9. Correct Answer - A

Explanation:

Minu's profit for the 1st time selling to Kanu = 20% of 1000 = Rs 200

So, cost price for Kanu = 1000 + 200 = Rs 1200

Now, cost price for Minu for the 2nd time = 1200 - 20% of 1200 = Rs 960

Since, total profit for Minu = Rs 500, so profit for the 2nd time = 500 - 200 = Rs 300

Percentage profit by Minu when sold to Tanu = $300/960 \times 100 = 31.25\%$

10. Correct Answer - B

Explanation:

Let the total number of employees = $5x$ and total salary = $6y$

So, number of employees in manufacturing department = 20% of $5x = x$

$\Rightarrow$ number of non-manufacturing employees = $5x - x = 4x$

Total salary withdrawn by manufacturing employees = $1/6 \times 6y = y$

Total salary withdrawn by non-manufacturing employees = $6y - y = 5y$

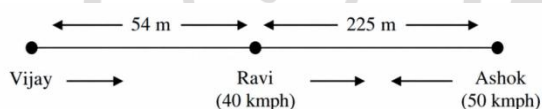
Average salary of manufacturing employees = y/x

Average salary of non-manufacturing employees = $5y/4x$

Hence, required ratio = $y/x: 5y/4x = 4: 5$

11. Correct Answer - A

Explanation:



$$\text{Time taken by R \& A to meet} = \frac{225}{(40+50) \cdot \frac{5}{18}} \text{ secs}$$

$$= \frac{225}{90} \times \frac{18}{5} = 9 \text{ secs.}$$

That means V should meet R after 9 secs.

$$\text{So, speed of Ravi} = \frac{54}{(V-40) \cdot \frac{5}{18}} = 9$$

$$V - 40 = \frac{54}{9} \times \frac{18}{5} = \frac{108}{5}$$

$$\text{So, } V = 40 + 21.6 = 61.6 \text{ kmph.}$$

12. Correct Answer - B

Explanation:

Let price and weight of stone be P and w

So, P is directly proportional to w^2

$\Rightarrow P = kw^2$ where k is a constant

Also, weight of stone = 18 units and the stone is broken into four parts of distinct weights

Now, maximum possible total price of all 4 pieces would be when one of the pieces has maximum possible weight. So, the weights would be 1, 2, 3 and 12

And similarly, minimum possible total price of all 4 pieces would be when the weights are as closest as possible

So, the weights would be 3, 4, 5 and 6

$$\text{So, maximum price} = k(1^2 + 2^2 + 3^2 + 12^2) = k(1 + 4 + 9 + 144) = 158k$$

$$\text{and minimum price} = k(3^2 + 4^2 + 5^2 + 6^2) = k(9 + 16 + 25 + 36) = 86k$$

Given $158k - 86k = 72k = 288000 \Rightarrow k = 4000$

Price of original piece = $kw^2 = 4000 \times (18)^2 = \text{Rs } 1296000$



13. Correct Answer - C

Explanation:

Given, $P = \text{Rs } 200000$ and $R\% = 8\% \text{ p.a.} \Rightarrow 4\% \text{ per half year}$

Amount after first year $= 200000 \left(1 + \frac{4}{100}\right)^2 = \text{Rs. } 216320$

Interest paid after 1st year $= \text{Rs } 10320$

Outstanding amount to be paid $= 216320 - 10320 = \text{Rs } 206000$

Compound amount after two more years $= 206000 \left(1 + \frac{4}{100}\right)^4 = 240991 \text{ (approx.)}$

Compound interest of last 2 years $= 240991 - 200000 = \text{Rs } 40991$

Compound interest paid in all 3 years $= 10320 + 40991 = \text{Rs } 51311$

14. Correct Answer - 407

Explanation:

Let the number of white shirts $= x$ and blue shirts $= y$

Total CP $= 1000x + 1125y$

$\Rightarrow$ Total MP $= 1.25 \times (1000x + 1125y)$

Total SP $= 0.9 \times 1.25 \times (1000x + 1125y) = 1.125 (1000x + 1125y)$

Profit $= 0.125 (1000x + 1125y) = 51000$

$\Rightarrow 1000x + 1125y = 408000$

$\Rightarrow 8x + 9y = 3264 \Rightarrow 9y = 8(408 - x)$

So, y should be a multiple of 8

If $y = 8$, $x = 399 \Rightarrow x + y = 407$

If $y = 16$, $x = 390 \Rightarrow x + y = 406$

If $y = 24$, $x = 381 \Rightarrow x + y = 405$ and so on

Hence, maximum possible value of $x + y = 407$

Alternative Solution:

Let average cost of all shirts $= 4a$

Then average MP $= 4a + 25\% \text{ of } 4a = 5a$

Average S.P. $= 5a - \frac{10}{100}(5a) = 4.5a$

Average Profit $= \text{S.P.} - \text{C.P.} = 0.5a$

Let the total number of shirts $= n$

Then $n(0.5a) = 51000$

$\Rightarrow na = 102000 \dots \dots (1)$

Now n has to be maximized i.e. a has to be minimized i.e. $4a$ has to be minimized.

i.e. $4a > 1000 \Rightarrow a > 250$

$\Rightarrow \frac{102000}{n} > 250 \dots \dots (\text{from } 1)$

$\Rightarrow n < 408$

$\Rightarrow n_{\max} = 407$

15. Correct Answer - 16

Explanation:

The total amount $= 352n$

Also, $352n = 2 \times 506 + (n - 2)y$, where $y \leq 330$

where $y = \text{per head money received by other people}$

$\Rightarrow y = \frac{352n - 1012}{n - 2}$

$\Rightarrow \frac{352n - 1012}{n - 2} \leq 330$

$$\Rightarrow \frac{352n-1012-330n+660}{n-2} \leq 0$$

$$\Rightarrow \frac{22n-352}{n-2} \leq 0 \Rightarrow \frac{n-16}{n-2} \leq 0$$

$$\Rightarrow \frac{(n-16)(n-2)}{(n-2)^2} \leq 0 \Rightarrow (n-16)(n-2) \leq 0 \Rightarrow 2 \leq n \leq 16$$

So, the maximum possible value of $n = 16$.

16. Correct Answer - 7

Explanation:

The volume of milk in the container becomes less than that of water, which means the percentage of milk should be less than 50% of the total.

Every time 4 litres is removed out of 40 litres, i.e., $1/10^{\text{th}}$ is removed.

Let the process be repeated n number of times.

So, remaining milk = $1 \times \frac{9}{10} \times \frac{9}{10} \times \frac{9}{10} \cdots n \text{ times} < \frac{1}{2}$

$$\Rightarrow \left(\frac{9}{10}\right)^n < \frac{1}{2}$$

17. Correct Answer - C

Explanation:

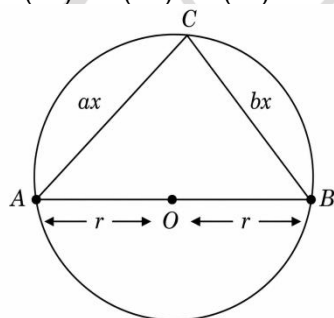
Given AC: BC = a: b

So, let us assume AC = ax, BC = bx

Since angle made in semi-circle is 90°

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

$$\Rightarrow (ax)^2 + (bx)^2 = (2r)^2$$

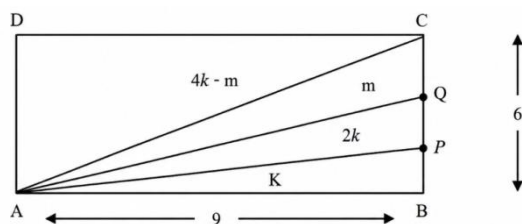


$$x^2 = \frac{4r^2}{a^2+b^2}$$

$$\text{Ar. } (\triangle ABC) = \frac{1}{2}(ax)(bx) = \frac{1}{2}abx^2 = \frac{1}{2}ab \left(\frac{4r^2}{a^2+b^2} \right) = \frac{2abr^2}{a^2+b^2}$$

18. Correct Answer- B

Explanation:



Let the area of triangle ABP = k

$$\Rightarrow \text{area of } AQCD = 4 (\text{Area of } ABP) = 4k$$

Now area (ABP), area (APQ) and area (AQCD) are in GP

$\Rightarrow k, \text{area (APQ)}, 4k$ are in GP

$\Rightarrow \text{area (APQ)} = 2k$

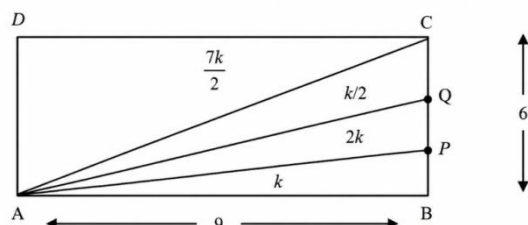
Let area of (AQC) = m

Also, area (ADC) = $4k - m = \text{half of the rectangle}$

$\Rightarrow \text{area (ACB)} = 3k + m$

$4k - m = 3k + m \Rightarrow k = 2m$

Now the rectangle looks like:



Now Area (APB): Area (AQP): Area (ACQ) = $\frac{1}{2} AB \cdot BP : \frac{1}{2} AB \cdot PQ : \frac{1}{2} AB \cdot CQ$

$= BP : PQ : CQ = k : 2k : \frac{k}{2} = 2 : 4 : 1$

19. Correct Answer - 45

Explanation:

Case 1: When $x - y > 0$ & $x - 5 > 0$

Equation becomes, $x - y - (x - 5) = 2$

$\Rightarrow y = 3$ where $x > 5$ and $x > y$

Case 2: When $x - y < 0$ and $x - 5 < 0$

$\Rightarrow x < y$ and $x < 5$

So, equation becomes, $-(x - y) + (x - 5) = 2$

$\Rightarrow y = 7$ where $x < 5$ and $x < y$

Case 3: When $x - y < 0$ & $x - 5 > 0$

$\Rightarrow x < y$ & $x > 5$

So, equation becomes, $-(x - y) - (x - 5) = 2$

$\Rightarrow y - 2x = -3 \Rightarrow 2x - y = 3, x < y, x > 5$

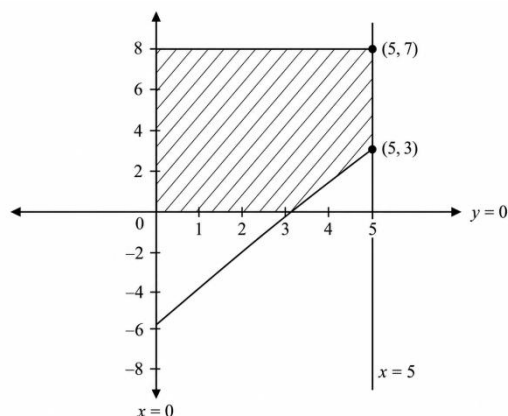
Case 4: When $x - y > 0$ and $x - 5 < 0$

$\Rightarrow x > y$ and $x < 5$

So, equation becomes

$x - y + x - 5 = 2$

$\Rightarrow 2x - y = 7$ where $x > y$ and $x < 5$



So, we can see the required figure is a trapezium.

So required area is $\frac{1}{2} \times (14 + 4) \times 5 = 45$

20. Correct Answer - A

Explanation:

Let both the series are

$a, a + q, a + 2q, \dots = a_1, a_2, a_3, \dots$

and $b, b + p, b + 2p, \dots = b_1, b_2, b_3, \dots$

Where p & q are prime nos.

Given $b_2 = 0 \Rightarrow b + p = 0 \Rightarrow b = -p$

So, the series becomes,

$-p, 0, p, 2p, \dots = b_n$ series.

Now, $b_{19} = -p + (19 - 1)p = 17p$.

And similarly, $b_9 = 7p$

$a_5 = b_9 = 7p$ & $a_{19} = b_{19} = 17p$

$\Rightarrow a + 4q = 7p$ and $a + 18q = 17p$

By solving both equations, we get $q = 5p/7$

Since p & q are primes; So, $p = 7, q = 5$ & $a = 29$.

So, $a_{11} = a + 10q = 29 + 10(5) = 79$

21. Correct Answer - B

Explanation:

Since $2pq - 20 = 52 - 2pq$

$\Rightarrow 4pq = 72 \Rightarrow pq = 18$

Also, $p^2 + q^2 - 29 = 2pq - 20$

$\Rightarrow p^2 + q^2 = 36 - 20 + 29 = 45$.

Now $p^3 - q^3 = (p - q)(p^2 + q^2 + pq)$

$= (p - q)(45 + 18) = 63(p - q) \dots (1)$

Also, $p^2 + q^2 - 29 = 2pq - 20$

$\Rightarrow p^2 + q^2 - 2pq = 9$

$\Rightarrow (p - q)^2 = 9 \Rightarrow p - q = \pm 3 \dots (2)$

Combining (1) & (2),

$(p^3 - q^3)_{\max} = 63 \times 3 = 189$

$(p^3 - q^3)_{\min} = 63 \times (-3) = -189$

So, required difference $= 189 - (-189) = 378$

22. Correct Answer - 967

Explanation:

We have, $a_n = 13 + 6(n - 1) = 6n + 7 = 7, 13, 19, 25, 31, 37, 43, \dots$

$b_n = 15 + 7(n - 1) = 8 + 7n = 8, 15, 22, 29, 36, 43, \dots$

Since, we are looking for common terms.

First common term is 43.

All the common terms should be in the form of

$n \times (\text{L.C.M.}(6, 7)) + 43 = 42n + 43$.

Now $42n + 43 < 1000$

$\Rightarrow 42n < 957$

$\Rightarrow n < 22.7 \dots$

$\Rightarrow$ the largest possible value of $n = 22$.

So, the largest 3-digit integer $= 42n + 43 = 42(22) + 43 = 967$.

