

## VERBAL ABILITY AND READING COMPREHENSION

**Direction for Reading Comprehension:** The passages given here are followed by some questions that have four answer choices; read the passage carefully and pick the option whose answer best aligns with the passage

[There is] a curious new reality: Human contact is becoming a luxury good. As more screens appear in the lives of the poor, screens are disappearing from the lives of the rich. The richer you are, the more you spend to be off-screen. . . . The joy — at least at first — of the internet revolution was its democratic nature. Facebook is the same Facebook whether you are rich or poor. Gmail is the same Gmail. And it's all free. There is something mass market and unappealing about that. And as studies show that time on these advertisement-support platforms is unhealthy, it all starts to seem *déclassé*, like drinking soda or smoking cigarettes, which wealthy people do less than poor people. The wealthy can afford to opt out of having their data and their attention sold as a product. The poor and middle class don't have the same kind of resources to make that happen.

Screen exposure starts young. And children who spent more than two hours a day looking at a screen got lower scores on thinking and language tests, according to early results of a landmark study on brain development of more than 11,000 children that the National Institutes of Health is supporting. Most disturbingly, the study is finding that the brains of children who spend a lot of time on screens are different. For some kids, there is premature thinning of their cerebral cortex. In adults, one study found an association between screen time and depression. . . .

Tech companies worked hard to get public schools to buy into programs that required schools to have one laptop per student, arguing that it would better prepare children for their screen-based future. But this idea isn't how the people who actually build the screen-based future raise their own children. In Silicon Valley, time on screens is increasingly seen as unhealthy. Here, the popular elementary school is the local Waldorf School, which promises a back-to-nature, nearly screen-free education. So as wealthy kids are growing up with less screen time, poor kids are growing up with more. How comfortable someone is with human engagement could become a new class marker.

Human contact is, of course, not exactly like organic food. But with screen time, there has been a concerted effort on the part of Silicon Valley behemoths to confuse the public. The poor and the middle class are told that screens are good and important for them and their children. There are fleets of psychologists and neuroscientists on staff at big tech companies working to hook eyes and minds to the screen as fast as possible and for as long as possible. And so human contact is rare. . . .

There is a small movement to pass a "right to disconnect" bill, which would allow workers to turn their phones off, but for now a worker can be punished for going offline and not being available. There is also the reality that in our culture of increasing isolation, in which so many of the traditional gathering places and social structures have disappeared, screens are filling a crucial void.

1. The author is least likely to agree with the view that the increase in screen-time is fuelled by the fact that:
  - (a) there is a growth in computer-based teaching in public schools.
  - (b) some workers face punitive action if they are not online.
  - (c) with falling costs, people are streaming more content on their devices.
  - (d) screens provide social contact in an increasingly isolating world.
2. The author claims that Silicon Valley tech companies have tried to "confuse the public" by:
  - (a) promoting screen time in public schools while opting for a screen-free education for their own children.
  - (b) pushing for greater privacy while working with advertisement-support platforms to mine data.
  - (c) concealing the findings of psychologists and neuroscientists on screen-time use from the public.
  - (d) developing new work-efficiency programmes while lobbying for the "right to disconnect" bill.
3. The statement "The richer you are, the more you spend to be off-screen" is supported by which other line from the passage?
  - (a) "Gmail is the same Gmail. And it's all free."
  - (b) "... screens are filling a crucial void."
  - (c) "How comfortable someone is with human engagement could become a new class marker."
  - (d) "... studies show that time on these advertisement-support platforms is unhealthy."
4. Which of the following statements about the negative effects of screen time is the author least likely to endorse?
  - (a) It is designed to be addictive.
  - (b) It is shown to have adverse effects on young children's learning.
  - (c) It increases human contact as it fills an isolation void.
  - (d) It can cause depression in viewers.

**Direction for Reading Comprehension: The passages given here are followed by some questions that have four answer choices; read the passage carefully and pick the option whose answer best aligns with the passage**

I've been following the economic crisis for more than two years now. I began working on the subject as part of the background to a novel, and soon realized that I had stumbled across the most interesting story I've ever found. While I was beginning to work on it, the British bank Northern Rock blew up, and it became clear that, as I wrote at the time, "If our laws are not extended to control the new kinds of super-powerful, super-complex, and potentially superrisky investment vehicles, they will one day cause a financial disaster of global-systemic proportions." . . . I was both right and too late, because all the groundwork for the crisis had already been done— though the sluggishness of the world's governments, in not preparing for the great unraveling of autumn 2008, was then and still is stupefying. But this is the first reason why I wrote this book: because what's happened is extraordinarily interesting. It is an absolutely amazing story, full of human interest and drama, one whose byways of mathematics, economics, and psychology are both central to the story of the last decades and mysteriously unknown to the general public. We have heard a lot about "the two cultures" of science and the arts—we heard a particularly large amount about it in 2009, because it was the fiftieth anniversary of the speech during which C. P. Snow first used the phrase. But I'm not sure the idea of a huge gap between science and the arts is as true as it was half a century ago—it's certainly true, for instance, that a general reader who wants to pick up an education in the fundamentals of science will find it easier than ever before. It seems to me that there is a much bigger gap between the world of finance and that of the general public and that there is a need to narrow that gap, if the financial industry is not to be a kind of priesthood, administering to its own mysteries and feared and resented by the rest of us. Many bright, literate people have no idea about all sorts of economic basics, of a type that financial insiders take as elementary facts of how the world works. I am an outsider to finance and economics, and my hope is that I can talk across that gulf.

My need to understand is the same as yours, whoever you are. That's one of the strangest ironies of this story: after decades in which the ideology of the Western world was personally and economically individualistic, we've suddenly been hit by a crisis which shows in the starkest terms that whether we like it or not—and there are large parts of it that you would have to be crazy to like—we're all in this together. The aftermath of the crisis is going to dominate the economics and politics of our societies for at least a decade to come and perhaps longer.

5. Which one of the following best captures the main argument of the last paragraph of the passage?
  - (a) The aftermath of the crisis will strengthen the central ideology of individualism in the Western world.
  - (b) Whoever you are, you would be crazy to think that there is no crisis.
  - (c) In the decades to come, other ideologies will emerge in the aftermath of the crisis.
  - (d) The ideology of individualism must be set aside in order to deal with the crisis.
6. Which one of the following, if true, would be an accurate inference from the first sentence of the passage?
  - (a) The author has witnessed many economic crises by travelling a lot for two years.
  - (b) The author's preoccupation with the economic crisis is not less than two years old.
  - (c) The author is preoccupied with the economic crisis because he is being followed.
  - (d) The economic crisis outlasted the author's preoccupation with it.
7. Which one of the following, if false, could be seen as supporting the author's claims?
  - (a) The economic crisis was not a failure of collective action to rectify economic problems.
  - (b) Most people are yet to gain any real understanding of the workings of the financial world.
  - (c) The huge gap between science and the arts has steadily narrowed over time.
  - (d) The global economic crisis lasted for more than two years.
8. All of the following, if true, could be seen as supporting the arguments in the passage, EXCEPT:
  - (a) The failure of economic systems does not necessarily mean the failure of their ideologies.
  - (b) The story of the economic crisis is also one about international relations, global financial security, and mass psychology.
  - (c) The difficulty with understanding financial matters is that they have become so arcane.
  - (d) Economic crises could be averted by changing prevailing ideologies and beliefs.
9. According to the passage, the author is likely to be supportive of which one of the following programmes?
  - (a) An educational curriculum that promotes developing financial literacy in the masses.

- (b) The complete nationalisation of all financial institutions.
- (c) An educational curriculum that promotes economic research.

- (d) Economic policies that are more sensitively calibrated to the fluctuations of the market.

**Direction for Reading Comprehension: The passages given here are followed by some questions that have four answer choices; read the passage carefully and pick the option whose answer best aligns with the passage**

Mode of transportation affects the travel experience and thus can produce new types of travel writing and perhaps even new “identities.” Modes of transportation determine the types and duration of social encounters; affect the organization and passage of space and time; . . . and also affect perception and knowledge—how and what the traveler comes to know and write about. The completion of the first U.S. transcontinental highway during the 1920s . . . for example, inaugurated a new genre of travel literature about the United States—the automotive or road narrative. Such narratives highlight the experiences of mostly male protagonists “discovering themselves” on their journeys, emphasizing the independence of road travel and the value of rural folk traditions.

Travel writing’s relationship to empire building—as a type of “colonialist discourse”—has drawn the most attention from academicians. Close connections have been observed between European (and American) political, economic, and administrative goals for the colonies and their manifestations in the cultural practice of writing travel books. Travel writers’ descriptions of foreign places have been analysed as attempts to validate, promote, or challenge the ideologies and practices of colonial or imperial domination and expansion. Mary Louise Pratt’s study of the genres and conventions of 18th- and 19th-century exploration narratives about South America and Africa (e.g., the “monarch of all I survey” trope) offered ways of thinking about travel writing as embedded within relations of power between metropole and periphery, as did Edward Said’s theories of representation and cultural imperialism. Particularly Said’s book, *Orientalism*, helped scholars understand ways in which representations of people in travel texts were intimately bound up with notions of self, in this case, that the Occident defined itself through essentialist, ethnocentric, and racist representations of the Orient. Said’s work became a model for demonstrating cultural forms of imperialism in travel texts, showing how the political, economic, or administrative fact of dominance relies on legitimating discourses such as those articulated through travel writing. . . .

Feminist geographers’ studies of travel writing challenge the masculinist history of geography by questioning who and what are relevant subjects of geographic study and, indeed, what counts as geographic knowledge itself. Such questions are worked through ideological constructs that posit men as explorers and women as travelers—or, conversely, men as travelers and women as tied to the home. Studies of Victorian women who were professional travel writers, tourists, wives of colonial administrators, and other (mostly) elite women who wrote narratives about their experiences abroad during the 19th century have been particularly revealing. From a “liberal” feminist perspective, travel presented one means toward female liberation for middle- and upper-class Victorian women. Many studies from the 1970s onward demonstrated the ways in which women’s gendered identities were negotiated differently “at home” than they were “away,” thereby showing women’s self-development through travel. The more recent poststructural turn in studies of Victorian travel writing has focused attention on women’s diverse and fragmented identities as they narrated their travel experiences, emphasizing women’s sense of themselves as women in new locations, but only as they worked through their ties to nation, class, whiteness, and colonial and imperial power structures.

10. According to the passage, Said’s book, “*Orientalism*”:
- (a) illustrated how narrow minded and racist westerners were.
  - (b) demonstrated how cultural imperialism was used to justify colonial domination.
  - (c) explained the difference between the representation of people and the actual fact.
  - (d) argued that cultural imperialism was more significant than colonial domination.

11. From the passage, it can be inferred that scholars argue that Victorian women experienced self-development through their travels because:

- (a) their identity was redefined when they were away from home.
- (b) they were from the progressive middle- and upper-classes of society.
- (c) they were on a quest to discover their diverse identities.
- (d) they developed a feminist perspective of the world.

12. American travel literature of the 1920s:

- (a) developed the male protagonists’ desire for independence.

- (b) presented travellers' discovery of their identity as different from others.
- (c) celebrated the freedom that travel gives.
- (d) showed participation in local traditions.

- (c) awareness of gender issues in Victorian society.
- (d) awareness of the ways in which identity is formed.

13. From the passage, we can infer that feminist scholars' understanding of the experiences of Victorian women travellers is influenced by all of the following EXCEPT scholars':
- (a) perspective that they bring to their research.
  - (b) knowledge of class tensions in Victorian society.

14. From the passage, we can infer that travel writing is most similar to:
- (a) feminist writing.
  - (b) historical fiction.
  - (c) political journalism.
  - (d) autobiographical writing.

**Direction for Reading Comprehension: The passages given here are followed by some questions that have four answer choices; read the passage carefully and pick the option whose answer best aligns with the passage**

Although one of the most contested concepts in political philosophy, human nature is something on which most people seem to agree. By and large, according to Rutger Bregman in his new book *Humankind*, we have a rather pessimistic view – not of ourselves exactly, but of everyone else. We see other people as selfish, untrustworthy and dangerous and therefore we behave towards them with defensiveness and suspicion. This was how the 17th-century philosopher Thomas Hobbes conceived our natural state to be, believing that all that stood between us and violent anarchy was a strong state and firm leadership.

But in following Hobbes, argues Bregman, we ensure that the negative view we have of human nature is reflected back at us. He instead puts his faith in Jean-Jacques Rousseau, the 18th-century French thinker, who famously declared that man was born free and it was civilisation – with its coercive powers, social classes and restrictive laws – that put him in chains.

Hobbes and Rousseau are seen as the two poles of the human nature argument and it's no surprise that Bregman strongly sides with the Frenchman. He takes Rousseau's intuition and paints a picture of a prelapsarian idyll in which, for the better part of 300,000 years, *Homo sapiens* lived a fulfilling life in harmony with nature . . . Then we discovered agriculture and for the next 10,000 years it was all property, war, greed and injustice. . . .

It was abandoning our nomadic lifestyle and then domesticating animals, says Bregman, that brought about infectious diseases such as measles, smallpox, tuberculosis, syphilis, malaria, cholera and plague. This may be true, but what Bregman never really seems to get to grips with is that pathogens were not the only things that grew with agriculture – so did the number of humans. It's one thing to maintain friendly relations and a property-less mode of living when you're 30 or 40 hunter-gatherers following the food. But life becomes a great deal more complex and knowledge far more extensive when there are settlements of many thousands.

"Civilisation has become synonymous with peace and progress and wilderness with war and decline," writes Bregman. "In reality, for most of human existence, it was the other way around." Whereas traditional history depicts the collapse of civilisations as "dark ages" in which everything gets worse, modern scholars, he claims, see them more as a reprieve, in which the enslaved gain their freedom and culture flourishes. Like much else in this book, the truth is probably somewhere between the two stated positions.

In any case, the fear of civilisational collapse, Bregman believes, is unfounded. It's the result of what the Dutch biologist Frans de Waal calls "veneer theory" – the idea that just below the surface, our bestial nature is waiting to break out. . . . There's a great deal of reassuring human decency to be taken from this bold and thought-provoking book and a wealth of evidence in support of the contention that the sense of who we are as a species has been deleteriously distorted. But it seems equally misleading to offer the false choice of Rousseau and Hobbes when, clearly, humanity encompasses both.

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15. According to the author, the main reason why Bregman contrasts life in preagricultural societies with agricultural societies is to:
- bolster his argument that people are basically decent, but progress as we know it can make them selfish.
  - make the argument that an environmentally conscious lifestyle is a more harmonious way of living.
  - highlight the enormous impact that settled farming had on population growth.
  - advocate the promotion of less complex societies as a basis for greater security and prosperity.
16. None of the following views is expressed in the passage EXCEPT that:
- Hobbes and Rousseau disagreed on the fundamental nature of humans, but both believed in the need for a strong state.
  - Bregman agrees with Hobbes that firm leadership is needed to ensure property rights and regulate strife.
  - the author of the review believes in the veneer theory of human nature.
  - most people agree with Hobbes' pessimistic view of human nature as being intrinsically untrustworthy and selfish.
17. According to the passage, the "collapse of civilisations" is viewed by Bregman as:
- a temporary phase which can be rectified by social action.
  - a time that enables changes in societies and cultures.
  - a sign of regression in society's trajectory.
  - resulting from a breakdown in the veneer of human nature.
18. The author has differing views from Bregman regarding:
- the role of pathogens in the spread of infectious diseases.
  - a property-less mode of living being socially harmonious.
  - the role of agriculture in the advancement of knowledge.
  - a civilised society being coercive and unjust.
19. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:
- Each one personified a different aspect of good fortune.
  - The others were versions of popular Buddhist gods, Hindu gods and Daoist gods.
  - Seven popular Japanese deities, the Shichi Fukujin, were considered to bring good luck and happiness.
  - Although they were included in the Shinto pantheon, only two of them, Daikoku and Ebisu, were indigenous Japanese gods.
20. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:
- The logic of displaying one's inner qualities through outward appearance was based on a distinction between being a woman and being feminine.
  - 'Appearance' became a signifier of conduct - to look was to be and conformity to the feminine ideal was measured by how well women could use the tools of the fashion and beauty industries.
  - The makeover-centric media sets out subtly and not-so-subtly, 'good' and 'bad' ways to be a woman, layering these over inequalities of race and class.
  - The denigration of working-class women and women of colour often centres on their perceived failure to embody feminine beauty.
  - 'Woman' was considered a biological category, but femininity was a 'process' by which women became specific kinds of women.
21. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.
- Brown et al. (2001) suggest that 'metabolic theory may provide a conceptual foundation for much of ecology just as genetic theory provides a foundation for much of evolutionary biology'. One of the successes of genetic theory is the diversity of theoretical approaches and models that have been developed and applied. A Web of Science (v. 5.9. Thomson Reuters) search on genetic\* + theor\* + evol\* identifies more than 12000 publications between 2005 and 2012. Considering only the 10 most-cited papers within this 12000 publication set, genetic theory can be seen to focus on genome dynamics, phylogenetic inference, game theory and the regulation of gene expression. There is no one fundamental genetic equation, but rather a wide array of genetic models, ranging from simple to complex, with differing inputs and outputs, and divergent areas of application, loosely connected to each other through the shared conceptual foundation of



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heritable variation.

1. Genetic theory has a wide range of theoretical approaches and applications and Metabolic theory must have the same in the field of ecology.
2. Genetic theory has evolved to spawn a wide range of theoretical models and applications but Metabolic theory need not evolve in a similar manner in the field of ecology.
3. Genetic theory has a wide range of theoretical approaches and application and is foundational to evolutionary biology and Metabolic theory has the potential to do the same for ecology.
4. Genetic theory provides an example of how a range of theoretical approaches and applications can make a theory successful.

22. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

- 1 It advocated a conservative approach to antitrust enforcement that espouses faith in efficient markets and voiced suspicion regarding the merits of judicial intervention to correct anticompetitive practices.
- 2 Many industries have consistently gained market share, the lion's share - without any official concern; the most successful technology companies have grown into veritable titans, on the premise that they advance 'public interest'.
- 3 That the new anticompetitive risks posed by tech giants like Google, Facebook, and Amazon, necessitate new legal solutions could be attributed to the dearth of enforcement actions against monopolies and the few cases challenging mergers in the USA.
- 4 The criterion of 'consumer welfare standard' and the principle that antitrust law should serve consumer interests and that it should protect competition rather than individual competitors was an antitrust law introduced by, and named after, the 'Chicago school'.

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

The dominant hypotheses in modern science believe that language evolved to allow humans to exchange factual information about the physical world. But an alternative view is that language evolved, in modern humans at least, to facilitate social bonding. It increased our ancestors' chances of survival by enabling them to hunt more successfully or to cooperate more extensively. Language meant that

things could be explained and that plans and past experiences could be shared efficiently.

1. From the belief that humans invented language to process factual information, scholars now think that language was the outcome of the need to ensure social cohesion and thus human survival.
2. Since its origin, language has been continuously evolving to higher forms, from being used to identify objects to ensuring human survival by enabling our ancestors to bond and cooperate.
3. Most believe that language originated from a need to articulate facts, but others think it emerged from the need to promote social cohesion and cooperation, thus enabling human survival.
4. Experts are challenging the narrow view of the origin of language, as being merely used to describe facts and label objects, to being necessary to promote more complex interactions among humans.

24. The four sentences (labelled 1, 2, 3, 4) below, when properly sequenced would yield a coherent paragraph. Decide on the proper sequencing of the order of the sentences and key in the sequence of the four numbers as your answer:

1. Complex computational elements of the CNS are organized according to a "nested" hierarchic criterion; the organization is not permanent and can change dynamically from moment to moment as they carry out a computational task.
2. Echolocation in bats exemplifies adaptation produced by natural selection; a function not produced by natural selection for its current use is exaptation -- feathers might have originally arisen in the context of selection for insulation.
3. From a structural standpoint, consistent with exaptation, the living organism is organized as a complex of "Russian Matryoshka Dolls" -- smaller structures are contained within larger ones in multiple layers.
4. The exaptation concept, and the Russian-doll organization concept of living beings deduced from studies on evolution of the various apparatuses in mammals, can be applied for the most complex human organ: the central nervous system (CNS).

25. The passage given below is followed by four alternate summaries. Choose the option that best captures the essence of the passage.

Aesthetic political representation urges us to realize that 'the representative has autonomy with regard to the people represented' but autonomy then is not an

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excuse to abandon one's responsibility. Aesthetic autonomy requires cultivation of 'disinterestedness' on the part of actors which is not indifference. To have disinterestedness, that is, to have comportment towards the beautiful that is devoid of all ulterior references to use – requires a kind of aesthetic commitment; it is the liberation of ourselves for the release of what has proper worth only in itself.

1. Disinterestedness is different from indifference as the former means a non-subjective evaluation of things which is what constitutes aesthetic political representation.
2. Aesthetic political representation advocates autonomy for the representatives manifested through disinterestedness which itself is different from indifference.
3. Disinterestedness, as distinct from indifference, is the basis of political representation.
4. Aesthetic political representation advocates autonomy for the representatives drawing from disinterestedness, which itself is different from indifference.
- 6.

**26. Five jumbled up sentences, related to a topic, are given below. Four of them can be put together to form a coherent paragraph. Identify the odd one out and key in the number of the sentence as your answer:**

1. Machine learning models are prone to learning human-like biases from the training data that feeds these algorithms.
2. Hate speech detection is part of the on-going effort against oppressive and abusive language on social media.
3. The current automatic detection models miss out on something vital: context.
4. It uses complex algorithms to flag racist or violent speech faster and better than human beings alone.
5. For instance, algorithms struggle to determine if group identifiers like "gay" or "black" are used in offensive or prejudiced ways because they're trained on imbalanced datasets with unusually high rates of hate speech.

## DATA INTERPRETATION AND LOGICAL REASONING

**Answer the next 4 questions based on the information given below.**

Sixteen patients in a hospital must undergo a blood test for a disease. It is known that exactly one of them has the disease. The hospital has only eight testing kits and has decided to pool blood samples of patients into eight vials for the tests. The patients are numbered 1 through 16, and the vials are labelled A, B, C, D, E, F, G, and H. The following table shows the vials into which each patient's blood sample is distributed.

Patient	Vials	Patient	Vials
1	B, D, F, H	9	A, D, F, H
2	B, D, F, G	10	A, D, F, G
3	B, D, E, H	11	A, D, E, H
4	B, D, E, G	12	A, D, E, G
5	B, C, F, H	13	A, C, F, H
6	B, C, F, G	14	A, C, F, G
7	B, C, E, H	15	A, C, E, H
8	B, C, E, G	16	A, C, E, G

If a patient has the disease, then each vial containing his/her blood sample will test positive. If a vial tests positive, one of the patients whose blood samples were mixed in the vial has the disease. If a vial tests negative, then none of the patients whose blood samples were mixed in the vial has the disease.

27. Suppose vial C tests positive and vials A, E and H test negative. Which patient has the disease?  
(a) Patient 14 (b) Patient 2  
(c) Patient 6 (d) Patient 8
28. Suppose vial A tests positive and vials D and G test negative. Which of the following vials should we test next to identify the patient with the disease?  
(a) Vial B (b) Vial C  
(c) Vial E (d) Vial H
29. Which of the following combinations of test results is NOT possible?
30. Suppose one of the lab assistants accidentally mixed two patients' blood samples before they were distributed to the vials. Which of the following correctly represents the set of all possible numbers of positive test results out of the eight vials?  
(a) {4,5,6,7} (b) {4,5,6,7,8}  
(c) {4,5} (d) {5,6,7,8}

**Answer the next 4 questions based on the information given.**

A survey of 600 schools in India was conducted to gather information about their online teaching learning processes (OTLP). The following four facilities were studied.

F1: Own software for OTLP F2: Trained teachers for OTLP

F3: Training materials for OTLP F4: All students having Laptops

The following observations were summarized from the survey.

- 80 schools did not have any of the four facilities – F1, F2, F3, F4.
- 40 schools had all four facilities.
- The number of schools with only F1, only F2, only F3, and only F4 was 25, 30, 26 and 20 respectively.
- The number of schools with exactly three of the facilities was the same irrespective of which three were considered.
- 313 schools had F2.



6. 26 schools had only F2 and F3 (but neither F1 nor F4).  
 7. Among the schools having F4, 24 had only F3, and 45 had only F2.  
 8. 162 schools had both F1 and F2.  
 9. The number of schools having F1 was the same as the number of schools having F4.
31. What was the total number of schools having exactly three of the four facilities? (c) 95 (d) 185  
 (a) 64 (b) 80  
 (c) 50 (d) 200
32. What was the number of schools having facilities F2 and F4? (a) 85 (b) 45
33. What was the number of schools having only facilities F1 and F3?
34. What was the number of schools having only facilities F1 and F4?

**Answer the next 4 questions based on the information given.**

XYZ organization got into the business of delivering groceries to home at the beginning of the last month. They have a two-day delivery promise. However, their deliveries are unreliable. An order booked on a particular day may be delivered the next day or the day after. If the order is not delivered at the end of two days, then the order is declared as lost at the end of the second day. XYZ then does not deliver the order, but informs the customer, marks the order as lost, returns the payment and pays a penalty for non-delivery.

The following table provides details about the operations of XYZ for a week of the last month. The first column gives the date, the second gives the cumulative number of orders that were booked up to and including that day. The third column represents the number of orders delivered on that day. The last column gives the cumulative number of orders that were lost up to and including that day.

It is known that the numbers of orders that were booked on the 11<sup>th</sup>, 12<sup>th</sup>, and 13<sup>th</sup> of the last month that took two days to deliver were 4, 6, and 8 respectively.

Day	Cumulative orders booked	Orders delivered on day	Cumulative orders lost
13 <sup>th</sup>	219	11	91
14 <sup>th</sup>	249	27	92
15 <sup>th</sup>	277	23	94
16 <sup>th</sup>	302	11	106
17 <sup>th</sup>	327	21	118
18 <sup>th</sup>	332	13	120
19 <sup>th</sup>	337	14	129

35. Among the following days, the largest fraction of orders booked on which day was lost? (a) 16<sup>th</sup> (b) 13<sup>th</sup> (c) 14<sup>th</sup> (d) 15<sup>th</sup>
36. On which of the following days was the number of orders booked the highest? (a) 14<sup>th</sup> (b) 12<sup>th</sup> (c) 15<sup>th</sup> (d) 13<sup>th</sup>
37. The delivery ratio for a given day is defined as the ratio of the number of orders booked on that day which are delivered on the next day to the number of orders booked on that day which are delivered on the second day after booking. On which of the following days, was the delivery ratio the highest? (a) 16<sup>th</sup> (b) 15<sup>th</sup> (c) 14<sup>th</sup> (d) 13<sup>th</sup>
38. The average time taken to deliver orders booked on a particular day is computed as follows. Let the number of orders delivered the next day be  $x$  and the number of orders delivered the day after be  $y$ . Then the average time to deliver order is  $(x+2y)/(x+y)$ . On which of the following days was the average time taken to deliver orders booked the least? (a) 13<sup>th</sup> (b) 15<sup>th</sup> (c) 16<sup>th</sup> (d) 14<sup>th</sup>

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**Answer the next 4 questions based on the information given.**

The Hi-Lo game is a four-player game played in six rounds. In every round, each player chooses to bid Hi or Lo. The bids are made simultaneously. If all four bid Hi, then all four lose 1 point each. If three players bid Hi and one bids Lo, then the players bidding Hi gain 1 point each and the player bidding Lo loses 3 points. If two players bid Hi and two bid Lo, then the players bidding Hi gain 2 points each and the players bidding Lo lose 2 points each. If one player bids Hi and three bid Lo, then the player bidding Hi gains 3 points and the players bidding Lo lose 1 point each. If all four bid Lo, then all four gain 1 point each.

Four players Arun, Bankim, Charu, and Dipak played the Hi-Lo game. The following facts are known about their game:

- At the end of three rounds, Arun had scored 6 points, Dipak had scored 2 points, Bankim and Charu had scored -2 points each.
- At the end of six rounds, Arun had scored 7 points Bankim and Dipak had scored -1 point each, and Charu had scored -5 points.
- Dipak's score in the third round was less than his score in the first round but was more than his score in the second round.
- In exactly two out of the six rounds, Arun was the only player who bid Hi.

39. What were the bids by Arun, Bankim, Charu and Dipak, respectively in the first round?

- (a) Hi, Lo, Lo, Lo                      (b) Lo, Lo, Lo, Hi  
(c) Hi, Lo, Lo, Hi                      (d) Hi, Hi, Lo, Lo

40. In how many rounds did Arun bid Hi?

41. In how many rounds did Bankim bid Lo?

42. In how many rounds did all four players make identical bids?

43. In how many rounds did Dipak gain exactly 1 point?

44. In which of the following rounds, was Arun DEFINITELY the only player to bid Hi?

- (a) First                                      (b) Second  
(c) Third                                      (d) Fourth

**Answer the next 4 questions based on the information given.**

A farmer had a rectangular land containing 205 trees. He distributed that land among his four daughters – Abha, Bina, Chitra and Dipti by dividing the land into twelve plots along three rows (X,Y,Z) and four Columns (1,2,3,4) as shown in the figure below:

	1	2	3	4
X	12 C			
Y	21 A			A
Z	B	C	9	28

The plots in rows X, Y, Z contained mango, teak and pine trees respectively. Each plot had trees in non-zero multiples of 3 or 4 and none of the plots had the same number of trees. Each daughter got an even number of plots. In the figure, the number mentioned in top left corner of a plot is the number of trees in that plot, while the letter in the bottom right corner is the first letter of the name of the daughter who got that plot (For example, Abha got the plot in row Y and column 1 containing 21 trees). Some information in the figure got erased, but the following is known:

- Abha got 20 trees more than Chitra but 6 trees less than Dipti.
- The largest number of trees in a plot was 32, but it was not with Abha.
- The number of teak trees in Column 3 was double of that in Column 2 but was half of that in Column 4. Both Abha and Bina got a higher number of plots than Dipti.
- Only Bina, Chitra and Dipti got corner plots. Dipti got two adjoining plots in the same row.
- Bina was the only one who got a plot in each row and each column.
- Chitra and Dipti did not get plots which were adjacent to each other (either in row / column / diagonal).
- The number of mango trees was double the number of teak trees.

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45. How many mango trees were there in total?

- (a) 49                      (b) 126  
(c) 98                      (d) 84

46. Which of the following is the correct sequence of trees received by Abha, Bina, Chitra and Dipti in that order?

- (a) 44, 87, 24, 50              (b) 50, 69, 30, 56  
(c) 60, 39, 40, 66              (d) 54, 57, 34, 60

47. How many pine trees did Chitra receive?

- (a) 18                      (b) 15  
(c) 30                      (d) 21

48. Who got the plot with the smallest number of trees

and how many trees did that plot have?

- (a) Dipti, 6 trees              (b) Bina, 4 trees  
(c) Bina, 3 trees              (d) Abha, 4 trees

49. Which of the following statements is NOT true?

- (a) Abha got 41 teak trees.  
(b) Chitra got 12 mango trees.  
(c) Bina got 32 pine trees.  
(d) Dipti got 56 mango trees.

50. Which column had the highest number of trees?

- (a) 4                      (b) 2  
(c) 3                      (d) Cannot be determined

## QUANTITATIVE APTITUDE

51. How many integers in the set {100, 101, 102, ..., 999} have at least one digit repeated?  
 (a) 15 (b) 12  
 (c) 13 (d) 14
52. A and B are two railway stations 90 km apart. A train leaves A at 9:00 am, heading towards B at a speed of 40 km/hr. Another train leaves B at 10:30 am, heading towards A at a speed of 20 km/hr. The trains meet each other at  
 (a) 11:45 a.m. (b) 11 a.m.  
 (c) 10:45 a.m. (d) 11:20 a.m.
53. A batsman played  $n + 2$  innings and got out on all occasions. His average score in these  $n + 2$  innings was 29 runs and he scored 38 and 15 runs in the last two innings. The batsman scored less than 38 runs in each of the first  $n$  innings. In these  $n$  innings, his average score was 30 runs and lowest score was  $x$  runs. The smallest possible value of  $x$  is  
 (a) 3 (b) 4  
 (c) 1 (d) 2
54. In a trapezium ABCD, AB is parallel to DC, BC is perpendicular to DC and  $\angle BAD = 45^\circ$ . If DC = 5 cm, BC = 4 cm, the area of the trapezium in sq.cm is
55. A contractor agreed to construct a 6 km road in 200 days. He employed 140 persons for the work. After 60 days, he realized that only 1.5 km road has been completed. How many additional people would he need to employ in order to finish the work exactly on time?
56. If  $x_1 = -1$  and  $x_m = x_{m+1} + (m + 1)$  for every positive integer  $m$ , then  $x_{100}$  equals  
 (a) -5151 (b) -5150  
 (c) -5050 (d) -5051
57. If  $a, b, c$  are non-zero and  $14^a = 36^b = 84^c$ , then  $6b\left(\frac{1}{c} - \frac{1}{a}\right)$  is equal to
58. Let  $m$  and  $n$  be natural numbers such that  $n$  is even and  $0.2 < \frac{m}{20}, \frac{n}{m}, \frac{n}{11} < 0.5$ . Then  $m - 2n$  equals  
 (a) 4 (b) 3  
 (c) 2 (d) 1
59. If  $f(x + y) = f(x)f(y)$  and  $f(5) = 4$ , then  $f(10) - f(-10)$  is equal to  
 (a) 0 (b) 15.9375  
 (c) 3 (d) 14.0625
60. The points (2, 1) and (-3, -4) are opposite vertices of a parallelogram. If the other two vertices lie on the line  $x + 9y + c = 0$ , then  $c$  is
61. Vimla starts for office every day at 9 am and reaches exactly on time if she drives at her usual speed of 40 km/hr. She is late by 6 minutes if she drives at 35 km/hr. One day, she covers two-thirds of her distance to office in one-third of her usual time to reach office, and then stops for 8 minutes. The speed, in km/hr, at which she should drive the remaining distance to reach office exactly on time is  
 (a) 26 (b) 28  
 (c) 29 (d) 27
62. A man buys 35 kg of sugar and sets a marked price in order to make a 20% profit. He sells 5 kg at this price, and 15 kg at a 10% discount. Accidentally, 3 kg of sugar is wasted. He sells the remaining sugar by raising the marked price by  $p$  percent so as to make an overall profit of 15%. Then  $p$  is nearest to  
 (a) 25 (b) 35  
 (c) 22 (d) 31
63. Let  $m$  and  $n$  be positive integers, If  $x^2 + mx + 2n = 0$  and  $x^2 + 2nx + m = 0$  have real roots, then the smallest possible value of  $m + n$  is  
 (a) 8 (b) 7  
 (c) 5 (d) 6
64. Anil, Sunil, and Ravi run along a circular path of length 3 km, starting from the same point at the same time, and going in the clockwise direction. If they run at speeds of 15 km/hr, 10 km/hr, and 8 km/hr, respectively, how much distance in km will Ravi have run when Anil and Sunil meet again for the first time at the starting point?  
 (a) 4.6 (b) 4.2  
 (c) 5.2 (d) 4.8
65. Let  $N, x$  and  $y$  be positive integers such that  $N = x + y$ ,  $2 < x < 10$  and  $14 < y < 23$ . If  $N > 25$ , then how many distinct values are possible for  $N$ ?
66. In the final examination, Bishnu scored 52% and Asha scored 64%. The marks obtained by Bishnu is 23 less, and that by Asha is 34 more than the marks obtained by Ramesh. The marks obtained by Geeta, who scored 84%, is  
 (a) 399 (b) 439  
 (c) 417 (d) 357
67. Dick is thrice as old as Tom and Harry is twice as old as Dick. If Dick's age is 1 year less than the average age of all three, then Harry's age, in years, is

68. The vertices of a triangle are (0, 0), (4, 0) and (3, 9). The area of the circle passing through these three points is

- (a)  $123\pi/7$  (b)  $205\pi/9$   
(c)  $14\pi/3$  (d)  $12\pi/5$

69.  $\frac{2 \times 4 \times 8 \times 16}{(\log_2 4)^2 (\log_4 8)^3 (\log_8 16)^4}$  equals

70. A person invested a certain amount of money at 10% annual interest, compounded half-yearly. After one and a half years, the interest and principal together became Rs 18522. The amount, in rupees, that the person had invested is

71. If  $\log_a 30 = A$ ,  $\log_a(5/3) = -B$  and  $\log_2 a = 1/3$ , then  $\log_3 a$  equals

- (a)  $(A + B)/2 - 3$  (b)  $2/(A + B) - 3$   
(c)  $2/(A + B - 3)$  (d)  $(A + B - 3)/2$

72. Two alcohol solutions, A and B, are mixed in the proportion 1 : 3 by volume. The volume of the mixture is then doubled by adding solution A such that the resulting mixture has 72% alcohol. If solution A has

60% alcohol, then the percentage of alcohol in solution B is

- (a) 92% (b) 90%  
(c) 89% (d) 94%

73. How many pairs (a, b) of positive integers are there such that  $a \leq b$  and  $ab = 4^{2017}$ ?

- (a) 2019 (b) 2017  
(c) 2020 (d) 2018

74. The area, in sq. units, enclosed by the lines  $x = 2$ ,  $y = |x - 2| + 4$ , the X-axis and the Y-axis is equal to

- (a) 6 (b) 10  
(c) 8 (d) 12

75. How many of the integers 1, 2, ..., 120, are divisible by none of 2, 5 and 7?

- (a) 42 (b) 41  
(c) 40 (d) 43

76. Let k be a constant. The equations  $kx + y = 3$  and  $4x + ky = 4$  have a unique solution if and only if

- (a)  $|k| = 2$  (b)  $k = 2$   
(c)  $|k| \neq 2$  (d)  $k \neq 2$



## ANSWER KEY AND EXPLANATIONS

### VERBAL ABILITY AND READING COMPREHENSION

1. **(c)** This is an overall easy passage to read. This question is a sort of factual question, the answer of which can be indirectly seen in this passage, but since the question is based on 'the author least likely to agree', the choice that is not there in the passage or the choice that is against the author's contention is likely to be the right choice. The question asks us to find the least likely reason for 'the increase in screen-time'. The ones that are stated or implied in the passage are not the right choices, but the one that is not stated or implied will become the right choice. The evidence for choice 1 can be seen in the fourth paragraph of the passage: "Tech companies worked hard to get public schools to buy into programs that required schools to have one laptop per student, arguing that it would better prepare children for their screen based future". The evidence for choice 2 can be seen in the last paragraph of the [passage: "There is a small movement to pass a "right to disconnect" bill, which would allow workers to turn their phones off, but for now a worker can be punished for going offline and not being available". The evidence for choice 4 can be seen in the last sentence of the passage: "There is also the reality that in our culture of increasing isolation, in which so many of the traditional gathering places and social structures have disappeared, screens are filling a crucial void". In the passage, we don't have any evidence for choice 3. Thus 3 is the best choice. Hence, option (c) is correct.
2. **(a)** Since the question asks us a specific detail about Silicon Valley tech, we can go to the part of the passage where we have the noun 'Silicon Valley'. The second last and the third last para are likely to have the answers. Two things about Silicon Valley are mentioned, one in the third last para and one in the second last para. The third last para says "...Tech companies worked hard to get public schools to buy into programs that required schools to have one laptop per student, arguing that it would better prepare children for their screen-based future. But this idea isn't how the people who actually build the screen-based future raise their own children". From this we can derive option 1 as the right choice because this is precisely how Silicon Valley tech companies have confused the public. Some of us may feel like marking choice 3 as the right answer, but what is given in choice 3 is a complete distortion of what is given in the passage. The passage says "There are fleets of psychologists and neuroscientists on staff at big tech companies working to hook eyes and minds to the screen as fast as possible and for as long as possible." The above sentence tells us that neuroscientists and the psychologists are working to do something, not to hide something. Nowhere does the sentence imply that they are deliberately trying to conceal findings of something. In fact, they are trying to find ways to hook our mind and attention to the screen. Thus option 3 is not the right choice. Options 2 and 4 in no way can be connected to Silicon Valley tech companies.

- Hence, option (a) is correct.
3. **(c)** To answer this question correctly there is no need to read the passage. The options have enough evidence using which we can mark the right answer. The statement in the question seems to be making a comparison between "the richer, and the not so richer". In other words, option 3 which mentions the phrase 'new class marker' is the right match for the statement given in the question. Moreover, "...comfortable with human engagement", and "the more you spend to be off-screen" are closely connected because "time spent off-screen=time spend in human engagement", as per the passage. The other choices are nowhere so closely connected with the statement given in the question as option 3 is. Hence, option (c) is correct.
4. **(c)** This question is one of the easiest question of the paper. You can mark option 3 even without looking at the other choices. The author is in favour of real-time human contact, not virtual human contact. So if choice 3 speaks positively about on-screen time, the author will definitely not agree with it. Psychologists and neuroscientists are working to make on-time engagement addictive. The passage does not say that directly but this is definitely implied from the second last para of the passage. The evidence for option 4 and 2 can be seen in the passage. Thus 3 is the best choice. Hence, option (c) is correct.
5. **(d)** This question asks us to choose an option that best captures the main argument of the last paragraph of the passage. There are two strong contenders for the right choice, option 2 and option 4. The point is to decide whether the last para focuses on "the presence or the absence of the financial crisis" or "setting aside the ideology of individualism". The best choice is 4. The author clearly states that "after decades in which the ideology of the western world was personally and economically individualistic, we have been hit by a crisis...in which we are all together". This is the reason why option 4 clearly matches what is given in the last paragraph. The point is how to disprove choice 2. If you carefully read choice 2, you will realise that it is the opposite of what is given in the paragraph. Choice 2 says "you will be crazy to think that there is no crisis", whereas the paragraph in the passage says "...there are large parts of it that you would be crazy to like". So if you like you would be crazy, and the option says you would be crazy to think that there is no crisis. This option is a distortion of what is given in the passage. Option 1 is the opposite of what the author wants to say. The author says that economic individualism has taken a hit, whereas the option says "the ideology of individualism will strengthen". Option 3 says "in decades to come other ideologies will emerge". Nothing of this sort has been mentioned in the passage. Hence, option (d) is correct.
6. **(b)** This question asks to draw an inference from the first sentence of the passage. This is definitely a far less-time-consuming question. The first sentence says "I have been following the economic crisis for more than two years now". Option 1 says "the author has witnessed many economic

crisis". Well, we have the phrase "this economic crisis". From this we can't infer that he has witnessed many economic crises. Option 1 goes out.

Option 2 says "the author's preoccupation with the crisis is not less than two years old." This seems to be correct. If he says that I have been following for two years, it means that his preoccupation is certainly not less than two years. Too simple to be true, right! But this is how inferences are. You derive something on the basis of a given fact.

Option 3 absurdly suggests that the author is being followed, but here the author is following the crisis.

Option 4 says that the crisis outlasted the author's preoccupation with it. We know that the author is following the crisis, but the crisis and the author's preoccupation with it are happening in two different time periods. The crisis has already happened and passed, whereas the author is learning about it and following it as a historian. The aftermath of the crisis will definitely be seen for years to come, but about the crisis itself there is no such evidence.

Option 1 is the best choice.

Hence option (b) is correct.

7. (a) This looks like a difficult question because of the way it is worded, but is not a difficult question at all. The choices have to be inversed and then have to be checked whether they support the author. If yes, then that choice is the right choice.

Choice 1 can be the right choice because the choice, when falsified, says "the crisis was failure of collective action to rectify economic problems". It was indeed a failure of collective action because the author in the passage says "the sluggishness of the world's governments in not preparing for the crisis was stupefying. The author here suggests that the crisis could have been prevented by world's governments.

Choice 2 is correct the way it is. If it is falsified, it would be exactly opposite of what the author wants to say. Choice 3, too, is correct the way it is, but when falsified, it becomes opposite of what the author wants to say.

Choice 4 does not relate to the author's claims. He says that he has followed the crisis for two years, but there is no evidence for how long the crisis lasted.

Hence, option (a) is correct.

8. (a) For this question, we have to pick the choice that does not support the author's argument. Option 1 is exactly opposite of what the author argues. In the last paragraph he writes "the ideology of the western world was personally and economically individualistic. But the crisis shows that we are all in it together". Thus the author implies that the failure of economic system is the failure of their ideologies. Option 1 is the exact opposite of this and is thus not supporting the author in any way. Option 1 is the right answer.

All the other choices find support in the passage. For instance, the author towards the end of the first paragraph says that the finance industry is a kind of priesthood administering its own mysteries, something that supports choice 3.

Hence, option (a) is correct.

9. (a) This is one of the easiest questions of the paper, the author right across the passage argues that we all need financial literacy. So, if an education curriculum promotes financial literacy in the masses, the author would be very

delighted at the prospect. As far as choice 3 is concerned, the author is not so much in favour of economic research as he is in favour of basic economic education for the layman

Hence, option (a) is correct.

10. (b) This is a slightly challenging question. To find the right answer, we have to read the entire second paragraph. The author towards the end says "Said's work became a model for demonstrating cultural forms of imperialism in travel texts... legitimating discourses such as those articulated through travel writing" ...to legitimise something means to give approval to something or justify something. Thus choice 2 is the right option, without a shade of doubt. Option 4 goes out because colonial domination and cultural imperialism seem to be one and the same thing. For the other choices we don't see any significant evidence.

Hence, option (a) is correct.

11. (a) This question is specifically about how Victorian women experienced self-development through their travels. The answer to this question can be found in the last few sentences of the last paragraph. The second last sentence of the last paragraph says that "...many studies demonstrated the ways in which women's gendered identities were negotiated differently "at home" than they were "away", thereby showing women's self-development through travel. Thus without the slightest doubt we can mark 1 as the right choice

Hence, option (a) is correct.

12. (c) This is a slightly tricky question. There are a few close choices, but by elimination we can arrive at the right choice. We have to answer for American literature of the 1920s. Option 1 goes out because it did not develop the desire for male protagonist's desire for independence. Instead it expressed their sense of independence they experienced through travel. Thus instead of developing the desire, it celebrated the freedom that travel gives, making choice 3 the right answer. There is no reference for discovering a sense of identity different from others. Option 4 goes out because though there was emphasis on value of rural folk traditions, it doesn't mean that they participated in it. They could have appreciated the value of rural folk traditions simply by observing those traditions from a distance or by indirectly studying about them. Choice 4 is not as directly stated as option 3 is

Hence, option (c) is correct.

13. (b) This is a challenging question and demands careful reading of the last paragraph. The question wants us to pick a choice that would not have influenced feminist scholars' understanding of the experiences of Victorian women. Choice 1 goes out because what is given in the choice did influence. The passage says "from a liberal feminist perspective...", suggesting that there was a liberal perspective brought in by the feminists. Remember we have to mark for the choice that did not influence the feminists. Option 3 goes out because gender issues can be derived from the fact that there were ideological constructs that posited men as explorers and women tied to home. So there were gender issues. Thus 3 can be ruled out. The fact that "poststructural turn in studies of Victorian travel writing has focussed attention on women's diverse and fragmented identities", suggests that feminists were aware of the ways in which identity was formed. Without being aware of that they would not be able to understand the gendered

identities of Victorian women. For option 2 we have the least amount of evidence. The Victorian women were indeed tied to their class, but that doesn't mean that the feminists had knowledge of class tensions in Victorian society. Hence, option (b) is correct.

14. **(d)** This is the easiest of all questions. The question wants us to answer for travel writing in general. Travel writing, from what is discussed in the passage, is very close to autobiographical writing. There is sense of independence, sense of self development through travel, sense of new identity...all these point towards personal experiences. Thus 4 is the best choice.  
Hence, option (d) is correct.
15. **(a)** This is a slightly difficult passage to read. Bregman contrasts preagricultural societies with agricultural societies. In answering the first question, we have to find the opinion of Bregman, who clearly supports Rousseau, clearly demonstrated in the third paragraph. Rousseau believes that "for the better part of 300,000 years, Homo sapiens lived a fulfilling life in harmony with nature... Then we discovered agriculture and for the next 10,000 years it was all property, war, greed and injustice." From this we see that there is ample support for choice 1. The rest can go out. Bregman is not an environmentalist; he is more of a social scientist. This eliminates 2. Again, choice 3 takes the focus away from bringing out the difference between pre-agricultural society and post-agricultural society. Bregman's focus is not on population but on "human nature and human conditions". 1 is the best choice.  
Hence, option (a) is correct.
16. **(d)** This question asks us to pick the option that finds mention in the passage. We have to simply look for the choices in the passage. Choice 1 goes out because nowhere is it given that both Hobbes and Rousseau believed in the need for a strong state. Option 2 goes out because Bregman does not agree with Hobbes; he instead sides with Rousseau. At the end of the passage, the author makes it very clear that the veneer theory is attributed to the Dutch biologist. Towards the end he says that human nature encompasses both Hobbes and Rousseau. Thus 3 also goes out. We are left with 4 as the only plausible choice, and we have enough evidence for it in the first paragraph, where the author says "we see other people as selfish...this was how Hobbes conceived our natural state to be...". By using the pronoun 'we', the author suggests that Hobbes views reflect the views of most people.  
Hence, option (d) is correct.
17. **(b)** This is a slightly tricky question, but the answer is implied in the second last para of the passage. There the author says "in traditional history, the collapse of civilization is seen as 'dark ages', but Bregman says it was the other way round in most of human experience. In other words, Bregman wants to say that "collapse of civilization means time of change". The author goes on to say that the truth is somewhere in between. We have to answer for Bregman, not for the author. Thus B is the best choice.  
Hence, option (b) is correct.
18. **(d)** In this question, for option 1, as far as the author is concerned, he agrees with Bregman. We have evidence for that in the fourth paragraph. The author says "this may be true". One might feel that 2 is correct, but the author has not stated any opinion contrary to Bregman's. In fact, there is

no evidence for either agreement or disagreement. We have evidence only for choice 4 in the second last para of the passage where the author says "the truth is probably somewhere between...", which truth is the he talking about? Bregman believes that collapse of civilization brings changes and has not much to do with peace and progress, as much of conventional history depicts. The author by partially disagreeing with this takes an opposite stand. Thus 4 is the best choice.

- Hence, option (d) is correct.
19. **(3142)** We should start this arrangement by fixing the pronoun "each one" in sentence 1. It says "each one personified a different aspect of good fortune". This statement refers to sentence 3 because it is in 3 that we find the "seven popular deities... Considered to bring goodluck and happiness". Thus the ideas of 3 and 1 are similar, with 3 acting as introduction and 1 taking the idea ahead. 4 and 2 form the other unit because in 4 we have the phrase "only two of them were indigenous Japanese gods", while 2 says "the others were...". The contrast between the two indigenous gods and the other Buddhist gods connects 4 with 2. Thus 3142 forms a logical sequence.  
Hence, 3142 is the answer
  20. **(3)** The theme of the passage is the distinction between being a woman and being a feminine. Except statement 3 all other statements talk about this theme. Statement 1 introduces the theme of distinction between being a woman and being a feminine. Statement 5 explains this distinction and hence follows 1. Statement 2 should follow as it continues on the manner in which the measure of "feminine ideal" was dependent on a woman's appearance... Statement 4 continues on this line by presenting how the incapacity to meet up to this ideal led to the denigration of working-class women and women of colour. ...  
Hence, 3.
  21. **(3)** For summary questions we must learn to pick the broader keywords and connect them together to form the summary. In this paragraph the author uses two broad keywords "genetic theory and metabolic theory. The genetic theory was successful because of the diversity of genetic models, and the same might happen for metabolic theory, which would provide a conceptual foundation for much of ecology." The contrast in choice 2 makes the choice an incorrect one because the author stresses on similarity, not contrasts. Option 1 says "metabolic theory must have the wide range of theoretical models". The word "must" makes this choice an incorrect one. The author talks about a possibility, not a necessity. Option 4 goes out because it misses discussing the keyword "metabolic theory" and how it is compared with genetic theory. 3 is the right choice.  
Hence, 3 is the correct answer.
  22. **(4123)** Sentence 1 says "it advocated a conservative approach". The pronoun "it" refers to the "consumer welfare standard" mentioned in 4. Thus 41 forms a pair. Though subtle, the connection between 1 and 2 can be easily established. Many industries gained market share because of conservative approach to antitrust enforcement (you can check the meaning of antitrust enforcement laws). Thus 1 is the cause and 2 is an effect. 3 is an example of that wherein we have the examples of technology companies such as Google, Facebook and Amazon which have

benefitted immensely from dearth of enforcement actions. Thus 4123 is the right sequence.

Hence, 4123 is the correct sequence.

23. **(3)** This is a very simple summary question. There are two views pertaining to the evolution of language. One view believes in sharing of factual information as the reason, whereas the other view believes in social bonding as the reason. The former being the dominant view, while the latter being the less dominant. Choice 1 does not bring out this distinction. Choice 2 also misses on this comparison. Option 4 incorrectly mentions that the views were challenged by one group. There is no such thing in the passage

Hence, 3 is the correct answer.

24. **(2431)** This question has two possible right sequences. Though the right answer is 2431, the sequence 2341 is also a logical sequence. 2 will definitely open the paragraph. Now the point is should we have 3 or 4 next in sequence. 4 introduces the idea of "Russian Doll" and elaborates on that further in 4. This makes 34 a logical pair. The idea of CNS connects 4 with 1. Thus 2341 seems perfectly logical. However, when we take the official answer, which is 2431, the sequence 31 is also logical because 3 mentions "hierarchy of complex structures smaller structures contained within larger ones" ...1 says that a similar hierarchy might be there in CNS as well. We believe that this question has two possible sequences.

Hence, 2431 is the correct sequence.

25. **(4)** This is one of the most difficult questions of this paper. There are three keywords in this paragraph: aesthetic political representation, disinterestedness and indifference. The author seems to prefer disinterestedness for aesthetic political representation. Option 1 is wrong because it inaccurately states that "aesthetic political representation constitutes of disinterestedness". But the passage says that aesthetic political representation should be seen from the angle of disinterestedness. 3 is too short a summary and misses on the crucial word "aesthetic". 2 and 4 are very close choices, with only a slight difference. 2 says "manifested through indifference", while 4 says "drawing from indifference". Now what is the difference between the two? When X is manifested through y, it is y that dominates. God is manifested through human beings, means that God is hidden within the human being and the human being dominates the outward appearance. Whereas drawing from something means, aesthetic political representation should have a tinge of disinterestedness. There is little to choose between 2 and 4, but the right choice is 4 because disinterestedness is just an outward shadow which must be cultivated, but not necessarily allowed to dominate.

Hence, (4) is the correct answer.

26. **(3)** 5 says 'for instance'. We must find the sentence that logically connects with 5.

Also, we must connect the pronoun 'it' in sentence 4 with some noun. The pronoun cannot refer to the plural "models" in 1 or the plural 'algorithms' in 5. It can refer to the singular noun "hate speech detection" in 2. Thus 24 form a pair.

Similarly, 1 and 5 form a pair because the example of 'human-like biases' in 1 can be found in 5.

Also, both the sentences speak about algorithms. Thus 2415 form a logical pair, and 3 is the odd one out. Hence,

option (c).

#### DATA INTERPRETATION AND LOGICAL REASONING

27. **(c)** Given, if a patient has the disease, then each vial containing his/her blood sample will test positive. E.g., suppose patient 5 has the disease. Then vials B, C, F and H will definitely test positive.

Or if vial B tests positive, it means one of patient 1, 2, 3, 4, 5, 6, 7, 8, 9 or 10 has the disease.

If vial C tests positive, it means one of patient 5, 6, 7, 8, 13, 14, 15 or 16 has the disease. Now, since vial A tests negative, it means that patient 9 to 16 don't have the disease.

Now, we are left with patient 5, 6, 7 and 8 who can have the disease. Vial E tests negative, it means patients 7 and 8 cannot have the disease. Now, we are left with patient 5 and 6 who can have the disease.

Vial H tests negative, it means patient 5 cannot have the disease.

∴ Only patient who can have the disease is patient 6.

Hence, option (c).

28. **(c)** Since vial A tests positive one of patient 9 to 16 will have the disease.

Now, vials D and G test negative hence, patients 9, 10, 11, 12, 14 and 16 cannot have the disease.

⇒ One of patients 13 or 15 will have the disease.

To check which one of patients 13 or 15 have the disease we need to check a vial which does not have both the samples.

∴ We can check either vial E or F.

Hence, option (c).

29. **(c)** Here the tests should be consistent with each other.

Checking for option (c): If vials A and E test positive, patients 11, 12, 15 or 16 will have the disease. If vials C and D test negative, it means patients 11, 12, 15 or 16 cannot have the disease.

Since these two tests are contradictory, they cannot both be true. Hence, option (c).

30. **(b)** Assuming patient 1 has the disease.

**Case 1:** Those patient's blood is mixed which have no common vial.

∴ Patient 1 and 16's samples are mixed.

In this case all 8 vials i.e., A to D will have the blood of diseased patient.

⇒ All 8 vials will test positive.

**Case 2:** Those patient's blood is mixed which have exactly 1 common vial.

∴ Patient 1 and 15's samples are mixed.

In this case 7 vials i.e., A to F and H will have the blood of diseased patient.

⇒ 7 vials will test positive.

**Case 3:** Those patient's blood is mixed which have exactly 2 common vials.

∴ Patient 1 and 13's samples are mixed.

In this case 6 vials i.e., A to D, F and H will have the blood of diseased patient.

⇒ 6 vials will test positive.

**Case 4:** Those patient's blood is mixed which have exactly 3 common vials.

∴ Patient 1 and 9's samples are mixed.

In this case 5 vials i.e., A, B, D, F and H will have the blood of diseased patient.

⇒ 5 vials will test positive.

**Case 5:** Those patient's blood is mixed which don't have the disease.

∴ Patient 2 and 3's samples are mixed.

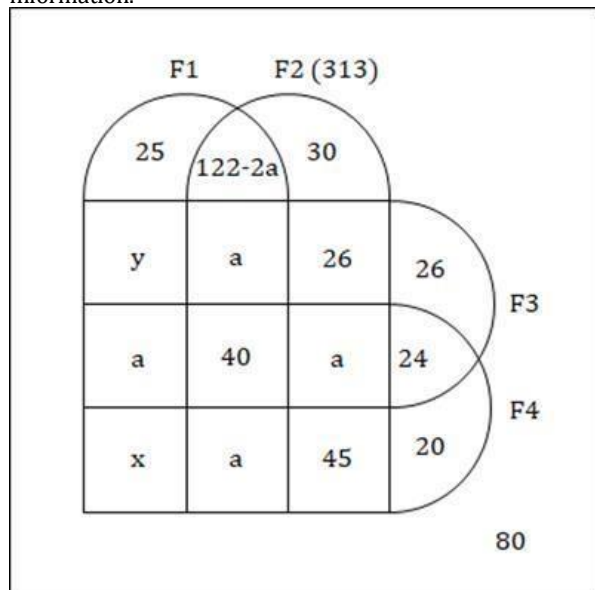
In this case 4 vials i.e., B, D, F and H will have the blood of diseased patient.

⇒ 4 vials will test positive.

∴ Either 4, 5, 6, 7 or 8 vials can test positive. Hence, option (b).

31. **(d)** Given, the number of schools with exactly three of the facilities was the same irrespective of which three were considered. Let us assume this number to be 'a' for every possible combination of three OTLPs.

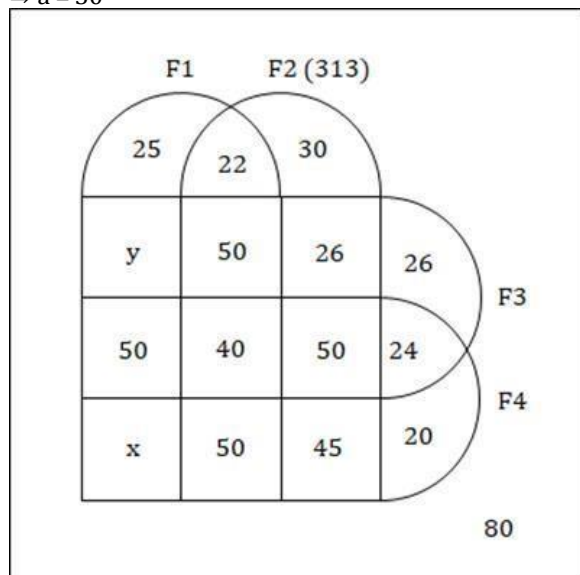
The following diagram can be drawn from the given information.



It is also given that 162 schools had F1 and F2

∴ Number of students having only F1 and F2 =  $162 - (a + 40 + a) = 122 - 2a$ . Total schools having F2 =  $313 = 162 + 30 + 26 + a + 45$

⇒  $a = 50$



Total number of schools having F1 is equal to total number of schools having F2.

∴  $(162 + 25 + y + 50 + x) = (50 + 40 + 50 + 24 + x + 50 + 45 + 20)$

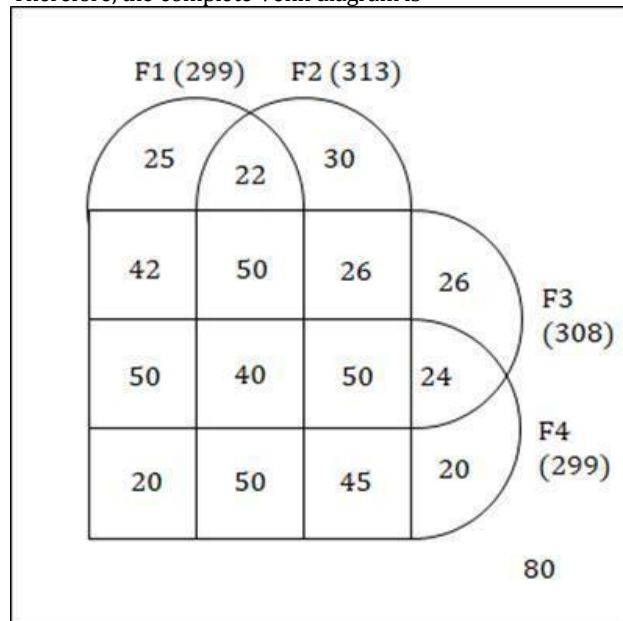
⇒  $y = 42$

Now there are a total of 600 schools

∴  $600 = 25 + 42 + 50 + x + 313 + 26 + 24 + 20 + 80$

⇒  $x = 20$

Therefore, the complete Venn diagram is



Number of schools having exactly 3 of the 4 facilities =  $50 + 50 + 50 + 50 = 200$ .

Hence, option (d).

32. **(d)** Consider the solution to the first question of this set. Number of schools having facilities F2 and F4 =  $40 + 50 + 50 + 45 = 185$ . Hence, option (d).
33. **(42)** Consider the solution to the first question of this set. Number of schools having only facilities F1 and F3 = 42. Hence, 42.
34. **(20)** Consider the solution to the first question of this set. Number of schools having only facilities F1 and F4 = 20. Hence, 20.



35. (d) It is given that 4 order which were booked on 11<sup>th</sup> day were delivered on 13<sup>th</sup> day.

⇒ Out of 11 orders delivered on 13<sup>th</sup> day,  $11 - 4 = 7$  were booked on 12<sup>th</sup> day.

Out of total orders booked on 12<sup>th</sup> day 6 were delivered on 14<sup>th</sup> day and 1 order was lost at the end of the 14<sup>th</sup> day.

∴ Total orders booked on 12<sup>th</sup> day = 7 (delivered on 13<sup>th</sup> day) + 6 (delivered on 14<sup>th</sup> day) + 1 (lost at the end of 14<sup>th</sup> day) = 14.

Similarly,

Total orders booked on 13<sup>th</sup> day = 21 (delivered on 14<sup>th</sup> day) + 8 (delivered on 15<sup>th</sup> day) + 2 (lost at the end of 15<sup>th</sup> day) = 31. Total

orders booked on 14<sup>th</sup> day =  $249 - 219 = 30$ .

Out of these 30 orders  $23 - 8 = 15$  orders were delivered on 15<sup>th</sup> day. Also, of the orders booked on 14<sup>th</sup> day orders lost on 16<sup>th</sup> day = 12.

Day	Booked		Delivered			Lost	
	Cumulative	On n <sup>th</sup> day	(n-1) <sup>th</sup> day	(n-2) <sup>th</sup> day	Total on n <sup>th</sup> day	Cumulative	n <sup>th</sup> day
11 <sup>th</sup>	174						
12 <sup>th</sup>	188	14					
13 <sup>th</sup>	219	31	7	4	11	91	
14 <sup>th</sup>	249	30	21	6	27	92	1
15 <sup>th</sup>	277	28	15	8	23	94	2
16 <sup>th</sup>	302	25	8	3	11	106	12
17 <sup>th</sup>	327	25	13	8	21	118	12
18 <sup>th</sup>	332	5	3	10	13	120	2
19 <sup>th</sup>	337	5	1	12	14	129	9

∴ Of the orders booked on 14<sup>th</sup> day orders delivered on 16<sup>th</sup> day =  $30 - 15 - 12 = 3$ . Similarly, we can make the following table for orders booked and delivered.

Fraction of orders booked on 13<sup>th</sup> day which were lost =  $2/31$  Fraction of orders booked on 14<sup>th</sup> day which were lost =  $12/30$

Fraction of orders booked on 15<sup>th</sup> day which were lost =  $12/28$  Fraction of orders booked on 16<sup>th</sup> day which were lost =  $2/25$

Largest of these fractions is  $12/28$  i.e., for 15<sup>th</sup> day. Hence, option (d).

36. (d) Consider the solution to the first question of this set. Highest number of orders booked is 31 on 13<sup>th</sup> day. Hence, option (d).

37. (c) Consider the solution to the first question of this set.

Delivery ratio for 13<sup>th</sup> day =  $21/8$

Delivery ratio for 14<sup>th</sup> day =  $15/3$

Delivery ratio for 15<sup>th</sup> day =  $8/8$  Delivery ratio for 16<sup>th</sup> day =  $13/10$

Highest of these delivery ratios is  $15/3 = 5$  for 14<sup>th</sup> day.

Hence, option (c).

38. (d) Consider the solution to the first question of this set.

$$\text{Average time taken for 13<sup>th</sup> day} = \frac{21 + 2 \times 8}{21 + 8} = \frac{37}{29}$$

39. (c) Points scored in a round has the following possibilities:

H H H H: (-1, -1, -1, -1); Total -4

H H H L: (1, 1, 1, -3); Total 0

H H L L: (2, 2, -2, -2); Total 0

H L L L: (3, -1, -1, -1); Total 0

L L L L: (1, 1, 1, 1); Total 4

Total points scored in a round can be -4, 0 or 4.

We can make the following table from the data given.

$$= 1.27$$

$$\text{Average time taken for 14<sup>th</sup> day} = \frac{15 + 2 \times 3}{15 + 3} = \frac{21}{28}$$

$$= 1.16$$

$$\text{Average time taken for 15<sup>th</sup> day} = \frac{8 + 2 \times 8}{8 + 8} = \frac{24}{16} = 1.5$$

$$\text{Average time taken for 16<sup>th</sup> day} = \frac{13 + 2 \times 10}{13 + 10} = \frac{33}{23}$$

$$= 1.43$$

Least of these average times is 1.16 for 14<sup>th</sup> day.

Hence, option (d).

	R1	R2	R3	Total score in first 3 rounds	R4	R5	R6	Total score in last 3 rounds
Arun				6				1
Bankim				-2				1
Charu				-2				-3
Dipak				2				-3

Net score after first 3 rounds is  $6 - 2 - 2 + 2 = 4$ .

This could have happened if the total score in first three rounds was  $\{4, 4, -4\}$  or  $\{4, 0, 0\}$  in any order.

∴ In one of the first 3 rounds the net score has to be 4. This is only possible when all of them bid Lo and score 1 point each.

Now, Arun scored total 6 points in first 3 rounds. Also, he scores 1 in one of the first 3 rounds. This is possible if he scores  $\{3, 2, 1\}$  in any order in the first 3 rounds.

For Arun to score 3 in a round he will have to bid Hi and other will bid Lo. Other 3 will score -1 each.

For Arun to score 2 in a round he will have to bid Hi along with one other and the remaining two will bid Lo. Scores of other 3 will be  $\{2, -2, -2\}$  in any order.

Dipak's score in two of the rounds is 1 and -1. His net score in 3 rounds is 2. Hence, Dipak scores 2 in one of the first three rounds. Also, Dipak's score in the third round was less than his score in the first round but was more than his score in the second round.

∴ We can make the following table for the first 3 rounds.

	R1	R2	R3	Total score in first 3 rounds
Arun	2 (Hi)	3 (Hi)	1 (Lo)	6
Bankim	-2 (Lo)	-1 (Lo)	1 (Lo)	-2
Charu	-2 (Lo)	-1 (Lo)	1 (Lo)	-2
Dipak	2 (Hi)	-1 (Lo)	1 (Lo)	2

Net score in last 3 rounds is  $1 + 1 - 3 = -1$ .

This could have happened if the total score in last three rounds was  $\{4, -4, -4\}$  or  $\{-4, 0, 0\}$  in any order.

∴ In one of the last 3 rounds the net score has to be -4. This is only possible when all of them bid Hi and score -1 point each. In exactly two out of the six rounds, Arun was the only player who bid Hi i.e., Arun scores 3 in exactly 2 of the six rounds.

∴ Arun scored 3 in one of the last 3 rounds. Also, his net score in last 3 rounds is 1. Hence, he scores -1 and -1 in 2 of the last 3 rounds.

∴ We can make the following table for the all 6 rounds.

	R1	R2	R3	Total score in first 3 rounds	R4/5/6	R4/5/6	R4/5/6	Total score in last 3 rounds
Arun	2 (Hi)	3 (Hi)	1 (Lo)	6	-1 (Hi)	3 (Hi)	-1 (Lo)	1
Bankim	-2 (Lo)	-1 (Lo)	1 (Lo)	-2	-1 (Hi)	-1 (Lo)	3 (Hi)	1
Charu	-2 (Lo)	-1 (Lo)	1 (Lo)	-2	-1 (Hi)	-1 (Lo)	-1 (Lo)	-3
Dipak	2 (Hi)	-1 (Lo)	1 (Lo)	2	-1 (Hi)	-1 (Lo)	-1 (Lo)	-3

In first round Arun, Bankim, Charu and Dipak bid Hi, Lo, Lo and Hi.

Hence, option (c).

40. **(4)** Consider the solution to first question of this set. Arun bid Hi in 4 rounds.  
Hence, 4.
41. **(4)** Consider the solution to first question of this set. Bankim bid Lo in 4 rounds.  
Hence, 4.
42. **(2)** Consider the solution to first question of this set. All 4 made identical bids in 2 of these 6 rounds.  
Hence, 2.
43. **(1)** Consider the solution to first question of this set. Dipak gained exactly 1 point in only 1 round (i.e., Round 3).  
Hence, 1.
44. **(b)** Consider the solution to first question of this set.

Arun was definitely the only player to bid Hi in round 2.

Hence, option (b).

45. **(c)** The number of teak trees in Column 3 was double of that in Column 2 but was half of that in Column 4. The number of mango trees was double the number of teak trees.  
Dipti got two adjoining plots in the same row. Chitra and Dipti did not get plots which were adjacent to each other (either in row /column /diagonal).  
∴ Dipti must have got adjacent plots in row X in column 3 and 4.  
Bina got a plot in each row and column. Hence, Bina gets last plot in row Z last column.

	1	2	3	4	Total Trees
X	12 C	B	D	D	$42 + 14x$
Y	21 A	x	2x	4x A	$21 + 7x$
Z	B	C	9	28 B	

Number of plots so far: A = 2, B = 3, C = 2 and D = 2  
 Since each daughter gets even number of plots and Abha and Bina got more plots than D.  
 $\therefore$  Bina gets one more plot in 2nd column in row X and Abha will get 2 more plots.

	1	2	3	4	Total Trees
X	12 C	B	D	D	$42 + 14x$
Y	21 A	x A	2x B	4x A	$21 + 7x$
Z	B	C	9 A	28 B	

Now, highest trees in a plot is 32 but this plot doesn't belong to Abha hence,  $4x < 32$

$$\Rightarrow x < 8$$

Also, x should be a multiple of 3 or 4. Hence, x can be 3, 4 or 6.

x cannot be 3 as  $4x = 12$  but all plots need to have different number of trees.

Also, x cannot be 6 as  $4x = 12$  but all plots need to have different number of trees.

$$\therefore x = 4.$$

	1	2	3	4	Total Trees
X	12 C	B	D	D	98
Y	21 A	4 A	8 B	16 A	49
Z	B	C	9 A	28 B	58

Abha got 20 trees more than Chitra but 6 trees less than Dipti. Abha gets total  $21 + 4 + 9 + 16 = 50$  trees.

$\therefore$  Chitra gets 30 trees & Dipti gets 56 trees

& Bina will have  $= 205 - 50 - 30 - 56 = 69$  trees

Since Dipti has 56 trees, in the first row B will have  $98 - 56 - 12 = 30$  trees. Trees for B =  $69 = 30 + 8 + 28 +$  (trees in row Z first column)

$\therefore$  Trees for B in row Z first column = 3

Number of trees for C in row Z =  $58 - 3 - 9 - 28 = 18$ .

Now, highest number of trees in a plot is 32, this must be with D in row X.

	1	2	3	4	Total Trees
X	12 C	30 B	32/24 D	24/32 D	98
Y	21 A	4 A	8 B	16 A	49
Z	3 B	18 C	9 A	28 B	58

Total number of mango trees is 98.

Hence, option (c).

46. (b) Consider the solution to first question of this set. Trees received by A = 50, B = 69, C = 30 and D = 56. Hence, option (b).
47. (a) Consider the solution to first question of this set. Chitra received 18 pine trees. (Row Z, column 2) Hence, option (a).
48. (c) Consider the solution to first question of this set. Bina got the plot with the smallest number of trees, which had 3 trees. (Row Z, column 1) Hence, option (c).
49. (c) Consider the solution to first question of this set. Bina got 31 pine trees. Hence, option (c).
50. (a) Consider the solution to first question of this set. Column 4 will have the highest number of trees. Hence, option (a).

## QUANTITATIVE APTITUDE

51. (252) Here we have to find all 3-digit numbers which have at least one digit repeated.

This can also be calculated by subtracting all 3-digit number which do not have any repeated digits from total 3-digit numbers.

Total 3-digit numbers =  $9 \times 10 \times 10 = 900$

3-digit numbers without repetition,

	Hundred's digit	Ten's digit	Unit's digit
Digits possible	1 to 9	0 to 9 except hundred's digit	0 to 9 except ten's & hundred's digit
Total possibilities	9	9	8

$\therefore$  The number 3-digit numbers without repetition =  $9 \times 9 \times 8 = 648$

Therefore, the number of 3-digit numbers which have at least one digit repeated  $900 - 648 = 252$ .

Hence, 252.

52. (b) Train A starts at 9 a.m. whereas Train B starts at 10:30 a.m.

Distance travelled by A till 10:30 a.m. =  $40 \times 1.5 = 60$  kms.

At 10:30 a.m. remaining distance between A and B =  $90 - 60 = 30$  kms.

Time taken for both of them to meet now =  $30/(40 + 20) = 0.5$  hours i.e., 30 mins.

$\therefore$  Both trains meet half after 10:30 a.m. i.e., at 11 a.m.

Hence, option (b).

53. (d) Average score in  $n$  innings is 30 and in  $n + 2$  innings is 29. Score in last 2 innings is 38 and 15

$$\therefore 30n + 38 + 15 = 29(n + 2)$$

$$\Rightarrow n = 5$$

$\therefore$  Total runs score in first  $n$  innings =  $5 \times 30 = 150$

Also, he scored less than 38 runs in each of these 5 innings.

To calculate the lowest possible score in an innings we try to maximize the score of other 4 innings. Maximum runs

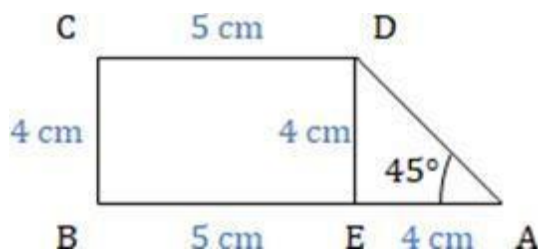
score in each of the 4 innings can be 37.

$$\therefore x + 4 \times 37 = 150$$

$$\Rightarrow x = 2$$

Hence, option (d).

54. (28) The following diagram can be drawn using the information given.



Since,  $\triangle ADE$  is an isosceles right triangle

hence,  $DE = AE = 4$  cm

$$\Rightarrow AB = BE + AE = 5 + 4 = 9 \text{ cm}$$

$\therefore$  Area of trapezium

$$= \frac{1}{2} \times (CD + AB) \times BC = \frac{1}{2} \times 14 \times 4 = 28 \text{ cm}^2$$

Hence, 28.

55. (40) In 60 days 1.5 kms out of 6 kms is built.

$\therefore$  In 60 days  $1.5/6 = 1/4^{\text{th}}$  work is done.

To complete the whole work, it would take  $4 \times 60 = 240$  days, i.e., 180 more days. Days remaining now is  $200 - 60 = 140$  days.

$\therefore$  To complete the remaining work in 140 days, contractor will have to hire more people. Assuming he hires  $x$  more men. The work which 140 men would take 180 more days, now need to be completed by  $140 + x$  men in 140 days.

$$\therefore 180 \times 140 = 140 \times (140 + x)$$

$$\Rightarrow x = 40$$

$\therefore$  Contractor hires 40 more people.

Hence, 40.

56. (c) Given,  $x_m = x_{m+1} + (m + 1)$

$$\Rightarrow x_{m+1} = x_m - (m + 1)$$

$$\text{Put } m = 1 \Rightarrow x_2 = -1 - 2$$

$$\text{Put } m = 2 \Rightarrow x_3 = -1 - 2 - 3$$

$$\text{Put } m = 3 \Rightarrow x_4 = -1 - 2 - 3 - 4$$

And so on.

$$\therefore x_{100} = -1 - 2 - 3 - 4 \dots - 100$$

$$\Rightarrow x_{100} = -(100 \times 101)/2 = -5050$$

Hence, option (c).

57. (3) Assuming,  $K = 14^a = 36^b = 84^c$

$$\Rightarrow 14 = k^{\frac{1}{a}}$$

$$\Rightarrow 36 = 6^2 = k^{\frac{1}{b}} \text{ or } 6 = k^{\frac{1}{2b}}$$

$$\Rightarrow 84 = k^{\frac{1}{c}}$$

We know,  $84 = 6 \times 14$

$$\Rightarrow k^{\frac{1}{c}} = k^{\frac{1}{2b}} \times k^{\frac{1}{a}}$$

$$\Rightarrow k^{\frac{1}{c} - \frac{1}{a}} = k^{\frac{1}{2b}}$$

$$\Rightarrow \frac{1}{c} - \frac{1}{a} = \frac{1}{2b}$$

$$\Rightarrow 2b \left( \frac{1}{c} - \frac{1}{a} \right) = 1$$

$$\text{Hence, } 6b \left( \frac{1}{c} - \frac{1}{a} \right) = 3$$

Hence 3.

58. (d) We know,  $0.2 < m/20 < 0.5 \Rightarrow 4 < m < 10$

Values  $m$  can take =  $\{5, 6, 7, 8, 9\}$

We know,  $0.2 < n/11 < 0.5 \Rightarrow 2.2 < n < 5.5$

Values  $n$  can take =  $\{3, 4, 5\}$

Since  $n$  is even, the only possible value of  $n$  is 4.

$$\text{Also, } 0.2 < \frac{m}{20}, \frac{n}{m}, \frac{n}{11} < 0.5 \Rightarrow \frac{m}{5} < n < \frac{m}{2}$$

Since  $n = 4 \Rightarrow 20 > m > 8$

The only possible value of  $m$  is 9.

$$\therefore m - 2n = 9 - 2 \times 4 = 1.$$

Hence, option (d).

59. (b) Given,  $f(x + y) = f(x) \times f(y)$  Substitute  $y = 0$

$$\Rightarrow f(x + 0) = f(x) \times f(0)$$

$$f(x) = f(x) \times f(0)$$

$[f(x) \text{ cannot be '0' since it is given that } f(5) = 4]$

$$\therefore f(0) = 1$$

$$f(5) = 4 \text{ (Given)}$$

$$f(10) = f(5 + 5) = f(5) \times f(5) = 4 \times 4 = 16$$

We know that  $f(0) = 1$

$$f(0) = f(10 - 10) = f(10 + (-10)) = f(10) \times f(-10) = 16 \times f(-10) = 1$$

$$f(-10) = 1/16 = 0.0625$$

$$f(10) - f(-10) = 16 - 0.0625 = 15.9375.$$

Hence, option (b).

60. (d) One of the diagonals of the parallelogram connects the points  $(2, 1)$  and  $(-3, -4)$ .

Line  $x + 9y + c = 0$ , represents the other diagonal of the parallelogram.

We know, diagonals of a parallelogram bisect each other.

$\therefore x + 9y + c = 0$  should pass through the midpoint of the line joining  $(2, 1)$  and  $(-3, -4)$ .

The midpoint of the line joining  $(2, 1)$  and  $(-3, -4) =$

$$\left( \frac{2-3}{2}, \frac{1-4}{2} \right) = (-0.5, -1.5)$$

$$\Rightarrow \text{Point } (-0.5, -1.5) \text{ lies on } x + 9y + c = 0.$$

$$\Rightarrow -0.5 + 9 \times (-1.5) + c = 0$$

$$\Rightarrow -0.5 - 13.5 + c = 0$$

$$\Rightarrow c = 14.$$

Hence, option (d).

61. (b) Let the distance from home to office be  $d$  kms.

$$\therefore \frac{d}{35} - \frac{d}{40} = \frac{6}{60}$$

$$\Rightarrow d = 28 \text{ kms.}$$

$$\therefore \text{Normal time taken} = \frac{28}{40} = 0.7 \text{ hour} = 42 \text{ minutes.}$$

Now, she covers  $2/3^{\text{rd}}$  of this distance in  $1/3^{\text{rd}}$  time i.e., in 14 minutes. She now takes rest for 8 minutes.

$\therefore$  Time elapsed = 14 + 8 = 22 minutes. Time remaining = 20 minutes.

In 20 minutes she needs to travel  $1/3^{\text{rd}}$  of the distance i.e.,  $28/3$  kms.

$$\therefore \text{Time taken} = \frac{28/3}{20/60} = 28 \text{ kmph.}$$

Hence, option (b).

62. (a) Let the cost price of sugar be Rs. 100/kg and marked price will be Rs. 120/kg

$$\therefore \text{Total cost for the man} = 35 \times 100 = \text{Rs. } 3500$$

He earns 15% profit on this, hence total selling price =  $3500 \times 1.15 = \text{Rs. } 4025$

$$\text{Total Selling price for 5 kg sugar} = 5 \times 120 = 600$$

$$\text{Total Selling price for 15 kg sugar} = 15 \times 120 \times 0.9 = 1620$$

$$\text{Total Selling price for 3 kg sugar} = 3 \times 0 = 0$$

$$\text{Total Selling price for remaining 12 kg sugar} = 12 \times 120(1 + p\%)$$

$$\therefore 4025 = 600 + 1620 + 0 + 1440(1 + p\%)$$

$$\Rightarrow 1805 = 1440(1 + p\%)$$

$$\Rightarrow 1 + p\% \approx 1.25$$

$$\Rightarrow p = 25\% \text{ Hence, option (a).}$$

63. (d) First, we have the quadratic equation,  $x^2 + mx + 2n = 0$

Since its roots are real, that means  $D \geq 0$ .

$$\Rightarrow m^2 - 8n \geq 0$$

$$\Rightarrow m \geq 2\sqrt{(2n)} \quad \dots (1)$$

Also, we have the quadratic equation,

$$x^2 + 2nx + m = 0$$

Since its roots are real, that means  $D \geq 0$ .

$$\Rightarrow (2n)^2 - 4m \geq 0$$

$$\Rightarrow 4n^2 - 4m \geq 0$$

$$\Rightarrow n^2 \geq m \quad \dots (2)$$

From (1) and (2)

$$\Rightarrow n^2 \geq m \geq 2\sqrt{(2n)}$$

$$\Rightarrow n^{3/2} \geq 2^{3/2}$$

$$\Rightarrow n \geq 2$$

Hence, least possible value of  $n = 2$ .

$$\Rightarrow m \geq 2\sqrt{(2n)}$$

$m$  will be least when  $n$  is least

$$\Rightarrow m \geq 2\sqrt{(4)}$$

$$\Rightarrow m \geq 4$$

Hence, least possible value of  $m = 4$ .

So, the smallest possible values of  $m$  and  $n$  are 4 and 2 respectively. Hence, smallest value of  $m + n = 4 + 2 = 6$ .

Hence, option (d).

64. (d) Speeds of Anil, Sunil and Ravi, which are 15 kmph, 10 kmph and 8 kmph respectively. Length of the track is 3 km. Time taken by Anil to complete one round =  $3/15 \times 60 = 12$  minutes. Time taken by Sunil to complete one round =  $3/10 \times 60 = 18$  minutes.

Both Anil and Sunil will reach at the starting points after  $\text{LCM}[12, 18] = 36$  minutes. The distance covered by Ravi in 36 minutes (= 0.6 hours) =  $8 \times 0.6 = 4.8$  km.

Hence, option (d).

65. (6) Given,  $2 < x < 10$

$x$  can take any of the values from  $\{3, 4, 5, 6, 7, 8, 9\}$

Also,  $14 < y < 23$

$y$  can take any of the values from  $\{15, 16, 17, 18, 19, 20, 21, 22\}$

The highest value  $N$  (i.e.,  $x + y$ ) can take =  $9 + 22 = 31$  (when  $x = 9$ ;  $y = 22$ )

The lowest value  $N$  (i.e.,  $x + y$ ) can take =  $3 + 15 = 18$  (when  $x = 3$ ;  $y = 15$ )

But,  $N = x + y > 25$ . Hence the different values of  $x + y$  are  $\{31, 30, 29, 28, 27, 26\}$ .

Hence,  $x + y$ , and thereby  $N$  can take 6 distinct values.

Hence, 6.

66. (a) Let the maximum marks be  $100x$ .

Marks scored by Bishnu =  $52x$  and Asha =  $64x$

Bishnu scored 23 less, Asha scored 34 more than the marks obtained by Ramesh

$$\therefore \text{Asha} - \text{Bishnu} = 34 + 23 = 57$$

$$\Rightarrow 64x - 52x = 57$$

$$\Rightarrow 12x = 57$$

Now, Geeta scored 84%, her score =  $84x = 7 \times 12x = 7 \times 57 = 399$ .

Hence, option (a).

67. (18) Let Tom's age to be ' $x$ ' years.

$$\therefore \text{Dick's age} = 3x.$$

$$\therefore \text{Harry's age} = 6x.$$

Given, Dick's age is 1 year less than the average age of all three,

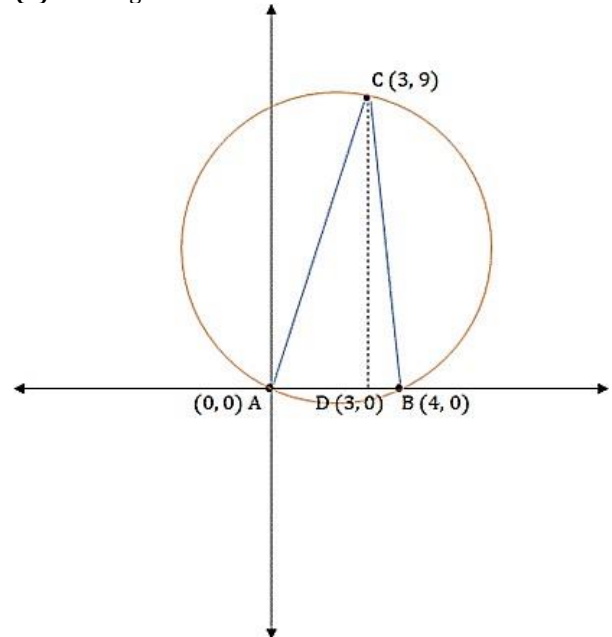
$$\therefore 3x = (x + 3x + 6x)/3 - 1$$

$$\Rightarrow 9x = 10x - 3$$

$$\Rightarrow x = 3$$

$$\therefore \text{Harry's age} = 6x = 6 \times 3 = 18. \text{ Hence, } 18.$$

68. (b) The diagram can be drawn as follows:



Height of the given triangle = 9 and base = 4

$$\therefore \text{Area of the triangle} = \frac{1}{2} \times 9 \times 4 = 18$$

We know area of a triangle =  $abc/4R$

(where  $a$ ,  $b$ , and  $c$  are the sides of the triangle and  $R$  is the circumradius)

$$a = AB = 4 \text{ units}$$



$$b = BC = \sqrt{9^2 + 1^2} = \sqrt{82} \text{ units}$$

$$c = AC = \sqrt{3^2 + 9^2} = \sqrt{90} \text{ units}$$

The sides of the triangle are 4,  $\sqrt{82}$  and  $\sqrt{90}$

$$\Rightarrow 18 = \frac{4 \times \sqrt{82} \times \sqrt{90}}{\sqrt{205}} \cdot 4R$$

$$\Rightarrow R = \frac{\sqrt{205}}{3}$$

$$\therefore \text{Area of the circumcircle} = \pi R^2 = \frac{205\pi}{9}$$

Hence, option (b).

69. **(24)** Given

$$\frac{2 \times 4 \times 8 \times 16}{(\log_2 4)^2 (\log_4 8)^3 (\log_8 16)^4} \text{ equals}$$

$$\frac{2 \times 2^2 \times 2^3 \times 2^4}{(\log_2 2^2)^2 (\log_4 2^3)^3 (\log_8 2^4)^4}$$

$$= \frac{2^{10}}{(2^2)^2 (2^{\frac{3}{2}})^3 (2^{\frac{4}{3}})^4}$$

$$= \frac{2^{10} \times 2^3 \times 3^4}{2^2 \times 3^3 \times 2^8}$$

$$= 2^3 \times 3 = 24$$

Hence, 24.

70. **(16000)** Rate of interest is 10% per annum. Hence, interest for half a year is 5%.

The Principal, P is invested for 1.5 years or 3 terms of half years.

$$\text{Therefore, } P(1 + 5\%)^3 = 18522.$$

$$\Rightarrow P \times 1.05^3 = 18522$$

$$\Rightarrow P \times \left(\frac{105}{100}\right)^3 = 18522$$

$$\Rightarrow P \times \left(\frac{21}{20}\right)^3 = 2 \times 213$$

$$\Rightarrow P = 2 \times 20^3 = 16000$$

Hence, 16000.

71. **(c)** Since all the 4 options have A + B, let's add A and B.

$$\therefore A + B = \log_a 30 + (-\log_a (5/3))$$

$$= \log_a 30 - \log_a (5/3) = \log_a (30 \times 3/5)$$

$$= \log_a (18) = \log_a (2 \times 3^2)$$

$$\Rightarrow A + B = \log_a (2) + 2 \log_a (3)$$

$$\Rightarrow A + B = 3 + 2 \log_a (3) \quad [\because \log_2 a = \frac{1}{3} \therefore \log_a 2 = 3]$$

$$\Rightarrow \log_a (3) = \frac{(A + B - 3)}{2}$$

$$\Rightarrow \log_3 (a) = \frac{2}{A + B - 3}$$

Hence, option (c).

72. **(a)** Given, A and B are mixed in the ratio 1 : 3

Let 10 liters of A and 30 liters of B is mixed initially i.e., total 40 liters solution.

Now volume is double by adding 40 liters of A.

$\therefore$  In the solution A = 10 + 40 = 50 liters and B = 30 liters

Concentration of alcohol in this 80-liter solution = 72%

Let the alcohol concentration in B = b%

$$\therefore 80 \times 72\% = 50 \times 60\% + 30 \times b\%$$

$$\Rightarrow 576 = 300 + 30b$$

$$\Rightarrow b = 92\%$$

Hence, option (a).

73. **(d)** Given,  $a \times b = 4^{2017} = 2^{4034}$

Here, a and b are integers and will be some power of 2 since RHS is  $2^{4034}$ .

Let's say  $a = 2^x$  and  $b = 2^y$ . [x and y are non-negative integers]

Also,  $a \leq b$ , Hence,  $x \leq y$ .

$$\text{Now, } 2^x \times 2^y = 2^{4034}$$

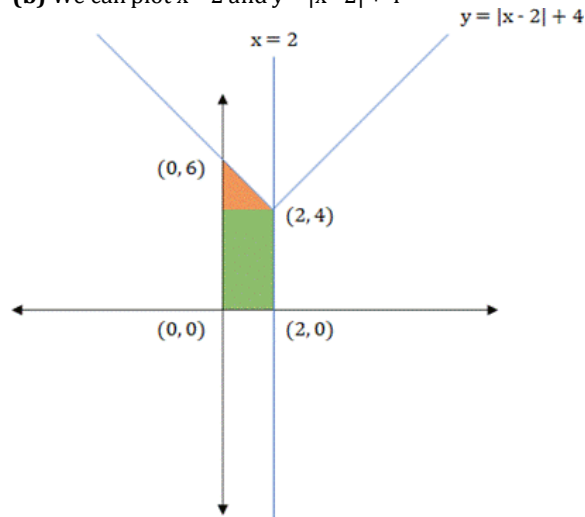
$$\text{Since } x \leq y, x \leq 4034/2 = 2017$$

The values x can take is 0, 1, 2, ..., till 2017.

Hence, x can take a total of 2018 values.

Hence, option (d).

74. **(b)** We can plot  $x = 2$  and  $y = |x - 2| + 4$



The required area is sum of the triangle (orange) + rectangle (green).

$$\text{Area of triangle (orange)} = \frac{1}{2} \times 2 \times 2 = 2$$

$$\text{Area of rectangle} = 2 \times 4 = 8$$

$$\therefore \text{Total required area} = 2 + 8 = 10 \text{ sq. units.}$$

Hence, option (b).

75. **(b)** There are total 120 numbers given.

Integers not divisible by 2, 5 and 7 = 120 - (numbers that are divisible by at least one of 2, 5 and 7)

$$\text{We know, } n(A \cup B \cup C) = n(A) + n(B) + n(C) - n(A \cap B) - n(B \cap C) - n(C \cap A) + n(A \cap B \cap C).$$

$n(x)$  = number of multiples of x.

$$\therefore n(2 \cup 5 \cup 7) = n(2) + n(5) + n(7) - n(2 \cap 5) - n(5 \cap 7) - n(7 \cap 2) + n(2 \cap 5 \cap 7)$$

$$\Rightarrow n(2 \cup 5 \cup 7) = n(2) + n(5) + n(7) - n(10) - n(35) - n(14) + n(70)$$

$$\Rightarrow n(2 \cup 5 \cup 7) = 60 + 24 + 17 - 12 - 3 - 8 + 1 = 79.$$

Now, Integers not divisible by 2, 5 and 7 = 120 - (numbers that are divisible by at least one of 2, 5 and 7)

$$= 120 - 79 = 41$$

$\therefore$  Out of 120 numbers given, 41 numbers are not divisible by any of 2, 5 and 7.

Hence, option (b).

76. **(c)** For 2 equations  $a_1x + b_1y = c_1$  and  $a_2x + b_2y = c_2$  to have a unique solution, the condition is:

$$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$$

$$\frac{k}{4} = \frac{1}{k}$$

$$\therefore \frac{k}{4} = \frac{1}{k}$$

$$\Rightarrow k^2 = 4$$

$$\Rightarrow k = \pm 2 \text{ or } |k| \neq 2.$$

Hence, option (c).

