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

In the late 1960s, while studying the northern-elephant-seal population along the coasts of Mexico and California, Burney Le Boeuf and his colleagues couldn't help but notice that the threat calls of males at some sites sounded different from those of males at other sites. . ..
That was the first-time dialects were documented in a nonhuman mammal. . ..

All the northern elephant seals that exist today are descendants of the small herd that survived on Isla Guadalupe [after the near extinction of the species in the nineteenth century]. As that tiny population grew, northern elephant seals started to recolonize former breeding locations. It was precisely on the more recently colonized islands where Le Boeuf found that the tempos of the male vocal displays showed stronger differences to the ones from Isla Guadalupe, the founder colony.

In order to test the reliability of these dialects over time, Le Boeuf and other researchers visited Año Nuevo Island in California—the island where males showed the slowest pulse rates in their calls—every winter from 1968 to 1972. "What we found is that the pulse rate increased, but it still remained relatively slow compared to the other colonies we had measured in the past" Le Boeuf told me.

At the individual level, the pulse of the calls stayed the same: A male would maintain his vocal signature throughout his lifetime. But the average pulse rate was changing. Immigration could have been responsible for this increase, as in the early 1970s, 43 percent of the males on Año Nuevo had come from southern rookeries that had a faster pulse rate. This led Le Boeuf and his collaborator, Lewis Petrinovich, to deduce that the dialects were, perhaps, a result of isolation over time, after the breeding sites had been recolonized. For instance, the first settlers of Año Nuevo could have had, by chance, calls with low pulse rates. At other sites, where the scientists found faster pulse rates, the opposite would have happened—seals with faster rates would have happened to arrive first.

As the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony. In the decades that followed, scientists noticed that the geographical variations reported in 1969 were not obvious anymore.
. . . In the early 2010s, while studying northern elephant seals on Año Nuevo Island, [researcher Caroline] Casey noticed, too, that what Le Boeuf had heard decades ago was not what she heard now. . . . By performing more sophisticated statistical analyses on both sets of data, [Casey and Le Boeuf] confirmed that dialects existed back then but had vanished. Yet there are other differences between the males from the late 1960s and their great-greatgrandsons: Modern males exhibit more individual diversity, and their calls are more complex. While 50 years ago the drumming pattern was quite simple and the dialects denoted just a change in tempo, Casey explained, the calls recorded today have more complex structures, sometimes featuring doublets or triplets. . . .

1. From the passage it can be inferred that the call pulse rate of male northern elephant seals in the southern rookeries was faster because:
- (a) a large number of male northern elephant seals from Año Nuevo Island might have migrated to the southern rookeries to recolonise them.
- (b) a large number of male northern elephant seals migrated from the southern rookeries to Año Nuevo Island in the early 1970s.
- (c) the male northern elephant seals of Isla Guadalupe with faster call pulse rates might have been the original settlers of the southern rookeries.
- (d) the calls of male northern elephant seals in the southern rookeries have more sophisticated structures, containing doublets and triplets.

2. Which one of the following conditions, if true, could have ensured that male northern elephant seal dialects did not disappear?
- (a) The call tempo of individual immigrant male seals changed to match the average tempo of resident male seals in the host colony.
- (b) Besides Isla Guadalupe, there was one more founder colony with the same average male call tempo from which male seals migrated to various other colonies.
- (c) The call tempo of individual male seals in host colonies changed to match the average call tempo of immigrant male seals.
- (d) Besides Isla Guadalupe, there was one more surviving colony with the same average male call tempo from which no migration took place.

3. Which one of the following best sums up the overall history of transformation of male northern elephant seal calls?

(a) The calls have transformed from exhibiting simple composition, great individual variety, and less regional variety to complex composition, less individual variety, and great regional variety.

(b) Owing to migrations in the aftermath of near species extinction, the average call pulse rates in the recolonised breeding locations exhibited a gradual increase until they matched the tempo at the founding colony.

(c) The calls have transformed from exhibiting simple composition, less individual variety, and great regional variety to complex composition, great individual variety, and less regional variety.

(d) Owing to migrations in the aftermath of near species extinction, the calls have transformed from exhibiting complex composition, less individual variety, and great regional variety to simple composition, less individual variety, and great regional variety.

4. All of the following can be inferred from Le Boeuf's study as described in the passage EXCEPT that:

(a) male northern elephant seals might not have exhibited dialects had they not become nearly extinct in the nineteenth century.

(b) the average call pulse rate of male northern elephant seals at Año Nuevo Island increased from the early 1970s till the disappearance of dialects.

(c) the influx of new northern elephant seals into Año Nuevo Island would have soon made the call pulse rate of its male seals exceed that of those at Isla Guadalupe.

(d) changes in population and migration had no effect on the call pulse rate of individual male northern elephant seals.

Direction for Reading Comprehension: The pass ages 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

Vocabulary used in speech or writing organizes itself in seven parts of speech (eight, if you count interjections such as Oh! and Gosh! and Fuhgeddaboudit!). Communication composed of these parts of speech must be organized by rules of grammar upon which we agree. When these rules break down, confusion and misunderstanding result. Bad grammar produces bad sentences. My favorite example from Strunk and White is this one: "As a mother of five, with another one on the way, my ironing board is always up."

Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence, since a sentence is, by definition, a group of words containing a subject (noun) and a predicate (verb); these strings of words begin with a capital letter, end with a period, and combine to make a complete thought which starts in the writer's head and then leaps to the reader's.

Must you write complete sentences each time, every time? Perish the thought. If your work consists only of fragments and floating clauses, the Grammar Police aren't going to come and take you away. Even William Strunk, that Mussolini of rhetoric, recognized the delicious pliability of language. "It is an old observation," he writes, "that the best writers sometimes disregard the rules of rhetoric." Yet he goes on to add this thought, which I urge you to consider: "Unless he is certain of doing well, [the writer] will probably do best to follow the rules."

The telling clause here is Unless he is certain of doing well. If you don't have a rudimentary grasp of how the parts of speech translate into coherent sentences, how can you be certain that you are doing well? How will you know if you're doing ill, for that matter? The answer, of course, is that you can't, you won't. One who does grasp the rudiments of grammar finds a comforting simplicity at its heart, where there need be only nouns, the words that name, and verbs, the words that act.

Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float. These are all perfect sentences. Many such thoughts make little rational sense, but even the stranger ones (Plums deify!) have a kind of poetic weight that's nice. The simplicity of noun-verb construction is useful—at the very least it can provide a safety net for your writing. Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric—all those restrictive and nonrestrictive clauses, those modifying phrases, those appositives and compound-complex sentences. If you start to freak out at the sight of such unmapped territory (unmapped by you, at least), just remind yourself that rocks explode, Jane transmits, mountains float, and plums deify. Grammar is . . . the pole you grab to get your thoughts up on their feet and walking.

5. Inferring from the passage, the author could be most supportive of which one of the following practices?
   (a) The critique of standardised rules of punctuation and capitalisation.
   (b) A campaign demanding that a writer's creative license should allow the breaking of grammatical rules.
   (c) A Creative Writing course that focuses on how to avoid the use of rhetoric.
   (d) The availability of language software that will standardise the rules of grammar as an aid to writers

6. "Take any noun, put it with any verb, and you have a sentence. It never fails. Rocks explode. Jane transmits. Mountains float." None of the following statements can be seen as similar EXCEPT:
   (a) Take an apple tree, plant it in a field, and you have an orchard.
   (b) A group of nouns arranged in a row becomes a sentence.
   (c) A collection of people with the same sports equipment is a sports team.
   (d) Take any vegetable, put some spices in it, and you have a dish.

7. All of the following statements can be inferred from the passage EXCEPT that:
   (a) the primary purpose of grammar is to ensure that sentences remain simple.
   (b) the subject–predicate relation is the same as the noun–verb relation.
   (c) "Grammar Police" is a metaphor for critics who focus on linguistic rules.
   (d) sentences do not always have to be complete.

8. Which one of the following quotes best captures the main concern of the passage?
   (a) "Bad grammar produces bad sentences."
   (b) "The telling clause here is Unless he is certain of doing well."
   (c) "Nouns and verbs are the two indispensable parts of writing. Without one of each, no group of words can be a sentence . . ."
   (d) "Strunk and White caution against too many simple sentences in a row, but simple sentences provide a path you can follow when you fear getting lost in the tangles of rhetoric . . ."

9. Which one of the following statements, if false, could be seen as supporting the arguments in the passage?
   (a) An understanding of grammar helps a writer decide if she/he is writing well or not.
   (b) Perish the thought that complete sentences necessarily need nouns and verbs!
   (c) Regarding grammar, women writers tend to be more attentive to method and accuracy.
   (d) It has been observed that writers sometimes disregard the rules of rhetoric.

Direction for Reading Comprehension: The pass ages 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

Few realise that the government of China, governing an empire of some 60 million people during the Tang dynasty (618–907), implemented a complex financial system that recognised grain, coins and textiles as money. . . . Coins did have certain advantages: they were durable, recognisable and provided a convenient medium of exchange, especially for smaller transactions. However, there were also disadvantages. A continuing shortage of copper meant that government mints could not produce enough coins for the entire empire, to the extent that for most of the dynasty's history, coins constituted only a tenth of the money supply. One of the main objections to calls for taxes to be paid in coin was that peasant producers who could weave cloth or grow grain – the other two major currencies of the Tang –would not be able to produce coins, and therefore would not be able to pay their taxes. . . .

As coins had advantages and disadvantages, so too did textiles. If in circulation for a long period of time, they could show signs of wear and tear. Stained, faded and torn bolts of textiles had less value than a brand new bolt. Furthermore, a full bolt had a particular value. If consumers cut textiles into smaller pieces to buy or sell something worth less than a full bolt, that, too, greatly lessened the value of the textiles. Unlike coins, textiles could not be used for small

transactions; as [an official] noted, textiles could not "be exchanged by the foot and the inch" . . .

But textiles had some advantages over coins. For a start, textile production was widespread and there were fewer problems with the supply of textiles. For large transactions, textiles weighed less than their equivalent in coins since a string of coins . . . could weigh as much as 4 kg. Furthermore, the dimensions of a bolt of silk held remarkably steady from the third to the tenth century: 56 cm wide and 12 m long . . . The values of different textiles were also more stable than the fluctuating values of coins. . . .

The government also required the use of textiles for large transactions. Coins, on the other hand, were better suited for smaller transactions, and possibly, given the costs of transporting coins, for a more local usage. Grain, because it rotted easily, was not used nearly as much as coins and textiles, but taxpayers were required to pay grain to the government as a share of their annual tax obligations, and official salaries were expressed in weights of grain. . . .

In actuality, our own currency system today has some similarities even as it is changing in front of our eyes We have cash – coins for small transactions like paying for parking at a meter, and banknotes for other items; cheques and debit/credit cards for other, often larger, types of payments. At the same time, we are shifting to electronic banking and making payments online. Some young people never use cash [and] do not know how to write a cheque . . .

10. According to the passage, the modern currency system shares all the following features with that of the Tang, EXCEPT that:
(a) it uses different materials as currency.
(b) it is undergoing transformation.
(c) its currencies fluctuate in value over time.
(d) it uses different currencies for different situations.

11. In the context of the passage, which one of the following can be inferred with regard to the use of currency during the Tang era?
(a) Currency that deteriorated easily was not used for official work.
(b) Copper coins were more valuable and durable than textiles.
(c) Currency usage was similar to that of modern times.
(d) Grains were the most used currency because of government requirements.

12. When discussing textiles as currency in the Tang period, the author uses the words "steady" and "stable" to indicate all of the following EXCEPT:
(a) reliable transportation.
(b) reliable supply.
(c) reliable measurements.
(d) reliable quality.

13. During the Tang period, which one of the following would not be an economically sound decision for a small purchase in the local market that is worth one-eighth of a bolt of cloth?
(a) Paying with a faded bolt of cloth that has approximately the same value.
(b) Making the payment with the appropriate weight of grain.
(c) Using coins issued by the government to make the payment.
(d) Cutting one-eighth of the fabric from a new bolt to pay the amount.

Direction for Reading Comprehension: The pass ages 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

The word 'anarchy' comes from the Greek anarkhia, meaning contrary to authority or without a ruler, and was used in a derogatory sense until 1840, when it was adopted by Pierre-Joseph Proudhon to describe his political and social ideology. Proudhon argued that organization without government was both possible and desirable. In the evolution of political ideas, anarchism can be seen as an ultimate projection of both liberalism and socialism, and the differing strands of anarchist thought can be related to their emphasis on one or the other of these.

Historically, anarchism arose not only as an explanation of the gulf between the rich and the poor in any community, and of the reason why the poor have been obliged to fight for their share of a common inheritance, but as a radical answer to the question 'What went wrong?' that followed the ultimate outcome of the French Revolution. It had ended not only with a reign of terror and the emergence of a newly rich ruling caste, but with a new adored emperor, Napoleon Bonaparte, strutting through his conquered territories.

The anarchists and their precursors were unique on the political Left in affirming that workers and peasants, grasping the chance that arose to bring an end to centuries of exploitation and tyranny, were inevitably betrayed by the new class of politicians, whose first priority was to re-establish a centralized state power. After every revolutionary uprising, usually won at a heavy cost for ordinary populations, the new rulers had no hesitation in applying violence

and terror, a secret-police, and a professional army to maintain their control.

For anarchists the state itself is the enemy, and they have applied the same interpretation to the outcome of every revolution of the 19th and 20th centuries. This is not merely because every state keeps a watchful and sometimes punitive eye on its dissidents, but because every state protects the privileges of the powerful.
The mainstream of anarchist propaganda for more than a century has been anarchistcommunism, which argues that property in land, natural resources, and the means of production should be held in mutual control by local communities, federating for innumerable joint purposes with other communes. It differs from state socialism in opposing the concept of any central authority. Some anarchists prefer to distinguish between anarchist-communism and collectivist anarchism in order to stress the obviously desirable freedom of an individual or family to possess the resources needed for living, while not implying the right to own the resources needed by others. . .

There are, unsurprisingly, several traditions of individualist anarchism, one of them deriving from the 'conscious egoism' of the German writer Max Stirner (1806–56), and another from a remarkable series of 19th-century American figures who argued that in protecting our own autonomy and associating with others for common advantages, we are promoting the good of all. These thinkers differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis on mutualism.

14. The author believes that the new ruling class of politicians betrayed the principles of the French Revolution, but does not specify in what way. In the context of the passage, which statement below is the likeliest explanation of that betrayal?
(a) The new ruling class was constituted mainly of anarchists who were against the destructive impact of the Revolution on the market.
(b) The anarchists did not want a new ruling class, but were not politically strong enough to stop them.
(c) The new ruling class struck a deal with the old ruling class to share power between them.
(d) The new ruling class rode to power on the strength of the workers' revolutionary anger, but then turned to oppress that very class.

15. Which one of the following best expresses the similarity between American individualist anarchists and free-market liberals as well as the difference between the former and the latter?
(a) Both reject the regulatory power of the state; but the former favour a people's state, while the latter favour state intervention in markets.
(b) Both prioritise individual autonomy; but the former also emphasise mutual dependence, while the latter do not do so.
(c) Both are sophisticated arguments for capitalism; but the former argue for a morally upright capitalism, while the latter argue that the market is the only morality.
(d) Both are founded on the moral principles of altruism; but the latter conceive of the market as a force too mystical for the former to comprehend.

16. The author makes all of the following arguments in the passage, EXCEPT:
(a) The failure of the French Revolution was because of its betrayal by the new class of politicians who emerged from it.
(b) The popular perception of anarchism as espousing lawlessness and violence comes from a mainstream mistrust of collectivism.
(c) Individualist anarchism is actually constituted of many streams, all of which focus on the autonomy of the individual.
(d) For anarchists, the state is the enemy because all states apply violence and terror to maintain their control.

17. According to the passage, what is the one idea that is common to all forms of anarchism?
(a) There is no idea common to all forms of anarchism; that is why it is anarchic.
(b) They all derive from the work of Pierre-Joseph Proudhon.
(c) They are all opposed to the centralisation of power in the state.
(d) They all focus on the primacy of the power of the individual.

18. Of the following sets of concepts, identify the set that is conceptually closest to the concerns of the passage.
(a) Revolution, State, Strike, Egoism.
(b) Revolution, State, Protection, Liberals.
(c) Anarchism, State, Individual, Freedom.
(d) Anarchism, Betrayal, Power, State.

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:
1. Relying on narrative structure alone, indigenous significances of nineteenth century San folktales are hard to determine.

2. Using their supernatural potency, benign shamans transcend the levels of the San cosmos in order to deal with social conflict and to protect material resources and enjoy a measure of respect that sets them apart from ordinary people.
3. Selected tales reveal that they deal with a form of spiritual conflict that has social implications and concern conflict between people and living or dead malevolent shamans.
4. Meaning can be elicited, and the tales contextualized, by probing beneath the narrative of verbatim, original-language records and exploring the connotations of highly significant words and phrases.

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:

1. Talk was the most common way for enslaved men and women to subvert the rules of their bondage, to gain more agency than they were supposed to have.
2. Even in conditions of extreme violence and unfreedom, their words remained ubiquitous, ephemeral, irrepressible, and potentially transgressive.
3. Slaves came from societies in which oaths, orations, and invocations carried great potency, both between people and as a connection to the all- powerful spirit world.
4. Freedom of speech and the power to silence may have been preeminent markers of white liberty in Colonies, but at the same time, slavery depended on dialogue: slaves could never be completely muted.
5. Slave-owners obsessed over slave talk, though they could never control it, yet feared its power to bind and inspire—for, as everyone knew, oaths, whispers, and secret conversations bred conspiracy and revolt.

21. 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. Tensions and sometimes conflict remain an issue in and between the 11 states in South East Asia (Brunei Darussalam, Cambodia, Indonesia, Laos, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Timor-Leste and Vietnam).
2. China's rise as a regional military power and its claims in the South China Sea have become an increasingly pressing security concern for many South East Asian states.
3. Since the 1990s, the security environment of South East Asia has seen both continuity and profound changes.
4. These concerns cause states from outside the region to take an active interest in South East Asian security.

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

As Soviet power declined, the world became to some extent multipolar, and Europe strove to define an independent identity. What a journey Europe has undertaken to reach this point. It had in every century changed its internal structure and invented new ways of thinking about the nature of international order. Now at the culmination of an era, Europe, in order to participate in it, felt obliged to set aside the political mechanisms through which it had conducted its affairs for three and a half centuries. Impelled also by the desire to cushion the emergent unification of Germany, the new European Union established a common currency in 2002 and a formal political structure in 2004. It proclaimed a Europe united, whole, and free, adjusting its differences by peaceful mechanisms.

1. Europe has consistently changed its internal structure to successfully adapt to the changing world order.
2. Europe has consistently changed in keeping with the changing world order and that has culminated in a united Europe.
3. The establishment of a formal political structure in Europe was hastened by the unification of Germany and the emergence of a multipolar world.
4. Europe has chosen to lower political and economic heterogeneity, in order to adapt itself to an emerging multi-polar world.

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

For years, movies and television series like Crime Scene Investigation (CSI) paint an unrealistic picture of the "science of voices." In the 1994 movie Clear and Present Danger an expert-listens to a brief recorded utterance and declares that the speaker is "Cuban, aged 35 to 45, educated in the […] eastern United States." The recording is then fed to a supercomputer that matches the voice to that of a

suspect, concluding that the probability of correct identification is 90%. This sequence sums up a good number of misimpressions about forensic phonetics, which have led to errors in reallife justice. Indeed, that movie scene exemplifies the so-called "CSI effect"—the phenomenon in which judges hold unrealistic expectations of the capabilities of forensic science.

1. Although voice recognition is often presented as evidence in legal cases, its scientific basis can be shaky.
2. Movies and televisions have led to the belief that the use of forensic phonetics in legal investigations is robust and fool proof.
3. Voice recognition as used in many movies to identify criminals has been used to identify criminals in real life also.
4. Voice recognition has started to feature prominently in crime-scene intelligence investigations because of movies and television series.

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

For nearly a century most psychologists have embraced one view of intelligence. Individuals are born with more or less intelligence potential (I.Q.); this potential is heavily influenced by heredity and difficult to alter; experts in measurement can determine a person's intelligence early in life, currently from paper-and-pencil measures, perhaps eventually from examining the brain in action or even scrutinizing his/her genome. Recently, criticism of this conventional wisdom has mounted. Biologists ask if speaking of a single entity called "intelligence" is coherent and question the validity of measures used to estimate heritability of a trait in humans, who, unlike plants or animals, are not conceived and bred under controlled conditions.

1. Biologists have questioned the long-standing view that 'intelligence' is a single entity and the attempts to estimate its heritability.
2. Biologists have started questioning psychologists' view of 'intelligence' as a measurable immutable characteristic of an individual.
3. Biologists have questioned the view that 'intelligence' is a single entity and the ways in which what is inherited.
4. Biologists have criticised that conventional wisdom that individuals are born with more or less intelligence potential.

25. 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. For feminists, the question of how we read is inextricably linked with the question of what we read.
2. Elaine Showalter's critique of the literary curriculum is exemplary of this work.
3. Androcentric literature structures the reading experience differently depending on the gender of the reader.
4. The documentation of this realization was one of the earliest tasks undertaken by feminist critics.
5. More specifically, the feminist inquiry into the activity of reading begins with the realization that the literary canon is androcentric, and that this has a profoundly damaging effect on women readers.

26. 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. Man has used poisons for assassination purposes ever since the dawn of civilization, against individual enemies but also occasionally against armies.
2. These dangers were soon recognized, and resulted in two international declarations—in 1874 in Brussels and in 1899 in The Hague—that prohibited the use of poisoned weapons.
3. The foundation of microbiology by Louis Pasteur and Robert Koch offered new prospects for those interested in biological weapons because it allowed agents to be chosen and designed on a rational basis.
4. Though treaties were all made in good faith, they contained no means of control, and so failed to prevent interested parties from developing and using biological weapons.

DATA INTERPRETATION AND LOGICAL REASONING

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

1000 patients currently suffering from a disease were selected to study the effectiveness of treatment of four types of medicines — A, B, C and D. These patients were first randomly assigned into two groups of equal size, called treatment group and control group. The patients in the control group were not treated with any of these medicines; instead they were given a dummy medicine, called placebo, containing only sugar and starch. The following information is known about the patients in the treatment group

A total of 250 patients were treated with type A medicine and a total of 210 patients were treated with type C medicine.
25 patients were treated with type A medicine only. 20 patients were treated with type C medicine only. 10 patients were treated with type D medicine only.
35 patients were treated with type A and type D medicines only. 20 patients were treated with type A and type B medicines only.
30 patients were treated with type A and type C medicines only. 20 patients were treated with type C and type D medicines only.
100 patients were treated with exactly three types of medicines.
40 patients were treated with medicines of types A, B and C, but not with medicines of type D. 20 patients were treated with medicines of types A, C and D, but not with medicines of type B.
50 patients were given all the four types of medicines. 75 patients were treated with exactly one type of medicine.

27. How many patients were treated with medicine type B?

28. The number of patients who were treated with medicine types B, C and D, but not type A was:

29. How many patients were treated with medicine types B and D only?

30. The number of patients who were treated with medicine type D was:

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

Ten musicians (A, B, C, D, E, F, G, H, I and J) are experts in at least one of the following three percussion instruments: tabla, mridangam, and ghatam. Among them, three are experts in tabla but not in mridangam or ghatam, another three are experts in mridangam but not in tabla or ghatam, and one is an expert in ghatam but not in tabla or mridangam. Further, two are experts in tabla and mridangam but not in ghatam, and one is an expert in tabla and ghatam but not in mridangam.

The following facts are known about these ten musicians.

- Both A and B are experts in mridangam, but only one of them is also an expert in tabla.
- D is an expert in both tabla and ghatam.
- Both F and G are experts in tabla, but only one of them is also an expert in mridangam.
- Neither I nor J is an expert in tabla.
- Neither H nor I is an expert in mridangam, but only one of them is an expert in ghatam.

31. Who among the following is DEFINITELY an expert in tabla but not in either mridangam or ghatam?
(a) F (b) A
(c) H (d) C

32. Who among the following is DEFINITELY an expert in mridangam but not in either tabla or ghatam?
(a) E (b) B
(c) G (d) J

33. Which of the following pairs CANNOT have any musician who is an expert in both tabla and mridangam but not in ghatam?
(a) C and E (b) C and F
(c) A and B (d) F and G

34. If C is an expert in mridangam and F is not, then which are the three musicians who are experts in tabla but not in either mridangam or ghatam?
(a) C, E and G (b) E, F and H
(c) C, G and H (d) E, G and H

Answer the next 6 questions based on the information given below.

In a certain board examination, students were to appear for examination in five subjects: English, Hindi, Mathematics, Science and Social Science. Due to a certain emergency situation, a few of the examinations could not be conducted for some students. Hence, some students missed one examination and some others missed two examinations. Nobody missed more than two examinations.

The board adopted the following policy for awarding marks to students. If a student appeared in all five examinations, then the marks awarded in each of the examinations were on the basis of the scores obtained by them in those examinations.

- If a student missed only one examination, then the marks awarded in that examination was the average of the best three among the four scores in the examinations they appeared for.
- If a student missed two examinations, then the marks awarded in each of these examinations was the average of the best two among the three scores in the examinations they appeared for.
- The marks obtained by six students in the examination are given in the table below. Each of them missed either one or two examinations.

	English	Hindi	Mathematics	Science	Social Science
Alva	80	75	70	75	60
Bithi	90	80	55	85	85
Carl	75	80	90	100	90
Deep	70	90	100	90	80
Esha	80	85	95	60	55
Foni	83	72	78	88	83

The following facts are also known.

- Four of these students appeared in each of the English, Hindi, Science, and Social Science examinations.
- The student who missed the Mathematics examination did not miss any other examination.
- One of the students who missed the Hindi examination did not miss any other examination. The other student who missed the Hindi examination also missed the Science examination.

35. Who among the following did not appear for the Mathematics examination?
(a) Carl (b) Esha
(c) Foni (d) Alva

36. Which students did not appear for the English examination?
(a) Cannot be determined
(b) Esha and Foni
(c) Carl and Deep
(d) Alva and Bithi

37. What BEST can be concluded about the students who did not appear for the Hindi examination?
(a) Alva and Esha
(b) Two among Alva, Deep and Esha
(c) Deep and Esha
(d) Alva and Deep

38. What BEST can be concluded about the students who missed the Science examination?
(a) Bithi and one out of Alva and Deep
(b) Alva and Deep
(c) Deep and Bithi
(d) Alva and Bithi

39. How many out of these six students missed exactly one examination?

40. For how many students can we be definite about which examinations they missed?

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

The local office of the APP-CAB company evaluates the performance of five cab drivers, Arun, Barun, Chandan, Damodaran, and Eman for their monthly payment based on ratings infive different parameters (P1 to P5) as given below:

P1: timely arrival
P2: behaviour
P3: comfortable ride
P4: driver's familiarity with the route
P5: value for money

Based on feedback from the customers, the office assigns a rating from 1 to 5 in each of these parameters. Each rating is an integer from a low value of 1 to a high value of 5. The final rating of a driver is the average of his ratings in these five parameters. The monthly payment of the drivers has two parts – a fixed payment and final rating-based bonus. If a driver gets a rating of 1 in any of the parameters, he is not eligible to get bonus. To be eligible for bonus a driver also needs to get a rating of five in at least one of the parameters.

The partial information related to the ratings of the drivers in different parameters and the monthly payment structure (in rupees) is given in the table below:

	P1	P2	P3	P4	P5	Fixed Payment	Bonus
Arun				4		Rs. 1000	Rs. 250 × Final Rating
Barun	3					Rs. 1200	Rs. 200 × Final Rating
Chandan			2			Rs. 1400	Rs. 100 × Final Rating
Damodaran		3				Rs. 1300	Rs. 150 × Final Rating
Eman					2	Rs. 1100	Rs. 200 × Final Rating

The following additional facts are known.

- Arun and Barun have got a rating of 5 in exactly one of the parameters. Chandan has got a rating of 5 in exactly two parameters.
- None of drivers has got the same rating in three parameters.

41. If Damodaran does not get a bonus, what is the maximum possible value of his final rating?
(a) 3.6 (b) 3.2
(c) 3.8 (d) 3.4

42. If Eman gets a bonus, what is the minimum possible value of his final rating?
(a) 3.4 (b) 3.0
(c) 3.2 (d) 2.8

43. If all five drivers get bonus, what is the minimum possible value of the monthly payment (in rupees) that a driver gets?
(a) 1750 (b) 1600
(c) 1740 (d) 1700

44. If all five drivers get bonus, what is the maximum possible value of the monthly payment (in rupees) that a driver gets?
(a) 1900 (b) 1950
(c) 1960 (d) 2050

Answer the following questions based on the information given below.

Four institutes, A, B, C, and D, had contracts with four vendors W, X, Y, and Z during the ten calendar years from 2010 to 2019. The contracts were either multi-year contracts running for several consecutive years or single-year contracts. No institute had more than one contract with the same vendor. However, in a calendar year, an institute may have had contracts with multiple vendors, and a vendor may have had contracts with multiple institutes. It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got into two contracts with two of these institutes.

The following facts are also known about these contracts.

- Vendor Z had at least one contract in every year.
- Vendor X had one or more contracts in every year up to 2015, but no contract in any year after that.
- Vendor Y had contracts in 2010 and 2019. Vendor W had contracts only in 2012.
- There were five contracts in 2012.

- There were exactly four multi-year contracts. Institute B had a 7-year contract, D had a 4-year contract, and A and C had one 3- year contract each. The other four contracts were single-year contracts.
- Institute C had one or more contracts in 2012 but did not have any contract in 2011.
- Institutes B and D each had exactly one contract in 2012. Institute D did not have any contract in 2010.

45. In which of the following years were there two or more contracts?
(a) 2016 (b) 2017
(c) 2015 (d) 2018

46. Which of the following is true?
(a) B had a contract with Y in 2019
(b) B had a contract with Z in 2017
(c) D had a contract with X in 2011
(d) D had a contract with Y in 2019

47. In how many years during this period was there only one contract?
(a) 4 (b) 5
(c) 3 (d) 2

48. What BEST can be concluded about the number of contracts in 2010?
(a) exactly 3 (b) at least 3
(c) exactly 4 (d) at least 4

49. Which institutes had multiple contracts during the same year?
(a) B only (b) A only
(c) B and C only (d) A and B only

50. Which institutes and vendors had more than one contracts in any year?
(a) A, B, W, and X (b) B, D, W, and X
(c) A, D, W, and Z (d) B, W, X, and Z

QUANTITATIVE APTITUDE

51. Two persons are walking beside a railway track at respective speeds of 2 and 4 km per hour in the same direction. A train came from behind them and crossed them in 90 and 100 seconds, respectively. The time, in seconds, taken by the train to cross an electric post is nearest to

(a) 75 (b) 82
(c) 87 (d) 78

52. A straight road connects points A and B. Car 1 travels from A to B and Car 2 travels from B to A, both leaving at the same time. After meeting each other, they take 45 minutes and 20 minutes, respectively, to complete their journeys. If Car 1 travels at the speed of 60 km/hr, then the speed of Car 2, in km/hr, is

(a) 100 (b) 90
(c) 70 (d) 80

53. Leaving home at the same time, Amal reaches office at 10:15 am if he travels at 8 km/hr, and at 9:40 am if he travels at 15 km/hr. Leaving home at 9:10 am, at what speed, in km/hr, must he travel so as to reach office exactly at 10 am?

(a) 13 (b) 14
(c) 11 (d) 12

54. A train travelled at one-thirds of its usual speed, and hence reached the destination 30 minutes after the scheduled time. On its return journey, the train initially travelled at its usual speed for 5 minutes but then stopped for 4 minutes for an emergency. The percentage by which the train must now increase its usual speed so as to reach the destination at the scheduled time, is nearest to

(a) 58 (b) 61
(c) 67 (d) 50

55. A person spent Rs. 50000 to purchase a desktop computer and a laptop computer. He sold the desktop at 20% profit and the laptop at 10% loss. If overall he made a 2% profit then the purchase price, in rupees, of the desktop is

56. In a group of people, 28% of the members are young while the rest are old. If 65% of the members are literates, and 25% of the literates are young, then the percentage of old people among the illiterates is nearest to

(a) 55 (b) 66
(c) 59 (d) 62

57. The mean of all 4-digit even natural numbers of the form 'aabb', where a > 0, is

(a) 5050 (b) 4864
(c) 4466 (d) 5544

58. A gentleman decided to treat a few children in the following manner. He gives half of his total stock of toffees and one extra to the first child, and then the half of the remaining stock along with one extra to the second and continues giving away in this fashion. His total stock exhausts after he takes care of 5 children. How many toffees were there in his stock initially?

59. Let A, B and C be three positive integers such that the sum of A and the mean of B and C is 5. In addition, the sum of B and the mean of A and C is 7. Then the sum of A and B is

(a) 4 (b) 5
(c) 6 (d) 7

60. How many distinct positive integer-valued solutions exist to the equation $(x^2 - 7x + 11)^{(x2-13x+42)} = 1$?

(a) 2 (b) 8
(c) 4 (d) 6

61. The number of real-valued solutions of the equation $2^x + 2^{-x} = 2 - (x - 2)^2$ is

(a) 0 (b) Infinite
(c) 2 (d) 1

62. How many 3-digit numbers are there, for which the product of their digits is more than 2 but less than 7?

63. A solution, of volume 40 litres, has dye and water in the proportion 2 : 3. Water is added to the solution to change this proportion to 2 : 5. If one-fourths of this diluted solution is taken out, how many litres of dye must be added to the remaining solution to bring the proportion back to 2 : 3?

64. On a rectangular metal sheet of area 135 sq in, a circle is painted such that the circle touches two opposite sides. If the area of the sheet left unpainted is two-thirds of the painted area then the perimeter of the rectangle in inches is

(a) $3\sqrt{\pi}\left(\frac{5}{2} + \frac{6}{\pi}\right)$ (b) $4\sqrt{\pi}\left(3 + \frac{9}{\pi}\right)$
(c) $3\sqrt{\pi}\left(5 + \frac{12}{\pi}\right)$ (d) $5\sqrt{\pi}\left(3 + \frac{9}{\pi}\right)$

65. Among 100 students, x_1 have birthdays in January, x_2 have birthdays in February, and so on. If $x_0 = max(x_1, x_2, \ldots, x_{12})$, then the smallest possible value of x_0 is

(a) 10 (b) 8
(c) 12 (d) 9

66. A solid right circular cone of height 27 cm is cut into two pieces along a plane parallel to its base at a height of 18 cm from the base. If the difference in volume of the two pieces is 225 cc, the volume, in cc, of the original cone is

(a) 256 (b) 232
(c) 264 (d) 243

67. If $x = (4096)^{7+4\sqrt{3}}$, then which of the following equals 64?

(a) $\frac{x^{\frac{7}{2}}}{x^{\frac{4}{\sqrt{3}}}}$ (b) $\frac{x^{7}}{x^{2\sqrt{3}}}$

(c) $\frac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$ (d) $\frac{x^{7}}{x^{4\sqrt{3}}}$

68. The number of distinct real roots of the equation $(x + \frac{1}{x})^2 - 3(x + \frac{1}{x}) + 2 = 0$ equals

69. If a, b and c are positive integers such that ab = 432, bc = 96 and c < 9, then the smallest possible value of a + b + c is

(a) 49 (b) 56
(c) 46 (d) 59

70. An alloy is prepared by mixing three metals A, B and C in the proportion 3 : 4 : 7 by volume. Weights of the same volume of the metals A, B and C are in the ratio 5 : 2 : 6. In 130 kg of the alloy, the weight, in kg, of the metal C is

(a) 70 (b) 84
(c) 96 (d) 48

71. Veeru invested Rs. 10,000 at 5% simple annual interest, and exactly after two years, Joy invested Rs. 8,000 at 10% simple annual interest. How many years after Veeru's investment, will their balances, i.e., principal plus accumulated interest, be equal?

72. A circle is inscribed in a rhombus with diagonals 12 cm and 16 cm. The ratio of the area of circle to the area of rhombus is

(a) $5\pi/18$ (b) $2\pi/15$
(c) $3\pi/25$ (d) $6\pi/25$

73. If y is a negative number such that $2^{y^2} \log_3 5 = 5^{\log_2 3}$, then y equals

(a) $\log_2(1/5)$ (b) $-\log_2(1/3)$
(c) $-\log_2(1/5)$ (d) $\log_2(1/3)$

74. If f(5 + x) = f(5 - x) for every real x, and f(x) = 0 has four distinct real roots, then the sum of these roots is

(a) 20 (b) 40
(c) 0 (d) 10

75. If $\log_4 5 = \log_4 y \times \log_6 \sqrt{5}$, then y equals

76. The area of the region satisfying the inequalities $|x| - y \le 1$, $y \ge 0$ and $y \le 1$ is

ANSWER KEY AND EXPLANATIONS

VERBAL ABILITY AND READING COMPREHENSION

1. **(c)** Last part of the second last paragraph states- "this led Le Boeuf to deduce that dialects were a result of isolation over time...for instance, the first settlers of Ano Nuevo could have had, by chance, calls with low pulse rates. At other sites, where scientists found faster pulse rates the opposite would have happened-seals with faster rates would have happened to arrive first".
So if the pulse rate of the elephant seals in southern rookeries was faster, it was because the seals with faster call pulse rates might have been the original settlers (or might have arrived there first). Thus C is the best choice.
Option (a) goes out because if that were the case, then the pulse rates of the seals in southern rookeries would have been slower, not faster.
Option (b) also goes because here the question is migration to southern rookeries and not from southern rookeries.
Option (d) is irrelavant to the question. Hence, option (c).

2. **(a)** First sentence of the last paragraph says "as the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony".
This is a simple concept of average. Now the question is which of the following could have ensured (it means it is asking us for a hypothetical situation) that male northern elephant seals dialects did not disappear.
It disappeared because the average changed because of migrant seals. As more and more seals came, the average regressed to "the pulse rate of the founder colony". To make the situation opposite, the call tempo of the individual immigrant seal should have changed to match the average tempo of resident male seals of the "host colony."
If option (a) had happened, the male northern seals dialect would not have disappeared.
Option (c) is the exact opposite of option (a). We must remember here that the islands kept on receiving immigrants from the original population, and the average pulse rate changed to match the founder colony, not the host colony. That's why the host colony's dialects disappeared.
Had option A been true, this would not have happened. Hence option (a).

3. **(c)** First sentence of the last paragraph says "As the population continued to expand and the islands kept on receiving immigrants from the original population, the calls in all locations would have eventually regressed to the average pulse rate of the founder colony. "
The last sentence of the passage says "modern males exhibit more individual diversity, and their calls are more complex...sometimes featuring doublets or triplets".
Therefore, there was more regional variety earlier but lesser individual varitey but now there is more of individual variety, but less regional variety.
The passage clearly tells us that "in the decades that followed, scientists noticed that the geographical variations reported in 1969 were not obvious anymore...".
Option (c) is the best choice.
Option (a) and (d) can be eliminated because they hint towards "great regional variety" now, which is not true.
Option (b) hints that pulse rate across all geographies was higher that founding colony which is not true. Last line of second last paragraph debunks that.
Hence, option (c).

4. **(c)** We have to mark the answer that cannot be inferred, as it is an EXCEPT question.
Option (a) can be inferred because the seals exhibited dialects because the population was isolated. This isolation was a result of the seal population being almost on the verge of extinction. Since their numbers were very small, the isolation happened. As the population grew there was immigration to different places and this resulted in disappearance of the dialects. Thus we can infer A.
Option (b) also can be inferred from the para that talks about Ano Nuevo seals. It clearly suggests that the average pulse rate increased from 1970s till the dialects disappeared.
Option (c) is certainly a wrong inference because the influx might have resulted in pulse rate of the seals averaging to that of Isla Guadalupe, but not exceeding. The word "exceeding" makes this a wrong inference, and therefore the right answer.
Option (d) is exactly true to what the passages, as a whole, discusses. The individual call rate did not change throughout, but the immigration made all the difference, by ensuring influx of seals with higher pulse rate, thus increasing the average pulse rate.
Hence, option (c) is correct.

5. **(d)** This is the simplest RC passage, and many questions here can be solved effortlessly. The question asks us to mark a choice of which the author would be supportive. We have to keep the central idea in mind while going through the options. The author opines that grammar is essential to frame sentences and one can't do away with grammar. Option 4 perfectly fits in. The author would indeed be supportive of such a software as the one that will standardise the rules of grammar as an aid to writers.
Option 1 goes out because it is too narrow a choice, and tends to specifically focus on punctuation and capitalization instead of grammar as a whole. Choice 2 is against grammar, so it goes out, while option does not even mention the keyword grammar, which is the focus on the passage.
Hence, option (d) is correct.

6. **(d)** This is an analogy question. You bring two different things together and what you have is a new thing. The right option must have two different things, which when combined should give us a new thing. 4 precisely does that. Vegetable is the noun, the spices is the verb, and the resulting new sentence is the new dish. There is no such analogy visible in 3. We don't understand the relevance of "same sports equipment". The question says "take any noun", but in 3 we are taking 'a collection of people'. 2 is logically flawed because without a verb we can't have a sentence. Option 1 might look close, but planting an apple tree alone in a field will not make the field an orchard. We need to have many such apple trees to

make an orchard. 4 is the best.
Hence, option (d) is correct.

7. **(a)** Here for this question, we have to mark a choice that cannot be inferred from the passage. For choice 2 we have evidence in the second paragraph of the passage. 2 can be definitely inferred from the second paragraph. Choice 2 is also correct, and can be inferred from the option itself. Police ensure enforcement of law and order, whereas grammar police insist on application of strict grammar rules. Option 4 goes because it too can be inferred. After all, the author is in favour of grammar and it is grammar that helps us form complete sentences. So how can the passage imply that sentences need not be complete. It has to be the other way round. Noun and verb come together to form a complete sentence.
Hence, option (a) is correct.

8. **(a)** Here we have mark a choice that captures the main idea of the passage. Since the author highlights the importance of grammar in framing correct sentences, choice 1 becomes the right answer. This is too simple a question to demand why others are not the right choice.
Hence, option (a) is correct.

9. **(b)** Here we have to pick a choice, which, when falsified, supports the arguments of the passage. Since 1 is supporting the author, it would not the same when falsified, so 1 goes out. 2 says that one must not think that nouns and verbs are necessary for complete sentences. But when falsified it means that nouns and verbs are necessary for complete sentences, so this supports the author, and is therefore the right answer. Choice 4 is irrelevant because the passage is concerned with grammar and not with rhetoric. Whether some writers regard or disregard the rules of rhetoric has nothing to do with the passage's chief concern, which is grammar.
Hence, option (b) is correct.

10. **(b)** This is an easy passage to read, but some of the questions have very close choices. This question asks to pick a choice that modern currency does not share with the currencies of the Tang era. You must remember that this is an EXCEPT question, and the feature not shared will become the right choice. 1 is a feature shared by both modern and Tang currencies. Last paragraph tells us about modern currencies, whereas the opening tells us about the Tang currencies. Choice 3 also is a feature shared by both, the bolt of silk lost value because of wear and tear. Now many might feel that the last paragraph does not speak anything about modern currencies losing value over time. But this is implied as common knowledge. The idea of inflation suggests that currency value my not always be the same always. The value of Rs 100 was greater 20 years ago than it is today. Thus 3 is a feature shared by both modern and Tang currencies. 4 is also a feature shared by both because in the modern times we use coins for smaller payments, currency for bigger payments, and electronic methods for still bigger payments. This was true of Tang era as well, as can be seen in the first and second paragraphs. The currencies during the Tang era were static: we had coins, fabric and grains to make payments; there is no transformation implied in these during that era, whereas in the modern times because of technology the currency system is undergoing transformation, as the last paragraph shows. The author says: it is changing in front of our eyes…
Hence, option (b) is correct.

11. **(c)** The answer to the earlier questions helps us answer this question. If in the earlier question we eliminated choices that modern currencies shared with the currencies of the Tang era, then it implies that currency usage during the Tang era was similar to currency usage of modern times. There is no evidence for choice 1. Copper coins were difficult to mint, the passage says, but that doesn't mean that copper coins were more valuable. Choice 4 is opposite of what is stated in the passage.
Hence, option (c) is correct.

12. **(a)** To answer this question, we must look for the word "steady and stable" and examine the context in which the words have been used. These words have come in the third paragraph. The para says "dimensions of a bolt of silk held steady ..." here by dimension, the author implies measurement. Thus 1 is correct, but it goes out because it is an except question. The idea of supply can also be inferred from the first sentence of the third paragraph of the passage. The values of different textiles were more stable because the textiles would not have deteriorated over time. The Passage tells us that the value of textiles depended on the quality of the textile. So stable value means stable quality. The reliability of transportation is not the question here. It is the cost of the transportation that the passage highlights (second last para). Thus 1 is the best choice.Hence, option (a) is correct.

13. **(d)** This is a slightly tricky question, but we have to pick the choice that is not economically a sound decision. So the right choice must imply some sort of a loss. Option 1 says that payment was done with a faded bolt of the same value since the faded bolt will further deteriorate, using it to pay makes sense. 1 goes out. Making payment in grains would be the most economical way as grains would rot easily, so the payer will gain while the payee will not. Here we have to answer for the payer. Thus both 2 and 3 are economical. 3 is also an economical way because coins, the passage says, lost value over time, but a piece of fabric from a new bolt is not likely to lose value over time, and so would be economically not a wise decision to make payment.
Hence, option (d) is correct.

14. **(d)** This is an application question. We have to pick from the choices the one that explains how the new ruling class might have betrayed the principles of the French Revolution. We have to first understand what, as per the passage, were the principles of the French Revolution. Here we have to understand that the workers and peasants were the oppressed class, and it is they who made the revolution possible. Betrayal means to against someone. 1 cannot be the right choice because the new ruling class was against the destructive impact of the revolution on the market, but not against the workers and peasants. Both in 2 and 3 there is no sign of betrayal. Only in 4 can we see the evidence of betrayal where the new ruling class rode to power on the strength of workers' revolutionary anger, but then turned to oppress that very class. 4 is the best choice.
Hence, option (d) is correct.

15. **(b)** The clue to the right answer can be seen in the last

paragraph where the author says "there are several traditions of anarchism...one was 19th century American figures who argued that in protecting our own autonomy and associating with others, we are promoting the good of all. These thinkers differed from free-market liberals in their absolute mistrust of American capitalism, and in their emphasis of mutualism." Thus there was a difference between free market liberals and the American anarchists. This difference was with respect to mutualism and capitalism. The anarchists favoured mutualism but mistrusted capitalism. Option 2 brings out this difference correctly. The others just go out because none of them talk about mutualism, which the American anarchists favoured, but the liberals did not.

Hence, option (b) is correct.

16. **(b)** Here we have to eliminate the choice that features in the passage as the author's argument, and choose as our right answer the one that does not. 1 is true as per the passage and can be verified from the second paragraph of the passage. The first sentence of the last para is evidence for choice 3. From the first sentence of the fourth paragraph, we can derive choice 4. Thus we have evidence for all choices except 2. In fact, we can directly mark 2 without verifying the others because anarchists are in favour of autonomy and mutualism. So anarchists will never mistrust collectivism. The evidence for this can be found in the last paragraph. Thus 2 is not the argument presented by the author in the passage.

Hence, option (b) is correct.

17. **(c)** The passage clearly says in the first para and the fourth paragraph that state itself is the enemy. Thus 3 is the right choice, unarguably. The others are easy to eliminate.

Hence, option (c) is correct.

18. **(c)** This too is a very simple question because we have to pick the concepts that are there in the passage. Both 1 and 2 go out because they don't have in them the most important concept: anarchism. Out of 3 and 4, we must pick 3 because the last part of the passage discussed Freedom and individual autonomy. You can refer to the last two paragraphs. Also in option 4 power and state are the same things, there is no need to keep them as two separate things.

Hence, option (c) is correct.

19. **(1432)** This is a simple parajumble question. None of the sentences, except 1 have the opening idea. 1 says "indigenous significances of nineteenth century San folk tales are hard to determine". The idea of "San Folk tales" makes this an opening idea. Rest all just mention the word "the tales" without specifying the kind of tales. Now, 1 says "significances of the tales are hard to determine" and 4 says "meaning can be elicited ...by probing beneath the narrative of the verbatim...". Thus 14 form a pair. 3 further says that "selected tales reveal that they deal with a form of spiritual conflict...and concern conflict between people". Finally, in 2 we have "...benign shamans transcend the levels of the San cosmos in order to deal with social conflict...". Thus 1432 is the right sequence in which information

flows like this: significance of San Folk tales is hard to determine...but meaning can be elicited the tales reveal social conflict shamans try to deal with the social conflict

20. **(3)** This is a relatively simple question. 4 opens the paragraph by giving us the reference of time and place. It talks about white liberty in colonies, and slavery in those colonies. 4 says "the slaves could never be muted". 5 comes as an additional information for 4, because 5 clearly says that "slave owners were obsessed over slave talk" and 1 says "talk was the most common way for enslaved men and women to subvert the rules of their bondage" ...2 further adds to the story by stating that "even in conditions of extreme violence.... their words remained ubiquitous". Thus 4512 form a logical link, with 3 as the odd one out. The sequence may not strictly be 4512, but in all cases 3 is the odd one.

21. **(3124)** In this question, it is easy for us to spot the opening sentence. It brings the action from the past (1990s) into the present. For this reason, 3 is in the present perfect continuous form, and 1 is in the simple present form. Thus 31 form a pair. 4 has the pronoun "these concerns". It refers to the noun "pressing security concern" in 2. Thus 24 form a pair. The right sequence has to be 3124.

22. **(4)** This is a slightly difficult question. The passage talks about what modern Europe has done in order to adapt to changing international order. There are two things it has done: establish a common currency, and a formal political structure, adjusting its internal differences by peaceful mechanisms. 1 looks good, but does the passage say that "Europe has consistently done this"? Maybe. But what it misses here is the essence. Europe has changed its structure, but the focus of the passage is on "what it has done of late". For this reason, 4 wins. By choosing a common currency it has tried to lower economic heterogeneity, and by establishing European Union it has tried to lower political heterogeneity. Thus 4 captures the essence, while 1, 2 and 3 walk on the periphery.

23. **(2)** This question is slightly easier than the earlier one. Let's see the critical elements of the passage. The most important critical element is "forensic phonetics in movies and television", and "these have led to errors in real-life justice, with unrealistic expectations of the capabilities of forensic science". 1 goes out because it misses the context of "movies and television". 3 is a complete distortion, whereas 4 misses the "unrealistic expectations" part. 2 is the best choice in every way.

24. **(1)** In this question, too, we have to look for the keywords. The passage talks about intelligence and its heritability, and the criticism mounted against it. Option 1 exactly captures all the keywords. 2 misses on the heritability part of the story. 3 wrongly mentions the debate about "ways in which intelligence is inherited". The criticism is about heritability itself, not about the ways in which it is inherited. Choice 4 also missies the crucial idea of heritability. Thus 1 is the best choice.

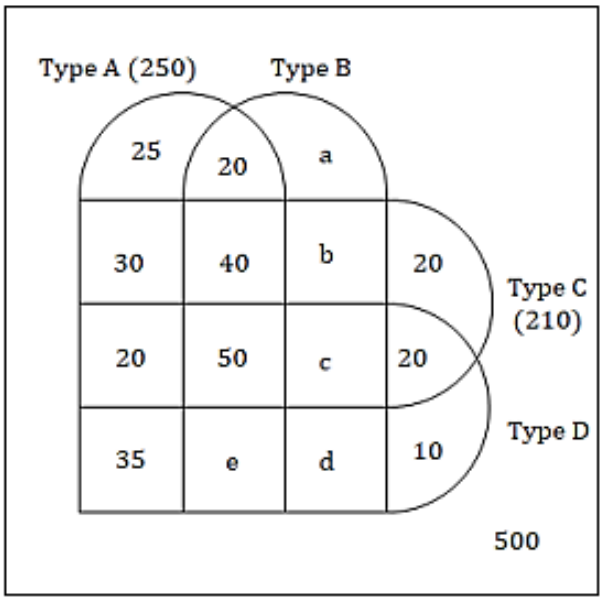
25. **(3)** This could be a challenging question, but we have to look for clues that connect the sentences. This will help us create a new sequence and find the odd one out. 5 says "more specifically, the feminist enquiry...". thus there must a reference to "more specifically" because this phrase is used to bring in clarity to something. We must try to find a reference to this. The reference can be found in 1, which says "for feminists, the question of ..." (the

question of =enquiry). Thus 15 form a pair. 5 has "...the feminist enquiry begins with the realization...and 4 further adds to it by saying "the documentation of this realization...was one of the earliest tasks undertaken by feminist critics..." 2 concludes by stating that "Elaine's critique of the literary curriculum is exemplary of this work". 2 serves as an example of 4. 3 is the odd one out.

26. (1324) This is the easiest parajumble you will ever get in cat exam. The passage moves from the broader idea of "historical use of poisons" to a narrower idea of "biological weapons". 1 opens the paragraph. It then moves to biological weapons in 3. In 2 treaties are signed against the use poisoned weapons. In 4 there is additional info about the treaties, that they contained no means of control. Thus 1324 is the right sequence.

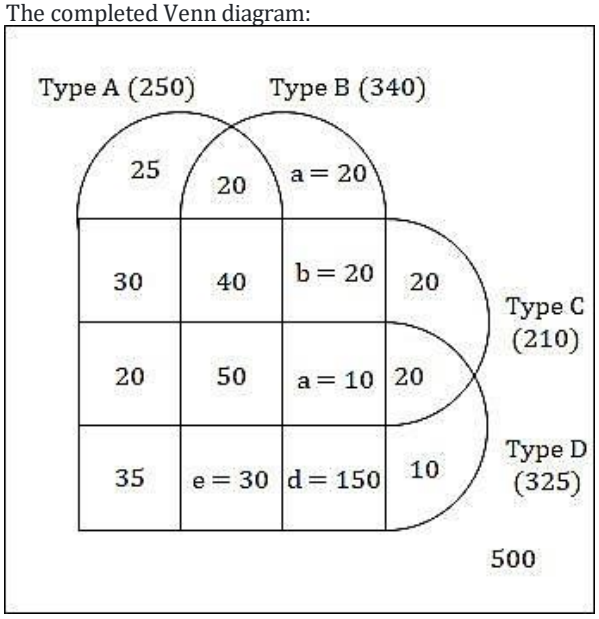
DATA INTERPRETATION AND LOGICAL REASONING

27. (340) We can draw the following Venn diagram according to the information given in the question.



75 patients were treated with exactly one type of medicine.
∴ 25 + a + 20 + 10 = 75
⇒ a = 20
250 patients were treated with type A medicine
∴ 25 + 30 + 20 + 35 + 20 + 40 + 50 + e = 250. ⇒ e = 30
100 patients were treated with exactly three types of medicines.
∴ 20 + 40 + c + e = 100
⇒ c = 10
210 patients were treated with type C medicine
∴ 30 + 40 + b + 20 + 20 + 50 + c + 20 = 210
⇒ b = 20
Since patients were equally in treatment group and control group hence, there were total 500 patients who were in the treatment group and 500 in control group (who were not given any medicine).

Total patient in treatment group = 500 = 25 + 30 + 20 + 35 + 20 + 40 + 50 + e + a + b + c + d + 20 + 20 + 10. ⇒ d = 150
The completed Venn diagram:



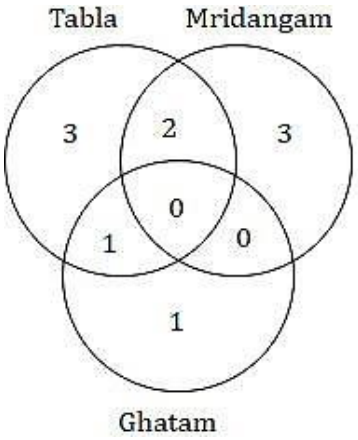
∴ 340 patients were treated with Type B medicine. Hence, 340.

28. (10) Consider the solution to the first question of this set. The number of patients who were treated with medicine types B, C and D, but not type A is a = 10.
Hence, 10.

29. (150) Consider the solution to the first question of this set. The number of patients who were treated with medicine types B and D only = d = 150.
Hence, 150.

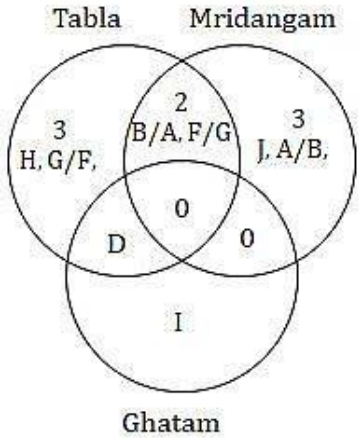
30. (325) Consider the solution to the first question of this set. The number of patients who were treated with medicine type D was 325. Hence, 325.

31. (c) We can draw the following Venn diagram based on the information given in the main paragraph.



D is an expert in both tabla and ghatam.
Since I is neither an expert in tabla nor in mridangam hence, he is an expert in ghatam
∴ D and I are the only two experts in ghatam.

Now, J is not an expert in tabla hence, he can only be an expert in mridangam only.
Also, H is not an expert in mridangam hence, he can only be an expert in tabla only.
Both A and B are experts in mridangam, but only one of them is also an expert in tabla. Both F and G are experts in tabla, but only one of them is also an expert in mridangam.
There are two experts in tabla and mridangam only one of them is either A or B and the other is either F or G.
∴ We can make the following Venn diagram

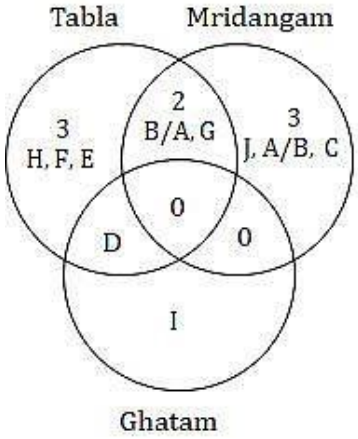


∴ H is an expert in tabla only.
Hence, option (c).

32. **(d)** Consider the solution to the first question of this set.
J is an expert in mridangam only.
Hence, option (d).

33. **(a)** Consider the solution to the first question of this set.
Neither C nor E can be an expert in both tabla and mridangam.
Hence, option (a).

34. **(b)** Consider the solution to the first question of this set.
If C is an expert in mridangam and F is not, we can make the following Venn diagram.
We can make the following Venn diagram



∴ E, F and H are experts in tabla but neither mridangam or ghatam.
Hence, option (b).

35. **(a)** For the subjects missed, the student gets average of top 2 or 3 scores.
∴ Among the six students given, no students would've missed that subject where they get highest of the lowest marks. Also, in the missed subject(s) the student cannot get 2nd lowest marks.
∴ For the missed subject(s), the student will get 2nd highest or 3rd highest marks.
English is missed by 2 students. These two students can only be Esha and Foni.
(For Esha and Foni English is neither highest nor lowest)
Solving for Esha:
Esha has missed English.
∴ Marks in English should be average of top three of the remaining subjects.
Average of remaining top three marks = (95 + 85 + 60)/3 = 80 (which is equal to Esha's marks in English).
One of the students missed only Mathematics. Carl is the only one who could've missed Mathematics.
Solving for Carl
∴ Carl will not miss any other exam.
One of the students missed Hindi and Science. This can be either Alva or Deep since they both have same marks in Hindi and Science. One of the students missed only Hindi. This can be either Alva, Deep since their marks in Hindi is same as average of the remaining top 3 scores.
∴ One of Alva or Deep missed only Hind and the other missed Hindi and Science.
So far we have
Alva missed ⟹ only Hindi or Hindi and Science
Carl ⟹ only Mathematics
Deep missed ⟹ only Hindi or Hindi and Science
Esha missed ⟹ only English
Alva and Deep definitely missed Hindi
Esha and Foni definitely missed English
One of Alva or Deep missed Science
We need to find one more person who missed Science and two more people who missed Social Science.
One more person who could've missed Science is Bithi and two more people who could've missed Social Science are Bithi and Foni
∴ We finally have
Alva missed ⟹ only Hindi or Hindi and Science
Carl missed ⟹ only Mathematics
Bithi missed ⟹ Science and Social Science
Deep missed ⟹ Hindi and Science or only Hindi
Esha missed ⟹ only English
Foni missed ⟹ English and Social Science
∴ Carl missed the Mathematics exam.
Hence, option (a).

36. **(b)** Consider the solution the first question of this set. Esha and Foni did not appear for English.
Hence, option (b).

37. **(d)** Consider the solution the first question of this set. Alva and Deep both missed Hindi exam.
Hence, option (d).

38. **(a)** Consider the solution the first question of this set.
Bithi definitely missed Science exam. One of Alva or Deep also missed Science. Hence, option (a).

39. **(3)** Consider the solution the first question of this set.
Esha, Carl and one of Alva or Deep missed only one exam.
Hence, 3.

40. **(4)** Consider the solution the first question of this set.

Except for Alva and Deep we can determine number of exams missed for other 4 students.
Hence, 4.

41. **(a)** Damodaran does not get bonus. Hence, either he got a rating of 1 in one of the parameters or he did not get a rating of 5 in any of the parameters.
The average rating would be maximum when he gets 2 5-star ratings long with a 1-star rating.
∴ Average rating for Damodaran = (5 + 5 + 4 + 3 + 1)/5 = 18/5 = 3.6
Hence, option (a).

42. **(b)** Since Eman gets the bonus he must have got at least one 5-star rating and no 1-star rating.
Average rating will be minimum when Eman get only 1 5-start rating, 2 2-start rating and 2 3-star rating.
∴ Average = (5 + 3 + 3 + 2 + 2)/5 = 15/5 = 3.
Hence, option (b).

43. **(d)** Since we have to minimize the monthly payment, we need to minimize the average rating for all the drivers. Minimum average rating for
Arun = (5 + 4 + 3 + 2 + 2)/5 = 16/5 = 3.2
⟹ Monthly payment = 1000 + 250 × 3.2 = 1800
Barun = (5 + 3 + 3 + 2 + 2)/5 = 15/5 = 3
⟹ Monthly payment = 1200 + 200 × 3 = 1800
Chandan = (5 + 5 + 3 + 2 + 2)/5 = 17/5 = 3.4
⟹ Monthly payment = 1400 + 100 × 3.4 = 1740
Damodaran = (5 + 3 + 3 + 2 + 2)/5 = 15/5 = 3
⟹Monthly payment = 1300 + 150 × 3 = 1750
Eman = (5 + 3 + 3 + 2 + 2)/5 = 15/5 = 3
⟹Monthly payment = 1100 + 200 × 3 = 1700
∴ Minimum monthly payment is Rs. 1700. Hence, option (d).

44. **(c)** Since we have to maximize the monthly payment, we need to maximise the average rating for all the drivers. Minimum average rating for
Arun = (5 + 4 + 4 + 3 + 3)/5 = 19/5 = 3.8
⟹Monthly payment = 1000 + 250 × 3.8 = 1950
Barun = (5 + 4 + 4 + 3 + 3)/5 = 19/5 = 3.8
⟹Monthly payment = 1200 + 200 × 3.8 = 1960
Chandan = (5 + 5 + 4 + 4 + 2)/5 = 20/5 = 4
⟹Monthly payment = 1400 + 100 × 4 = 1800
Damodaran = (5 + 5 + 4 + 4 + 3)/5 = 21/5 = 4.2
⟹Monthly payment = 1300 + 150 × 4.2 = 1930
Eman = (5 + 5 + 4 + 4 + 2)/5 = 20/5 = 4
⟹Monthly payment = 1100 + 200 × 4 = 1900
∴ Maximum monthly payment is Rs. 1960.
Hence, option (c).

45. **(c)** Given:
It is known that over the decade, the institutes each got into two contracts with two of these vendors, and each vendor got into two contracts with two of these institutes.
Therefore, considering point (V), A had one 3-year contract and one single-year contract. B had one 7- year contract and one single- year contract. C had one 3-year contract and one single-year contract. D had one 4-year contract and one single-year contract.
Using point (III), we can conclude that Y and W have only one-year contracts. Thus, 4 one-year contracts were with Y and W.
Using points (III) and (IV), W had two single-year contracts in 2012. Y did not have any contract in 2012. So, among Z and X, either Z has 2 contracts or X has two contract in 2012.
Using point (II) and (III), X, Y and W did not have 7-year contract. Therefore using point (I) we can conclude that Z must have had 7-year contract with Institute B. Also, another contract Z has must be a 3-year or a 4-year contract.
Case (i): Z has a 4-year contract.
Then X will have two 3-year contracts. One from 2010-2012 and other from 2013-2015.
So Z has to have two contracts in 2012. The 4-year contract must have been from 2010-2013 and the 7- year contract from 2013-2019 OR the 7-year contract must have been from 2010-2016 and the 4-year contract from 2016-2019
But in that case, there will be only 4 contracts in 2012. Therefore this case is invalid.
Thus, Z had a 3-year contract either with institute A or C. Therefore, X had one 4-year with D and one 3- year contract. As D did not have contract in 2010 and C did not have contract in 2011, A had contract in 2010-2012 with Vendor X and D had contract from 2012- 2015 with vendor X. Again as institute C did not have a contact in 2011, B had a 7-year contract (2010-2016) with vendor Z and C had a 3-year contract (2017-2019) with vendor Z.
As institutes B and D each had exactly one contract in 2012, Remaining contracts must be with A and C.
Therefore, both contracts of W must be single-year contracts with institutes A and C. As D did not have any contract in 2010, Y must have had a single-year contract with B in 2010 and with D in 2019.

Thus, we have

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, X)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)
(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Among the given options, there were two or more contracts in 2015. Hence, option (c).

46. **(d)** Consider the solution to first questions of this set.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, Z)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)

(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Hence, option (d).

47. **(c)** Consider the solution to first questions of this set.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, X)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)
(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Hence, option (c).

48. **(a)** Consider the solution to first questions of this set.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, X)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)
(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Hence, option (a).

49. **(d)** Consider the solution to first questions of this set.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, X)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)
(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Hence, option (d).

50. **(a)** Consider the solution to first questions of this set.

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
(A, X)	(A, X)	(A, X)							
		(D, X)	(D, X)	(D, X)	(D, X)				
(B, Y)									(D, Y)
(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(B, Z)	(C, Z)	(C, Z)	(C, Z)
		(C, W)							
		(A, W)							

Hence, option (a).

QUANTITATIVE APTITUDE

51. **(b)** Let the speed and length of train be 's' m/s and 't' m respectively.
Speeds of two persons is 2 kmph and 4 kmph i.e., 5/9 m/s and 10/9 m/s
Train passes the first person in 90 seconds.

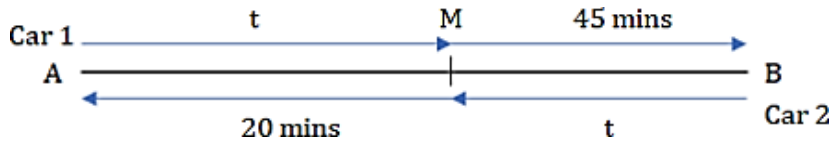
$\therefore \frac{t}{s-\frac{5}{9}} = 90$

$\Rightarrow$ t = 90s – 50 ...(1)
Train passes the second person in 100 seconds.

$\therefore \frac{t}{s-\frac{5}{9}} = 90$

$\Rightarrow$ t = 100s – 1000/9 ...(2)
(1) = (2)
$\Rightarrow$ 90s – 50 = 100s – 1000/9
$\Rightarrow$ s = 55/9 m/s and t = 500 m
$\therefore$ Time taken to cross an electric pole = $\frac{500}{55/9} = \frac{4500}{55} = \frac{900}{11} =$ 81.81 $\approx$ 82 second.
Hence, option (b).

52. **(b)** Let the time taken for them to meet after starting from opposite ends be t mins.
Also, let speeds of Car 2 be b kmph.



Distance AM = 60 × t = b × 20 ...(1)
Distance BM = b × t = 60 × 45 ...(2)
(1) × (2)
⇒ $t^2 = 900$
⇒ t = 30 minutes
From (2) we get,
60 × 30 = b × 20
⇒ b = 90 kmph
Hence, option (b).

53. **(d)** Let the distance between home and office be d kms.
∴ $\frac{d}{8} - \frac{d}{15} = \frac{35}{60} = \frac{7}{12}$
⇒ $d = 10\ kms$
If he leaves home at 9:10 a.m. and reaches office at 10 a.m., i.e., time taken = 50 minutes = 5/6 hours
∴ Required speed = $\frac{10}{5/6} = 12\ kmph.$
Hence, option (d).

54. **(c)** Since the train travelled at 1/3rd of its speed, it will take thrice the usual time.
Hence, if the normal time taken for train is t minutes, now it will take 3t minutes.
∴ 3t – t = 30
⇒ t = 15 minutes.
While coming back train travels at usual speed for 5 minutes and then takes 4 minutes break.
∴ If the train has to come back at scheduled time, it needs to cover the remaining distance in (15 – 5 – 4 =) 6 minutes.
Train usually takes 10 minutes to travel this distance.
∴ The time reduced to 6/10 = 3/5th hence speed should become 5/3 times.
∴ % increase = $\frac{\frac{3}{5}-1}{1} \times 100 = 66.66\% \approx 67\%$
Hence, option (c).

55. **(20000)** Let the price of desktop be Rs. d, and laptop be Rs. (50,000 - d)
Total profit = 2% of 50,000 = Rs. 1,000
⇒ 1000 = 20% of d - 10% of (50000 - d)
⇒ 100000 = 20d - 500000 + 10d
⇒ 30d = 6,00,000
⇒ d = 20,000
Hence, 20000.

56. **(b)** According to the information given in the question, we can make the following table.

	Young (28%)	**Old (72%)**
Literates (65%)	25% of 65% = 16.25%	$65 - 16.25 = 48.75\%$
Illiterates (35%)	$28 - 16.25 = 11.75\%$	$35 - 11.75 = 23.25\%$

∴ % old illiterates among illiterates = 23.25/35 × 100 = 66.4%
Hence, option (b).

57. **(d)** 'aabb' is an even number hence, b can be either 0 or 2 or 4 or 6 or 8.
∴ 'aabb' can be:
1100, 1122, 1144, 1166, 1188
2200, 2222, 2244, 2266, 2288
...
9900, 9999, 9944, 9966, 9988
Adding all these number
= 5 × (1100 + ... + 9900) + 9 × (22 + 44 + 66 + 88)
= (5 × 1100 × 45) + 9 × 22 × 10 = 5500 × 45 + 44 × 45 = 5544 × 45
∴ Average of all such numbers = (5544 × 45)/45 = 5544.
Hence, option (d).

58. **(62) Giving chocolates to 5th child:**
Let the man be left with x chocolates after 4th child.
Now he gives half of x i.e., x/2 chocolates to 5th child.
Hence, he will be left with x/2 chocolates.
The man again gives 1 chocolate to 5th child and is now left with no chocolates.
∴ x/2 – 1 = 0
⇒ x = 2
Giving chocolates to 4th child:
Now, let the man be left with y chocolates after 3rd child.
Now he gives half of y i.e., y/2 chocolates to 4th child.
Hence, he will be left with y/2 chocolates.
The man again gives 1 chocolate to 4th child and is now left with 2 chocolates.
∴ y/2 – 1 = 2
⇒ y = 6
Giving chocolates to 3rd child:
Now, let the man be left with z chocolates after 2nd child.
∴ z/2 – 1 = 6
⇒ y = 14
Giving chocolates to 2nd child:
Now, let the man be left with z chocolates after 1st child.
∴ a/2 – 1 = 14
⇒ y = 30
Giving chocolates to 1st child:
Now, let the man have c chocolates in the beginning.
∴ c/2 – 1 = 30
⇒ y = 62
Hence, 62.

59. **(c)** Given,
$a + \frac{b+c}{2} = 5$
⇒ 2a + b + c = 10 ...(1)
Also, $b + \frac{a+c}{2} = 7$
⇒ 2b + a + c = 14 ...(2)
Solving (1) and (2) we get,
b – a = 4
⇒ b = a + 4
Substituting this in the (1)

⇒ 2a + a + 4 + c = 10
⇒ 3a + c = 6
Given all three as positive integers, only possible value for a is 1. (c cannot be 0)
So, when a = 1, c = 3 and b = 5
∴ a + b = 6.
Hence, option (c).

60. **(d)** Given, $(x^2 - 7x + 11)^{(x2-13x+42)} = 1$?
This is possible when either $(x^2 - 7x + 11) = 1$ or $(x^2 - 13x + 42) = 0$ *or* $(x^2 - 7x + 11) = -1$ *and* $(x^2 - 13x + 42) =$ *even number*.
Case 1 : $x^2 - 7x + 11 = 1$
⇒ $x^2 - 7x + 10 = 0$
⇒ (x - 5)(x - 2) = 0 ⇒ x = 5 or 2.
Case 2 : $(x^2 - 13x + 42) = 0$
⇒ (x - 6)(x - 7) = 0
⇒ x = 6 or 7.
Case 3 : $x^2 - 7x + 11 = -1$ and $(x^2 - 13x + 42)$ = even
⇒ $x^2 - 7x + 12 = 0$
⇒ (x - 3)(x - 4) = 0 ⇒ x = 3 or 4.
Now, $(x^2 - 13x + 42)$ is even for all values of x.
∴ We have a total of 6 possible values of x i.e. 5 or 2, 6 or 7 and 3 or 4.
Hence, option (d).

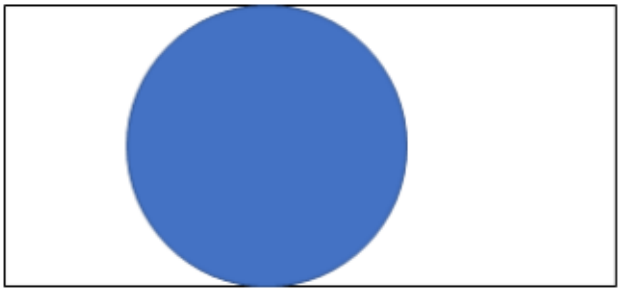
61. **(a)** $2^x + 2^{-x}$ is of the form y + 1/y
Minimum value the expression can take is 2.
Hence, $2^x + 2^{-x} \geq 2$
$Now, 2 - (x - 2)^2$
We know, $(x - 2)2 \geq 0$
∴ $2 - (x - 2)^2 \leq 2$ (From 2 we are subtracting a non-negative number) Maximum value this expression can have is 2.
The only possibility is both sides are = 2
LHS = $2^x + 2^{-x} = 0$
This is possible only when x = 0.
When x = 0, RHS = $2 - (x - 2)^2 = 2 - 2^2 = -2$
Hence, at x = 0, LHS ≠ RHS.
∴ There is no solution possible.
Hence, option (a).

62. **(21)** Let the digits of the 3-digit number be p, q, & r.
∴ 2 < p × q × r < 7
⇒ p × q × r can take the values 3, 4, 5, or 6.
Let's start with prime numbers 3 & 5.
Since they are prime, they can't be split, and hence if one of p, q or r is 3, the remaining two should be 1.
So, the possible combinations are
If p × q × r = 3
The number can be {113, 131, 311}
If p × q × r = 5
The number can be {115, 151, 511}
If p × q × r = 4
4 can be written as 1 × 2 × 2 or 1 × 1 × 4.
Therefore, the possible combinations of p, q, r are {122, 212, 221, 114, 141, 411}
If p × q × r = 6
6 can be written as 1 × 3 × 2 or 1 × 1 × 6.
Therefore, the possible combinations of p, q, r are {123, 132, 213, 231, 312, 321, 116, 161, 611}

Therefore, the total number of possibilities are 3 + 3 + 6 + 9 = 21.
Hence, 21.

63. **(8)** 40 litres solution had dye and water in the ratio 2 : 3
∴ dye = 16 l and water = 24 l.
After adding x liters of water, now proportion is 2 : 5
⇒ $\frac{16}{24+x} = \frac{2}{5}$
⇒ $x = 16$ *liters*
Dye = 16 l and water = 40 l now in the solution.
Now, 1/4th is removed from the solution, hence dye left = ¾ × 16 = 12 l and water left = ¾ × 40 = 30 l
Now, After adding y liters of dye, proportion becomes 2 : 3.
⇒ $\frac{12+y}{30} = \frac{2}{3}$
⇒ y = 8 liters
Hence, 8.

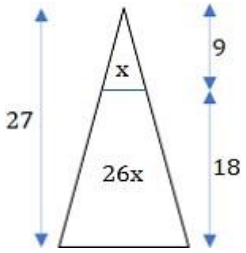
64. **(c)** Area of the sheet left unpainted is two-thirds of painted area i.e., area of the circles will be three-fifth of the total area.



∴ Area of the circle = 3/5 × 135 = 54 sq. in.
Let the radius of the circle be r and l be the length of the rectangle. Width of the rectangle will be 2r.
⇒ $\pi r^2 = 81$
⇒ $r = \frac{9}{\sqrt{\pi}}$
Area of rectangle = 135 = 2r × l
⇒ $l = \frac{135}{2r} = \frac{135}{2\times\frac{9}{\sqrt{\pi}}} = \frac{15\sqrt{\pi}}{2}$
∴ $Perimater\ of\ the\ rectangel = 2(l + r) = 2\left(\frac{15\sqrt{\pi}}{2} + \frac{18}{\sqrt{\pi}}\right) = 3\sqrt{\pi}\left(5 + \frac{12}{\pi}\right)$
Hence, option (c).

65. **(d)** Given, $x_0 = max(x_1, x_2, \ldots, x_{12})$
x_0 will be minimum when we distribute students all 100 students as equally among the 12 months as possible.
This can be done in the following way: 8, 8, 8, 8, 8, 8, 8, 8, 9, 9, 9, 9 (Adding these 12 we will get 100)
∴ x_0 = max(8, 8, 8, 8, 8, 8, 8, 8, 9, 9, 9, 9).
⇒ Minimum value of x_0 = 9
Hence, option (d).

66. **(d)** When a cone of height 'H' is cut at a distance of 'h' from the top
⇒ $\frac{\text{Volume of smaller cone}}{\text{Volume of original cone}} = \left(\frac{h}{H}\right)^3$



$\Rightarrow \frac{\text{Volume of smaller cone}}{\text{Volume of original cone}} = \left(\frac{9}{27}\right)^3 = \frac{1}{27}$

$\Rightarrow$ If volume of the smaller cone = x, the volume of original cone is 27x, and volume of the frustum = 26x
$\Rightarrow 26x - x = 225$
$\Rightarrow x = 9$
$\therefore$ Volume of the original cone = $27x = 27 \times 9 = 243$.
Hence, option (d).

67. (c)
Given,

$x = (4096)^{7+4\sqrt{3}}$

$\Rightarrow x = (64^2)^{7+4\sqrt{3}}$

$\Rightarrow x = (64)^{14+8\sqrt{3}}$

$\Rightarrow x^{\frac{1}{14+\sqrt{3}}} = 64$

Now, let's rationalize $\frac{1}{14+8\sqrt{3}}$,

$\Rightarrow \frac{1}{14+8\sqrt{3}} = \frac{1}{14+8\sqrt{3}} \times \frac{14-8\sqrt{3}}{14-8\sqrt{3}} = \frac{14-8\sqrt{3}}{196-192} = \frac{7-4\sqrt{3}}{2}$

$\Rightarrow x^{\frac{1}{14+8\sqrt{3}}} = x^{\frac{7-4\sqrt{3}}{2}} = 64$

$\Rightarrow x^{\frac{7}{2} \times \frac{-4\sqrt{7}}{2}} = 64$

$\Rightarrow 64 = \frac{x^{\frac{7}{2}}}{x^{2\sqrt{3}}}$

Hence, option (c).

68. (1) Let $x + 1/x = y$
$\Rightarrow y^2 - 3y + 2 = 0$
$\Rightarrow (y - 1)(y - 2) = 0$
$\Rightarrow y = 1$ or 2
We know, sum of a number and its reciprocal are either ≤ 2 or ≥ 2.
$\therefore y = 2$
$\Rightarrow x + 1/x = 2$
This is only possible when x = 1 hence, only one real root.
Hence, 1.

69. (c) Given ab = 432, bc = 96 and c < 9.
To get the minimum value for a + b + c, the two bigger numbers should be as close as possible.
So possible values are
a = 36, b = 12, c = 8 $\Rightarrow$ Sum = 46
a = 27, b = 16, c = 6 $\Rightarrow$ Sum = 49
a = 18, b = 24, c = 4 $\Rightarrow$ Sum = 46
a = 9, b = 48, c = 2 $\Rightarrow$ Sum = 59
Least possible value = 46
Hence, option (c).

70. (b) Let 1 liter of A, B and C weight 5kg, 2kg and 6 kg respectively.
Now, let's suppose 3, 4 and 7 liters of A, B and C are mixed.
$\therefore$ Total weight of 14 liters of this solution = $3 \times 5 + 4 \times 2 + 7 \times 6 = 65$ kgs.
$\Rightarrow$ 65 kgs of the solution contains $7 \times 6 = 42$ kgs of C $\therefore$ 130 kgs of the solution contains $2 \times 42 = 84$ kgs of C
Hence, option (b).

71. (12) Let the amounts become equal in t years.

$Veeru's\ investment\ after\ t\ years = 10000\left(1 + \frac{5 \times t}{100}\right)$

$Joy's\ investment\ after\ t\ years = 8000\left(1 + \frac{10 \times (t-2)}{100}\right)$

$\therefore 10000\left(1 + \frac{5 \times t}{100}\right) = 8000\left(1 + \frac{10 \times (t-2)}{100}\right)$

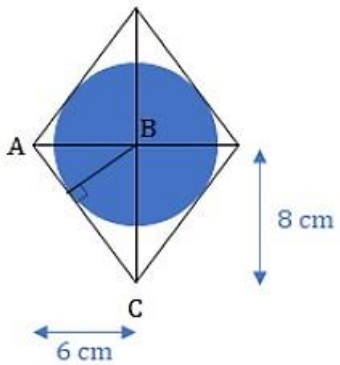
$\Rightarrow 5\left(1 + \frac{5 \times t}{100}\right) = 4\left(1 + \frac{10 \times (t-2)}{100}\right)$

$\Rightarrow 500 + 25t = 400 + 40t - 80$

$\Rightarrow t = 12$

Hence, 12.

72. (d) The following diagram can be drawn from the given information.



$\Rightarrow$ Area of the Rhombus $= \frac{1}{2} \times 12 \times 16 = 96$

Radius of the circle is same as the height of ΔABC
In a right triangle, altitude from right angle
$= \frac{Product\ of\ shorter\ sides}{hypotenuese} = \frac{(6 \times 8)}{10} = \frac{24}{5}$

$\Rightarrow$ Area of circle $= \pi\left(\frac{24}{5}\right)^2$

$\therefore$ Area of Circle : Area of Rhombus $= \pi\left(\frac{24}{5}\right)^2 : 96 = 6\pi : 25$.

Hence, option (d).

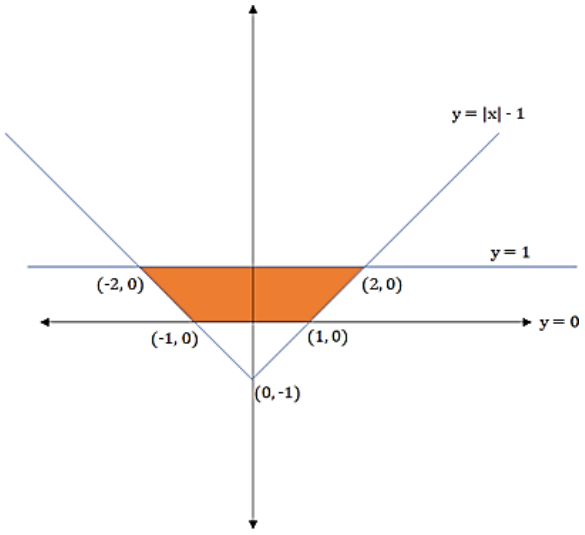
73. **(d)** Given, $2^{y^2} \log_3 5 = 5^{\log_2 3}$,
Taking log on both sides (Choosing the base to be 3)
$\Rightarrow y^2 \times \log_3 5 \times \log_3 2 = \log_2 3 \times \log_3 5$
$\Rightarrow y^2 \times \log_3 2 = \log_2 3$
$\Rightarrow y^2 = (log 23)^2$
$\Rightarrow y = -\log_2 3$ ($\because$ *y is a negative number*)
$\Rightarrow y = \log_2(1/3)$
Hence, option (d).

74. **(20)** Given f(5 + x) = f(5 – x)
Assuming one of the roots is (5 + α).
⇒ f(5 + α) = 0
Now, we know, f(5 + α) = f(5 - α) = 0
⇒ If one of the roots is 5 + α, the other root will be 5 – α.
∴ If (5 + α) and (5 + β) are two of the roots then (5 – α) and (5 – β) will be the other two roots.
⇒ Sum of the roots = (5 + α) + (5 + β) + (5 – α) + (5 – β) = 20
Hence, 20.

75. **(36)** Given, $\log_4 5 = \log_4 y \times \log_6 \sqrt{5}$
$\Rightarrow \log_4 5 \times \log_4 y = \log_6 \sqrt{5}$
$\Rightarrow \log_y 5 = ½ \times \log_6 5$
$\Rightarrow \log_y 5 = \log_{36} 5$
⇒ y = 36.
Hence, 36.

76. **(3)** Given,
|x| - y ≤ 1 ⇒ y ≥ |x| - 1
y ≥ 0 and y ≤ 1.

The following diagram can be drawn from the given information.



The required area is highlighted in orange i.e., a trapezium whose parallel sides are 4 units and 2 units and height is 1 unit.
∴ Area of the trapezium = 1/2 × (2 + 4) × 1 = 3 square units.
Hence, 3.