

**Directions of Test**

Test Name	Actual CAT 2018 Slot I	Total Questions	100	Total Time	180 Mins
Section Name	No. of Questions	Time limit	Marks per Question	Negative Marking	
Verbal Ability	34	1:0(h:m)	3	1/3	
DI & Reasoning	32	1:0(h:m)	3	1/3	
Quantitative Ability	34	1:0(h:m)	3	1/3	

**Section : Verbal Ability**

**DIRECTIONS for the question:** Read the passage and answer the question based on it.

**Question No. : 1**

"Everybody pretty much agrees that the relationship between elephants and people has dramatically changed," [says psychologist Gay] Bradshaw. . . . "Where for centuries humans and elephants lived in relatively peaceful coexistence, there is now hostility and violence. Now, I use the term 'violence' because of the intentionality associated with it, both in the aggression of humans and, at times, the recently observed behavior of elephants." . . .

Typically, elephant researchers have cited, as a cause of aggression, the high levels of testosterone in newly matured male elephants or the competition for land and resources between elephants and humans. But. . . Bradshaw and several colleagues argue. . . that today's elephant populations are suffering from a form of chronic stress, a kind of species-wide trauma. Decades of poaching and culling and habitat loss, they claim, have so disrupted the intricate web of familial and societal relations by which young elephants have traditionally been raised in the wild, and by which established elephant herds are governed, that what we are now witnessing is nothing less than a precipitous collapse of elephant culture. . . .

Elephants, when left to their own devices, are profoundly social creatures. . . . Young elephants are raised within an extended, multilayered network of doting female caregivers that includes the birth mother, grandmothers, aunts and friends. These relations are maintained over a life span as long as 70 years. Studies of established herds have shown that young elephants stay within 15 feet of their mothers for nearly all of their first eight years of life, after which young females are socialized into the matriarchal network, while young males go off for a time into an all-male social group before coming back into the fold as mature adults. . . .

This fabric of elephant society, Bradshaw and her colleagues [demonstrate], ha[s] effectively been frayed by years of habitat loss and poaching, along with systematic culling by government agencies to control elephant numbers and translocations of herds to different habitats. . . . As a result of such social upheaval, calves are now being born to and raised by ever younger and inexperienced mothers. Young orphaned elephants, meanwhile, that have witnessed the death of a parent at the hands of poachers are coming of age in the absence of the support system that defines traditional elephant life. "The loss of elephant elders," [says] Bradshaw . . . "and the traumatic experience of witnessing the massacres of their family, impairs normal brain and behavior development in young elephants."

What Bradshaw and her colleagues describe would seem to be an extreme form of anthropocentric conjecture if the evidence that they've compiled from various elephant researchers. . . weren't so compelling. The elephants of decimated herds, especially orphans who've watched the death of their parents and elders from poaching and culling, exhibit behavior typically associated with post-traumatic stress disorder and other trauma-related disorders in humans: abnormal startle response, unpredictable asocial behavior, inattentive mothering and hyperaggression. . . .

[According to Bradshaw], "Elephants are suffering and behaving in the same ways that we recognize in ourselves as a result of violence. . . . Except perhaps for a few specific features, brain organization and early development of elephants and humans are extremely similar."

In the first paragraph, Bradshaw uses the term "violence" to describe the recent change in the human-elephant relationship because, according to him:

- A) both humans and elephants have killed members of each other's species.
- B) elephant herds and their habitat have been systematically destroyed by humans.

- C) there is a purposefulness in human and elephant aggression towards each other.  
D) human-elephant interactions have changed their character over time.

**Question No. : 2**

Which of the following measures is Bradshaw most likely to support to address the problem of elephant aggression?

- A) The development of treatment programmes for elephants drawing on insights gained from treating post-traumatic stress disorder in humans.  
B) Studying the impact of isolating elephant calves on their early brain development, behaviour and aggression.  
C) Increased funding for research into the similarity of humans and other animals drawing on insights gained from human-elephant similarities.  
D) Funding of more studies to better understand the impact of testosterone on male elephant aggression.

**Question No. : 3**

Which of the following statements best expresses the overall argument of this passage?

- A) The brain organisation and early development of elephants and humans are extremely similar.  
B) The relationship between elephants and humans has changed from one of coexistence to one of hostility.  
C) Recent elephant behaviour could be understood as a form of species-wide trauma-related response.  
D) Elephants, like the humans they are in conflict with, are profoundly social creatures.

**Question No. : 4**

The passage makes all of the following claims EXCEPT:

- A) elephants establish extended and enduring familial relationships as do humans.  
B) elephant mothers are evolving newer ways of rearing their calves to adapt to emerging threats.  
C) the elephant response to deeply disturbing experiences is similar to that of humans.  
D) human actions such as poaching and culling have created stressful conditions for elephant communities.

**Question No. : 5**

In paragraph 4, the phrase, "The fabric of elephant society . . . has[s] effectively been frayed by . . ." is:

- A) a metaphor for the effect of human activity on elephant communities.    B) an exaggeration aimed at bolstering Bradshaw's claims.  
C) an accurate description of the condition of elephant herds today.    D) an ode to the fragility of elephant society today.

**DIRECTIONS for the question:** Read the passage and answer the question based on it.

**Question No. : 6**

When researchers at Emory University in Atlanta trained mice to fear the smell of almonds (by pairing it with electric shocks), they found, to their consternation, that both the children and grandchildren of these mice were spontaneously afraid of the same smell. That is not supposed to happen. Generations of schoolchildren have been taught that the inheritance of acquired characteristics is impossible. A mouse should not be born with something its parents have learned during their lifetimes, any more than a mouse that loses its tail in an accident should give birth to tailless mice. . . .

Modern evolutionary biology dates back to a synthesis that emerged around the 1940s-60s, which married Charles Darwin's mechanism of natural selection with Gregor Mendel's discoveries of how genes are inherited. The traditional, and still dominant, view is that adaptations – from the human brain to the peacock's tail – are fully and satisfactorily explained by natural selection (and subsequent inheritance). Yet [new evidence] from genomics, epigenetics and developmental biology [indicates] that evolution is more complex than we once assumed. . . .

In his book On Human Nature (1978), the evolutionary biologist Edward O Wilson claimed that human culture is held on a genetic leash. The metaphor [needs revision]. . . . Imagine a dog-walker (the genes) struggling to retain control of a brawny mastiff (human culture). The pair's trajectory (the pathway of evolution) reflects the outcome of the struggle. Now imagine the same dog-walker struggling with multiple dogs, on leashes of varied lengths, with each dog tugging in different directions. All these tugs represent the influence of developmental factors, including epigenetics, antibodies and hormones passed on by parents, as well as the ecological legacies and culture they bequeath. . . .

The received wisdom is that parental experiences can't affect the characters of their offspring. Except they do. The way that genes are expressed to produce an organism's phenotype – the actual characteristics it ends up with – is affected by chemicals that attach to them. Everything from diet to air pollution to parental behaviour can influence the addition or removal of these chemical marks, which switches genes on or off. Usually these so-called 'epigenetic' attachments are removed during the production of sperm and eggs cells, but it turns out that some escape the resetting process and are passed on to the next generation, along with the genes. This is known as 'epigenetic inheritance', and more and more studies are confirming that it really happens. Let's return to the almond-fearing mice. The inheritance of an epigenetic mark transmitted in the sperm is what led the mice's offspring to acquire an inherited fear. . . .

Epigenetics is only part of the story. Through culture and society, [humans and other animals] inherit knowledge and skills acquired by [their] parents. . . . All this complexity . . . points to an evolutionary process in which genomes (over hundreds to thousands of generations), epigenetic modifications and inherited cultural factors (over several, perhaps tens or hundreds of generations), and parental effects (over single-generation timespans) collectively inform how organisms adapt. These extra-genetic kinds of inheritance give organisms the flexibility to make rapid adjustments to environmental challenges, dragging genetic change in their wake – much like a rowdy pack of dogs.

Which of the following, if found to be true, would negate the main message of the passage?

- A) A study indicating the primacy of ecological impact on human adaptation.
- B) A study affirming the sole influence of natural selection and inheritance on evolution.
- C) A study highlighting the criticality of epigenetic inheritance to evolution.
- D) A study affirming the influence of socio-cultural markers on evolutionary processes.

**Question No. : 7**

The passage uses the metaphor of a dog walker to argue that evolutionary adaptation is most comprehensively understood as being determined by:

- A) ecological, hormonal, extra genetic and genetic legacies
- B) socio-cultural, genetic, epigenetic, and genomic legacies
- C) extra genetic, genetic, epigenetic and genomic legacies
- D) genetic, epigenetic, developmental factors, and ecological legacies

**Question No. : 8**

The Emory University experiment with mice points to the inheritance of:

- A) personality traits
- B) acquired parental fears
- C) acquired characteristics
- D) psychological markers

**Question No. : 9**

Which of the following best describes the author's argument?

- A) Darwin's and Mendel's theories together best explain evolution
- B) Darwin's theory of natural selection cannot fully explain evolution
- C) Wilson's theory of evolution is scientifically superior to either Darwin's or Mendel's
- D) Mendel's theory of inheritance is unfairly underestimated in explaining evolution

**DIRECTIONS for the question:** Read the passage and answer the question based on it.

**Question No. : 10**

[The] Indian government [has] announced an international competition to design a National War Memorial in New Delhi, to honour all of the Indian soldiers who served in the various wars and counter-insurgency campaigns from 1947 onwards. The terms of the competition also specified that the new structure would be built adjacent to the India Gate – a memorial to the Indian soldiers who died in the First World War. Between the old imperialist memorial and the proposed nationalist one, India's contribution to the Second World War is airbrushed out of existence.

The Indian government's conception of the war memorial was not merely absent-minded. Rather, it accurately reflected the fact that both academic history and popular memory have yet to come to terms with India's Second World War, which continues to be seen as little more than mood music in the drama of India's advance towards independence and partition in 1947. Further, the political trajectory of the postwar subcontinent has militated against popular remembrance of the war. With partition and the onset of the India-Pakistan rivalry, both of the new nations needed fresh stories for self-legitimisation rather than focusing on shared wartime experiences.

However, the Second World War played a crucial role in both the independence and partition of India. . . . The Indian army recruited, trained and deployed some 2.5 million men, almost 90,000 of which were killed and many more injured. Even at the time, it was recognised as the largest volunteer force in the war. . . .

India's material and financial contribution to the war was equally significant. India emerged as a major military-industrial and logistical base for Allied operations in south-east Asia and the Middle East. This led the United States to take considerable interest in the country's future, and ensured that this was no longer the preserve of the British government.

Other wartime developments pointed in the direction of India's independence. In a stunning reversal of its long-standing financial relationship with Britain, India finished the war as one of the largest creditors to the imperial power.

Such extraordinary mobilization for war was achieved at great human cost, with the Bengal famine the most extreme manifestation of widespread wartime deprivation. The costs on India's home front must be counted in millions of lives.

Indians signed up to serve on the war and home fronts for a variety of reasons. . . . [M]any were convinced that their contribution would open the doors to India's freedom. . . . The political and social churn triggered by the war was evident in the massive waves of popular protest and unrest that washed over rural and urban India in the aftermath of the conflict. This turmoil was crucial in persuading the Attlee government to rid itself of the incubus of ruling India. . . .

Seventy years on, it is time that India engaged with the complex legacies of the Second World War. Bringing the war into the ambit of the new national memorial would be a fitting – if not overdue – recognition that this was India's War.

The author claims that omitting mention of Indians who served in the Second World War from the new National War Memorial is:

- A) a reflection of misplaced priorities of the post-independence Indian governments
- B) a reflection of the academic and popular view of India's role in the War
- C) appropriate as their names can always be included in the India Gate memorial
- D) something which can be rectified in future by constructing a separate memorial

**Question No. : 11**

In the first paragraph, the author laments the fact that:

- A) India lost thousands of human lives during the Second World War
- B) the new war memorial will be built right next to India Gate
- C) funds will be wasted on another war memorial when we already have the India Gate memorial
- D) there is no recognition of the Indian soldiers who served in the Second World War

**Question No. : 12**

The author suggests that a major reason why India has not so far acknowledged its role in the Second World War is that it:

- A) has been focused on building an independent, non-colonial political identity.
- B) wants to forget the human and financial toll of the War on the country
- C) views the War as a predominantly Allied effort, with India playing only a supporting role
- D) blames the War for leading to the momentous partition of the country

**Question No. : 13**

The phrase "mood music" is used in the second paragraph to indicate that the Second World War is viewed as:

- A) a part of the narrative on the ill-effects of colonial rule on India
- B) a backdrop to the subsequent independence and partition of the region
- C) setting the stage for the emergence of the India–Pakistan rivalry in the subcontinent
- D) a tragic period in terms of loss of lives and national wealth

**Question No. : 14**

The author lists all of the following as outcomes of the Second World War EXCEPT:

- A) the large financial debt India owed to Britain after the War
- B) independence of the subcontinent and its partition into two countries
- C) large-scale deaths in Bengal as a result of deprivation and famine
- D) US recognition of India's strategic location and role in the War

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 15**

The only thing worse than being lied to is not knowing you're being lied to. It's true that plastic pollution is a huge problem, of planetary proportions. And it's true we could all do more to reduce our plastic footprint. The lie is that blame for the plastic problem is wasteful consumers and that changing our individual habits will fix it.

Recycling plastic is to saving the Earth what hammering a nail is to halting a falling skyscraper. You struggle to find a place to do it and feel pleased when you succeed. But your effort is wholly inadequate and distracts from the real problem of why the building is collapsing in the first place. The real problem is that single-use plastic—the very idea of producing plastic items like grocery bags, which we use for an average of 12 minutes but can persist in the environment for half a millennium—is an incredibly reckless abuse of technology. Encouraging individuals to recycle more will never solve the problem of a massive production of single-use plastic that should have been avoided in the first place.

As an ecologist and evolutionary biologist, I have had a disturbing window into the accumulating literature on the hazards of plastic pollution. Scientists have long recognized that plastics biodegrade slowly, if at all, and pose multiple threats to wildlife through entanglement and consumption. More recent reports highlight dangers posed by absorption of toxic chemicals in the water and by plastic odors that mimic some species' natural food. Plastics also accumulate up the food chain, and studies now show that we are likely ingesting it ourselves in seafood. . . .

Beginning in the 1950s, big beverage companies like Coca-Cola and Anheuser-Busch, along with Phillip Morris and others, formed a non-profit called Keep America Beautiful. Its mission is/was to educate and encourage environmental stewardship in the public. . . . At face value, these efforts seem benevolent, but they obscure the real problem, which is the role that corporate polluters play in the plastic problem. This clever misdirection has led journalist and author Heather Rogers to describe Keep America Beautiful as the first corporate green washing front, as it has helped shift the public focus to consumer recycling behavior and actively thwarted legislation that would increase extended producer responsibility for waste management. . . . [T]he greatest success of Keep America Beautiful has been to shift the onus of environmental responsibility onto the public while simultaneously becoming a trusted name in the environmental movement. . . .

So what can we do to make responsible use of plastic a reality? First: reject the lie. Litterbugs are not responsible for the global ecological disaster of plastic. Humans can only function to the best of their abilities, given time, mental bandwidth and systemic constraints. Our huge problem with plastic is the result of a permissive legal framework that has allowed the uncontrolled rise of plastic pollution, despite clear evidence of the harm it causes to local communities and the world's oceans. Recycling is also too hard in most parts of the U.S. and lacks the proper incentives to make it work well.

It can be inferred that the author considers the Keep America Beautiful organisation:

- A) an innovative example of a collaborative corporate social responsibility initiative
- B) a sham as it diverted attention away from the role of corporates in plastics pollution
- C) a "greenwash" because it was a benevolent attempt to improve public recycling habits
- D) an important step in sensitising producers to the need to tackle plastics pollution

**Question No. : 16**

The author lists all of the following as negative effects of the use of plastics EXCEPT the:

- A) slow pace of degradation or non-degradation of plastics in the environment
- B) poisonous chemicals released into the water and food we consume
- C) adverse impacts on the digestive systems of animals exposed to plastic
- D) air pollution caused during the process of recycling plastics

**Question No. : 17**

Which of the following interventions would the author most strongly support:

- A) completely banning all single-use plastic bags
- B) passing regulations targeted at producers that generate plastic products
- C) recycling all plastic debris in the seabed
- D) having all consumers change their plastic consumption habits

**Question No. : 18**

In the first paragraph, the author uses "lie" to refer to the:

- A) understatement of the enormity of the plastics pollution problem
- B) understatement of the effects of recycling plastics
- C) fact that people do not know they have been lied to
- D) blame assigned to consumers for indiscriminate use of plastics

**Question No. : 19**

In the second paragraph, the phrase "what hammering a nail is to halting a falling skyscraper" means:

- A) relying on emerging technologies to mitigate the ill-effects of plastic pollution
- B) focusing on single-use plastic bags to reduce the plastics footprint
- C) encouraging the responsible production of plastics by firms
- D) focusing on consumer behaviour to tackle the problem of plastics pollution

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 20**

Economists have spent most of the 20th century ignoring psychology, positive or otherwise. But today there is a great deal of emphasis on how happiness can shape global economies, or — on a smaller scale — successful business practice. This is driven, in part, by a trend in "measuring" positive emotions, mostly so they can be optimized. Neuroscientists, for example, claim to be able to locate specific emotions, such as happiness or disappointment, in particular areas of the brain. Wearable technologies, such as Spire, offer data-driven advice on how to reduce stress.

We are no longer just dealing with "happiness" in a philosophical or romantic sense — it has become something that can be monitored and measured, including by our behavior, use of social media and bodily indicators such as pulse rate and facial expressions.

There is nothing automatically sinister about this trend. But it is disquieting that the businesses and experts driving the quantification of happiness claim to have our best interests at heart, often concealing their own agendas in the process. In the workplace, happy workers are viewed as a "win-win." Work becomes more pleasant, and employees, more productive. But this is now being pursued through the use of performance-evaluating wearable technology, such as Humanyze or Virgin Pulse, both of which monitor physical signs of stress and activity toward the goal of increasing productivity.

Cities such as Dubai, which has pledged to become the "happiest city in the world," dream up ever-more elaborate and intrusive ways of collecting data on well-being — to the point where there is now talk of using CCTV cameras to monitor facial expressions in public spaces. New ways of detecting emotions are hitting the market all the time: One company, Beyond Verbal, aims to calculate moods conveyed in a phone conversation, potentially without the knowledge of at least one of the participants. And Facebook [has] demonstrated.. . that it could influence our emotions through tweaking our news feeds — opening the door to ever-more targeted manipulation in advertising and influence.

As the science grows more sophisticated and technologies become more intimate with our thoughts and bodies, a clear trend is emerging. Where happiness indicators were once used as a basis to reform society, challenging the obsession with money that G.D.P. measurement entrenches, they are increasingly used as a basis to transform or discipline individuals.

Happiness becomes a personal project, that each of us must now work on, like going to the gym. Since the 1970s, depression has come to be viewed as a cognitive or neurological defect in the individual, and never a consequence of circumstances. All of this simply escalates the sense of responsibility each of us feels for our own feelings, and with it, the sense of failure when things go badly. A society that deliberately removed certain sources of misery, such as precarious and exploitative employment, may well be a happier one. But we won't get there by making this single, often fleeting emotion, the over-arching goal.

From the passage we can infer that the author would like economists to:

- A) incorporate psychological findings into their research cautiously
- B) measure the effectiveness of Facebook and social media advertising
- C) work closely with neuroscientists to understand human behaviour
- D) correlate measurements of happiness with economic indicators

**Question No. : 21**

In the author's opinion, the shift in thinking in the 1970s:

- A) put people in touch with their own feelings rather than depending on psychologists
- B) was a welcome change from the earlier view that depression could be cured by changing circumstances
- C) reflected the emergence of neuroscience as the authority on human emotions
- D) introduced greater stress into people's lives as they were expected to be responsible for their own happiness

**Question No. : 22**

The author's view would be undermined by which of the following research findings?

- A) A proliferation of gyms that are collecting data on customer well-being
- B) There is a definitive move towards the adoption of wearable technology that taps into emotions
- C) Stakeholders globally are moving away from collecting data on the well-being of individuals
- D) Individuals worldwide are utilising technologies to monitor and increase their well-being

**Question No. : 23**

According to the author, wearable technologies and social media are contributing most to:

- A) making individuals aware of stress in their lives
- B) depression as a thing of the past
- C) happiness as a "personal project"
- D) disciplining individuals to be happy

**Question No. : 24**

According to the author, Dubai:

- A) is on its way to becoming one of the world's happiest cities
- B) incentivises companies that prioritise worker welfare
- C) develops sophisticated technologies to monitor its inhabitants' states of mind
- D) collaborates with Facebook to selectively influence its inhabitants' moods

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph.

**Question No. : 25**

Artificial embryo twinning is a relatively low-tech way to make clones. As the name suggests, this technique mimics the natural process that creates identical twins. In nature, twins form very early in development when the embryo splits in two.

Twinning happens in the first days after egg and sperm join, while the embryo is made of just a small number of unspecialized cells. Each half of the embryo continues dividing on its own, ultimately developing into separate, complete individuals. Since they developed from the same fertilized egg, the resulting individuals are genetically identical.

- A) Artificial embryo twinning is low-tech unlike the natural development of identical twins from the embryo after fertilization
- B) Artificial embryo twinning is low-tech and is close to the natural development of twins where the embryo splits into two identical twins
- C) Artificial embryo twinning is low-tech and mimetic of the natural development of genetically identical twins from the embryo after fertilization
- D) Artificial embryo twinning is just like the natural development of twins, where during fertilization twins are formed

**DIRECTIONS for the question:** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

**Question No. : 26**

1. Translators are like bumblebees.
2. Though long since scientifically disproved, this factoid is still routinely trotted out.
3. Similar pronouncements about the impossibility of translation have dogged practitioners since Leonardo Bruni's *De interpretatione recta*, published in 1424.
4. Bees, unaware of these deliberations, have continued to flit from flower to flower, and translators continue to translate.
5. In 1934, the French entomologist August Magnan pronounced the flight of the bumblebee to be aerodynamically impossible

- A) 2    B)    C)    D)

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

**Question No. : 27**

1. The woodland's canopy receives most of the sunlight that falls on the trees.
2. Swifts do not confine themselves to woodlands, but hunt wherever there are insects in the air.
3. With their streamlined bodies, swifts are agile flyers, ideally adapted to twisting and turning through the air as they chase flying insects – the creatures that form their staple diet.
4. Hundreds of thousands of insects fly in the sunshine up above the canopy, some falling prey to swifts and swallows

A) 1432   B)   C)   D)

**DIRECTIONS for the question:** The five sentences (labelled 1,2,3,4 and 5) given in this question, when properly sequenced, from a coherent paragraph. Arrange them in the correct order.

**Question No. : 28**

1. In many cases time inconsistency is what prevents our going from intention to action.
2. For people to continuously postpone getting their children immunized, they would need to be constantly fooled by themselves.
3. In the specific case of immunization, however, it is hard to believe that time inconsistency by itself would be sufficient to make people permanently postpone the decision if they were fully cognizant of its benefits.
4. In most cases, even a small cost of immunization was large enough to discourage most people.
5. Not only do they have to think that they prefer to spend time going to the camp next month rather than today, they also have to believe that they will indeed go next month.

A) 4   B)   C)   D)

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

**Question No. : 29**

1. The eventual diagnosis was skin cancer and after treatment all seemed well.
2. The viola player didn't know what it was; nor did her GP.
3. Then a routine scan showed it had come back and spread to her lungs.
4. It started with a lump on Cathy Perkins' index finger.

A) 4213   B)   C)   D)

**DIRECTIONS for the question:** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

**Question No. : 30**

1. Displacement in Bengal is thus not very significant in view of its magnitude.
2. A factor of displacement in Bengal is the shifting course of the Ganges leading to erosion of river banks.
3. The nature of displacement in Bengal makes it an interesting case study.
4. Since displacement due to erosion is well spread over a long period of time, it remains invisible.
5. Rapid displacement would have helped sensitize the public to its human costs.

A) 1   B)   C)   D)

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

**Question No. : 31**

1. Impartiality and objectivity are fiendishly difficult concepts that can cause all sorts of injustices even if transparently implemented.
2. It encourages us into bubbles of people we know and like, while blinding us to different perspectives, but the deeper problem of 'transparency' lies in the words "...and much more".
3. Twitter's website says that "tweets you are likely to care about most will show up first in your timeline...based on accounts you interact with most, tweets you engage with, and much more."
4. We are only told some of the basic principles, and we can't see the algorithm itself, making it hard for citizens to analyse the system sensibly or fairly or be convinced of its impartiality and objectivity.

A) 1324    B)    C)    D)

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph.

**Question No. : 32**

The conceptualization of landscape as a geometric object first occurred in Europe and is historically related to the European conceptualization of the organism, particularly the human body, as a geometric object with parts having a rational, three-dimensional organization and integration. The European idea of landscape appeared before the science of landscape emerged, and it is no coincidence that Renaissance artists such as Leonardo da Vinci, who studied the structure of the human body, also facilitated an understanding of the structure of landscape. Landscape which had been a subordinate background to religious or historical narratives, became an independent genre or subject of art by the end of sixteenth century or the beginning of the seventeenth century.

- A) The Renaissance artists were responsible for the study of landscape as a subject of art.
- B) The study of landscape as an independent genre was aided by the Renaissance artists.
- C) Landscape became a major subject of art at the turn of the sixteenth century.
- D) The three-dimensional understanding of the organism in Europe led to a similar approach towards the understanding of landscape.

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

**Question No. : 33**

1. But now we have another group: the unwitting enablers.
2. Democracy and high levels of inequality of the kind that have come to characterize the United States are simply incompatible.
3. Believing these people are working for a better world, they are, actually, at most, chipping away at the margins, making slight course corrections, ensuring the system goes on as it is, uninterrupted.
4. Very rich people will always use money to maintain their political and economic power.

A) 2413    B)    C)    D)

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph and write the key for most appropriate option.

**Question No. : 34**

Production and legitimization of scientific knowledge can be approached from a number of perspectives. To study knowledge production from the sociology of professions perspective would mean a focus on the institutionalization of a body of knowledge. The professions-approach informed earlier research on managerial occupation, business schools and management knowledge. It however tends to reify institutional power structures in its understanding of the links between knowledge and authority. Knowledge production is restricted in the perspective to the selected members of the professional community, most notably to the university faculties and professional colleges. Power is understood as a negative mechanism, which prevents the non-professional actors from offering their ideas and information as legitimate knowledge.

- A) Professions-approach aims at the institutionalization of knowledge but restricts knowledge production as a function of a select few.
- B) Professions-approach focuses on the creation of institutions of higher education and disciplines to promote knowledge production
- C) The study of knowledge production can be done through many perspectives
- D) The professions-approach has been one of the most relied upon perspective in the study of management knowledge production

**Section : DI & Reasoning**

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 35**

You are given an  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it.

What is the minimum number of different numerals needed to fill a  $3 \times 3$  square matrix?

- A) 4
- B)
- C)
- D)

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 36**

You are given an  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it.

What is the minimum number of different numerals needed to fill a  $5 \times 5$  square matrix?

- A) 4
- B)
- C)
- D)

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 37**

You are given an  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it.

Suppose you are allowed to make one mistake, that is, one pair of adjacent cells can have the same numeral. What is the minimum number of different numerals required to fill a  $5 \times 5$  matrix?

- A) 9
- B) 25
- C) 4
- D) 16

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 38**

You are given an  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Two cells are called adjacent if they touch each other horizontally, vertically or diagonally. So a cell in one of the four corners has three cells adjacent to it, and a cell in the first or last row or column which is not in the corner has five cells adjacent to it. Any other cell has eight cells adjacent to it.

Suppose that all the cells adjacent to any particular cell must have different numerals. What is the minimum number of different numerals needed to fill a  $5 \times 5$  square matrix?

- A) 4    B) 16    C) 9    D) 25

**DIRECTIONS for the question:** Go through the graph and the information given below and answer the question that follows.

**Question No. : 39**

A company administers a written test comprising of three sections of 20 marks each – Data Interpretation (DI), Written English (WE) and General Awareness (GA), for recruitment. A composite score for a candidate (out of 80) is calculated by doubling her marks in DI and adding it to the sum of her marks in the other two sections. Candidates who score less than 70% marks in two or more sections are disqualified. From among the rest, the four with the highest composite scores are recruited. If four or less candidates qualify, all who qualify are recruited.

Ten candidates appeared for the written test. Their marks in the test are given in the table below. Some marks in the table are missing, but the following facts are known:

1. No two candidates had the same composite score.
2. Ajay was the unique highest scorer in WE.
3. Among the four recruited, Geeta had the lowest composite score.
4. Indu was recruited.
5. Danish, Harini, and Indu had scored the same marks in GA.
6. Indu and Jatin both scored 100% in exactly one section and Jatin's composite score was 10 more than Indu's.

Candidate	Marks out of 20		
	DI	WE	GA
Ajay	8		16
Bala		9	11
Chetna	19	4	12
Danish	8	15	
Ester	12	18	16
Falak	15	7	10
Geeta	14		6
Harini	5		
Indu		8	
Jatin	16		14

Which of the following statements MUST be true?

1. Jatin's composite score was more than that of Danish.
2. Indu scored less than Chetna in DI.
3. Jatin scored more than Indu in GA.

- A) Both 1 and 2    B) Only 2    C) Both 2 and 3    D) Only 1

**Question No. : 40**

Which of the following statements MUST be FALSE?

- A) Harini's composite score was less than that of Falak    B) Bala's composite score was less than that of Ester  
 C) Chetna scored more than Bala in DI    D) Bala scored same as Jatin in DI

**Question No. : 41**

If all the candidates except Ajay and Danish had different marks in DI, and Bala's composite score was less than Chetna's composite score, then what is the maximum marks that Bala could have scored in DI?

- A) 13    B)    C)    D)

**Question No. : 42**

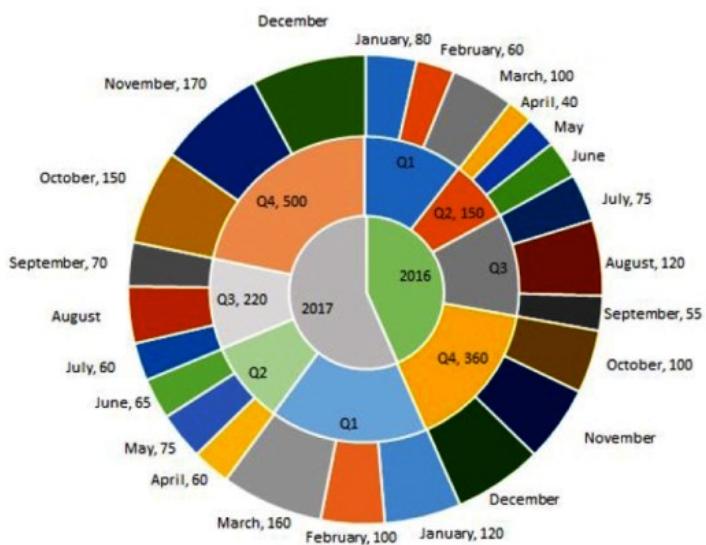
If all the candidates scored different marks in WE then what is the maximum marks that Harini could have scored in WE?

- A) 14    B)    C)    D)

**DIRECTIONS for the question:** Go through the pie chart/s given below and answer the question that follows.

**Question No. : 43**

The multi-layered pie-chart below shows the sales of LED television sets for a big retail electronics outlet during 2016 and 2017. The outer layer shows the monthly sales during this period, with each label showing the month followed by sales figure of that month. For some months, the sales figures are not given in the chart. The middle-layer shows quarter-wise aggregate sales figures (in some cases, aggregate quarter-wise sales numbers are not given next to the quarter). The innermost layer shows annual sales. It is known that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression, as do the three monthly sales figures in the fourth quarter (October, November, December) of that year.



What is the percentage increase in sales in December 2017 as compared to the sales in December 2016?

- A) 50.00    B) 22.22    C) 38.46    D) 28.57

**Question No. : 44**

In which quarter of 2017 was the percentage increase in sales from the same quarter of 2016 the highest?

- A) Q4    B) Q1    C) Q2    D) Q3

**Question No. : 45**

During which quarter was the percentage decrease in sales from the previous quarter's sales the highest?

- A) Q2 of 2017    B) Q1 of 2017    C) Q2 of 2016    D) Q4 of 2017

**Question No. : 46**

During which month was the percentage increase in sales from the previous month's sales the highest?

- A) October of 2017    B) March of 2017    C) March of 2016    D) October of 2016

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 47**

Fuel contamination levels at each of 20 petrol pumps P1, P2, ..., P20 were recorded as either high, medium, or low.

1. Contamination levels at three pumps among P1 – P5 were recorded as high.
2. P6 was the only pump among P1 – P10 where the contamination level was recorded as low.
3. P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.
4. High contamination levels were not recorded at any of the pumps P16 – P20.
5. The number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded.

Which of the following MUST be true?

- A) The contamination level at P10 was recorded as high    B) The contamination level at P13 was recorded as low  
C) The contamination level at P12 was recorded as high    D) The contamination level at P20 was recorded as medium

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 48**

Fuel contamination levels at each of 20 petrol pumps P1, P2, ..., P20 were recorded as either high, medium, or low.

1. Contamination levels at three pumps among P1 – P5 were recorded as high.
2. P6 was the only pump among P1 – P10 where the contamination level was recorded as low.
3. P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.
4. High contamination levels were not recorded at any of the pumps P16 – P20.
5. The number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded.

What best can be said about the number of pumps at which the contamination levels were recorded as medium?

- A) More than 4    B) At least 8    C) At most 9    D) Exactly 8

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 49**

Fuel contamination levels at each of 20 petrol pumps P1, P2, ..., P20 were recorded as either high, medium, or low.

1. Contamination levels at three pumps among P1 – P5 were recorded as high.
2. P6 was the only pump among P1 – P10 where the contamination level was recorded as low.
3. P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.
4. High contamination levels were not recorded at any of the pumps P16 – P20.
5. The number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded.

If the contamination level at P11 was recorded as low, then which of the following MUST be true?

- A) The contamination level at P15 was recorded as medium    B) The contamination level at P18 was recorded as low  
C) The contamination level at P12 was recorded as high    D) The contamination level at P14 was recorded as medium

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 50**

Fuel contamination levels at each of 20 petrol pumps P1, P2, ..., P20 were recorded as either high, medium, or low.

1. Contamination levels at three pumps among P1 – P5 were recorded as high.
2. P6 was the only pump among P1 – P10 where the contamination level was recorded as low.
3. P7 and P8 were the only two consecutively numbered pumps where the same levels of contamination were recorded.
4. High contamination levels were not recorded at any of the pumps P16 – P20.
5. The number of pumps where high contamination levels were recorded was twice the number of pumps where low contamination levels were recorded.

If contamination level at P15 was recorded as medium, then which of the following MUST be FALSE?

- A) Contamination levels at P13 and P17 were recorded as the same
- B) Contamination levels at P11 and P16 were recorded as the same
- C) Contamination levels at P10 and P14 were recorded as the same
- D) Contamination level at P14 was recorded to be higher than that at P15

**Question No. : 51**

1600 satellites were sent up by a country for several purposes. The purposes are classified as broadcasting (B), communication (C), surveillance (S), and others (O). A satellite can serve multiple purposes; however a satellite serving either B, or C, or S does not serve O. The following facts are known about the satellites:

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

What best can be said about the number of satellites serving C?

- A) Must be between 450 and 725
- B) Must be at least 100
- C) Cannot be more than 800
- D) Must be between 400 and 800

**Question No. : 52**

What is the minimum possible number of satellites serving B exclusively?

- A) 500
- B) 250
- C) 200
- D) 100

**Question No. : 53**

If at least 100 of the 1600 satellites were serving O, what can be said about the number of satellites serving S?

- A) Exactly 475
- B) No conclusion is possible based on the given information
- C) At least 475
- D) At most 475

**Question No. : 54**

If the number of satellites serving at least two among B, C, and S is 1200, which of the following MUST be FALSE?

- A) The number of satellites serving B is more than 1000
- B) The number of satellites serving B exclusively is exactly 250
- C) All 1600 satellites serve B or C or S
- D) The number of satellites serving C cannot be uniquely determined

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 55**

An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

In how many different ways can the ATM serve a customer who gives 500 rupee notes as her preference?

- A) 7    B)    C)    D)

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 56**

An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

If the ATM could serve only 10 customers with a stock of fifty 500 rupee notes and a sufficient number of notes of other denominations, what is the maximum number of customers among these 10 who could have given 500 rupee notes as their preferences?

- A) 6    B)    C)    D)

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 57**

An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

What is the maximum number of customers that the ATM can serve with a stock of fifty 500 rupee notes and a sufficient number of notes of other denominations, if all the customers are to be served with at most 20 notes per withdrawal?

- A) 13    B) 10    C) 16    D) 12

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 58**

An ATM dispenses exactly Rs. 5000 per withdrawal using 100, 200 and 500 rupee notes. The ATM requires every customer to give her preference for one of the three denominations of notes. It then dispenses notes such that the number of notes of the customer's preferred denomination exceeds the total number of notes of other denominations dispensed to her.

What is the number of 500 rupee notes required to serve 50 customers with 500 rupee notes as their preferences and another 50 customers with 100 rupee notes as their preferences, if the total number of notes to be dispensed is the smallest possible?

- A) 750    B) 900    C) 800    D) 1400

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 59**

Twenty four people are part of three committees which are to look at research, teaching, and administration respectively. No two committees have any member in common. No two committees are of the same size. Each committee has three types of people: bureaucrats, educationalists, and politicians, with at least one from each of the three types in each committee. The following facts are also known about the committees:

1. The numbers of bureaucrats in the research and teaching committees are equal, while the number of bureaucrats in the research committee is 75% of the number of bureaucrats in the administration committee.
2. The number of educationalists in the teaching committee is less than the number of educationalists in the research committee. The number of educationalists in the research committee is the average of the numbers of educationalists in the other two committees.
3. 60% of the politicians are in the administration committee, and 20% are in the teaching committee.

Based on the given information, which of the following statements MUST be FALSE?

- A) The size of the research committee is less than the size of the teaching committee
- B) The size of the research committee is less than the size of the administration committee
- C) In the administration committee the number of bureaucrats is equal to the number of educationalists
- D) In the teaching committee the number of educationalists is equal to the number of politicians

**Question No. : 60**

What is the number of bureaucrats in the administration committee?

- A) 4
- B)
- C)
- D)

**Question No. : 61**

What is the number of educationalists in the research committee?

- A) 3
- B)
- C)
- D)

**Question No. : 62**

Which of the following CANNOT be determined uniquely based on the given information?

- A) The total number of bureaucrats in the three committees
- B) The size of the teaching committee
- C) The total number of educationalists in the three committees
- D) The size of the research committee

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 63**

Adriana, Bandita, Chitra, and Daisy are four female students, and Amit, Barun, Chetan, and Deb are four male students. Each of them studies in one of three institutes - X, Y, and Z. Each student majors in one subject among Marketing, Operations, and Finance, and minors in a different one among these three subjects. The following facts are known about the eight students:

1. Three students are from X, three are from Y, and the remaining two students, both female, are from Z.
2. Both the male students from Y minor in Finance, while the female student from Y majors in Operations.
3. Only one male student majors in Operations, while three female students minor in Marketing.
4. One female and two male students major in Finance.
5. Adriana and Deb are from the same institute. Daisy and Amit are from the same institute.
6. Barun is from Y and majors in Operations. Chetan is from X and majors in Finance.
7. Daisy minors in Operations.

Who are the students from the institute Z?

- A) Chitra and Daisy
- B) Adriana and Daisy
- C) Bandita and Chitra
- D) Adriana and Bandita

**Question No. : 64**

Which subject does Deb minor in?

- A) Finance    B) Marketing    C) Cannot be determined uniquely from the given information    D) Operations

**Question No. : 65**

Which subject does Amit major in?

- A) Cannot be determined uniquely from the given information    B) Marketing    C) Finance    D) Operations

**Question No. : 66**

If Chitra majors in Finance, which subject does Bandita major in?

- A) Marketing    B) Cannot be determined uniquely from the given information    C) Finance    D) Operations

**Section : Quantitative Ability**

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

**Question No. : 67**

Let  $x, y, z$  be three positive real numbers in a geometric progression such that  $x < y < z$ . If  $5x, 16y$ , and  $12z$  are in an arithmetic progression then the common ratio of the geometric progression is

- A) 1/6    B) 3/2    C) 5/2    D) 3/6

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

**Question No. : 68**

Humans and robots can both perform a job but at different efficiencies. Fifteen humans and five robots working together take thirty days to finish the job, whereas five humans and fifteen robots working together take sixty days to finish it. How many days will fifteen humans working together (without any robot) take to finish it?

- A) 45    B) 36    C) 40    D) 32

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

**Question No. : 69**

A tank is fitted with pipes, some filling it and the rest draining it. All filling pipes fill at the same rate, and all draining pipes drain at the same rate. The empty tank gets completely filled in 6 hours when 6 filling and 5 draining pipes are on, but this time becomes 60 hours when 5 filling and 6 draining pipes are on. In how many hours will the empty tank get completely filled when one draining and two filling pipes are on?

- A) 10    B)    C)    D)

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

**Question No. : 70**

Points E, F, G, H lie on the sides AB, BC, CD, and DA, respectively, of a square ABCD. If EFGH is also a square whose area is 62.5% of that of ABCD and CG is longer than EB, then the ratio of length of EB to that of CG is

- A) 3 : 8    B) 2 : 5    C) 1 : 3    D) 4 : 9

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

**Question No. : 71**

Given an equilateral triangle T<sub>1</sub> with side 24 cm, a second triangle T<sub>2</sub> is formed by joining the midpoints of the sides of T<sub>1</sub>. Then a third triangle T<sub>3</sub> is formed by joining the midpoints of the sides of T<sub>2</sub>. If this process of forming triangles is continued, the sum of the areas, in sq cm, of infinitely many such triangles T<sub>1</sub>, T<sub>2</sub>, T<sub>3</sub>,... will be

- A)  $248\sqrt{3}$    B)  $192\sqrt{3}$    C)  $188\sqrt{3}$    D)  $164\sqrt{3}$

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

**Question No. : 72**

If x is a positive quantity such that  $2^x = 3^{\log_5 2}$ , then x is equal to

- A)  $1 + \log_3 \frac{5}{3}$    B)  $\log_5 9$    C)  $\log_5 8$    D)  $1 + \log_5 \frac{3}{5}$

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

**Question No. : 73**

A trader sells 10 litres of a mixture of paints A and B, where the amount of B in the mixture does not exceed that of A. The cost of paint A per litre is Rs. 8 more than that of paint B. If the trader sells the entire mixture for Rs. 264 and makes a profit of 10%, then the highest possible cost of paint B, in Rs. per litre, is

- A) 20   B) 22   C) 16   D) 26

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

**Question No. : 74**

Raju and Lalitha originally had marbles in the ratio 4:9. Then Lalitha gave some of her marbles to Raju. As a result, the ratio of the number of marbles with Raju to that with Lalitha became 5:6. What fraction of her original number of marbles was given by Lalitha to Raju?

- A) 6/19   B) 7/33   C) 1/4   D) 1/4

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

**Question No. : 75**

When they work alone, B needs 25% more time to finish a job than A does. They two finish the job in 13 days in the following manner: A works alone till half the job is done, then A and B work together for four days, and finally B works alone to complete the remaining 5% of the job. In how many days can B alone finish the entire job?

- A) 16   B) 20   C) 18   D) 22

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

**Question No. : 76**

Two types of tea, A and B, are mixed and then sold at Rs. 40 per kg. The profit is 10% if A and B are mixed in the ratio 3 : 2, and 5% if this ratio is 2 : 3. The cost prices, per kg, of A and B are in the ratio

- A) 17 : 25   B) 21 : 25   C) 18 : 25   D) 19 : 24

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

**Question No. : 77**

In an apartment complex, the number of people aged 51 years and above is 30 and there are at most 39 people whose ages are below 51 years. The average age of all the people in the apartment complex is 38 years. What is the largest possible average age, in years, of the people whose ages are below 51 years?

- A) 26    B) 27    C) 28    D) 25

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

**Question No. : 78**

In a circle with center O and radius 1 cm, an arc AB makes an angle 60 degrees at O. Let R be the region bounded by the radii OA, OB and the arc AB. If C and D are two points on OA and OB, respectively, such that OC = OD and the area of triangle OCD is half that of R, then the length of OC, in cm, is

- A)  $\left(\frac{\pi}{4}\right)^{\frac{1}{2}}$     B)  $\left(\frac{\pi}{3\sqrt{3}}\right)^{\frac{1}{2}}$     C)  $\left(\frac{\pi}{6}\right)^{\frac{1}{2}}$     D)  $\left(\frac{\pi}{4\sqrt{3}}\right)^{\frac{1}{2}}$

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

**Question No. : 79**

The number of integers x such that  $0.25 < 2^x < 200$ , and  $2^x + 2$  is perfectly divisible by either 3 or 4, is

- A) 5    B)    C)    D)

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

**Question No. : 80**

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

- A) 25, 9    B) 24, 12    C) 24, 10    D) 25, 10

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

**Question No. : 81**

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

- A)  $32\sqrt{3}$     B)  $18\sqrt{3}$     C)  $24\sqrt{3}$     D)  $12\sqrt{3}$

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

**Question No. : 82**

Given that  $x^{2018}y^{2017} = 1/2$  and  $x^{2016}y^{2019} = 8$ , the value of  $x^2 + y^3$  is

- A) 33/4    B) 37/4    C) 35/4    D) 31/4

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

**Question No. : 83**

In an examination, the maximum possible score is N while the pass mark is 45% of N. A candidate obtains 36 marks, but falls short of the pass mark by 68%. Which one of the following is then correct?

- A)  $243 \leq N \leq 252$    B)  $N \geq 253$    C)  $201 \leq N \leq 242$    D)  $N \leq 200$

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

**Question No. : 84**

Let  $f(x) = \min\{2x^2, 52 - 5x\}$ , where x is any positive real number. Then the maximum possible value of  $f(x)$  is

- A) 32   B)   C)   D)

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

**Question No. : 85**

Point P lies between points A and B such that the length of BP is thrice that of AP. Car 1 starts from A and moves towards B. Simultaneously, car 2 starts from B and moves towards A. Car 2 reaches P one hour after car 1 reaches P. If the speed of car 2 is half that of car 1, then the time, in minutes, taken by car 1 in reaching P from A is

- A) 12   B)   C)   D)

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

**Question No. : 86**

John borrowed Rs.210,000 from a bank at an interest rate of 10% per annum, compounded annually. The loan was repaid in two equal installments, the first after one year and the second after another year. The first installment was interest of one year plus part of the principal amount, while the second was the rest of the principal amount plus due interest thereon. Then each installment, in Rs., is

- A) 121000   B)   C)   D)

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

**Question No. : 87**

A CAT aspirant appears for a certain number of tests. His average score increases by 1 if the first 10 tests are not considered, and decreases by 1 if the last 10 tests are not considered. If his average scores for the first 10 and the last 10 tests are 20 and 30, respectively, then the total number of tests taken by him is

- A) 60   B)   C)   D)

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

**Question No. : 88**

Train T leaves station X for station Y at 3 pm. Train S, traveling at three quarters of the speed of T, leaves Y for X at 4 pm. The two trains pass each other at a station Z, where the distance between X and Z is three-fifths of that between X and Y. How many hours does train T take for its journey from X to Y?

- A) 15   B)   C)   D)

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

**Question No. : 89**

A right circular cone, of height 12 ft, stands on its base which has diameter 8 ft. The tip of the cone is cut off with a plane which is parallel to the base and 9 ft from the base. With  $\pi = 22/7$ , the volume, in cubic ft, of the remaining part of the cone is

- A) 198    B)    C)    D)

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

**Question No. : 90**

If  $\log_{12}81 = p$ , then  $3\left(\frac{4-p}{4+p}\right)$  is equal to

- A)  $\log_2 8$     B)  $\log_4 16$     C)  $\log_6 8$     D)  $\log_6 16$

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

**Question No. : 91**

A wholesaler bought walnuts and peanuts, the price of walnut per kg being thrice that of peanut per kg. He then sold 8 kg of peanuts at a profit of 10% and 16 kg of walnuts at a profit of 20% to a shopkeeper. However, the shopkeeper lost 5 kg of walnuts and 3 kg of peanuts in transit. He then mixed the remaining nuts and sold the mixture at Rs. 166 per kg, thus making an overall profit of 25%. At what price, in Rs. per kg, did the wholesaler buy the walnuts?

- A) 86    B) 96    C) 84    D) 98

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

**Question No. : 92**

If  $f(x + 2) = f(x) + f(x + 1)$  for all positive integers  $x$ , and  $f(11) = 91$ ,  $f(15) = 617$ , then  $f(10)$  equals

- A) 54    B)    C)    D)

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

**Question No. : 93**

While multiplying three real numbers, Ashok took one of the numbers as 73 instead of 37. As a result, the product went up by 720. Then the minimum possible value of the sum of squares of the other two numbers is

- A) 40    B)    C)    D)

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

**Question No. : 94**

The distance from A to B is 60 km. Partha and Narayan start from A at the same time and move towards B. Partha takes four hours more than Narayan to reach B. Moreover, Partha reaches the mid-point of A and B two hours before Narayan reaches B. The speed of Partha, in km per hour, is

- A) 5    B) 6    C) 4    D) 3

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

**Question No. : 95**

In a circle, two parallel chords on the same side of a diameter have lengths 4 cm and 6 cm. If the distance between these chords is 1 cm, then the radius of the circle, in cm, is

- A)  $\sqrt{13}$    B)  $\sqrt{14}$    C)  $\sqrt{11}$    D)  $\sqrt{12}$

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

**Question No. : 96**

If among 200 students, 105 like pizza and 134 like burger, then the number of students who like only burger can possibly be

- A) 93   B) 26   C) 96   D) 23

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

**Question No. : 97**

How many numbers with two or more digits can be formed with the digits 1,2,3,4,5,6,7,8,9, so that in every such number, each digit is used at most once and the digits appear in the ascending order?

- A) 502   B)   C)   D)

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

**Question No. : 98**

If  $u^2 + (u-2v-1)^2 = -4v(u + v)$ , then what is the value of  $u + 3v$ ?

- A) 0   B)  $-1/4$    C)  $1/4$    D)  $1/2$

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

**Question No. : 99**

If  $\log_2(5 + \log_3 a) = 3$  and  $\log_5(4a + 12 + \log_2 b) = 3$ , then  $a + b$  is equal to

- A) 40   B) 67   C) 59   D) 32

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

**Question No. : 100**

Each of 74 students in a class studies at least one of the three subjects H, E and P. Ten students study all three subjects, while twenty study H and E, but not P. Every student who studies P also studies H or E or both. If the number of students studying H equals that studying E, then the number of students studying H is

- A) 52   B)   C)   D)

**QNo:- 1 ,Correct Answer:- C**

**Explanation:-** Refer to lines from first paragraph, "I use the term 'violence' because of the intentionality associated with it, both in the aggression of humans and, at times, the recently observed behavior of elephants.". so option 3 is the appropriate answer.

**QNo:- 2 ,Correct Answer:- A**

**Explanation:-** Bradshaw opines that elephants also feel the trauma of loss of loved ones just like human-beings ; thus he would prefer a trauma-treatment for them as is mentioned in **option A**.

Option B can be ruled out as the main argument of Bradshaw is based on trauma and this study has no direct relationship with trauma.

Option C is rejected as research regarding human-elephant similarity has already been supported by Bradshaw.

Option D is against what Bradshaw intends to counter.

---

**QNo:- 3 ,Correct Answer:- C**

**Explanation:-** The passage talks about growing frequency of aggression between humans and elephants and the author also mentions about traumatic stress that happens among the elephants as it happens among human-beings under similar conditions. All these points get focus in **option C**.

Option A is incorrect as it doesn't mention anything about the outcome of similarity in brain organization of elephants and human-beings.

Option B just mentions only a part of the passage not in totality, so rejected.

Option D is unrelated as regards the contents of the passage.

---

**QNo:- 4 ,Correct Answer:- B**

**Explanation:-** option 1 can be inferred from para 2

option 4 can be inferred from "The elephants of decimated herds, especially orphans who've watched the death of their parents and elders from poaching and culling, exhibit behavior typically associated with post-traumatic stress disorder and other trauma-related disorders in humans: abnormal startle response, unpredictable asocial behavior, inattentive mothering and hyperaggression"

option 3 is from ""Elephants are suffering and behaving in the same ways that we recognize in ourselves as a result of violence. . . . Except perhaps for a few specific features, brain organization and early development of elephants and humans are extremely similar.""

---

**QNo:- 5 ,Correct Answer:- A**

**Explanation:-** Fabric of the society means social customs, practices, habits, rituals, etiquette, protocols, and similar interactions comprise the core behavior of a particular society (the paragraph mentions elephant community).

The paragraph line, "the fabric -----different habitats" has been used by the author as a **metaphor** (is a word or phrase used to compare two unlike objects, ideas, thoughts or feelings to provide a clearer description) to indicate the altercation among elephants that has resulted in their loss of habitat due to human intrusion. This idea has been highlighted clearly in **option A**.

---

**QNo:- 6 ,Correct Answer:- B**

**Explanation:-** This is critical reasoning based wherein it is required to negate (weaken) the main message(argument) i.e. natural selection and inheritance cannot define attaining of acquired characteristics by next generation. **Option B** would negate the main idea as author has mentioned: " The traditional, and still dominant, view is that adaptations – from the human brain to the peacock's tail – are fully and satisfactorily explained by natural selection (and subsequent inheritance). Yet [new evidence] from genomics, epigenetics and developmental biology [indicates] that evolution is more complex than we once assumed. . . ."

All other given options actually support the main message.

**QNo:- 7 ,Correct Answer:- D**

**Explanation:-** Refer to lines in 2nd and 3rd paragraph, "The traditional, and still dominant, view is that adaptations . . . ecological legacies and culture they bequeath." These lines give a description about how genes struggling to control human culture reflect the pathway of evolution and different factors like, genomics(genetics), epigenetics, developmental factors and ecological legacies influence the path of evolution which is appropriately highlighted in **option D**. Other given options do not present all the aforesaid factors, so are rejected.

"

**QNo:- 8 ,Correct Answer:- C**

**Explanation:-** Entire passage talks about inheritance of the acquired characteristics. Refer first paragraph "generations of school children----is impossible." Therefore, option C is the most appropriate.

**QNo:- 9 ,Correct Answer:- C**

**Explanation:-** **Option C** is correct as per the explanation given in the passage. The second paragraph speaks about the supposed dominance of Darwin and Mendel's theory of inheritance. But towards the third and subsequent paragraphs the author mentions that Wilson's theory was able to explain how acquired traits are inherited in a better way as compared to Darwin and Mendel and this has been highlighted only in option C.

**QNo:- 10 ,Correct Answer:- B**

**Explanation:-** Refer to lines in 2nd paragraph, "The Indian government's conception of the war memorial was not merely absent-minded. Rather, it accurately reflected the fact that both academic history and popular memory have yet to come to terms with India's Second World War".

The same is highlighted in **option B** make it the best choice.

Option A does not clarify misplaced priorities.

Option C is incorrect as it is nowhere mentioned about the inclusion of their names in India Gate memorial

Option D does not find reference in the passage.

---

**QNo:- 11 ,Correct Answer:- D**

**Explanation:-** Refer to 1st paragraph last line, "India's contribution to the Second World War is airbrushed out of existence". This implies that the author feels down-hearted about such disregard. This makes **option D** being the appropriate choice.

Option A is incorrect as the author is not sad about how many lives were lost but they were left unrecognised.

Option B is incorrect as author is not having any problem with new war memorial, so no question of lamenting.

Option C is again incorrect as he has nowhere mentioned about the wastage of money.

---

**QNo:- 12 ,Correct Answer:- A**

**Explanation:-** Refer to lines in 2nd paragraph, "Further, the political trajectory ----- wartime experiences." This suggests that India was primarily interested in self-legitimization(to make oneself acceptable). Therefore **option A** is correct which clearly emphasises the same.

The remaining options are false as per the content of the passage.

**QNo:- 13 ,Correct Answer:- B**

**Explanation:-** The phrase "**mood music**" as used in 2nd paragraph is just indicating the **backdrop**; whereas struggle for independence was the main theme of "drama".

This is depicted in **option B** which makes it the correct choice.

Option A is rejected because it is not mentioned in the passage.

Option C is incorrect because India- Pakistan rivalry was not in focus at the time of Second World War.

Option D is irrelevant .

**QNo:- 14 ,Correct Answer:- A**

**Explanation:-** For option B, refer 2nd paragraph" Further, the political trajectory of the postwar subcontinent has militated against popular remembrance of the war. With partition and the onset of the India-Pakistan rivalry, both of the new nations needed fresh stories for self-legitimisation rather than focusing on shared wartime experiences."

For option D refer 4th paragraph,"This led the United States to take considerable interest in the country's future, and ensured that this was no longer the preserve of the British government."

For option C , refer 6th paragraph,"Such extraordinary mobilization for war was achieved at great human cost, with the Bengal famine the most extreme manifestation of widespread wartime deprivation. The costs on India's home front must be counted in millions of lives.

As per 5th paragraph," In a stunning reversal of its long-standing financial relationship with Britain, India finished the war as one of the largest creditors to the imperial power." **option A** is incorrect statement .

**QNo:- 15 ,Correct Answer:- B**

**Explanation:-** Refer to second last paragraph, "Its mission is/was to educate and encourage environmental public. . . while simultaneously becoming a trusted name in the environmental movement." This indicates that the efforts maintained had actually shadowed real problem. So, **option B** properly depicts this and is correct choice.

**QNo:- 16 ,Correct Answer:- D**

**Explanation:-** Refer to 3rd paragraph of passage that depict all the options A,B and C except D

**QNo:- 17 ,Correct Answer:- B**

**Explanation:-**

**Option B** can be clearly inferred from last paragraph of the passage " Our huge problem with plastic is the result of a permissive legal framework that has allowed the uncontrolled rise of plastic pollution, despite clear evidence of the harm it causes to local communities and the world's oceans. Recycling is also too hard in most parts of the U.S. and lacks the proper incentives to make it work well."

**QNo:- 18 ,Correct Answer:- D**

**Explanation:-** Refer to the last line of first paragraph where "lie" implies that the burden of plastic pollution has been put on the consumers. So,**option D** is appropriate.

**QNo:- 19 ,Correct Answer:- D**

**Explanation:-** Throughout the whole passage the author believes that the bigger problem is the production itself,that is causing plastic pollution rather than focusing on consumer behavior which is just a minor part of the giant problem like plastic pollution. So **option D** explains the phrase "what hammering a nail is to halting a falling skyscraper"properly.

**QNo:- 20 ,Correct Answer:- A**

**Explanation:-** Refer 1st paragraph and also by going through the passage as a whole the author seems to emphasise that economists should incorporate psychological aspect , certain emotions in their research making **option A** as an appropriate choice. Others don't fit the bill.

**QNo:- 21 ,Correct Answer:- D**

**Explanation:-** Refer to lines from last paragraph " Since the 1970s, depression has come to be viewed as a cognitive ----- failure when things go badly", we can derive author's opinion which has been aptly depicted in **option D**

**QNo:- 22 ,Correct Answer:- C**

**Explanation:-** Throughout the passage the author is emphasising on incorporating psychological aspects in research findings by economists. Only **option C** goes against author's main argument

**QNo:- 23 ,Correct Answer:- D**

**Explanation:-** Refer to the second last paragraph of the passage "As the science grows more sophisticated -----basis to transform or discipline individuals."It implies that **option D** is the best choice.

**QNo:- 24 ,Correct Answer:- C**

**Explanation:-** refer to para 4

**QNo:- 25 ,Correct Answer:- C**

**Explanation:-** **Option C** comprehensively summarises the entire paragraph  
Option A talks about development and not formation of identical twins , hence rejected.  
Option B is lacking important point of genetic similarity, hence rejected.  
Option D is wrong as it suggests formation of twins"during fertilization", it is actually "one day after fertilization"

**QNo:- 26 ,Correct Answer:- 2**

**Explanation:-** The paragraph opens with the subject in question which is given in line 1."Translators are like bumblebees. Then we move further putting a chronological order(present-past).In 1934, the French entomologist August Magnan pronounced the flight of the bumblebee to be aerodynamically impossible, and though long since scientifically disproved, this factoid is still routinely trotted out. Similar pronouncements about the impossibility of translation have dogged practitioners since Leonardo Bruni's *De interpretatione recta*, published in 1424. Meanwhile, bees, unaware of these deliberations, have continued to flit from flower to flower, and translators continue to translate."  
Apart from **option 2** rest of the options form a coherent paragraph

**QNo:- 27 ,Correct Answer:- 1432**

**Explanation:-** Line 1 introduces the noun, Line 4 introduces "swifts" and thought is continued in line 3. so correct order is 1432

**QNo:- 28 ,Correct Answer:- 4**

**Explanation:-** correct order is 1325, passage talks about imunization and inconsitency, it does not concern with cost so line 4 is the odd one out

**QNo:- 29 ,Correct Answer:- 4213**

**Explanation:-** Line 4 introduces noun, Line 2 furthers information about it, Line 3 talks about the diagnosis and 4 talks about how far it had spread . so correct order is 4213

**QNo:- 30 ,Correct Answer:- 1**

**Explanation:-**

**QNo:- 31 ,Correct Answer:- 1324**

**Explanation:-** Line 1 introduces the two main subjects, Line 2 will follow Line 3 as it is a mandatory pair(noun 'twitter'-pronoun 'it'), Line 2 continues what is mentioned in Line 3. and 4 will be the concluding sentence expressing how Twitter poses as an example to what has been mentioned in line 1. So the correct order is 1324.

**QNo:- 32 ,Correct Answer:- D**

**Explanation:-** refer lines "The European idea of landscape appeared before the science of landscape emerged, and it is no coincidence that Renaissance artists such as Leonardo da Vinci, who studied the structure of the human body, also facilitated an understanding of the structure of landscape"  
 option b best summarises the paragraph

**QNo:- 33 ,Correct Answer:- 2413**

**Explanation:-** option 2 is the perfect opening statement option 4 continues with the thought in option 2. option 1 introduces unwitting enablers and is followed by option 3

**QNo:- 34 ,Correct Answer:- A**

**Explanation:-** as author states that "Power is understood as a negative mechanism, which prevents the non-professional actors from offering their ideas and information as legitimate knowledge. " It basically restricts knowledge to the ones in power.

**QNo:- 35 ,Correct Answer:- 4**

**Explanation:-** Given that  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Also, two cells are called adjacent if they touch each other horizontally, vertically or diagonally.  
 As per the given definition, in the following matrix, the following are the cases of adjacent cells.

A <sub>1</sub>	A <sub>2</sub>	

A <sub>1</sub>		
A <sub>2</sub>		

A <sub>1</sub>		
	A <sub>2</sub>	

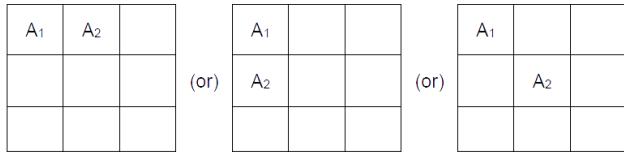
As per the information, we've the following diagram for a  $3 \times 3$  matrix to have minimum number of numerals.

1	2	1
3	4	3
1	2	1

So, we require 4 elements to have all different numerals.

**QNo:- 36 ,Correct Answer:- 4**

**Explanation:-** Given that  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Also, two cells are called adjacent if they touch each other horizontally, vertically or diagonally. As per the given definition, in the following matrix, the following are the cases of adjacent cells.



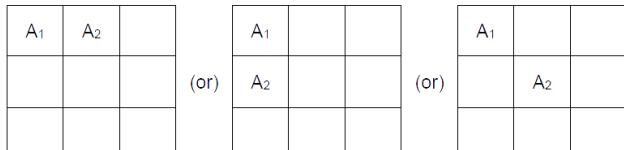
As per the information, we've the following diagram for a  $5 \times 5$  matrix to have minimum number of numerals.

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

So, we require 4 elements to have all different numerals.

**QNo:- 37 ,Correct Answer:- C**

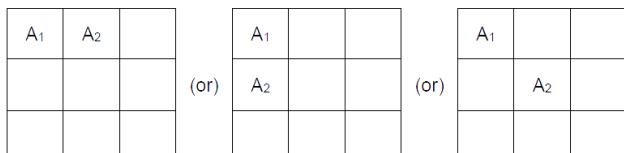
**Explanation:-** Given that  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Also, two cells are called adjacent if they touch each other horizontally, vertically or diagonally. As per the given definition, in the following matrix, the following are the cases of adjacent cells.



Even if one mistake is allowed, then also there won't be any change in the solution given above.

**QNo:- 38 ,Correct Answer:- C**

**Explanation:-** Given that  $n \times n$  square matrix to be filled with numerals so that no two adjacent cells have the same numeral. Also, two cells are called adjacent if they touch each other horizontally, vertically or diagonally. As per the given definition, in the following matrix, the following are the cases of adjacent cells.



Given that all the cells adjacent to any particular cell must have different numerals, which is satisfied only when there are at least 9 numerals.

**QNo:- 39 ,Correct Answer:- A**

**Explanation:-** Given, Indu was recruited and Indu scored 100% in exactly one section.

Jatin scored 100% in exactly one section

⇒ Jatin's scored are

DI	WE	GA
20	16	14

$$\text{Composite score} = 20x + 2 + 16 + 14 = 70$$

$$\text{Indu's score is } 70 - 10 = 60$$

$$\text{If Indu scores 20 in DI, Indu's score in GA} = 60 - 40 - 8 = 12$$

In this case, Indu will not qualify Hence, Indu scored 20 in GA.

$$\Rightarrow \text{Score in DI} = \frac{60 - 20 - 8}{2} = \frac{32}{2} = 16$$

⇒ Danish, Harini and Indu scored 20 in GA

$$\text{Score of Danish is } 2(8) + 15 + 20 = 51$$

$$\text{Hence, Score of Ajay is } 2(8) + 20 + 16 = 52$$

(∴ Ajay scores either 19 or 20 in DI, the composite score cannot be 51)

	DI	WE	GA	Total
A	8	20	16	52
B		9	11	
c	19	4	12	54
d	8	15	20	51
e	12	18	16	58
f	15	7	10	47
g	14	> 14	6	
h	5		20	
i	16	8	20	60
j	20	16	14	70

(Jatin's composite score was more than that of Danish) and (Indu scored less than Chetan in DI).

**QNo:- 40 ,Correct Answer:- D**

**Explanation:-** Given, Indu was recruited and Indu scored 100% in exactly one section.

Jatin scored 100% in exactly one section

⇒ Jatin's scores are

DI	WE	GA
20	16	14

$$\text{Composite score} = 20 + 2 + 16 + 14 = 70$$

Indu's score is  $70 - 10 = 60$

If Indu scores 20 in DI, Indu's score in GA =  $60 - 20 - 8 = 12$

In this case, Indu will not qualify Hence, Indu scored 20 in GA.

$$\Rightarrow \text{Score in DI} = \frac{60 - 20 - 8}{2} = \frac{32}{2} = 16$$

⇒ Danish, Harini and Indu scored 20 in GA

$$\text{Score of Danish is } 2(8) + 15 + 20 = 51$$

$$\text{Hence, Score of Ajay is } 2(8) + 20 + 16 = 52$$

(∴ Ajay scores either 19 or 20 in DI, the composite score cannot be 51)

	DI	WE	GA	Total
A	8	20	16	52
B		9	11	
c	19	4	12	54
d	8	15	20	51
e	12	18	16	58
f	15	7	10	47
g	14	> 14	6	
h	5		20	
i	16	8	20	60
j	20	16	14	70

If Bala scores 20 in DI, Score =  $2(20) + 9 + 11 = 60$ , which is the same as that of Indu.

Not possible

Hence, Bala scored same as Jatin in DI must be false.

Ans : Bala scored same as Jatin in DI

**QNo:- 41 ,Correct Answer:- 13**

**Explanation:-** Given, Indu was recruited and Indu scored 100% in exactly one section.

Jatin scored 100% in exactly one section

⇒ Jatin's scored are

DI	WE	GA
20	16	14

$$\text{Composite score} = 20x + 2 + 16 + 14 = 70$$

$$\text{Indu's score is } 70 - 10 = 60$$

$$\text{If Indu scores 20 in DI, Indu's score in GA} = 60 - 40 - 8 = 12$$

In this case, Indu will not qualify Hence, Indu scored 20 in GA.

$$\Rightarrow \text{Score in DI} = \frac{60 - 20 - 8}{2} = \frac{32}{2} = 16$$

⇒ Danish, Harini and Indu scored 20 in GA

$$\text{Score of Danish is } 2(8) + 15 + 20 = 51$$

$$\text{Hence, Score of Ajay is } 2(8) + 20 + 16 = 52$$

(∴ Ajay scores either 19 or 20 in DI, the composite score cannot be 51)

	DI	WE	GA	Total
A	8	20	16	52
B		9	11	
c	19	4	12	54
d	8	15	20	51
e	12	18	16	58
f	15	7	10	47
g	14	> 14	6	
h	5		20	
i	16	8	20	60
j	20	16	14	70

**QNo:- 42 ,Correct Answer:- 14**

**Explanation:-** Given, Indu was recruited and Indu scored 100% in exactly one section.

Jatin scored 100% in exactly one section

⇒ Jatin's scores are

DI	WE	GA
20	16	14

$$\text{Composite score} = 20 \times 2 + 16 + 14 = 70$$

$$\text{Indu's score is } 70 - 10 = 60$$

$$\text{If Indu scores 20 in DI, Indu's score in GA} = 60 - 40 - 8 = 12$$

In this case, Indu will not qualify Hence, Indu scored 20 in GA.

$$\Rightarrow \text{Score in DI} = \frac{60 - 20 - 8}{2} = \frac{32}{2} = 16$$

⇒ Danish, Harini and Indu scored 20 in GA

$$\text{Score of Danish is } 2(8) + 15 + 20 = 51$$

$$\text{Hence, Score of Ajay is } 2(8) + 20 + 16 = 52$$

(∴ Ajay scores either 19 or 20 in DI, the composite score cannot be 51)

	DI	WE	GA	Total
A	8	20	16	52
B		9	11	
c	19	4	12	54
d	8	15	20	51
e	12	18	16	58
f	15	7	10	47
g	14	> 14	6	
h	5		20	
i	16	8	20	60
j	20	16	14	70

**QNo:- 43 ,Correct Answer:- D**

**Explanation:-** It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression.

$$\text{So } 40 + (40 + x) + (40 + 2x) = 150$$

$$x = 10$$

$$\text{April 2016} = 40$$

$$\text{May 2016} = 50$$

$$\text{June 2016} = 60$$

Also, the same case holds for October, November, December of 2016.

$$100 + (100 + x) + (100 + 2x) = 360$$

$$x = 20$$

$$\text{October 2016} = 100$$

$$\text{November 2016} = 120$$

$$\text{December 2016} = 140$$

2016			2017		
Quarter	Month	Sales Figures	Quarter	Month	Sales Figures
Q <sub>1</sub> (240)	January	80	Q <sub>1</sub> (380)	January	120
	February	60		February	100
	March	100		March	160
Q <sub>2</sub> (150)	April	40	Q <sub>2</sub> (200)	April	60
	May	50		May	75
	June	60		June	65
Q <sub>3</sub> (250)	July	75	Q <sub>3</sub> (220)	July	60
	August	120		August	90
	September	55		September	70
Q <sub>4</sub> (360)	October	100	Q <sub>4</sub> (500)	October	150
	November	120		November	170
	December	140		December	180

$$\text{Sales in December 2017} = 180$$

$$\text{Sales in December 2016} = 140$$

$$\text{Percentage increase} = \frac{40}{140} \times 100 = 28.57\%$$

**QNo:- 44 ,Correct Answer:- B**

**Explanation:-** It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression.

$$\text{So } 40 + (40 + x) + (40 + 2x) = 150$$

$$x = 10$$

$$\text{April 2016} = 40$$

$$\text{May 2016} = 50$$

$$\text{June 2016} = 60$$

Also, the same case holds for October, November, December of 2016.

$$100 + (100 + x) + (100 + 2x) = 360$$

$$x = 20$$

$$\text{October 2016} = 100$$

$$\text{November 2016} = 120$$

$$\text{December 2016} = 140$$

2016			2017		
Quarter	Month	Sales Figures	Quarter	Month	Sales Figures
Q <sub>1</sub> (240)	January	80	Q <sub>1</sub> (380)	January	120
	February	60		February	100
	March	100		March	160
Q <sub>2</sub> (150)	April	40	Q <sub>2</sub> (200)	April	60
	May	50		May	75
	June	60		June	65
Q <sub>3</sub> (250)	July	75	Q <sub>3</sub> (220)	July	60
	August	120		August	90
	September	55		September	70
Q <sub>4</sub> (360)	October	100	Q <sub>4</sub> (500)	October	150
	November	120		November	170
	December	140		December	180

	<u>2017</u>	<u>2016</u>	<u>Percentage increase</u>
Q <sub>1</sub>	380	240	$\frac{140}{240} \times 100 = 58.33$
Q <sub>2</sub>	200	150	$\frac{50}{150} \times 100 = 33.33$
Q <sub>3</sub>	220	250	$\frac{-30}{250} \times 100 = -12$
Q <sub>4</sub>	500	360	$\frac{140}{560} \times 100 = 38.88$

So the percentage increase in the sales is highest for Q1.

**QNo:- 45 ,Correct Answer:- A**

**Explanation:-** It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression.

$$So \ 40 + (40 + x) + (40 + 2x) = 150$$

$$x = 10$$

$$April \ 2016 = 40$$

$$May \ 2016 = 50$$

$$June \ 2016 = 60$$

Also, the same case holds for October, November, December of 2016.

$$100 + (100 + x) + (100 + 2x) = 360$$

$$x = 20$$

$$October \ 2016 = 100$$

$$November \ 2016 = 120$$

$$December \ 2016 = 140$$

2016			2017		
Quarter	Month	Sales Figures	Quarter	Month	Sales Figures
Q <sub>1</sub> (240)	January	80	Q <sub>1</sub> (380)	January	120
	February	60		February	100
	March	100		March	160
Q <sub>2</sub> (150)	April	40	Q <sub>2</sub> (200)	April	60
	May	50		May	75
	June	60		June	65
Q <sub>3</sub> (250)	July	75	Q <sub>3</sub> (220)	July	60
	August	120		August	90
	September	55		September	70
Q <sub>4</sub> (360)	October	100	Q <sub>4</sub> (500)	October	150
	November	120		November	170
	December	140		December	180

→ Q<sub>1</sub> of 2017 compared with Q<sub>4</sub> of 2016.

$$= 380 - 360 / 360 \times 100 = 5.55\% \ increase.$$

→ Q<sub>2</sub> of 2016 compared with Q<sub>1</sub> of 2016

$$= 150 - 240 / 240 \times 100 = -37.5\% \ increase \ or \ 37.5\% \ decrease$$

→ Q<sub>4</sub> of 2017 with compared with Q<sub>3</sub> of 2017

There is an increase from 220 to 500.

→ Q<sub>2</sub> of 2017 with compared with Q<sub>1</sub> of 2017

$$= 200 - 380 / 380 \times 100 = -47.36 \ or \ 47.36\% \ decrease$$

So, sales of Q<sub>2</sub> of 2017, had the highest percentage decrease compared with Q<sub>1</sub> of 2017. Ans: Q<sub>2</sub> of 2017

**QNo:- 46 ,Correct Answer:- A**

**Explanation:-** It is given that the sales figures during the three months of the second quarter (April, May, June) of 2016 form an arithmetic progression.

$$So \ 40 + (40 + x) + (40 + 2x) = 150$$

$$x = 10$$

$$April \ 2016 = 40$$

$$May \ 2016 = 50$$

$$June \ 2016 = 60$$

Also, the same case holds for October, November, December of 2016.

$$100 + (100 + x) + (100 + 2x) = 360$$

$$x = 20$$

$$October \ 2016 = 100$$

$$November \ 2016 = 120$$

$$December \ 2016 = 140$$

2016			2017		
Quarter	Month	Sales Figures	Quarter	Month	Sales Figures
Q <sub>1</sub> (240)	January	80	Q <sub>1</sub> (380)	January	120
	February	60		February	100
	March	100		March	160
Q <sub>2</sub> (150)	April	40	Q <sub>2</sub> (200)	April	60
	May	50		May	75
	June	60		June	65
Q <sub>3</sub> (250)	July	75	Q <sub>3</sub> (220)	July	60
	August	120		August	90
	September	55		September	70
Q <sub>4</sub> (360)	October	100	Q <sub>4</sub> (500)	October	150
	November	120		November	170
	December	140		December	180

- (1) March 2017, Feb 2017  
 160            100             $= \frac{60}{100} \times 100 = 60\% \text{ increase.}$
- (2) March 2016, Feb 2016  
 100            60             $= \frac{40}{60} \times 100 = 66.66\% \text{ increase.}$
- (3) October 2016, September 2016  
 100            55             $= \frac{45}{55} \times 100 = 81.81\% \text{ increase}$
- (4) October 2017, September 2017  
 150            70             $= \frac{80}{70} \times 100 = 114.2\% \text{ increase.}$

∴ The highest percentage increase in this case is from September 2017 to October 2017. Ans: October of 2017

**QNo:- 47 ,Correct Answer:- A**

**Explanation:-** According to 1 and 2, we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

Also, from 4, we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

From (5)

If total number of low (L) pipes = 3

number of high (H) pipes = 6

number of medium (M) pipes = 11

Also if number of low (L) pipes = 4

number of high (H) pipes = 8

number of medium (M) pipes = 8

P7 and P8 can be HH or MM

∴ Two cases arise for P1 – P10

1	2	3	4	5	6	7	8	9	10
H	M	H	M	H	L	M	M	H	M
H	M	H	M	H	L	H	H	M	H

Combining (1) & (2), we get the following possible cases for P1 – P20

Case 1:

H M H M H L H H M H

M H M H M L M L M L

No. (L) = 4

No. (H) = 8

No. (M) = 8

Case 2:

H M H M H L H H M H

L M H M H M L M L M

No. (L) = 4,

No. (H) = 8,

and No. (M) = 8

Case 3:

H M H M H L H H M H

M L H M H M L M L M

No. (L) = 4

No. (H) = 8

No. (M) = 8

The contamination level at P10 was recorded as high.

Ans : The contamination level at P10 was recorded as high.

**QNo:- 48 ,Correct Answer:- D**

**Explanation:-** According to 1 and 2, we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

Also, from 4, we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

From (5)

If total number of low (L) pipes = 3

number of high (H) pipes = 6

number of medium (M) pipes = 11

Also if number of low (L) pipes = 4

number of high (H) pipes = 8

number of medium (M) pipes = 8

P7 and P8 can be HH or MM

∴ Two cases arise for P1 – P10

1	2	3	4	5	6	7	8	9	10
H	M	H	M	H	L	M	M	H	M
H	M	H	M	H	L	H	H	M	H

Combining (1) & (2), we get the following possible cases for P1 – P20

Case 1:

H M H M H L H H M H

M H M H M L M L M L

No. (L) = 4

No. (H) = 8

No. (M) = 8

Case 2:

H M H M H L H H M H

L M H M H M L M L M

No. (L) = 4,

No. (H) = 8,

and No. (M) = 8

Case 3:

H M H M H L H H M H

M L H M H M L M L M

No. (L) = 4

No. (H) = 8

No. (M) = 8

Exactly 8

**QNo:- 49 ,Correct Answer:- D**

**Explanation:-** According to 1 and 2, we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

Also, from 4, we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

From (5)

If total number of low (L) pipes = 3

number of high (H) pipes = 6

number of medium (M) pipes = 11

Also if number of low (L) pipes = 4

number of high (H) pipes = 8

number of medium (M) pipes = 8

P7 and P8 can be HH or MM

∴ Two cases arise for P1 – P10

1	2	3	4	5	6	7	8	9	10
H	M	H	M	H	L	M	M	H	M
H	M	H	M	H	L	H	H	M	H

Combining (1) & (2), we get the following possible cases for P1 – P20

Case 1:

H M H M H L H H M H

M H M H M L M L M L

No. (L) = 4

No. (H) = 8

No. (M) = 8

Case 2:

H M H M H L H H M H

L M H M H M L M L M

No. (L) = 4,

No. (H) = 8,

and No. (M) = 8

Case 3:

H M H M H L H H M H

M L H M H M L M L M

No. (L) = 4

No. (H) = 8

No. (M) = 8

The contamination level at P14 was recorded as medium.

**QNo:- 50 ,Correct Answer:- B**

**Explanation:-** According to 1 and 2, we get

P1	P2	P3	P4	P5	P6
H	M	H	M	H	L

Also, from 4, we get 2 cases:

P16	P17	P18	P19	P20
L	M	L	M	L
M	L	M	L	M

From (5)

If total number of low (L) pipes = 3

number of high (H) pipes = 6

number of medium (M) pipes = 11

Also if number of low (L) pipes = 4

number of high (H) pipes = 8

number of medium (M) pipes = 8

P7 and P8 can be HH or MM

∴ Two cases arise for P1 – P10

1	2	3	4	5	6	7	8	9	10
H	M	H	M	H	L	M	M	H	M
H	M	H	M	H	L	H	H	M	H

Combining (1) & (2), we get the following possible cases for P1 – P20

Case 1:

H M H M H L H H M H

M H M H M L M L M L

No. (L) = 4

No. (H) = 8

No. (M) = 8

Case 2:

H M H M H L H H M H

L M H M H M L M L M

No. (L) = 4,

No. (H) = 8,

and No. (M) = 8

Case 3:

H M H M H L H H M H

M L H M H M L M L M

No. (L) = 4

No. (H) = 8

No. (M) = 8

Contamination levels at P11 and P16 are recorded as the same.

**QNo:- 51 ,Correct Answer:- A**

**Explanation:-** It is given that the satellites serving either B, C or S do not serve O.

From (1), let the number of satellites serving B, C and S be  $2K$ ,  $K$ ,  $K$  respectively.

Let the number of satellites exclusively serving B be  $x$ .

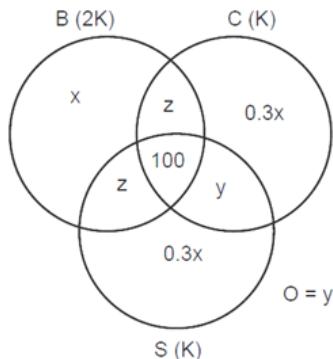
From (3), the number of satellites exclusively serving C and exclusively serving S will each be  $0.3x$

From (4), the number of satellites serving O is same as the number of satellites serving only C and S. Let that number be  $y$ .

Since the number of satellites serving C is same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +  $0.3x$  + 100 +  $y$  = (number of satellites serving only B and S) +  $0.3x$  + 100 +  $y$

∴ Let the number of satellites serving only B and C = the number of satellites serving only B and S =  $Z$

Therefore, the venn diagram will be as follows



Given that there are a total of 1600 satellites

$$\Rightarrow x + z + 0.3x + z + 100 + y + 0.3x + y = 1600$$

$$1.6x + 2y + 2z = 1500 \quad \dots \quad (1)$$

$$\text{Also } K = 0.3x + z + y + 100$$

$$\text{Satellites serving B} = 2K = x + 2z + 100$$

$$\Rightarrow 2(0.3x + z + y + 100) = x + 2z + 100$$

$$0.4x = 2y + 100$$

$$x = 5y + 250 \quad \dots \quad (2)$$

Substituting (2) in (1), we will get

$$1.6(5y + 250) + 2y + 2z = 1500$$

$$10y + 2z = 1100$$

$$Z = 550 - 5y \quad \dots \quad (3)$$

The number of satellites serving C

$$= z + 0.3x + 100 + y$$

$$= (550 - 5y) + 0.3(5y + 250) + 100 + y$$

$$= 725 - 2.5y$$

This number will be maximum when  $y$  is minimum.

Minimum value of  $y$  is 0.

∴ The maximum number of satellites serving C will be 725.

From (3),  $z = 550 - 5y$

Since the number of satellites cannot be negative,

$$z \geq 0 \quad 550 - 5y \geq 0$$

$$y \leq 110.$$

∴ Maximum value of  $y$  is 110.

When  $y = 110$ , the number of satellites serving C will be  $725 - 2.5 \times 110 = 450$ . This will be the minimum number of satellites serving C.

The number of satellites serving C must be between 450 and 725.

**QNo:- 52 ,Correct Answer:- B**

**Explanation:-** It is given that the satellites serving either B, C or S do not serve O.

From (1), let the number of satellites serving B, C and S be  $2K$ ,  $K$ ,  $K$  respectively.

Let the number of satellites exclusively serving B be  $x$ .

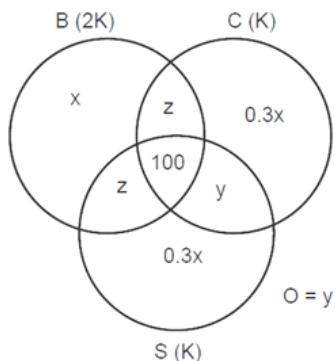
From (3), the number of satellites exclusively serving C and exclusively serving S will each be  $0.3x$

From (4), the number of satellites serving O is same as the number of satellites serving only C and S. Let that number be  $y$ .

Since the number of satellites serving C is same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +  $0.3x$  + 100 +  $y$  = (number of satellites serving only B and S) +  $0.3x$  + 100 +  $y$

$\therefore$  Let the number of satellites serving only B and C = the number of satellites serving only B and S =  $Z$

Therefore, the venn diagram will be as follows



Given that there are a total of 1600 satellites

$$\Rightarrow x + z + 0.3x + z + 100 + y + 0.3x + y = 1600$$

$$1.6x + 2y + 2z = 1500 \quad \dots \quad (1)$$

$$\text{Also } K = 0.3x + z + y + 100$$

$$\text{Satellites serving B} = 2K = x + 2z + 100$$

$$\Rightarrow 2(0.3x + z + y + 100) = x + 2z + 100$$

$$0.4x = 2y + 100$$

$$x = 5y + 250 \quad \dots \quad (2)$$

Substituting (2) in (1), we will get

$$1.6(5y + 250) + 2y + 2z = 1500$$

$$10y + 2z = 1100$$

$$Z = 550 - 5y \quad \dots \quad (3)$$

From 2, the number of satellites serving B exclusively is  $x = 5y + 250$

This is minimum when  $y$  is minimum.

Minimum value of  $y = 0$ .

$\therefore$  The minimum number of satellites serving B exclusively =  $5 \times 0 + 250 = 250$ .

**QNo:- 53 ,Correct Answer:- D**

**Explanation:-** It is given that the satellites serving either B, C or S do not serve O.

From (1), let the number of satellites serving B, C and S be  $2K$ ,  $K$ ,  $K$  respectively.

Let the number of satellites exclusively serving B be  $x$ .

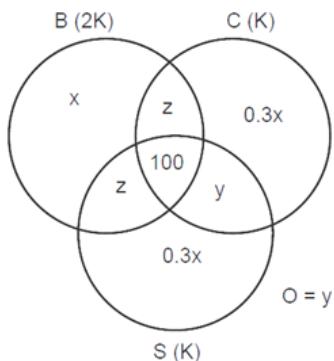
From (3), the number of satellites exclusively serving C and exclusively serving S will each be  $0.3x$

From (4), the number of satellites serving O is same as the number of satellites serving only C and S. Let that number be  $y$ .

Since the number of satellites serving C is same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +  $0.3x$  + 100 +  $y$  = (number of satellites serving only B and S) +  $0.3x$  + 100 +  $y$

$\therefore$  Let the number of satellites serving only B and C = the number of satellites serving only B and S =  $Z$

Therefore, the venn diagram will be as follows



Given that there are a total of 1600 satellites

$$\Rightarrow x + z + 0.3x + z + 100 + y + 0.3x + y = 1600$$

$$1.6x + 2y + 2z = 1500 \quad \text{----- (1)}$$

$$\text{Also } K = 0.3x + z + y + 100$$

$$\text{Satellites serving B} = 2K = x + 2z + 100$$

$$\Rightarrow 2(0.3x + z + y + 100) = x + 2z + 100$$

$$0.4x = 2y + 100$$

$$x = 5y + 250 \quad \text{----- (2)}$$

Substituting (2) in (1), we will get

$$1.6(5y + 250) + 2y + 2z = 1500$$

$$10y + 2z = 1100$$

$$Z = 550 - 5y \quad \text{----- (3)}$$

Given that at least 100 satellites serve O; we can say in this case that  $y \geq 100$ .

$$\text{Number of satellites serving S} = 0.3x + z + 100 + y = 725 - 2.5y$$

This is minimum when  $y$  is maximum, i.e. 110, (from ③)

$$\text{Minimum number of satellites serving} = 725 - 2.5 \times 100 = 450.$$

This is maximum when  $y$  is minimum, i.e., 100 in this case.

$$\text{Maximum number of satellites serving} = 725 - 2.5 \times 100 = 475$$

Therefore, the number of satellites serving S is at most 475

**QNo:- 54 ,Correct Answer:- D**

**Explanation:-** It is given that the satellites serving either B, C or S do not serve O.

From (1), let the number of satellites serving B, C and S be  $2K$ ,  $K$ ,  $K$  respectively.

Let the number of satellites exclusively serving B be  $x$ .

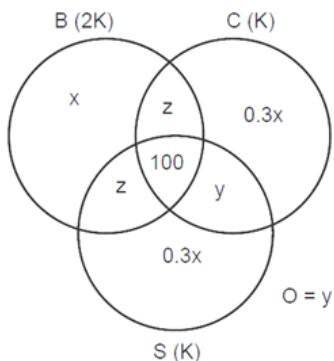
From (3), the number of satellites exclusively serving C and exclusively serving S will each be  $0.3x$

From (4), the number of satellites serving O is same as the number of satellites serving only C and S. Let that number be  $y$ .

Since the number of satellites serving C is same as the number of satellites serving S, we can say that (number of satellites serving only B and C) +  $0.3x + 100 + y =$  (number of satellites serving only B and S) +  $0.3x + 100 + y$

$\therefore$  Let the number of satellites serving only B and C = the number of satellites serving only B and S =  $Z$

Therefore, the venn diagram will be as follows



Given that there are a total of 1600 satellites

$$\Rightarrow x + z + 0.3x + z + 100 + y + 0.3x + y = 1600$$

$$1.6x + 2y + 2z = 1500 \quad \dots\dots\dots (1)$$

$$\text{Also } K = 0.3x + z + y + 100$$

$$\text{Satellites serving B} = 2K = x + 2z + 100$$

$$\Rightarrow 2(0.3x + z + y + 100) = x + 2z + 100$$

$$0.4x = 2y + 100$$

$$x = 5y + 250 \quad \dots\dots\dots (2)$$

Substituting (2) in (1), we will get

$$1.6(5y + 250) + 2y + 2z = 1500$$

$$10y + 2z = 1100$$

$$Z = 550 - 5y \quad \dots\dots\dots (3)$$

The number of satellites serving at least two of

B, C or S = number of satellites serving exactly two of B, C or S + Number of satellites serving all the three

$$= z + z + y + 100$$

$$= 2(550 - 5y) + y + 100$$

$$= 1200 - 9y.$$

Given that this is equal to 1200

$$1200 - 9y = 1200$$

$$\Rightarrow y = 0$$

$$\text{If } y = 0, x = 5y + 250 = 250$$

$$z = 550 - 5y = 550$$

$$\text{No. of satellites serving C} = k = z + 0.3x + 100 + y$$

$$= 550 + 0.3 \times 250 + 100 + y$$

$$= 725$$

$$\text{No. of satellites serving B} = 2k = 2 \times 725 = 1450.$$

From the given options, we can say that the option "the number of satellites serving C cannot be uniquely determined" must be FALSE. Ans : The number of satellites serving C cannot be uniquely determined

**QNo:- 55 ,Correct Answer:- 7**

**Explanation:-** The ATM dispenses only 500, 200 and 100 notes and since 500 rupee notes is the preference, it has to dispense more 500 rupee notes than the other two notes combined. The following ways are possible:

500 rupee notes	200 rupee notes	100 rupee notes
10	0	0
9	2	1
9	1	3
9	0	5
8	5	0
8	4	2
8	3	4

Hence, a total of seven ways are possible.

**Note:** Given that the ATM dispenses 500, 200 and 100 rupee notes. A possible interpretation of this is that at least one note of each denomination is dispensed.

However, as there is no additional information supporting this, you should also consider the cases in which not all the three denominations are dispensed.

**QNo:- 56 ,Correct Answer:- 6**

**Explanation:-** To serve the maximum number of customers with 500 rupee notes as preference, we need to minimize the number of 500 rupee notes that can be served to any person.

From the above solution, the minimum number of 500 rupee notes that the ATM can dispense to any person with 500 rupee notes as his/her preference is 8.

Hence, with fifty 500 rupee notes, a total of 6 persons can be served. Ans : 6

**Note:** Given that the ATM dispenses 500, 200 and 100 rupee notes. A possible interpretation of this is that at least one note of each denomination is dispensed. However, as there is no additional information supporting this, you should also consider the cases in which not all the three denominations are dispensed.

**QNo:- 57 ,Correct Answer:- D**

**Explanation:-**

Since there are a limited number of 500 rupee notes, we can minimize the number of 500 rupee notes dispensed to each customer, while ensuring that each customer is served at most 20 notes.

If no 500 rupee notes is dispensed, the minimum number of notes that must be dispensed is 25 (all 200 rupee notes). This is not possible.

If one 500 rupee note is dispensed, the minimum number of notes is 14 (one 500 rupee note, twelve 200 rupee notes and one 100 rupee note). This is also not possible.

If two 500 rupee notes are dispensed, the minimum number of notes is 22 (two 500 rupee notes and twenty 200 rupee notes).

If three 500 rupee notes are dispensed, the minimum number of notes is 21 (three 500 rupee notes, seventeen 200 rupee notes and one 100 rupee note).

If four 500 rupee notes are dispensed, the minimum

number of notes is 19 (four 500 rupee notes and fifteen 200 rupee notes).

Hence, the minimum number of 500 rupee notes that can be dispensed to any person is 4.

With fifty 500 rupee notes, a maximum of 12 persons can be served.

**Note:** Given that the ATM dispenses 500, 200 and 100 rupee notes. A possible interpretation of this is that at least one note of each denomination is dispensed. However, as there is no additional information supporting this, you should also consider the cases in which not all the three denominations are dispensed.

**QNo:- 58 ,Correct Answer:- B**

**Explanation:-**

To dispense the smallest possible number of notes to a person with 500 rupee notes as his/her preference, the ATM should dispense all 500 rupee notes.

Hence, minimum number of notes required to serve any person with 500 rupee notes as his/her preference = 10 (all of 500 rupees).

Total number of 500 rupee notes required to serve 50 customers with 500 rupee notes as his/her preference =  $10 \times 50 = 500$

To minimize the number of notes to be served to a person with 100 rupee notes as his/her preference, we can maximize the number of 500 rupee notes served to him, keeping the 100 rupee notes more than the sum of the other two denominations.

This is possible if the machine serves eight 500 rupee notes and ten 100 rupee notes.

Hence, the total number of 500 rupee notes required to serve 50 customers with 100 rupee notes as his/her preference =  $8 \times 50 = 400$

Total number of 500 rupee notes required in the given scenario =  $500 + 400 = 900$

**Note:** Given that the ATM dispenses 500, 200 and 100 rupee notes. A possible interpretation of this is that at least one note of each denomination is dispensed. However, as there is no additional information supporting this, you should also consider the cases in which not all the three denominations are dispensed.

**QNo:- 59 ,Correct Answer:- A**

**Explanation:-**

	Research	Teaching	Administration
Bureaucrats	$3x$	$3x$	$4x$
Educationalist	$m > n$	$N$	$o$
Politicians	$Y$	$Y$	$3y$

Total = 24

Bureaucrats are in the ratio  $3 : 3 : 4$  only value will be 3, 3, 4. So  $x = 1$

Educationalist  $n < m < o$   $m = \frac{o+n}{2}$

Politicians are in ratio  $1 : 1 : 3$  only value will be 1, 1, 3.

Possible value of  $m, n, o$  are 3, 2, 4 and 3, 1, 5.

Case (i)				Case (ii)					
R	T	A		R	T	A			
B	3	3	4	10	B	3	3	4	10
E	3	2	4	9	E	3	1	5	9
P	1	1	3	5	P	1	1	3	5
	7	6	11	24		7	5	12	24

The Size of the research committee is less than teaching committee.

**QNo:- 60 ,Correct Answer:- 4**

**Explanation:-**

	Research	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalist	$m > n$	N	o
Politicians	Y	Y	3y

Total = 24

Bureaucrats are in the ratio  $3 : 3 : 4$  only value will be 3, 3, 4. So  $x = 1$

Educationalist  $n < m < o$   $m = \frac{o+n}{2}$

Politicians are in ratio  $1 : 1 : 3$  only value will be 1, 1, 3.

Possible value of  $m, n, o$  are 3, 2, 4 and 3, 1, 5.

Case (i)				Case (ii)					
R	T	A		R	T	A			
B	3	3	4	10	B	3	3	4	10
E	3	2	4	9	E	3	1	5	9
P	1	1	3	5	P	1	1	3	5
	7	6	11	24		7	5	12	24

Four.

**QNo:- 61 ,Correct Answer:- 3**

**Explanation:-**

	Research	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalist	$m > n$	N	o
Politicians	Y	Y	3y

Total = 24

Bureaucrats are in the ratio  $3 : 3 : 4$  only value will be 3, 3, 4. So  $x = 1$

Educationalist  $n < m < o$   $m = \frac{o+n}{2}$

Politicians are in ratio  $1 : 1 : 3$  only value will be 1, 1, 3.

Possible value of  $m, n, o$  are 3, 2, 4 and 3, 1, 5.

Case (i)				Case (ii)					
R	T	A		R	T	A			
B	3	3	4	10	B	3	3	4	10
E	3	2	4	9	E	3	1	5	9
P	1	1	3	5	P	1	1	3	5
	7	6	11	24		7	5	12	24

Three.

**QNo:- 62 ,Correct Answer:- B**

**Explanation:-**

	Research	Teaching	Administration
Bureaucrats	3x	3x	4x
Educationalist	$m > n$	N	o
Politicians	Y	Y	3y

Total = 24

Bureaucrats are in the ratio  $3 : 3 : 4$  only value will be 3, 3, 4. So  $x = 1$

Educationalist  $n < m < o$   $m = \frac{o+n}{2}$

Politicians are in ratio  $1 : 1 : 3$  only value will be 1, 1, 3.

Possible value of  $m, n, o$  are 3, 2, 4 and 3, 1, 5.

Case (i)				Case (ii)					
R	T	A		R	T	A			
B	3	3	4	10	B	3	3	4	10
E	3	2	4	9	E	3	1	5	9
P	1	1	3	5	P	1	1	3	5
	7	6	11	24		7	5	12	24

Size of the teaching committee.

QNo:- 63 ,Correct Answer:- C

**Explanation:-**

Name	Gender	Institute	Major	Minor
Adriana	F	P		F
Bandita	F	Z		F
Chitra	F	Z		F
Daisy	F	Q		O
Amit	M	Q		
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

Daisy minors in operations (O) so other three must have minored in Finance (F).

Let Adriana and Deb be from the same institute P.

Daisy and Amit are from some institute q.

So Bandita and Chitra must be from z as only two females are from z.

Female student from y majors in operations so daisy cannot be from Y so daisy is from X so is Amit.

So Adriana and Deb are from Y

	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z	F/O	M
Chitra	F	Z	F/O	M
Daisy	F	X	F/M	O
Amit	M	X	F	O/M
Barun	M	Y	O	F
Chetan	M	X	F	O/M
Deb	M	Y	M	F

Chitra and Bandita

**QNo:- 64 ,Correct Answer:- A**

**Explanation:-**

Name	Gender	Institute	Major	Minor
Adriana	F	P		F
Bandita	F	Z		F
Chitra	F	Z		F
Daisy	F	Q		O
Amit	M	Q		
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

*Daisy minors in operations (O) so other three must have minored in Finance (F).*

*Let Adriana and Deb be from the same institute P.*

*Daisy and Amit are from some institute q.*

*So Bandita and Chitra must be from z as only two females are from z.*

*Female student from y majors in operations so daisy cannot be from Y so daisy is from X so is Amit.*

*So Adriana and Deb are from Y*

	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z	F/O	M
Chitra	F	Z	F/O	M
Daisy	F	X	F/M	O
Amit	M	X	F	O/M
Barun	M	Y	O	F
Chetan	M	X	F	O/M
Deb	M	Y	M	F

*Deb minors in Finance*

QNo:- 65 ,Correct Answer:- C

**Explanation:-**

Name	Gender	Institute	Major	Minor
Adriana	F	P		F
Bandita	F	Z		F
Chitra	F	Z		F
Daisy	F	Q		O
Amit	M	Q		
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

Daisy minors in operations (O) so other three must have minored in Finance (F).

Let Adriana and Deb be from the same institute P.

Daisy and Amit are from some institute q.

So Bandita and Chitra must be from z as only two females are from z.

Female student from y majors in operations so daisy cannot be from Y so daisy is from X so is Amit.

So Adriana and Deb are from Y

	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z	F/O	M
Chitra	F	Z	F/O	M
Daisy	F	X	F/M	O
Amit	M	X	F	O/M
Barun	M	Y	O	F
Chetan	M	X	F	O/M
Deb	M	Y	M	F

Amit majors in finance.

**QNo:- 66 ,Correct Answer:- D**

**Explanation:-**

Name	Gender	Institute	Major	Minor
Adriana	F	P		F
Bandita	F	Z		F
Chitra	F	Z		F
Daisy	F	Q		O
Amit	M	Q		
Barun	M	Y	O	F
Chetan	M	X	F	
Deb	M			

Daisy minors in operations (O) so other three must have minored in Finance (F).

Let Adriana and Deb be from the same institute P.

Daisy and Amit are from some institute q.

So Bandita and Chitra must be from z as only two females are from z.

Female student from y majors in operations so daisy cannot be from Y so daisy is from X so is Amit.

So Adriana and Deb are from Y

	Gender	Institute	Major	Minor
Adriana	F	Y	O	M
Bandita	F	Z	F/O	M
Chitra	F	Z	F/O	M
Daisy	F	X	F/M	O
Amit	M	X	F	O/M
Barun	M	Y	O	F
Chetan	M	X	F	O/M
Deb	M	Y	M	F

Given one female student majors in finance. If chitra majors in finance, Bandita majors in operations.

**QNo:- 67 ,Correct Answer:- C**

**Explanation:-**  $5x, 16y, 12z$  are in AP

$$32y = 5x + 12z \quad \dots(1)$$

$x, y, z$  are in GP

$$y^2 = xz \quad \dots(2)$$

Squaring both sides of (1),  $1024y^2 = 25x^2 + 144z^2 + 120xz$

$$1024xz = 25x^2 + 144z^2 + 120xz$$

$$25x^2 + 144z^2 - 904xz = 0$$

$$25x^2 - 900xz - 4xz + 144z^2 = 0$$

$$25x(x-36z) - 4z(x-36z) = 0$$

$$(25x-4z)(x-36z) = 0$$

$x, y$  and  $z$  are positive real numbers such that  $x = \frac{4}{25}z$

Let the common ratio of the GP be  $r$ .

$$\begin{aligned} \frac{1}{r^2} &= \frac{4}{25} \\ r &= \frac{5}{2} \end{aligned}$$

**QNo:- 68 ,Correct Answer:- D**

**Explanation:-** Let the rates of work of each human and each robot be  $H$  and  $R$  respectively (both in units/day).

$$15H + 5R = \frac{1}{30} \quad \text{(1)}$$

$$5H + 15R = \frac{1}{60} \quad \text{(2)}$$

$$3(1) - (2) \Rightarrow 40H = \frac{1}{12}$$

$$H = \frac{1}{480}$$

In a day, 15 humans can complete  $15H$  i.e.  $1/32$ th of the job. 15 humans can complete the job in 32 days.

**QNo:- 69 ,Correct Answer:- 10**

**Explanation:-** Let the rates at which each filling pipe and each emptying pipe works be  $f$  and  $e$  respectively (both in units/hr).

$$6f + 5d = 1/6 \text{ and } 5f + 6d = 1/60$$

$$\text{Solving, } f = 1/12 \text{ and } d = -1/15$$

$$\text{Part of the tank that one draining and two filling pipes can fill in a hour} = d + 2f = -1/15 + 1/6 = 1/10$$

One draining and two filling pipes can fill the tank in 10 hours.

**QNo:- 70 ,Correct Answer:- C**

**Explanation:-** Let the area of  $ABCD$  be 100. Side of  $ABCD = 10$

$$\text{Area of } EFGH \text{ is } 62.5 \Rightarrow \text{Side of } EFGH = \sqrt{62.5}$$

Triangles  $AEH$ ,  $BFE$ ,  $CGF$  and  $DHG$  are congruent by ASA.

$$\text{Let } AE = BF = CG = DH = x; EB = FC = DG = AH = 10 - x$$

$$AE^2 + AH^2 = EH^2$$

$$x^2 + (10-x)^2 = (\sqrt{62.5})^2$$

$$\text{Solving, } x = 2.5 \text{ or } 7.5$$

Since it's given that  $CG$  is longer than  $EB$ ,  $CG = 7.5$  and  $EB = 2.5$ .

$$EB : CG = 1 : 3$$

**QNo:- 71 ,Correct Answer:- B**

**Explanation:-** Any equilateral triangle formed by joining the midpoints of the sides of another equilateral triangle will have its side equal to half the side of the second equilateral triangle.

$$\text{Side of } T_1 = 24 \text{ cm}$$

$$\text{Side of } T_2 = 12 \text{ cm}$$

$$\text{Side of } T_3 = 6 \text{ cm}$$

and so on.

$$\text{Sum of the areas of all the triangles} = \sqrt{3}/4 (24^2 + 12^2 + 6^2 + \dots)$$

$$= \frac{\sqrt{3}}{4} \left[ \frac{576}{1} + \frac{144}{4} + \frac{36}{16} \right] = 192\sqrt{3}$$

**QNo:- 72 ,Correct Answer:- D**

**Explanation:-**  $2^x = 3 \log_5 2$

Taking logarithms to base 5 on both sides, we have

$$x (\log_5 2) = \log_5 2 * \log_5 3$$

$$x = \log_5 3 = 1 + \log_5 3/5$$

**QNo:- 73 ,Correct Answer:- A**

**Explanation:-** Let the quantities of the paints A and B in the mixture sold be  $a$  litres and  $b$  litres respectively.

Value at which the entire mixture is sold = 264

Profit percent made = 10%

Value at which the entire mixture is bought =  $264 * (100/110) = 240$

Price at which the entire mixture is bought = 24 per litre

Let the cost of B be  $x$  per litre.

Cost of A =  $(x+8)$  per litre

$$\frac{(x+8)a+xb}{10} = 24$$

Maximum cost of B will occur when  $a$  is minimum.

$b \leq a$ .

So, minimum  $a$  is 5. Corresponding  $b$  is 5.

Then  $(x+8)(5)+x(5)=240$

$x=20$

**QNo:- 74 ,Correct Answer:- B**

**Explanation:-** Let the numbers of marbles with Raju and Lalitha be  $4x$  and  $9x$  respectively. Let us say Lalitha gave  $y$  marbles to Raju.

$$\frac{4x+y}{9x-y} = \frac{5}{6}$$

$$y = \frac{21}{11}x$$

Fraction of original marbles that Lata gave to Raju =  $\frac{y}{9x}$

$$= \frac{7}{33}$$

**QNo:- 75 ,Correct Answer:- B**

**Explanation:-** Let the time taken by A to finish the job be "a" days. Time taken by B to finish the job =  $5/4 a$  days.

Part of the job completed when A and B worked

Part of the job completed when A and B worked together for 4 days =

$$1 - \frac{1}{2} - \frac{5}{100} = \frac{9}{20}$$

$$4\left(\frac{1}{a} + \frac{1}{\frac{5a}{4}}\right) = \frac{9}{20} \Rightarrow a=16.$$

Time taken by B alone to complete the entire job =  $5a/4 = 20$  days.

**QNo:- 76 ,Correct Answer:- D**

**Explanation:-** Let the cost prices of A and B be  $C_a$  and  $C_b$  respectively.

Selling price of the mixture = 40 per kg.

The profit made is 10% if A and B are mixed in the ratio 3:2.

$$\frac{40}{1.1} = \frac{3C_a + 2C_b}{5} \quad (1)$$

The profit made is 5% if A and B are mixed in the ratio 2:3.

$$\frac{40}{1.05} = \frac{2C_a + 3C_b}{5} \quad (2)$$

Dividing (1) by (2), we have  $\frac{1.05}{1.1} = \frac{3C_a + 2C_b}{2C_a + 3C_b}$

$$\frac{C_a}{C_b} = \frac{19}{24}$$

**QNo:- 77 ,Correct Answer:- C**

**Explanation:-** Let the average age of people aged 51 years and above be  $A_1$  years. Let the average age of people aged below 51 years be  $A_2$  years. Let the number of people aged below 51 years be  $N_2$ .

The average age of all the people in the apartment complex is 38 years.

$$38 = \frac{(A_1)(30) + (A_2)(N_2)}{30 + N_2} \quad \text{---(1)}$$

We seek the maximum value of  $A_2$ . This will occur when  $A_1$  is minimum i.e. 51.

from (1),  $390 = N_2(38 - A_2)$

When  $A_2$  is maximum,  $N_2$  is maximum i.e. 39.

Then,  $A_2 = 28$

Maximum  $A_2 = 28$ .

**QNo:- 78 ,Correct Answer:- B**

$$\text{Area of region } R = \frac{60}{360} * \pi(1)^2 = \frac{\pi}{6}$$

**Explanation:-** Area of OCD is half that of region R.

$$\text{Area of OCD} = \frac{1}{2} \left( \frac{\pi}{6} \right) = \frac{\pi}{12}.$$

This is also equal to  $\frac{1}{2} (OC)(OD) \sin 60$

$$\frac{1}{2} OC^2 \sin 60 = \frac{\pi}{12} \quad (OC = OD)$$

$$OC^2 = \frac{\frac{\pi}{6}}{\frac{\sqrt{3}}{2}} \Rightarrow OC = \sqrt{\frac{\pi}{3\sqrt{3}}}$$

**QNo:- 79 ,Correct Answer:- 5**

**Explanation:-**  $0.25 \leq 2^x \leq 200$ .

Possible values of  $x$  satisfying the above inequality are  $-2, -1, 0, 1, 2, 3, 4, 5, 6, 7$ . When  $x = 0, 1, 2, 4$  and  $6$ ,  $2^x + 2$  is divisible by 3 or 4.

The number of values of  $x$  is 5.

**QNo:- 80 ,Correct Answer:- C**

**Explanation:-** Let the length and the breadth of the rectangle be  $l$  and  $b$  respectively.

Diameter of the circle = Diagonal of the rectangle

$$26 = \sqrt{l^2 + b^2}$$

$$l^2 + b^2 = 676$$

Possible values of  $l$  and  $b$  are 24 and 10 respectively.

**QNo:- 81 ,Correct Answer:- A**

**Explanation:-** Area of the parallelogram ABCD = (base)(height) = (CD)(AP) = 72 sq.cm.

$$(CD)(AP) = 72$$

$$9(AP) = 72 \Rightarrow AP = 8$$

$$DP = \sqrt{AD^2 - AP^2} = \sqrt{16^2 - 8^2} = 8\sqrt{3}$$

Area of triangle

$$APD = \frac{1}{2}(AP)(PD) = 32\sqrt{3}$$

**QNo:- 82 ,Correct Answer:- A**

**Explanation:-**  $x^{2018}y^{2017} = 1/2$  and  $x^{2016}y^{2019} = 8$

$$\text{Dividing, } \frac{x^2}{y^2} = \frac{1}{16}$$

$$\frac{x}{y} = \pm \frac{1}{4} \Rightarrow x = \pm \frac{1}{4}y$$

$$\text{Now } \left(\pm \frac{1}{4}y\right)^{2018} y^{2017} = \frac{1}{2}$$

$$\Rightarrow y^{4035} = 2^{2035}$$

$$\Rightarrow y = 2$$

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

**QNo:- 83 ,Correct Answer:- A**

**Explanation:-** A got 36 marks but falls short of pass marks by 68%. Maximum possible score is N. Pass mark is 45% of N.  
 $32\% \text{ of } 45\% \text{ of } N = 36 \Rightarrow N = 250$

**QNo:- 84 ,Correct Answer:- 32**

**Explanation:-** The maximum value of  $f(x)$  will occur when  $2x^2 = 52 - 5x$  i.e. when  $2x^2 + 5x - 52 = 0$

i.e. when  $2x^2 + 13x - 8x - 52 = 0$

$\Rightarrow (2x + 13)(x - 4) = 0 \Rightarrow x = -13/2$  or 4. But  $x$  is any positive real number. So,  $x = 4$ . Maximum value of  $f(x) = 2(4^2) = 32$

**QNo:- 85 ,Correct Answer:- 12**

**Explanation:-** Let the time taken for car 1 to reach P from A be  $x$  hours.

Speed of car 1 = AP/x

BP = 3AP.

Car 2 starts from B to A and reaches P one hour after car 1 reaches P.

$$\begin{aligned} \text{Speed of car 2} &= \frac{3AP}{x+1} \\ \frac{3AP}{x+1} &= \frac{1}{2} \left( \frac{AP}{x} \right) \quad x = \frac{1}{5} \end{aligned}$$

Time taken for car 1 to reach P from A is 12 min.

**QNo:- 86 ,Correct Answer:- 121000**

**Explanation:-** Let each instalment be Rs.  $x$ . Equating the present value of both the instalments to the money borrowed,

$$\frac{x}{1.1} + \frac{x}{1.1^2} = 210000$$

$$x = 121000$$

**QNo:- 87 ,Correct Answer:- 60**

**Explanation:-** Let the average score of the aspirant in all the tests be A. Let the number of tests be N.

The aspirant's average score for the first 10 tests and last 10 tests are 20 and 30 respectively.

$$\frac{NA-200}{N-10} = A+1 \text{ and } \frac{NA-300}{N-10} = A - 1$$

Solving,  $N = 60$ .

**QNo:- 88 ,Correct Answer:- 15**

**Explanation:-** Let the time taken by S to reach Z be t hours.

Let the speed of T be St. Distance between X and Z is  $3/5$  of the distance between X and Y.

$XZ : ZY = 3 : 2$

$$\frac{(t+1)}{\frac{3}{4} * St * t} = \frac{3}{2}$$

$$t = 8$$

S takes 8 hours to cover YZ. T would take  $8 \times (3/4)$  i.e. 6 hours to cover ZY. T would take  $t + 1$  i.e. 9 hours to cover XZ. T would take 15 hours to reach Y.

**QNo:- 89 ,Correct Answer:- 198**

**Explanation:-** The radius of the cone is 4 feet.

The tip of the cone is a cone of height 3 feet. By similarity, its radius is 1 foot.

The volume of the remaining part of the cone = Volume of the cone - Volume of the tip of the cone =  $64\pi - \pi = 63\pi = 63 \times (22/7) = 198$

**QNo:- 90 ,Correct Answer:- C**

**Explanation:-**  $\log_{12} 81 = p \Rightarrow \log_{12} 3^4 = p$

$$\Rightarrow 4 \log_{12} 3 = p$$

$$\Rightarrow \frac{p}{4} = \log_{12} 3$$

$$3 \left( \frac{\frac{4-p}{4}}{4+p} \right) = 3 \left( \frac{1-\frac{p}{4}}{1+\frac{p}{4}} \right)$$

$$= 3 \left( \frac{1-\log_{12} 3}{1+\log_{12} 3} \right)$$

$$= 3 \left( \frac{\log_{12} 12 - \log_{12} 3}{\log_{12} 12 + \log_{12} 3} \right)$$

$$= 3 \left( \frac{\log(12/3)}{\log(12 \times 3)} \right) = 3 \frac{\log 4}{\log 36}$$

$$= 3 \log_{36} 4$$

$$= \log 68$$

**QNo:- 91 ,Correct Answer:- B**

**Explanation:-**

Let the cost price of peanuts for the wholesaler be  $x$  per kg. Cost price of walnuts for the wholesaler is  $3x$  per kg. The wholesaler sold 8 kg of peanuts at 10% profit and 16 kg of walnuts at 20% profit to a shopkeeper. Total cost price to the shopkeeper =  $(8)(x)(1.1) + (16)(3x)(1.2) = 66.4x$

The shopkeeper lost 5 kg walnuts and 3 kg peanuts. The shopkeeper sold the mixture of 11 kg walnuts and 5 kg peanuts.

His total selling price =  $166(16) = 2656$

His total cost price =  $2656 \left( \frac{100}{125} \right) = 2124.8$

$$66.4x = 2124.8$$

$$x = 32$$

Price at which the wholesaler bought walnuts =  $3x = 96/-$  per kg

**QNo:- 92 ,Correct Answer:- 54**

**Explanation:-**  $f(x+2) = f(x) + f(x+1)$

$$f(11) = 91$$

$$\text{Let } f(12) = a$$

$$f(13) = 91 + a$$

$$f(14) = 91 + 2a$$

$$f(15) = 182 + 3a. \text{ This is also equal to 617.}$$

$$182 + 3a = 617 \Rightarrow a = 145$$

$$f(10) = f(12) - f(11) = 145 - 91 = 54$$

**QNo:- 93 ,Correct Answer:- 40**

**Explanation:-** Let the other two numbers be  $y$  and  $z$ .

$$73yz - 37yz = 720$$

$$yz = 20$$

Minimum possible sum of the squares of the other two numbers would occur when  $y = z$  and equals 40.

**QNo:- 94 ,Correct Answer:- A**

**Explanation:-** Let the speeds of Partha and Narayan be  $S_p$  and  $S_n$  respectively.

$$\frac{60}{S_p} = \frac{60}{S_n} + 4$$

$$\frac{30}{S_p} = \frac{60}{S_n} - 2$$

$$\text{Subtracting, } \frac{30}{S_p} = 6$$

$$S_p = 5 \text{ kmph}$$

**QNo:- 95 ,Correct Answer:- A**

**Explanation:-** Let the 6 cm long chord be  $x$  cm away from the centre of the circle. Let the radius of the circle be  $r$  cm. The perpendiculars from the centre of the circle to the chords bisect the chords.

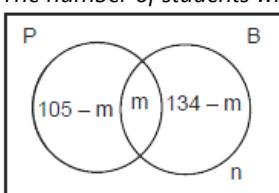
$$r^2 = x^2 + 3^2 = (x+1)^2 + 2^2$$

$$\text{Solving, } x = 2 \text{ and } r = \sqrt{13}$$

**QNo:- 96 ,Correct Answer:- A**

**Explanation:-** Let the number of students who like both pizza and burger be ' $m$ '

The number of students who like neither of them be  $n$



From venn diagram

$$105 - m + m + 134 - m + n = 200$$

$$m - n = 39$$

$\therefore$  The possible values of  $(m, n)$  are  $(39, 0), (40, 1), \dots, (105, 66)$

$\therefore$  The number of students who like only burger is lies in the range  $[134 - 105, 134 - 39] = [29, 95]$

$\therefore$  From options, 93 is a possible answer.

**QNo:- 97 ,Correct Answer:- 502**

**Explanation:-** As the digits appear in ascending order in the numbers, number of ways of forming a n-digit number using the 9 digits =  ${}^9C_n$

Number of possible two-digit numbers which can be formed =  ${}^9C_2 + {}^9C_3 + {}^9C_4 + {}^9C_5 + {}^9C_6 + {}^9C_7 + {}^9C_8 + {}^9C_9 = 29 - {}^9C_0 + {}^9C_1$   
 $= 512 - (1 + 9) = 502$

**QNo:- 98 ,Correct Answer:- B**

$$\begin{aligned} \text{Explanation:- } & u^2 + (u - 2v - 1)^2 = -4v(u + v) \\ \Rightarrow & u^2 + u^2 + 4v^2 + 1 - 4uv + 4v - 2u + 4vu + 4v^2 = 0 \\ \Rightarrow & 2u^2 - 2u + 8v^2 + 4v + 1 = 0 \\ \Rightarrow & 2(u^2 - u + \frac{1}{4}) + 2(4v^2 + 2v + \frac{1}{4}) = 0 \\ \Rightarrow & 2(u - \frac{1}{2})^2 + 2(2v + \frac{1}{2})^2 = 0 \\ \Rightarrow & u - \frac{1}{2} = 0; 2v + \frac{1}{2} = 0 \\ u = & \frac{1}{2} \text{ and } v = -\frac{1}{4} \\ u + 3v = & \frac{1}{2} - \frac{3}{4} = -\frac{1}{4} \end{aligned}$$

**QNo:- 99 ,Correct Answer:- C**

$$\text{Explanation:- } 5 + \log_3 a = 2^3 = 8 \Rightarrow a = 27$$

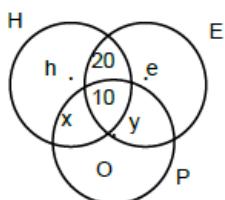
$$\text{Similarly, } 4a + 12 + \log_2 b = 5^3 = 125$$

$$\text{Since } a = 27, 4(27) + 12 + \log_2 b = 125 \Rightarrow b = 32.$$

$$a + b = 59.$$

**QNo:- 100 ,Correct Answer:- 52**

**Explanation:-** Let the number of students who studying only H be h, only E be e, only H and P but not E be x, only E and P but not H be y.



Given only P = 0

All three = 10;

Studying only H and E but not P = 20

Given number of students studying H =

Number of students studying E =

$$h + x + 20 + 10 = e + y + 20 + 10$$

$$h + x = e + y$$

total number of students = 74

$$\therefore h + x + 20 + 10 + e + y = 74$$

$$h + x + e + y = 44$$

$$h + x + h + x = 44$$

$$h + x = 22$$

$$\therefore \text{The number of students studying H} = h + x + 20 + 10 = 22 + 20 + 10 = 52.$$

**Directions of Test**

Test Name	Actual CAT 2018 Slot II	Total Questions	100	Total Time	180 Mins
Section Name	No. of Questions	Time limit	Marks per Question	Negative Marking	
Verbal Ability	34	1:0(h:m)	3	1/3	
DI & Reasoning	32	1:0(h:m)	3	1/3	
Quantitative Ability	34	1:0(h:m)	3	1/3	

**Section : Verbal Ability**

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 1**

NOT everything looks lovelier the longer and closer its inspection. But Saturn does. It is gorgeous through Earthly telescopes. However, the 13 years of close observation provided by Cassini, an American spacecraft, showed the planet, its moons and its remarkable rings off better and better, revealing finer structures, striking novelties and greater drama. . . .

By and large the big things in the solar system—planets and moons—are thought of as having been around since the beginning. The suggestion that rings and moons are new is, though, made even more interesting by the fact that one of those moons, Enceladus, is widely considered the most promising site in the solar system on which to look for alien life. If Enceladus is both young and bears life, that life must have come into being quickly. This is also believed to have been the case on Earth. Were it true on Enceladus, that would encourage the idea that life evolves easily when conditions are right.

One reason for thinking Saturn’s rings are young is that they are bright. The solar system is suffused with comet dust, and comet dust is dark. Leaving Saturn’s ring system (which Cassini has shown to be more than 90% water ice) out in such a mist is like leaving laundry hanging on a line downwind from a smokestack: it will get dirty. The lighter the rings are, the faster this will happen, for the less mass they contain, the less celestial pollution they can absorb before they start to discolour. . . . Jeff Cuzzi, a scientist at America’s space agency, NASA, who helped run Cassini, told the Lunar and Planetary Science Conference in Houston that combining the mass estimates with Cassini’s measurements of the density of comet-dust near Saturn suggests the rings are no older than the first dinosaurs, nor younger than the last of them—that is, they are somewhere between 200m and 70m years old.

That timing fits well with a theory put forward in 2016, by Matija Cuk of the SETI Institute, in California and his colleagues. They suggest that at around the same time as the rings came into being an old set of moons orbiting Saturn destroyed themselves, and from their remains emerged not only the rings but also the planet’s current suite of inner moons— Rhea, Dione, Tethys, Enceladus and Mimas. . . .

Dr Cuk and his colleagues used computer simulations of Saturn’s moons’ orbits as a sort of time machine. Looking at the rate at which tidal friction is causing these orbits to lengthen they extrapolated backwards to find out what those orbits would have looked like in the past. They discovered that about 100m years ago the orbits of two of them, Tethys and Dione, would have interacted in a way that left the planes in which they orbit markedly tilted. But their orbits are untilted. The obvious, if unsettling, conclusion was that this interaction never happened—and thus that at the time when it should have happened, Dione and Tethys were simply not there. They must have come into being later. . . .

Data provided by Cassini challenged the assumption that:

- A) there was life on earth when Saturn’s rings were being formed.
- B) new celestial bodies can form from the destruction of old celestial bodies.
- C) all big things in the solar system have been around since the beginning.
- D) Saturn’s ring system is composed mostly of water ice.

**Question No. : 2**

Based on information provided in the passage, we can conclude all of the following except

- A) Saturn's rings were created from the remains of older moons
- B) Saturn's lighter rings discolour faster than rings with greater mass.
- C) none of Saturn's moons ever had suitable conditions for life to evolve.
- D) Thethys and Dione are less than 100 million years old.

**Question No. : 3**

The phrase "leaving laundry hanging on a line downwind from a smokestack" is used to explain how the ringed planet's:

- A) rings discolour and darken over time.    B) atmosphere absorbs comet dust    C) rings lose mass over time
- D) moons create a gap between the rings.

**Question No. : 4**

Based on information provided in the passage, we can infer that, in addition to water ice, Saturn's rings might also have small amounts of:

- A) helium and methane    B) rock particles and comet dust.    C) methane and rock particles    D) helium and comet dust.

**Question No. : 5**

The main objective of the passage is to:

- A) highlight the beauty, finer structures and celestial drama of Saturn's rings and moons.
- B) demonstrate how the orbital patterns of Saturn's rings and moons change over time
- C) establish that Saturn's rings and inner moons have been around since the beginning of time.
- D) provide evidence that Saturn's rings and moons are recent creations.

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 6**

Will a day come when India's poor can access government services as easily as drawing cash from an ATM? . . . [N]o country in the world has made accessing education or health or policing or dispute resolution as easy as an ATM, because the nature of these activities requires individuals to use their discretion in a positive way. Technology can certainly facilitate this in a variety of ways if it is seen as one part of an overall approach, but the evidence so far in education, for instance, is that just adding computers alone doesn't make education any better. . . .

The dangerous illusion of technology is that it can create stronger, top down accountability of service providers in implementation-intensive services within existing public sector organisations. One notion is that electronic management information systems (EMIS) keep better track of inputs and those aspects of personnel that are 'EMIS visible' can lead to better services. A recent study examined attempts to increase attendance of Auxiliary Nurse Midwife (ANMs) at clinics in Rajasthan, which involved high-tech time clocks to monitor attendance. The study's title says it all: Band-Aids on a Corpse . . . e-governance can be just as bad as any other governance when the real issue is people and their motivation.

For services to improve, the people providing the services have to want to do a better job with the skills they have. A study of medical care in Delhi found that even though providers, in the public sector had much better skills than private sector providers their provision of care in actual practice was much worse.

In implementation-intensive services the key to success is face-to-face interactions between a teacher, a nurse, a policeman, an extension agent and a citizen. This relationship is about power. Amartya Sen's . . . report on education in West Bengal had a supremely telling anecdote in which the villagers forced the teacher to attend school, but then, when the parents went off to work, the teacher did not teach, but forced the children to massage his feet. . . . As long as the system empowers providers over citizens, technology is irrelevant.

The answer to successfully providing basic services is to create systems that provide both autonomy and accountability. In basic education for instance, the answer to poor teaching is not controlling teachers more . . . The key . . . is to hire teachers who want to teach and let them teach, expressing their professionalism and vocation as a teacher through autonomy in the classroom. This autonomy has to be matched with accountability for results—not just narrowly measured through test scores, but broadly for the quality of the education they provide.

A recent study in Uttar Pradesh showed that if, somehow, all civil service teachers could be replaced with contract teachers, the state could save a billion dollars a year in revenue and double student learning. Just the additional autonomy and accountability of contracts through local groups—even without complementary system changes in information and empowerment—led to that much improvement. The first step to being part of the solution is to create performance information accessible to those outside of the government. . . .

The main purpose of the passage is to:

- A) find a solution to the problem of poor service delivery in education by examining different strategies.
- B) critique the government's involvement in educational activities and other implementation intensive services.
- C) analyse the shortcomings of government-appointed nurses and their management through technology.
- D) argue that some types of services can be improved by providing independence and requiring accountability.

**Question No. : 7**

Which of the following, IF TRUE, would undermine the passage's main argument?

- A) If it were proven that service providers in the private sector have better skills than those in the public sector.
- B) If absolute instead of moderate technological surveillance is exercised over the performance of service providers.
- C) Empowerment of service providers leads to increased complacency and rigged performance results.
- D) If it were proven that increase in autonomy of service providers leads to an exponential increase in their work ethic and sense of responsibility.

**Question No. : 8**

According to the author, service delivery in Indian education can be improved in all of the following ways EXCEPT through:

- A) recruitment of motivated teachers    B) access to information on the quality of teaching
- C) elimination of government involvement    D) use of technology.

**Question No. : 9**

The author questions the use of monitoring systems in services that involve face-to face interaction between service providers and clients because such systems:

- A) improve the skills but do not increase the motivation of service providers.
- B) do not improve services that need committed service providers.
- C) are ineffective because they are managed by the government.
- D) are not as effective in the public sector as they are in the private sector.

**Question No. : 10**

In the context of the passage, we can infer that the title "Band Aids on a Corpse" (in paragraph 2) suggests that:

- A) the nurses attended the clinics, but the clinics were ill-equipped.
- B) the nurses who attended the clinics were too poorly trained to provide appropriate medical care.
- C) the clinics were better funded, but performance monitoring did not result in any improvement.
- D) the electronic monitoring system was a superficial solution to a serious problem.

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 11**

The complexity of modern problems often precludes any one person from fully understanding them. Factors contributing to rising obesity levels, for example, include transportation systems and infrastructure, media, convenience foods, changing social norms, human biology and psychological factors. . . . The multidimensional or layered character of complex problems also undermines the principle of meritocracy: the idea that the 'best person' should be hired. There is no best person. When putting together an oncological research team, a biotech company such as Gilead or Genentech would not construct a multiple-choice test and hire the top scorers, or hire people whose resumes score highest according to some performance criteria. Instead, they would seek diversity.

They would build a team of people who bring diverse knowledge bases, tools and analytic skills. . . . Believers in a meritocracy might grant that teams ought to be diverse but then argue that meritocratic principles should apply within each category. Thus the team should consist of the 'best' mathematicians, the 'best' oncologists, and the 'best' biostatisticians from within the pool. That position suffers from a similar flaw. Even with a knowledge domain, no test or criteria applied to individuals will produce the best team. Each of these domains possesses such depth and breadth, that no test can exist. Consider the field of neuroscience. Upwards of 50,000 papers were published last year covering various techniques, domains of enquiry and levels of analysis, ranging from molecules and synapses up through networks of neurons. Given that complexity, any attempt to rank a collection of neuroscientists from best to worst, as if they were competitors in the 50-metre butterfly, must fail. What could be true is that given a specific task and the composition of a particular team, one scientist would be more likely to contribute than another. Optimal hiring depends on context. Optimal teams will be diverse.

Evidence for this claim can be seen in the way that papers and patents that combine diverse ideas tend to rank as high-impact. It can also be found in the structure of the socalled random decision forest, a state-of-the-art machine-learning algorithm. Random forests consist of ensembles of decision trees. If classifying pictures, each tree makes a vote: is that a picture of a fox or a dog? A weighted majority rules. Random forests can serve many ends. They can identify bank fraud and diseases, recommend ceiling fans and predict online dating behaviour. When building a forest, you do not select the best trees as they tend to make similar classifications. You want diversity. Programmers achieve that diversity by training each tree on different data, a technique known as bagging. They also boost the forest 'cognitively' by training trees on the hardest cases – those that the current forest gets wrong. This ensures even more diversity and accurate forests.

Yet the fallacy of meritocracy persists. Corporations, non-profits, governments, universities and even preschools test, score and hire the 'best'. This all but guarantees not creating the best team. Ranking people by common criteria produces homogeneity. . . . That's not likely to lead to breakthroughs.

Which of the following best describes the purpose of the example of neuroscienc

- A) In narrow fields of knowledge, a meaningful assessment of expertise has always been possible.
- B) Neuroscience is an advanced field of science because of its connections with other branches of science like oncology and biostatistics.
- C) In the modern age, every field of knowledge is so vast that a meaningful assessment of merit is impossible.
- D) Unlike other fields of knowledge, neuroscience is an exceptionally complex field, making a meaningful assessment of neuroscientists impossible.

**Question No. : 12**

Which of the following conditions, if true, would invalidate the passage's main argument?

- A) If it were proven that teams characterised by diversity end up being conflicted about problems and take a long time to arrive at a solution.
- B) If assessment tests were made more extensive and rigorous.
- C) If a new machine-learning algorithm were developed that proved to be more effective than the random decision forest.
- D) If top-scorers possessed multidisciplinary knowledge that enabled them to look at a problem from several perspectives.

**Question No. : 13**

Which of the following conditions would weaken the efficacy of a random decision forest?

- A) If a large number of decision trees in the ensemble were trained on data derived from easy and hard cases.
- B) If the types of ensembles of decision trees in the forest were doubled.
- C) If a large number of decision trees in the ensemble were trained on data derived from easy cases.
- D) If the types of decision trees in each ensemble of the forest were doubled.

**Question No. : 14**

The author critiques meritocracy for all the following reasons EXCEPT that:

- A) modern problems are multifaceted and require varied skill-sets to be solved.
- B) diversity and context-specificity are important for making major advances in any field.
- C) criteria designed to assess merit are insufficient to test expertise in any field of knowledge.
- D) an ideal team comprises of best individuals from diverse fields of knowledge.

**Question No. : 15**

On the basis of the passage, which of the following teams is likely to be most effective in solving the problem of rising obesity levels?

- A) A specialised team of nutritionists from various countries, who are also trained in the machine-learning algorithm of random decision forest.
- B) A team comprised of nutritionists, psychologists, urban planners and media personnel, who have each performed well in their respective subject tests.
- C) A team comprised of nutritionists, psychologists, urban planners and media personnel, who have each scored a distinction in their respective subject tests.
- D) A specialised team of top nutritionists from various countries, who also possess some knowledge of psychology.

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 16**

More and more companies, government agencies, educational institutions and philanthropic organisations are today in the grip of a new phenomenon: 'metric fixation'. The key components of metric fixation are the belief that it is possible – and desirable – to replace professional judgment (acquired through personal experience and talent) with numerical indicators of comparative performance based upon standardised data (metrics); and that the best way to motivate people within these organisations is by attaching rewards and penalties to their measured performance.

The rewards can be monetary, in the form of pay for performance, say, or reputational, in the form of college rankings, hospital ratings, surgical report cards and so on. But the most dramatic negative effect of metric fixation is its propensity to incentivise gaming: that is, encouraging professionals to maximise the metrics in ways that are at odds with the larger purpose of the organisation. If the rate of major crimes in a district becomes the metric according to which police officers are promoted, then some officers will respond by simply not recording crimes or downgrading them from major offences to misdemeanours. Or take the case of surgeons. When the metrics of success and failure are made public – affecting their reputation and income – some surgeons will improve their metric scores by refusing to operate on patients with more complex problems, whose surgical outcomes are more likely to be negative. Who suffers? The patients who don't get operated upon.

When reward is tied to measured performance, metric fixation invites just this sort of gaming. But metric fixation also leads to a variety of more subtle unintended negative consequences. These include goal displacement, which comes in many varieties: when performance is judged by a few measures, and the stakes are high (keeping one's job, getting a pay rise or raising the stock price at the time that stock are vested), people focus on satisfying those measures – often at the expense of other, more important organisational goals that are not measured. The best-known example is 'teaching to the test', a widespread phenomenon that has distorted primary and secondary education in the United States since the adoption of the *No Child Left Behind Act* of 2001. Short-termism is another negative. Measured performance encourages what the US sociologist Robert K Merton in 1936 called 'the imperious immediacy of interests ... where the actor's paramount concern with the foreseen immediate consequences excludes consideration of further or other consequences'. In short, advancing short-term goals at the expense of long-range considerations. This problem is endemic to publicly traded corporations that sacrifice long-term research and development, and the development of their staff, to the perceived imperatives of the quarterly report. To the debit side of the ledger must also be added the transactional costs of metrics: the expenditure of employee time by those tasked with compiling and processing the metrics in the first place – not to mention the time required to actually read them. . . .

Of the following, which would have added the least depth to the author's argument?

- A) A comparative case study of metrics- and non-metrics-based evaluation, and its impact on the main goals of an organisation.
- B) More real-life illustrations of the consequences of employees and professionals gaming metrics-based performance measurement systems.
- C) An analysis of the reasons why metrics fixation is becoming popular despite its drawbacks.
- D) Assessment of the pros and cons of a professional judgment-based evaluation system.

**Question No. : 17**

Which of the following is NOT a consequence of the 'metric fixation' phenomenon mentioned in the passage?

- A) Improving cooperation among employees leading to increased organizational effectiveness in the long run.
- B) Finding a way to show better results without actually improving performance.
- C) Deviating from organisationally important objectives to measurable yet less important objectives.
- D) Short-term orientation induced by frequent measurement of performance.

**Question No. : 18**

All of the following can be a possible feature of the *No Child Left Behind Act* of 2001, EXCEPT:

- A) standardised test scores can be critical in determining a student's educational future.
- B) school funding and sanctions are tied to yearly improvement shown on tests.
- C) assessment is dependent on the teacher's subjective evaluation of students' class participation.
- D) the focus is more on test-taking skills than on higher order thinking and problem-solving.

**Question No. : 19**

What is the main idea that the author is trying to highlight in the passage?

- A) Long-term organisational goals should not be ignored for short-term measures of organisational success.
- B) Performance measurement needs to be precise and cost-effective to be useful for evaluating organisational performance
- C) All kinds of organisations are now relying on metrics to measure performance and to give rewards and punishments.
- D) Evaluating performance by using measurable performance metrics may misguide organisational goal achievement.

**Question No. : 20**

What main point does the author want to convey through the examples of the police officer and the surgeon?

- A) The actions of police officers and surgeons have a significantly impact on society.
- B) Some professionals are likely to be significantly influenced by the design of performance measurement systems.
- C) Critical public roles should not be evaluated on metrics-based performance measures.
- D) Metrics-linked rewards may encourage unethical behaviour among some professionals.

**DIRECTIONS for the question :** Read the passage and answer the question based on it.

**Question No. : 21**

Grove snails as a whole are distributed all over Europe, but a specific variety of the snail, with a distinctive white-lipped shell, is found exclusively in Ireland and in the Pyrenees mountains that lie on the border between France and Spain. The researchers sampled a total of 423 snail specimens from 36 sites distributed across Europe, with an emphasis on gathering large numbers of the white-lipped variety. When they sequenced genes from the mitochondrial DNA of each of these snails and used algorithms to analyze the genetic diversity between them, they found that... a distinct lineage (the snails with the whitelipped shells) was indeed endemic to the two very specific and distant places in question.

Explaining this is tricky. Previously, some had speculated that the strange distributions of creatures such as the white-lipped grove snails could be explained by convergent evolution —in which two populations evolve the same trait by coincidence—but the underlying genetic similarities between the two groups rules that out. Alternately, some scientists had suggested that the white-lipped variety had simply spread over the whole continent, then been wiped out everywhere besides Ireland and the Pyrenees, but the researchers say their sampling and subsequent DNA analysis eliminate that possibility too. "If the snails naturally colonized Ireland, you would expect to find some of the same genetic type in other areas of Europe, especially Britain. We just don't find them," Davidson, the lead author, said in a press statement.

Moreover, if they'd gradually spread across the continent, there would be some genetic variation within the white-lipped type, because evolution would introduce variety over the thousands of years it would have taken them to spread from the Pyrenees to Ireland. That variation doesn't exist, at least in the genes sampled. This means that rather than the organism gradually expanding its range, large populations instead were somehow moved en masse to the other location within the space of a few dozen generations, ensuring a lack of genetic variety.

"There is a very clear pattern, which is difficult to explain except by involving humans," Davidson said. Humans, after all, colonized Ireland roughly 9,000 years ago, and the oldest fossil evidence of grove snails in Ireland dates to roughly the same era. Additionally, there is archaeological evidence of early sea trade between the ancient peoples of Spain and Ireland via the Atlantic and even evidence that humans routinely ate these types of snails before the advent of agriculture, as their burnt shells have been found in Stone Age trash heaps.

The simplest explanation, then? Boats. These snails may have inadvertently traveled on the floor of the small, coast-hugging skiffs these early humans used for travel, or they may have been intentionally carried to Ireland by the seafarers as a food source. "The highways of the past were rivers and the ocean—as the river that flanks the Pyrenees was an ancient trade route to the Atlantic, what we're actually seeing might be the long lasting legacy of snails that hitched a ride...as humans travelled from the South of France to Ireland 8,000 years ago," Davidson said.

Which one of the following makes the author eliminate convergent evolution as a probable explanation for why white-lipped grove snails are found in Ireland and the Pyrenees?

- A) The absence of genetic similarities between white-lipped grove snails of Ireland and snails from other parts of Europe, especially Britain.
- B) The absence of genetic variation between white-lipped grove snails of Ireland and the Pyrenees.
- C) The coincidental evolution of similar traits (white-lipped shell) in the grove snails of Ireland and the Pyrenees.
- D) The distinct lineage of white-lipped grove snails found specifically in Ireland and the Pyrenees.

**Question No. : 22**

The passage outlines several hypotheses and evidence related to white-lipped grove snails to arrive at the most convincing explanation for:

- A) why the white-lipped variety of grove snails were wiped out everywhere except in Ireland and the Pyrenees.
- B) how the white-lipped variety of grove snails might have migrated from the Pyrenees to Ireland.
- C) how the white-lipped variety of grove snails independently evolved in Ireland and the Pyrenees.
- D) why the white-lipped variety of grove snails are found only in Ireland and the Pyrenees.

**Question No. : 23**

All of the following evidence supports the passage's explanation of sea travel/trade EXCEPT:

- A) archaeological evidence of early sea trade between the ancient peoples of Spain and Ireland via the Atlantic Ocean.
- B) the coincidental existence of similar traits in the white-lipped grove snails of Ireland and the Pyrenees because of convergent evolution.
- C) absence of genetic variation within the white-lipped grove snails of Ireland and the Pyrenees, whose genes were sampled.
- D) the oldest fossil evidence of white-lipped grove snails in Ireland dates back to roughly 9,000 years ago, the time when humans colonised Ireland.

**Question No. : 24**

In paragraph 4, the evidence that "humans routinely ate these types of snails before the advent of agriculture" can be used to conclude that:

- A) white-lipped grove snails may have inadvertently traveled from the Pyrenees to Ireland on the floor of the small, coast-hugging skiffs that early seafarers used for travel.
- B) the seafarers who traveled from the Pyrenees to Ireland might have carried white-lipped grove snails with them as edibles.
- C) rivers and oceans in the Stone Age facilitated trade in white-lipped grove snails.
- D) 9,000 years ago, during the Stone Age, humans traveled from the South of France to Ireland via the Atlantic Ocean

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

**Question No. : 25**

1. In the era of smart world, however, 'Universal Basic Income' is an ineffective instrument which cannot address the potential breakdown of the social contract when large swathes of the population would effectively be unemployed.
2. In the era of industrial revolution, the abolition of child labour, poor laws and the growth of trade unions helped families cope with the pressures of mechanised work.
3. Growing inequality could be matched by a creeping authoritarianism that is bolstered by technology that is increasingly able to peer into the deepest vestiges of our lives.
4. New institutions emerge which recognise ways in which workers could contribute to and benefit by economic growth when, rather than if, their jobs are automated.

- A) 4213    B)    C)    D)

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

**Question No. : 26**

1. They would rather do virtuous side projects assiduously as long as these would not compel them into doing their day jobs more honourably or reduce the profit margins.
2. They would fund a million of the buzzwordy programs rather than fundamentally question the rules of their game or alter their own behavior to reduce the harm of the existing distorted, inefficient and unfair rules.
3. Like the dieter who would rather do anything to lose weight than actually eat less, the business elite would save the world through social-impact-investing and philanthrocapitalism.
4. Doing the right thing — and moving away from their win-win mentality — would involve real sacrifice; instead, it's easier to focus on their pet projects and initiatives.

- A) 3241    B)    C)    D)

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

**Question No. : 27**

1. Self-management is thus defined as the 'individual's ability to manage the symptoms, treatment, physical and psychosocial consequences and lifestyle changes inherent in living with a chronic condition'.
2. Most people with progressive diseases like dementia prefer to have control over their own lives and health-care for as long as possible.
3. Having control means, among other things, that patients themselves perform self management activities.
4. Supporting people in decisions and actions that promote self-management is called selfmanagement support requiring a cooperative relationship between the patient, the family, and the professionals.

A) 2314    B)    C)    D)

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph.

**Question No. : 28**

A Japanese government panel announced that it recommends regulating only genetically modified organisms that have had foreign genes permanently introduced into their genomes and not those whose endogenous genes have been edited. The only stipulation is that researchers and businesses will have to register their modifications to plants or animals with the government, with the exception of microbes cultured in contained environments. Reactions to the decision are mixed. While lauding the potential benefits of genome editing, an editorial opposes across the-board permission. Unforeseen risks in gene editing cannot be ruled out. All genetically modified products must go through the same safety and labeling processes regardless of method.

- A) Exempting from regulations the editing of endogenous genes is not desirable as this procedure might be risk-prone.
- B) Creating categories within genetically modified products in terms of transgenic modification and genome editing advances science but defies laws.
- C) A government panel in Japan says transgenic modification and genome editing are not the same.
- D) Excepting microbes cultured in contained environments from the regulations of genome editing is premature.

**DIRECTIONS for the question:** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

**Question No. : 29**

1. Our smartphones can now track our diets, our biological cycles, even our digestive systems and sleep-patterns.
2. Researchers have even coined a new term, "orthosomnia", to describe the insomnia brought on by paying too much attention to smartphones and sleep-tracking apps.
3. Sleep, nature's soft nurse, is a blissful, untroubled state all too easily disturbed by earthly worries or a guilty conscience.
4. The existence of a market for such apps is unsurprising: shift work, a long-hours culture and blue light from screens have conspired to rob many of us of sufficient rest.
5. A new threat to a good night's rest has emerged – smart-phones, with sleep-tracking apps.

A) 3    B)    C)    D)

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph.

**Question No. : 30**

Should the moral obligation to rescue and aid persons in grave peril, felt by a few, be enforced by the criminal law? Should we follow the lead of a number of European countries and enact bad Samaritan laws? Proponents of bad Samaritan laws must overcome at least three different sorts of obstacles. First, they must show the laws are morally legitimate in principle, that is, that the duty to aid others is a proper candidate for legal enforcement. Second, they must show that this duty to aid can be defined in a way that can be fairly enforced by the courts. Third, they must show that the benefits of the laws are worth their problems, risks and costs.

- A) If bad Samaritan laws are found to be legally sound and enforceable they must be enacted.
- B) A number of European countries that have successfully enacted bad Samaritan laws may serve as model statutes.
- C) Bad Samaritan laws may be desirable but they need to be tested for legal soundness.
- D) Everyone agrees that people ought to aid others, the only debate is whether to have a law on it.

**DIRECTIONS for the question:** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

**Question No. : 31**

- 1. Much has been recently discovered about the development of songs in birds.
- 2. Some species are restricted to a single song learned by all individuals, others have a range of songs.
- 3. The most important auditory stimuli for the birds are the sounds of other birds.
- 4. For all bird species there is a prescribed path to development of the final song,
- 5. A bird begins with the subsong, passes through plastic song, until it achieves the species song.

- A) 3
- B)
- C)
- D)

**DIRECTIONS for the question:** Identify the most appropriate summary for the paragraph.

**Question No. : 32**

The early optimism about sport's deterrent effects on delinquency was premature as researchers failed to find any consistent relationships between sports participation and deviance. As the initial studies were based upon cross-sectional data and the effects captured were short-term, it was problematic to test and verify the temporal sequencing of events suggested by the deterrence theory. The correlation between sport and delinquency could not be disentangled from class and cultural variables known. Choosing individuals to play sports in the first place was problematic, which became more acute in the subsequent decades as researchers began to document just how closely sports participation was linked to social class indicators.

- A) Contradicting the previous optimism, latter researchers have proved that there is no consistent relationship between sports participation and deviance.
- B) Sports participation is linked to class and cultural variables such as education, income, and social capital.
- C) There is a direct relationship between sport participation and delinquency but it needs more empirical evidence.
- D) Statistical and empirical weaknesses stand in the way of inferring any relationship between sports participation and deviance.

**DIRECTIONS for the question:** Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

**Question No. : 33**

1. As India looks to increase the number of cities, our urban planning must factor in potential natural disasters and work out contingencies in advance.
2. Authorities must revise data and upgrade infrastructure and mitigation plans even if their local area hasn't been visited by a natural calamity yet.
3. Extreme temperatures, droughts, and forest fires have more than doubled since 1980.
4. There is no denying the fact that our baseline normal weather is changing.
5. It is no longer a question of whether we will be hit by nature's fury but rather when.

A) 3    B)    C)    D)

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

**Question No. : 34**

1. It was his taxpayers who had to shell out as much as \$1.6bn over 10 years to employees of failed companies.
2. Companies in many countries routinely engage in such activities which means that the employees are left with unpaid entitlements
3. Deliberate and systematic liquidation of a company to avoid liabilities and then restarting the business is called phoenixing.
4. The Australian Minister for Revenue and Services discovered in an audit that phoenixing had cost the Australian economy between \$2.9bn and \$5.1bn last year.

A) 3241    B)    C)    D)

**Section : DI & Reasoning**

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 35**

The base exchange rate of a currency X with respect to a currency Y is the number of units of currency Y which is equivalent in value to one unit of currency X. Currency exchange outlets buy currency at buying exchange rates that are lower than base exchange rates, and sell currency at selling exchange rates that are higher than base exchange rates.

A currency exchange outlet uses the local currency L to buy and sell three international currencies A, B, and C, but does not exchange one international currency directly with another. The base exchange rates of A, B and C with respect to L are in the ratio 100:120:1. The buying exchange rates of each of A, B, and C with respect to L are 5% below the corresponding base exchange rates, and their selling exchange rates are 10% above their corresponding base exchange rates.

The following facts are known about the outlet on a particular day:

1. The amount of L used by the outlet to buy C equals the amount of L it received by selling C.
2. The amounts of L used by the outlet to buy A and B are in the ratio 5:3.
3. The amounts of L the outlet received from the sales of A and B are in the ratio 5:9.
4. The outlet received 88000 units of L by selling A during the day.
5. The outlet started the day with some amount of L, 2500 units of A, 4800 units of B, and 48000 units of C.
6. The outlet ended the day with some amount of L, 3300 units of A, 4800 units of B, and 51000 units of C.

How many units of currency A did the outlet buy on that day?

A) 1200    B)    C)    D)

**Question No. : 36**

How many units of currency C did the outlet sell on that day?

- A) 22000   B) 3000   C) 6000   D) 19000

**Question No. : 37**

What was the base exchange rate of currency B with respect to currency L on that day?

- A) 240   B)   C)   D)

**Question No. : 38**

What was the buying exchange rate of currency C with respect to currency L on that day?

- A) 1.90   B) 1.10   C) 2.20   D) 0.95

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 39**

According to a coding scheme the sentence

Peacock is designated as the national bird of India is coded as  
5688999 35 1135556678 56 458 13666689 1334 79 13366

This coding scheme has the following rules:

1. The scheme is case-insensitive (does not distinguish between upper case and lower case letters).
2. Each letter has a unique code which is a single digit from among 1,2,3, ..., 9.
3. The digit 9 codes two letters, and every other digit codes three letters.
4. The code for a word is constructed by arranging the digits corresponding to its letters in a non-decreasing sequence.

What best can be concluded about the code for the letter L?

- A) 1 or 8   B) 1   C) 8   D) 6

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 40**

According to a coding scheme the sentence

Peacock is designated as the national bird of India is coded as  
5688999 35 1135556678 56 458 13666689 1334 79 13366

This coding scheme has the following rules:

1. The scheme is case-insensitive (does not distinguish between upper case and lower case letters).
2. Each letter has a unique code which is a single digit from among 1,2,3, ..., 9.
3. The digit 9 codes two letters, and every other digit codes three letters.
4. The code for a word is constructed by arranging the digits corresponding to its letters in a non-decreasing sequence.

What best can be concluded about the code for the letter B?

- A) 1 or 3 or 4   B) 3   C) 3 or 4   D) 1

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 41**

According to a coding scheme the sentence

Peacock is designated as the national bird of India is coded as  
5688999 35 1135556678 56 458 13666689 1334 79 13366

This coding scheme has the following rules:

1. The scheme is case-insensitive (does not distinguish between upper case and lower case letters).
2. Each letter has a unique code which is a single digit from among 1,2,3, ..., 9.
3. The digit 9 codes two letters, and every other digit codes three letters.
4. The code for a word is constructed by arranging the digits corresponding to its letters in a non-decreasing sequence.

For how many digits can the complete list of letters associated with that digit be identified?

- A) 2    B) 3    C) 0    D) 1

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 42**

According to a coding scheme the sentence

Peacock is designated as the national bird of India is coded as  
5688999 35 1135556678 56 458 13666689 1334 79 13366

This coding scheme has the following rules:

1. The scheme is case-insensitive (does not distinguish between upper case and lower case letters).
2. Each letter has a unique code which is a single digit from among 1,2,3, ..., 9.
3. The digit 9 codes two letters, and every other digit codes three letters.
4. The code for a word is constructed by arranging the digits corresponding to its letters in a non-decreasing sequence.

Which set of letters CANNOT be coded with the same digit?

- A) X,Y,Z    B) S,U,V    C) I,B,M    D) S,E,Z

**DIRECTIONS for the question:** Study the following information carefully and answer the given question.

**Question No. : 43**

There are only four brands of entry level smartphones called Azra, Bysi, Cxqi, and Dipq in a country. Details about their market share, unit selling price, and profitability (defined as the profit as a percentage of the revenue) for the year 2016 are given in the table below:

Brand	Market Share (%)	Unit Selling Price (Rs.)	Profitability (%)
Azra	40	15,000	10
Bysi	25	20,000	30
Cxqi	15	30,000	40
Dipq	20	25,000	30

In 2017, sales volume of entry level smartphones grew by 40% as compared to that in 2016. Cxqi offered a 40% discount on its unit selling price in 2017, which resulted in a 15% increase in its market share. Each of the other three brands lost 5% market share. However, the profitability of Cxqi came down to half of its value in 2016. The unit selling prices of the other three brands and their profitability values remained the same in 2017 as they were in 2016.

The brand that had the highest revenue in 2016 is:

- A) Azra    B) Bysi    C) Dipq    D) Cxqi

**Question No. : 44**

The brand that had the highest profit in 2016 is:

- A) Bysi   B) Azra   C) Dipq   D) Cxqi

**Question No. : 45**

The brand that had the highest profit in 2017 is:

- A) Cxqi   B) Bysi   C) Azra   D) Dipq

**Question No. : 46**

The complete list of brands whose profits went up in 2017 from 2016 is:

- A) Bysi, Cxqi, Dipq   B) Azra, Bysi, Dipq   C) Azra, Bysi, Cxqi   D) Cxqi, Azra, Dipq

**DIRECTIONS for the question:** Study the following information carefully and answer the given question.

**Question No. : 47**

Seven candidates, Akil, Balaram, Chitra, Divya, Erina, Fatima, and Ganeshan, were invited to interview for a position. Candidates were required to reach the venue before 8 am. Immediately upon arrival, they were sent to one of three interview rooms: 101, 102, and 103. The following venue log shows the arrival times for these candidates. Some of the names have not been recorded in the log and have been marked as '?'.

Time	7:10 am	7:15 am	7:25 am	7:30 am	7:40 am	7:45 am
Person	Akil, ?	?	?	Chitra	Fatima	?

Additionally here are some statements from the candidates:

Balaram: I was the third person to enter Room 101.

Chitra: I was the last person to enter the room I was allotted to.

Erina: I was the only person in the room I was allotted to.

Fatima: Three people including Akil were already in the room that I was allotted to when I entered it.

Ganeshan: I was one among the two candidates allotted to Room 102.

What best can be said about the room to which Divya was allotted?

- A) Definitely Room 101   B) Either Room 101 or Room 102   C) Definitely Room 103   D) Definitely Room 102

**Question No. : 48**

Who else was in Room 102 when Ganeshan entered?

- A) Divya   B) No one   C) Chitra   D) Akil

**Question No. : 49**

When did Erina reach the venue?

- A) 7:45 am   B) 7:15 am   C) 7:25 am   D) 7:10 am

**Question No. : 50**

If Ganeshan entered the venue before Divya, when did Balaram enter the venue?

- A) 7:45 am   B) 7:25 am   C) 7:10 am   D) 7:15 am

**DIRECTIONS for the question:** Study the following information carefully and answer the given question.

**Question No. : 51**

An agency entrusted to accredit colleges looks at four parameters: faculty quality (F), reputation (R), placement quality (P), and infrastructure (I). The four parameters are used to arrive at an overall score, which the agency uses to give an accreditation to the colleges. In each parameter, there are five possible letter grades given, each carrying certain points: A (50 points), B (40 points), C (30 points), D (20 points), and F (0 points). The overall score for a college is the weighted sum of the points scored in the four parameters. The weights of the parameters are 0.1, 0.2, 0.3 and 0.4 in some order, but the order is not disclosed.

Accreditation is awarded based on the following scheme:

Range	Accreditation
Overall score $\geq$ 45	AAA
$35 \leq$ Overall score < 45	BAA
$25 \leq$ Overall score < 35	BBA
$15 \leq$ Overall score < 25	BBB
Overall score < 15	Junk

Eight colleges apply for accreditation, and receive the following grades in the four parameters (F, R, P, and I):

	F	R	P	I
A-one	A	A	A	B
Best Ed	B	C	D	D
Cosmopolitan	B	D	D	C
Dominance	D	D	B	C
Education Aid	A	A	B	A
Fancy	A	A	B	B
Global	C	F	D	D
High Q	C	D	D	B

It is further known that in terms of overall scores:

1. High Q is better than Best Ed;
2. Best Ed is better than Cosmopolitan; and
3. Education Aid is better than A-one.

What is the weight of the faculty quality parameter?

- A) 0.3    B) 0.1    C) 0.2    D) 0.4

**Question No. : 52**

How many colleges receive the accreditation of AAA?

- A) 3    B)    C)    D)

**Question No. : 53**

What is the highest overall score among the eight colleges?

- A) 48    B)    C)    D)

**Question No. : 54**

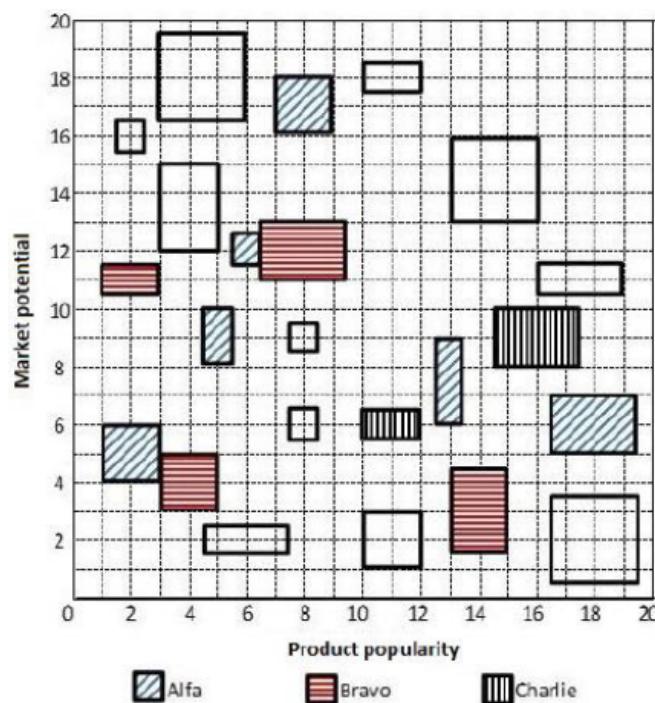
How many colleges have overall scores between 31 and 40, both inclusive?

- A) 1    B) 2    C) 3    D) 0

**DIRECTIONS for the question:** Analyse the graph/s given below and answer the question that follows.

**Question No. : 55**

Each of the 23 boxes in the picture below represents a product manufactured by one of the following three companies: Alfa, Bravo and Charlie. The area of a box is proportional to the revenue from the corresponding product, while its centre represents the Product popularity and Market potential scores of the product (out of 20). The shadings of some of the boxes have got erased.



The companies classified their products into four categories based on a combination of scores (out of 20) on the two parameters – Product popularity and Market potential as given below:

	Promising	Blockbuster	Doubtful	No-hope
Product popularity score	> 10	> 10	$\leq 10$	$\leq 10$
Market potential score	> 10	$\leq 10$	> 10	$\leq 10$

The following facts are known:

1. Alfa and Bravo had the same number of products in the Blockbuster category.
2. Charlie had more products than Bravo but fewer products than Alfa in the No-hope category.
3. Each company had an equal number of products in the Promising category.
4. Charlie did not have any product in the Doubtful category, while Alfa had one product more than Bravo in this category.
5. Bravo had a higher revenue than Alfa from products in the Doubtful category.
6. Charlie had a higher revenue than Bravo from products in the Blockbuster category.
7. Bravo and Charlie had the same revenue from products in the No-hope category.
8. Alfa and Charlie had the same total revenue considering all products.

Considering all companies' products, which product category had the highest revenue?

- A) Blockbuster    B) Doubtful    C) No-hope    D) Promising

**Question No. : 56**

Which of the following is the correct sequence of numbers of products Bravo had in No-hope, Doubtful, Promising and Blockbuster categories respectively?

- A) 1,3,1,3    B) 3,3,1,2    C) 2,3,1,2    D) 1,3,1,2

**Question No. : 57**

Which of the following statements is NOT correct?

- A) Alfa's revenue from Blockbuster products was the same as Charlie's revenue from  
B) The total revenue from No-hope products was less than the total revenue from Doubtful products  
C) Bravo's revenue from Blockbuster products was greater than Alfa's revenue from Doubtful products  
D) Bravo and Charlie had the same revenues from No-hope products

**Question No. : 58**

If the smallest box on the grid is equivalent to revenue of Rs.1 crore, then what approximately was the total revenue of Bravo in Rs. crore?

- A) 30    B) 24    C) 40    D) 34

**DIRECTIONS for the question:** Read the information given below and answer the question that follows.

**Question No. : 59**

Each visitor to an amusement park needs to buy a ticket. Tickets can be Platinum, Gold, or Economy. Visitors are classified as Old, Middle-aged, or Young. The following facts are known about visitors and ticket sales on a particular day:

1. 140 tickets were sold.
2. The number of Middle-aged visitors was twice the number of Old visitors, while the number of Young visitors was twice the number of Middle-aged visitors.
3. Young visitors bought 38 of the 55 Economy tickets that were sold, and they bought half the total number of Platinum tickets that were sold.
4. The number of Gold tickets bought by Old visitors was equal to the number of Economy tickets bought by Old visitors.

If the number of Old visitors buying Platinum tickets was equal to the number of Middle-aged visitors buying Platinum tickets, then which among the following could be the total number of Platinum tickets sold?

- A) 34    B) 38    C) 36    D) 32

**Question No. : 60**

If the number of Old visitors buying Platinum tickets was equal to the number of Middle-aged visitors buying Economy tickets, then the number of Old visitors buying Gold tickets was

- A)    B)    C)    D)

**Question No. : 61**

If the number of Old visitors buying Gold tickets was strictly greater than the number of Young visitors buying Gold tickets, then the number of Middle-aged visitors buying Gold tickets was

- A)    B)    C)    D)

**Question No. : 62**

Which of the following statements MUST be FALSE?

- A) The numbers of Gold and Platinum tickets bought by Young visitors were equal  
B) The numbers of Old and Middle-aged visitors buying Platinum tickets were equal  
C) The numbers of Old and Middle-aged visitors buying Economy tickets were equal  
D) The numbers of Middle-aged and Young visitors buying Gold tickets were equal

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

**Question No. : 63**

Fun Sports (FS) provides training in three sports – Gilli-danda (G), Kho-Kho (K), and Ludo (L). Currently it has an enrollment of 39 students each of whom is enrolled in at least one of the three sports. The following details are known:

1. The number of students enrolled only in L is double the number of students enrolled in all the three sports.
2. There are a total of 17 students enrolled in G.
3. The number of students enrolled only in G is one less than the number of students enrolled only in L.
4. The number of students enrolled only in K is equal to the number of students who are enrolled in both K and L.
5. The maximum student enrollment is in L.
6. Ten students enrolled in G are also enrolled in at least one more sport.

What is the minimum number of students enrolled in both G and L but not in K?

- A) 4    B)    C)    D)

**Question No. : 64**

If the numbers of students enrolled in K and L are in the ratio 19:22, then what is the number of students enrolled in L?

- A) 18    B) 19    C) 17    D) 22

**Question No. : 65**

Due to academic pressure, students who were enrolled in all three sports were asked to withdraw from one of the three sports. After the withdrawal, the number of students enrolled in G was six less than the number of students enrolled in L, while the number of students enrolled in K went down by one. After the withdrawal, how many students were enrolled in both G and K?

- A) 2    B)    C)    D)

**Question No. : 66**

Due to academic pressure, students who were enrolled in all three sports were asked to withdraw from one of the three sports. After the withdrawal, the number of students enrolled in G was six less than the number of students enrolled in L, while the number of students enrolled in K went down by one. After the withdrawal, how many students were enrolled in both G and L?

- A) 7    B) 6    C) 5    D) 8

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**Section : Quantitative Ability**

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

**Question No. : 67**

Points A, P, Q and B lie on the same line such that P, Q and B are, respectively, 100 km, 200 km and 300 km away from A. Cars 1 and 2 leave A at the same time and move towards B. Simultaneously, car 3 leaves B and moves towards A. Car 3 meets car 1 at Q, and car 2 at P. If each car is moving in uniform speed then the ratio of the speed of car 2 to that of car 1 is

- A) 1:2    B) 2:9    C) 1:4    D) 2:7

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

**Question No. : 68**

A water tank has inlets of two types A and B. All inlets of type A when open, bring in water at the same rate. All inlets of type B, when open, bring in water at the same rate. The empty tank is completely filled in 30 minutes if 10 inlets of type A and 45 inlets of type B are open, and in 1 hour if 8 inlets of type A and 18 inlets of type B are open. In how many minutes will the empty tank get completely filled if 7 inlets of type A and 27 inlets of type B are open?

- A) 48    B)    C)    D)

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

**Question No. : 69**

How many two-digit numbers, with a non-zero digit in the units place, are there which are more than thrice the number formed by interchanging the positions of its digits?

- A) 8    B) 7    C) 6    D) 5

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

**Question No. : 70**

A tank is emptied everyday at a fixed time point. Immediately thereafter, either pump A or pump B or both start working until the tank is full. On Monday, A alone completed filling the tank at 8 pm. On Tuesday, B alone completed filling the tank at 6 pm. On Wednesday, A alone worked till 5 pm, and then B worked alone from 5 pm to 7 pm, to fill the tank. At what time was the tank filled on Thursday if both pumps were used simultaneously all along?

- A) 4:36 pm    B) 4:24 pm    C) 4:12 pm    D) 4:48 pm

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

**Question No. : 71**

The area of a rectangle and the square of its perimeter are in the ratio 1 : 25. Then the lengths of the shorter and longer sides of the rectangle are in the ratio

- A) 1:4    B) 3:8    C) 2:9    D) 1:3

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

**Question No. : 72**

If the sum of squares of two numbers is 97, then which one of the following cannot be their product?

- A) 64    B) 48    C) -32    D) 16

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

**Question No. : 73**

If a and b are integers such that  $2x^2 - ax + 2 > 0$  and  $x^2 - bx + 8 \geq 0$  for all real numbers x, then the largest possible value of  $2a - 6b$  is

- A) 36    B)    C)    D)

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

**Question No. : 74**

The value of the sum  $7 \times 11 + 11 \times 15 + 15 \times 19 + \dots + 95 \times 99$  is

- A) 80730    B) 80751    C) 80707    D) 80773

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

**Question No. : 75**

If  $A = \{6^{2n} - 35n - 1 : n = 1, 2, 3, \dots\}$  and  $B = \{35(n-1) : n = 1, 2, 3, \dots\}$  then which of the following is true?

- A) Every member of B is in A    B) Every member of A is in B and at least one member of B is not in A  
C) Neither every member of A is in B nor every member of B is in A    D) At least one member of A is not in B

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

**Question No. : 76**

In a tournament, there are 43 junior level and 51 senior level participants. Each pair of juniors play one match. Each pair of seniors play one match. There is no junior versus senior match. The number of girl versus girl matches in junior level is 153, while the number of boy versus boy matches in senior level is 276. The number of matches a boy plays against a girl is

- A) 1098    B)    C)    D)

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

**Question No. : 77**

A chord of length 5 cm subtends an angle of  $60^\circ$  at the centre of a circle. The length, in cm, of a chord that subtends an angle of  $120^\circ$  at the centre of the same circle is

- A)  $5\sqrt{3}$     B) 8    C)  $2\pi$     D)  $6\sqrt{2}$

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

**Question No. : 78**

From a rectangle ABCD of area 768 sq cm, a semicircular part with diameter AB and area  $72\pi$  sq cm is removed. The perimeter of the leftover portion, in cm, is

- A)  $86 + 8\pi$     B)  $88 + 12\pi$     C)  $80 + 16\pi$     D)  $82 + 24\pi$

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

**Question No. : 79**

Gopal borrows Rs. X from Ankit at 8% annual interest. He then adds Rs. Y of his own money and lends Rs.  $X+Y$  to Ishan at 10% annual interest. At the end of the year, after returning Ankit's dues, the net interest retained by Gopal is the same as that accrued to Ankit. On the other hand, had Gopal lent Rs.  $X+2Y$  to Ishan at 10%, then the net interest retained by him would have increased by Rs. 150. If all interests are compounded annually, then find the value of  $X + Y$ .

- A) 4000    B)    C)    D)

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

**Question No. : 80**

The smallest integer n for which  $4^n > 17^{19}$  holds, is closest to

- A) 39    B) 35    C) 37    D) 33

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

**Question No. : 81**

A triangle ABC has area 32 sq units and its side BC, of length 8 units, lies on the line  $x = 4$ . Then the shortest possible distance between A and the point (0,0) is

- A) 8 units    B)  $2\sqrt{2}$  units    C) 4 units    D)  $4\sqrt{2}$  units

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

**Question No. : 82**

For two sets A and B, let  $A \Delta B$  denote the set of elements which belong to A or B but not both. If  $P = \{1, 2, 3, 4\}$ ,  $Q = \{2, 3, 5, 6\}$ ,  $R = \{1, 3, 7, 8, 9\}$ ,  $S = \{2, 4, 9, 10\}$ , then the number of elements in  $(P \Delta Q) \Delta (R \Delta S)$  is

- A) 7    B) 6    C) 8    D) 9

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

**Question No. : 83**

If  $p^3 = q^4 = r^5 = s^6$ , then the value of  $\log_s(pqr)$  is equal to

- A) 1    B)  $24/5$     C)  $16/5$     D)  $47/10$

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

**Question No. : 84**

There are two drums, each containing a mixture of paints A and B. In drum 1, A and B are in the ratio 18 : 7. The mixtures from drums 1 and 2 are mixed in the ratio 3 : 4 and in this final mixture, A and B are in the ratio 13 : 7. In drum 2, then A and B were in the ratio

- A) 239 : 161    B) 229 : 141    C) 251 : 163    D) 220 : 149

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

**Question No. : 85**

The scores of Amal and Bimal in an examination are in the ratio 11 : 14. After an appeal, their scores increase by the same amount and their new scores are in the ratio 47 : 56. The ratio of Bimal's new score to that of his original score is

- A) 5:4    B) 3:2    C) 8:5    D) 4:3

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

**Question No. : 86**

The arithmetic mean of x, y and z is 80, and that of x, y, z, u and v is 75, where  $u = (x + y)/2$  and  $v = (y + z)/2$ . If  $x \geq z$ , then the minimum possible value of x is

- A) 105    B)    C)    D)

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

**Question No. : 87**

The strength of a salt solution is p% if 100 ml of the solution contains p grams of salt. If three salt solutions A, B, C are mixed in the proportion 1 : 2 : 3, then the resulting solution has strength 20%. If instead the proportion is 3 : 2 : 1, then the resulting solution has strength 30%. A fourth solution, D, is produced by mixing B and C in the ratio 2 : 7. The ratio of the strength of D to that of A is

- A) 1:4    B) 3:10    C) 1:3    D) 2:5

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

**Question No. : 88**

Points A and B are 150 km apart. Cars 1 and 2 travel from A to B, but car 2 starts from A when car 1 is already 20 km away from A. Each car travels at a speed of 100 kmph for the first 50 km, at 50 kmph for the next 50 km, and at 25 kmph for the last 50 km. The distance, in km, between car 2 and B when car 1 reaches B is

- A) 5    B)    C)    D)

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

**Question No. : 89**

Let  $f(x) = \max\{5x, 52 - 2x^2\}$ , where  $x$  is any positive real number. Then the minimum possible value of  $f(x)$  is

- A) 20    B)    C)    D)

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

**Question No. : 90**

$$\frac{1}{\log_2 100} - \frac{1}{\log_4 100} + \frac{1}{\log_5 100} - \frac{1}{\log_{10} 100} + \frac{1}{\log_{20} 100} - \frac{1}{\log_{25} 100} + \frac{1}{\log_{50} 100} = ?$$

- A) 0    B) 10    C) -4    D) 1/2

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

**Question No. : 91**

Let  $t_1, t_2, \dots$  be real numbers such that  $t_1 + t_2 + \dots + t_n = 2n^2 + 9n + 13$ , for every positive integer  $n \geq 2$ . If  $t_k = 103$ , then  $k$  equals

- A) 24    B)    C)    D)

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

**Question No. : 92**

A 20% ethanol solution is mixed with another ethanol solution, say, S of unknown concentration in the proportion 1:3 by volume. This mixture is then mixed with an equal volume of 20% ethanol solution. If the resultant mixture is a 31.25% ethanol solution, then the unknown concentration of S is

- A) 48%    B) 55%    C) 52%    D) 50%

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

**Question No. : 93**

On a triangle ABC, a circle with diameter BC is drawn, intersecting AB and AC at points P and Q, respectively. If the lengths of AB, AC, and CP are 30 cm, 25 cm, and 20 cm respectively, then the length of BQ, in cm, is

- A) 24    B)    C)    D)

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

**Question No. : 94**

The smallest integer n such that  $n^3 - 11n^2 + 32n - 28 > 0$  is

- A) 8    B)    C)    D)

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

**Question No. : 95**

Let  $a_1, a_2, \dots, a_{52}$  be positive integers such that  $a_1 < a_2 < \dots < a_{52}$ . Suppose, their arithmetic mean is one less than the arithmetic mean of  $a_2, a_3, \dots, a_{52}$ . If  $a_{52} = 100$ , then the largest possible value of  $a_1$  is

- A) 20    B) 23    C) 45    D) 48

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

**Question No. : 96**

A parallelogram ABCD has area 48 sqcm. If the length of CD is 8 cm and that of AD is s cm, then which one of the following is necessarily true?

- A)  $5 \leq s \leq 7$     B)  $s \neq 6$     C)  $s \leq 6$     D)  $s \geq 6$

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

**Question No. : 97**

If N and x are positive integers such that  $N^N = 2^{160}$  and  $N^2 + 2^N$  is an integral multiple of  $2x$ , then the largest possible x is

- A) 10    B)    C)    D)

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

**Question No. : 98**

Ramesh and Ganesh can together complete a work in 16 days. After seven days of working together, Ramesh got sick and his efficiency fell by 30%. As a result, they completed the work in 17 days instead of 16 days. If Ganesh had worked alone after Ramesh got sick, in how many days would he have completed the remaining work?

- A) 13.5    B) 14.5    C) 11    D) 12

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

**Question No. : 99**

On a long stretch of east-west road, A and B are two points such that B is 350 km west of A. One car starts from A and another from B at the same time. If they move towards each other, then they meet after 1 hour. If they both move towards east, then they meet in 7 hrs. The difference between their speeds, in km per hour, is

- A) 50    B)    C)    D)

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

**Question No. : 100**

A jar contains a mixture of 175 ml water and 700 ml alcohol. Gopal takes out 10% of the mixture and substitutes it by water of the same amount. The process is repeated once again. The percentage of water in the mixture is now

- A) 30.3    B) 20.2    C) 25.4    D) 35.2

**QNo:- 1 ,Correct Answer:- C**

**Explanation:-** By thoroughly reading 2nd and 3rd paragraph of the passage ,we can conveniently assume that Cassini has challenged the assumption of "**By and large the big things in the solar system—planets and moons—are thought of as having been around since the beginning**" and in the aforesaid paragraphs, he is giving full justification to what he has challenged by providing sufficient data.

**QNo:- 2 ,Correct Answer:- C**

**Explanation:-** Except option C, all others can be safely concluded from the passage.

Option A-- Refer 4th paragraph,"they suggest-----only the rings."

Option B-- Refer 3rd paragraph,"Leaving Saturn's ring system-----start to discolour."

Option D-- Refer last paragraph,"they discovered that-----into being later."

Option C--We do not find support for the same in the passage.

**QNo:- 3 ,Correct Answer:- A**

**Explanation:-** Refer 3rd paragraph "leaving Saturn's-----start to discolour." It clearly helps us to consider option A as the correct one.

**QNo:- 4 ,Correct Answer:- B**

**Explanation:-** Nowhere in the passage helium and methane find any mention. Referring to 3rd paragraph, we find that rings of Saturn have 90% water ice alongwith comet dust and celestial pollution that makes option B as the best choice.

**QNo:- 5 ,Correct Answer:- D**

**Explanation:-** In the whole passage, the author is trying to give evidence and different facts to support that the rings of Saturn are of recent origin as against the popular belief of their into being since the beginning of time. This makes option D as the appropriate answer to the main objective of the passage.

**QNo:- 6 ,Correct Answer:- D**

**Explanation:-** Refer first line of 5th paragraph "the answer to-----accountability" brings the crux of the whole passage making option D fit for the answer to the main purpose of the passage.

**QNo:- 7 ,Correct Answer:- C**

**Explanation:-** This is a critical reasoning based question wherein we have been asked to weaken the main argument (i.e. provide autonomy and accountability to the service providers). The whole passage is revolving around this main argument for which the author is providing us examples and evidence in support.

From the given choices, only **option C** is going against(i.e. weakening) the main argument which says that empowering service providers leads to complacency(carelessness/laziness) and rigged (conduct something fraudulently)performance results.

**QNo:- 8 ,Correct Answer:- C**

**Explanation:-** Thorough reading of the last two paragraphs of the passage help us to mark option C as the one which is against the content of the passage because for all the ways of improvement, the involvement of state(government) is mandatory. But option C speaks totally opposite.

**QNo:- 9 ,Correct Answer:- B**

**Explanation:-** 4th paragraph of the passage with example justifies the point arisen by author to counter the use of technology only ; also the concerned human dedication is required most to make the services successful. Therefore option B is the best choice.

**QNo:- 10 ,Correct Answer:- D**

**Explanation:-** The other options given are just focussing on the example taken (from different angles) but the real inference of the phrase used by author lies in option D as the problem was not getting proper solution.

**QNo:- 11 ,Correct Answer:- C**

**Explanation:-** Refer second paragraph of the passage that describes the example of neuroscience taken to justify the intricacies of every field of knowledge are vast to suggest optimum level. Therefore option C captures the purpose of taking example of neuroscience.

The other options are taking neuroscience as main point but it is just taken as an example to prove another point.

**QNo:- 12 ,Correct Answer:- D**

**Explanation:-** The idea here is to weaken the main argument and the answer lies in option D. The idea is not to hire best person but to create a team of people having a diverse knowledge and skills that can be optimised which gets defeated by taking in top scorers having diverse knowledge.

**QNo:- 13 ,Correct Answer:- C**

**Explanation:-** Refer line,"they also boost the forest-----accurate forests" from last paragraph which clearly says that efficacy is achieved from diversity and training trees on hardest cases and this stands weakened in option C which mentions training in easy cases.

**QNo:- 14 ,Correct Answer:- D**

**Explanation:-** Refer to the line " The multidimensional or layered character of complex problems also undermines the principle of meritocracy: the idea that the 'best person' should be hired. There is no best person", from first paragraph.

Also refer to the opening lines of second paragraph"they would build -----within the pool"

The author critiques all others except option D where building up of a team has been mentioned (which is the actual focus according to the passage).

**QNo:- 15 ,Correct Answer:- B**

**Explanation:-** From the passage, we understand that the requirement to boost up success in problems lies not in making a team of top scorers; instead the requirement is of diversity. So the answer lies in **option B** which describes a team with members from diverse areas and performed well in their subject fields and not those (option C) who hold distinctions in their subjects.

**QNo:- 16 ,Correct Answer:- B**

**Explanation:-** Real life examples might not have added to the argument put forward by the author; though a comparative case-study, analysis and assessment of pros and cons could have served a better purpose.

**QNo:- 17 ,Correct Answer:- A**

**Explanation:-** Consequences are the shortcomings of any event or idea. Option A is talking about positive outcome and can't be considered as consequence.

**QNo:- 18 ,Correct Answer:- C**

**Explanation:-** The teacher's subjectivity cannot be the part of evaluation according to the content present in the latter half of the last paragraph of the passage. Therefore all others except option C can be a possible feature of the No Child Left Behind Act,2001.

**QNo:- 19 ,Correct Answer:- D**

**Explanation:-** The main focus of the author in this passage is on **metric fixation** (i.e. measuring performance in numbers and motivating people in different organizations by attaching rewards and penalties to their measured performance) which can actually backfire. Therefore option D.

**QNo:- 20 ,Correct Answer:- D**

**Explanation:-** Refer 2nd paragraph of the passage as regards **police-officer** (If the rate of major crimes in a district becomes the metric according to which police officers are promoted, then some officers will respond by simply not recording crimes or downgrading them from major offences to misdemeanours) and **surgeon** (When the metrics of success and failure are made public – affecting their reputation and income – some surgeons will improve their metric scores by refusing to operate on patients with more complex problems, whose surgical outcomes are more likely to be negative). So it can be understood that metric fixation as regards performance in these fields evoke unethical behavior. Therefore option D.

**QNo:- 21 ,Correct Answer:- B**

**Explanation:-** Refer 3rd paragraph "moreover , if they'd gradually-----genes sampled." makes clear there was absence of genetic variation. Therefore option B is appropriate.

**QNo:- 22 ,Correct Answer:- D**

**Explanation:-** The opening lines of the passage "groove snails-----and Spain" clearly justify option D as the author is providing explanation and evidence why that particular variety of snails are only found in Ireland and the Pyrenees.

**QNo:- 23 ,Correct Answer:- B**

**Explanation:-** Option B is totally opposite to what is mentioned in the passage. Refer to second paragraph "previously---rules that out"

**QNo:- 24 ,Correct Answer:- B**

**Explanation:-** The explanation lies in last paragraph. So refer the last line of 4th paragraph alongwith opening lines of last paragraph.

**QNo:- 25 ,Correct Answer:- 4213**

**Explanation:-** Statement 4 is the opening sentence that generally speaks about how new institutions recognize ways in which workers contribute and economically benefit if their jobs are automated and gets further explanation in statement 2 where families of workers cope with pressure of mechanised work. The word 'however' in statement 1 gives contrast to the idea presented in sentence 2. Statement 3 conveniently concludes the paragraph as it furthers(growing inequality) presented in sentence 1(breakdown of social contract). So the final sequence is 4213

**QNo:- 26 ,Correct Answer:- 3241**

**Explanation:-** The paragraph opens with sentence 3 as it mentions the subject( the dieter and the business elite). Sentence 2 furthers the idea presented in statement 3 by elaborating on social impact investing and philanthrocapitalism. Sentence 4 and 1 make a mandatory pair(in that order) with the key word 'projects'(wherein 4th talks about pet projects and 1st talks about side projects). So the final arrangement comes to be 3241.

**QNo:- 27 ,Correct Answer:- 2314**

**Explanation:-** The paragraph is about self-management and we could have conveniently opened with line 1. But the word 'thus' used in line 1 makes the whole difference that it needs some background. Statement 4 also presents another definition based on self management , so 4 can follow 1. Statement 3 is actually introducing the idea of self-mangement. Statement 2 and 3 are mandatory pairs having 'control' as key-word, but contextually statement 2 leads the sequence. So the final arrangement is 2314

**QNo:- 28 ,Correct Answer:- A**

**Explanation:-** Only option A brings in the gist of the given paragraph as a whole. All other options are either irrelevant or point out a minor point . Hence option A is the best choice.

**QNo:- 29 ,Correct Answer:- 3**

**Explanation:-** The options 1,2,4 and 5 talk about negative impact of smart phones on our sleep pattern. But statement 3 is talking about state of sleep that gets disturbed by earthly worries or guilty conscience ; nothing is being talked about impact of smart phones. Therefore 3 is the odd one.

**QNo:- 30 ,Correct Answer:- C**

**Explanation:-** The paragraph speaks about the need for Bad Samaritan laws with the condition that supporters clear the legal ground.  
Option 1 and 2 are ahead the state of the situation in the passage.  
Option 4 is out of scope.  
Option 3 is , therefore, the best choice that brings in the summary of the given paragraph appropriately.

**QNo:- 31 ,Correct Answer:- 3**

**Explanation:-** All the sentences 1,2,4 and 5 are discussing about the result of research on classification and formation of song in the birds. But line 3 is drifting away from the main point as to how birds are stimulated by sounds of other birds making it the odd one.

**QNo:- 32 ,Correct Answer:- D**

**Explanation:-** The paragraph talks about regret that researchers were not able to establish relationship between playing sports and deviance from delinquency due to insufficient result of study so as to relate to deterrence theory. Therefore the negative tone of the failure has been appropriately captured in option D.

Option A is just taking the discussion one step ahead.

Option B and C do not find support(though related) of any kind of direct relation between sports & delinquency or culture.

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**QNo:- 33 ,Correct Answer:- 3**

**Explanation:-** Sentence 4 is a generic statement qualifying for being the opening sentence and line 5 just furthers the intensity of the situation. Line 1 and 2 (in that order) talk about the safety measures that can be adopted to face the disaster.

Statement 3 is unrelated as it is giving some general data.

Therefore line 3 is the odd one.

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**QNo:- 34 ,Correct Answer:- 3241**

**Explanation:-** The sentences given are following a pattern i.e. definition of phonexing(line3).

Who all are engaged in it (line2).

Related example in the form of statistical data to prove the act of phoenixing is given(line4).

Line 1 follows 4 being a **mandatory noun**(Australian Minister for Revenue&Services)**pronoun** (his)**pair**

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Therefore the final sequence is **3241**

**QNo:- 35 ,Correct Answer:- 1200**

**Explanation:-** The base exchange rates of currencies A, B and C with respect to L is in the ratio 100 : 120 : 1.

The given information can be tabulated as follows:

	A	B	C
Base exchange rate (ratio)	100	120	1
Buying rate	95	114	0.95
Selling rate	110	132	1.10
Net addition	800	0	3000

The outlet received 88,000 units of L by selling A and the ratio of amounts of L used to by A and B are in the ratio 5 : 3 and from the sales of A and B are in the ratio 5 : 9.

This set is best solved by looking at the choices for the question which asked for the base exchange rate of currency C. From that we have only two possible value for the base exchange rates for A, B and C 100,120 and 1 or 200, 240 and 2.

Assuming L to be 100 for A

$$\text{Units sold of A} = \frac{88,000}{110} = 800$$

As the net addition is 800, the units of A bought is 1600

Amount of L used in buying 1600 units is  $1600 \times 0.95 \times 100 = 152000$

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{the amount used to buy B is } \frac{152000}{5} \times 3 = 91,200$$

$$\text{Number of units of B bought} = \frac{91,200}{114} = 800$$

As the net addition of B is zero, number of units of B sold = 800.

$$\text{The amount received} = \frac{800}{132} \times 132 = 105600$$

The amount received form selling A = 88,000

As 88,000 : 105600 is not in the ratio 5 : 9 as given in the data the base exchange rate for A is not 100 and has to be 200.

$$\text{Units sold for A} = \frac{88000}{220} = 400$$

As net addition is 800, the units of A bought is 1200.

Amount of L used in buying 1200 units of A =  $1200 \times 0.95 \times 2000 = 228000$ .

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{quantity of L used to buy B is } \frac{228000}{5} \times 3 = 136800$$

$$\text{Number of units of B bought} = \frac{136800}{228} = 600$$

As the net addition in B is zero, the number of units of B sold = 600.

The amount received from selling B =  $600 \times 264$

$$= 158400$$

The amount received from selling A = 88,000

$$\text{The required ratio} = \frac{88000}{158400} = 59$$

Number of units of currency A bought  $400 + 800 = 1200$

**QNo:- 36 ,Correct Answer:- D**

**Explanation:-** The base exchange rates of currencies A, B and C with respect to L is in the ratio 100 : 120 : 1.

The given information can be tabulated as follows:

	A	B	C
Base exchange rate (ratio)	100	120	1
Buying rate	95	114	0.95
Selling rate	110	132	1.10
Net addition	800	0	3000

The outlet received 88,000 units of L by selling A and the ratio of amounts of L used to by A and B are in the ratio 5 : 3 and from the sales of A and B are in the ratio 5 : 9.

This set is best solved by looking at the choices for the question which asked for the base exchange rate of currency C. From that we have only two possible value for the base exchange rates for A, B and C 100,120 and 1 or 200, 240 and 2.

Assuming L to be 100 for A

$$\text{Units sold of A} = \frac{88,000}{110} = 800$$

As the net addition is 800, the units of A bought is 1600

Amount of L used in buying 1600 units is  $1600 \times 0.95 \times 100 = 152000$

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{the amount used to buy B is } \frac{152000}{5} \times 3 = 91,200$$

$$\text{Number of units of B bought} = \frac{91,200}{114} = 800$$

As the net addition of B is zero, number of units of B sold = 800.

$$\text{The amount received} = \frac{800}{132} \times 132 = 105600$$

The amount received form selling A = 88,000

As 88,000 : 105600 is not in the ratio 5 : 9 as given in the data the base exchange rate for A is not 100 and has to be 200.

$$\text{Units sold for A} = \frac{88000}{220} = 400$$

As net addition is 800, the units of A bought is 1200.

Amount of L used in buying 1200 units of A =  $1200 \times 0.95 \times 2000 = 228000$ .

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{quantity of L used to buy B is } \frac{228000}{5} \times 3 = 136800$$

$$\text{Number of units of B bought} = \frac{136800}{228} = 600$$

As the net addition in B is zero, the number of units of B sold = 600.

The amount received from selling B =  $600 \times 264$

$$= 158400$$

The amount received from selling A = 88,000

$$\text{The required ratio} = \frac{88000}{158400} = 59$$

As the net addition in the number of units of C is 3,000 and the buying and selling rates are in the ratio 0.95 and 1.1, assuming x units are sold

$$0.95(x + 3000) = 1.1(x)$$

$$0.15x = 2850$$

$$X = 19000$$

**QNo:- 37 ,Correct Answer:- 240**

**Explanation:-** The base exchange rates of currencies A, B and C with respect to L is in the ratio 100 : 120 : 1.

The given information can be tabulated as follows:

	A	B	C
Base exchange rate (ratio)	100	120	1
Buying rate	95	114	0.95
Selling rate	110	132	1.10
Net addition	800	0	3000

The outlet received 88,000 units of L by selling A and the ratio of amounts of L used to by A and B are in the ratio 5 : 3 and from the sales of A and B are in the ratio 5 : 9.

This set is best solved by looking at the choices for the question which asked for the base exchange rate of currency C. From that we have only two possible value for the base exchange rates for A, B and C 100,120 and 1 or 200, 240 and 2.

Assuming L to be 100 for A

$$\text{Units sold of A} = \frac{88,000}{110} = 800$$

As the net addition is 800, the units of A bought is 1600

Amount of L used in buying 1600 units is  $1600 \times 0.95 \times 100 = 152000$

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{the amount used to buy B is } \frac{152000}{5} \times 3 = 91,200$$

$$\text{Number of units of B bought} = \frac{91,200}{114} = 800$$

As the net addition of B is zero, number of units of B sold = 800.

$$\text{The amount received} = \frac{800}{132} \times 132 = 105600$$

The amount received form selling A = 88,000

As 88,000 : 105600 is not in the ratio 5 : 9 as given in the data the base exchange rate for A is not 100 and has to be 200.

$$\text{Units sold for A} = \frac{88000}{220} = 400$$

As net addition is 800, the units of A bought is 1200.

Amount of L used in buying 1200 units of A =  $1200 \times 0.95 \times 2000 = 228000$ .

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{quantity of L used to buy B is } \frac{228000}{5} \times 3 = 136800$$

$$\text{Number of units of B bought} = \frac{136800}{228} = 600$$

As the net addition in B is zero, the number of units of B sold = 600.

The amount received from selling B =  $600 \times 264$

$$= 158400$$

The amount received from selling A = 88,000

$$\text{The required ratio} = \frac{88000}{158400} = 59$$

The base exchange rate of currency B with respect to L is 240.

**QNo:- 38 ,Correct Answer:- A**

**Explanation:-** The base exchange rates of currencies A, B and C with respect to L is in the ratio 100 : 120 : 1.

The given information can be tabulated as follows:

	A	B	C
Base exchange rate (ratio)	100	120	1
Buying rate	95	114	0.95
Selling rate	110	132	1.10
Net addition	800	0	3000

The outlet received 88,000 units of L by selling A and the ratio of amounts of L used to by A and B are in the ratio 5 : 3 and from the sales of A and B are in the ratio 5 : 9.

This set is best solved by looking at the choices for the question which asked for the base exchange rate of currency C. From that we have only two possible value for the base exchange rates for A, B and C 100,120 and 1 or 200, 240 and 2.

Assuming L to be 100 for A

$$\text{Units sold of A} = \frac{88,000}{110} = 800$$

As the net addition is 800, the units of A bought is 1600

Amount of L used in buying 1600 units is  $1600 \times 0.95 \times 100 = 152000$

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{the amount used to buy B is } \frac{152000}{5} \times 3 = 91,200$$

$$\text{Number of units of B bought} = \frac{91,200}{114} = 800$$

As the net addition of B is zero, number of units of B sold = 800.

$$\text{The amount received} = \frac{800}{132} \times 132 = 105600$$

The amount received form selling A = 88,000

As 88,000 : 105600 is not in the ratio 5 : 9 as given in the data the base exchange rate for A is not 100 and has to be 200.

$$\text{Units sold for A} = \frac{88000}{220} = 400$$

As net addition is 800, the units of A bought is 1200.

Amount of L used in buying 1200 units of A =  $1200 \times 0.95 \times 2000 = 228000$ .

As the amount used to buy A and B are in the ratio 5 : 3,

$$\text{quantity of L used to buy B is } \frac{228000}{5} \times 3 = 136800$$

$$\text{Number of units of B bought} = \frac{136800}{228} = 600$$

As the net addition in B is zero, the number of units of B sold = 600.

The amount received from selling B =  $600 \times 264$

$$= 158400$$

The amount received from selling A = 88,000

$$\text{The required ratio} = \frac{88000}{158400} = 59$$

The buying exchange rate of currency C with respect to L on that day was 1.9.

**QNo:- 39 ,Correct Answer:- B**

**Explanation:-** Given 'peacock is designated as the national bird of India' is coded as ' 5688999 35 1135556678 56 458 13666689 1334 79 13366'

9 is the code for o and c from the words peacock and of.

F is coded as 7 from the word of.

I is coded as either 3 or 6 from the word India, but from the word 'is' and 'designated' code for 'I' is 3.

S is coded as 5 from the word is. A is coded as 6 from the word 'as'.

N is coded as 6 from the word national. Thus D is coded as 1 from the word India.

E is coded as 5 from the word designated. T is coded as 8 from the word 'the' and 'National'. Thus H is coded as 4 from the word 'the'. G is coded as 7. L is coded as 1 from the word 'National'. P and K are coded as 8 from the word 'peacock'.

B and R are coded as 3 and 4 many order from the word 'bird'.

We get the codes as follows.

Code	Letter
1	D, L
2	
3	I
4	H
5	S, E
6	A, N
7	F, G
8	T, P, K
9	O, C

B and R is coded as 3 or 4.

L is coded as '1'.

**QNo:- 40 ,Correct Answer:- C**

**Explanation:-**

Given 'peacock is designated as the national bird of India' is coded as ' 5688999 35 1135556678 56 458 13666689 1334 79 13366'. 9 is the code for o and c from the words peacock and of.

F is coded as 7 from the word of.

I is coded as either 3 or 6 from the word India, but from the word 'is' and 'designated' code for 'I' is 3.

S is coded as 5 from the word is. A is coded as 6 from the word 'as'.

N is coded as 6 from the word national. Thus D is coded as 1 from the word India.

E is coded as 5 from the word designated. T is coded as 8 from the word 'the' and 'National'. Thus H is coded as 4 from the word 'the'. G is coded as 7. L is coded as 1 from the word 'National'. P and K are coded as 8 from the word 'peacock'.

B and R are coded as 3 and 4 many order from the word 'bird'.

We get the codes as follows.

Code	Letter
1	D, L
2	
3	I
4	H
5	S, E
6	A, N
7	F, G
8	T, P, K
9	O, C

B and R is coded as 3 or 4.

Either 3 or 4 is the code for B.

**QNo:- 41 ,Correct Answer:- A**

**Explanation:-**

Given 'peacock is designated as the national bird of India' is coded as ' 5688999 35 1135556678 56 458 13666689 1334 79 13366'. 9 is the code for o and c from the words peacock and of.

F is coded as 7 from the word of.

I is coded as either 3 or 6 from the word India, but from the word 'is' and 'designated' code for 'I' is 3.

S is coded as 5 from the word is. A is coded as 6 from the word 'as'.

N is coded as 6 from the word national. Thus D is coded as 1 from the word India.

E is coded as 5 from the word designated. T is coded as 8 from the word 'the' and 'National'. Thus H is coded as 4 from the word 'the'. G is coded as 7. L is coded as 1 from the word 'National'. P and K are coded as 8 from the word 'peacock'.

B and R are coded as 3 and 4 many order from the word 'bird'.

We get the codes as follows.

Code	Letter
1	D, L
2	
3	I
4	H
5	S, E
6	A, N
7	F, G
8	T, P, K
9	O, C

B and R is coded as 3 or 4.

The code for 8 and 9 is identified.

**QNo:- 42 ,Correct Answer:- B**

**Explanation:-** Given 'peacock is designated as the national bird of India' is coded as ' 5688999 35 1135556678 56 458 13666689 1334 79 13366'

9 is the code for o and c from the words peacock and of.

F is coded as 7 from the word of.

I is coded as either 3 or 6 from the word India, but from the word 'is' and 'designated' code for 'I' is 3.

S is coded as 5 from the word is. A is coded as 6 from the word 'as'.

N is coded as 6 from the word national. Thus D is coded as 1 from the word India.

E is coded as 5 from the word designated. T is coded as 8 from the word 'the' and 'National'. Thus H is coded as 4 from the word 'the'. G is coded as 7. L is coded as 1 from the word 'National'. P and K are coded as 8 from the word 'peacock'.

B and R are coded as 3 and 4 many order from the word 'bird'.

We get the codes as follows.

Code	Letter
1	D, L
2	
3	I
4	H
5	S, E
6	A, N
7	F, G
8	T, P, K
9	O, C

B and R is coded as 3 or 4.

S, U, V cannot be coded with same digit.

**QNo:- 43 ,Correct Answer:- A**

**Explanation:-** Let the total market size be 100 units. The sales of Azra, Bysi, Cxqi and Dipq would be 40, 25, 15 and 20 units respectively.

The revenue would be as follows

$$\text{Azra} = 40 \times 15,000 = 6.0 \text{ lac}$$

$$\text{Bysi} = 25 \times 20,000 = 5.0 \text{ lac}$$

$$\text{Cxgi} = 15 \times 30,000 = 4.5 \text{ lac}$$

$$\text{Dipq} = 20 \times 25,000 = 5.0 \text{ lac}$$

The brand with the highest revenue is Azra.

**QNo:- 44 ,Correct Answer:- D**

**Explanation:-** The profits for the different brands, assuming revenue as in the previous question would be

$$\text{Azra} - 6.0 \text{ lac} \times 10 / 100 = 60,000$$

$$\text{Bysi} - 5.0 \text{ lac} \times 30 / 100 = 1,50,000$$

$$\text{Cxgi} - 4.5 \text{ lac} \times 40 / 100 = 1,80,000$$

$$\text{Dipq} - 5.0 \text{ lac} \times 30 / 100 = 1,50,000$$

The profit is the highest for Cxgi

**QNo:- 45 ,Correct Answer:- B**

**Explanation:-** The new market share, selling prices and profitability for the different brands are

Brand	Market share	Selling price	Profitability
Azra	35	15,000	10
Bysi	20	20,000	30
Cxqi	30	18,000	20
Dipq	15	25,000	30

Now the total sales is 140 units.(Increase of 40%)

The profits are as follows

$$Azra - 49 \times 15,000 \times 10 / 100 = 73,500$$

$$Bysi - 28 \times 20,000 \times 30 / 100 = 1,68,000$$

$$Cxqi - 42 \times 18,000 \times 20 / 100 = 1,51,200$$

$$Dipq - 21 \times 25,000 \times 30 / 100 = 1,57,500$$

The profit is the highest for Bysi

**QNo:- 46 ,Correct Answer:- B**

**Explanation:-** The profits increased for Azra ( $60,000 - 73,500$ ) for Bysi ( $1,50,000 - 1,68,000$ ) and Dipq ( $1,50,000 - 1,57,500$ )

**QNo:- 47 ,Correct Answer:- A**

**Explanation:-** From the given information,

Balaram is the third person to enter room 101.

Erina was allotted either room 102 or 103.

Three persons entered the room before Fatima. It means Fatima and Akil entered into room 101.

Ganeshan entered room 102 with only one other person. Thus, only Erina entered room 103.

Chitra was the last person to enter the room. Thus, Chitra entered room 102 with Ganeshan.

Divya, who was the second person to enter room 101 From the above information we get the arrangement as follows.

101	102	103
Akil	Ganeshan	Erina
Divya	Chitra	
Balaram		
Fatima		

Divya entered room 101.

**QNo:- 48 ,Correct Answer:- B**

**Explanation:-** From the given information,  
*Balaram is the third person to enter room 101.*  
*Erina was allotted either room 102 or 103.*  
*Three persons entered the room before Fatima. It means Fatima and Akil entered into room 101.*  
*Ganeshan entered room 102 with only one other person. Thus, only Erina entered room 103.*  
*Chitra was the last person to enter the room. Thus, Chitra entered room 102 with Ganeshan.*  
*Divya, who was the second person to enter room 101 From the above information we get the arrangement as follows.*

101	102	103
Akil	Ganeshan	Erina
Divya	Chitra	
Balaram		
Fatima		

No one entered into the room 102 before Ganeshan.

**QNo:- 49 ,Correct Answer:- A**

**Explanation:-** From the given information,  
*Balaram is the third person to enter room 101.*  
*Erina was allotted either room 102 or 103.*  
*Three persons entered the room before Fatima. It means Fatima and Akil entered into room 101.*  
*Ganeshan entered room 102 with only one other person. Thus, only Erina entered room 103.*  
*Chitra was the last person to enter the room. Thus, Chitra entered room 102 with Ganeshan.*  
*Divya, who was the second person to enter room 101 From the above information we get the arrangement as follows.*

101	102	103
Akil	Ganeshan	Erina
Divya	Chitra	
Balaram		
Fatima		

Erina entered room at 07:45am as in room 101- Divya and Balaram entered before Fatima and Ganeshan entered the room before Chitra, thus Divya, Balaram and Ganeshan entered room before Chitra and fatima in any order.

**QNo:- 50 ,Correct Answer:- B**

**Explanation:-** From the given information,  
 Balaram is the third person to enter room 101.  
 Erina was allotted either room 102 or 103.

Three persons entered the room before Fatima. It means Fatima and Akil entered into room 101.  
 Ganeshan entered room 102 with only one other person. Thus, only Erina entered room 103.  
 Chitra was the last person to enter the room. Thus, Chitra entered room 102 with Ganeshan.  
 Divya, who was the second person to enter room 101 From the above information we get the arrangement as follows.

101	102	103
Akil	Ganeshan	Erina
Divya	Chitra	
Balaram		
Fatima		

From the information, Ganeshan entered room at 7:10 am, Divya entered room at 7:15 am and Balaram entered room at 7:25 am.

**QNo:- 51 ,Correct Answer:- B**

**Explanation:-** Let  $a, b, c$  and  $d$  be the weights of parameters  $F, R, P$  and  $I$  respectively.

Given,

$$(i) 30a + 20b + 20c + 40d > 40a + 30b + 20c + 20d$$

$$(ii) 40a + 30b + 20c + 20d > 40a + 20b + 20c + 30d$$

$$(iii) 50a + 50b + 40c + 50d > 50a + 50b + 50c + 40d$$

From (i),  $2d > a + b$

From (ii),  $b > d$

From (iii),  $d > c$

$$\Rightarrow b > d > c$$

$a, b, c$  and  $d$  are 0.1, 0.2, 0.3 and 0.4 in any order.

$d$  cannot be 0.1 or 0.2. ( $\because 2d$  cannot be greater than  $a + b$ )

$d$  can be 0.3 or 0.4, but given  $b > d$ .

$$\Rightarrow b = 0.4, d = 0.3$$

$$2(0.3) > 0.4 + a$$

$$a < 0.2$$

$$a = 0.1, c = 0.2$$

	F(0.1)	R(0.3)	P(0.2)	I(0.4)	F(0.1)
A - One	5	15	10	16	46
Best Ed	4	6	4	8	22
Cosmopolitan	4	6	4	12	26
Dominance	2	6	8	12	28
Education Aid	5	15	8	20	48
Fancy	5	15	8	16	42
Global	3	0	4	8	15
High Q	3	6	4	16	29

Weight of faculty parameter is 0.1.

**QNo:- 52 ,Correct Answer:- 3**

**Explanation:-** Let  $a, b, c$  and  $d$  be the weights of parameters  $F, R, P$  and  $I$  respectively.

Given,

$$(i) 30a + 20b + 20c + 40d > 40a + 30b + 20c + 20d$$

$$(ii) 40a + 30b + 20c + 20d > 40a + 20b + 20c + 30d$$

$$(iii) 50a + 50b + 40c + 50d > 50a + 50b + 50c + 40d$$

From (i),  $2d > a + b$

From (ii),  $b > d$

From (iii),  $d > c$

$$\Rightarrow b > d > c$$

$a, b, c$  and  $d$  are 0.1, 0.2, 0.3 and 0.4 in any order.

$d$  cannot be 0.1 or 0.2. ( $\because 2d$  cannot be greater than  $a + b$ )

$d$  can be 0.3 or 0.4, but given  $b > d$ .

$$\Rightarrow b = 0.4, d = 0.3$$

$$2(0.3) > 0.4 + a$$

$$a < 0.2$$

$$a = 0.1, c = 0.2$$

	<b>F(0.1)</b>	<b>R(0.3)</b>	<b>P(0.2)</b>	<b>I(0.4)</b>	<b>F(0.1)</b>
A - One	5	15	10	16	46
Best Ed	4	6	4	8	22
Cosmopolitan	4	6	4	12	26
Dominance	2	6	8	12	28
Education Aid	5	15	8	20	48
Fancy	5	15	8	16	42
Global	3	0	4	8	15
High Q	3	6	4	16	29

Three colleges received AAA rating.

**QNo:- 53 ,Correct Answer:- 48**

**Explanation:-** Let  $a, b, c$  and  $d$  be the weights of parameters  $F, R, P$  and  $I$  respectively.

Given,

$$(i) 30a + 20b + 20c + 40d > 40a + 30b + 20c + 20d$$

$$(ii) 40a + 30b + 20c + 20d > 40a + 20b + 20c + 30d$$

$$(iii) 50a + 50b + 40c + 50d > 50a + 50b + 50c + 40d$$

From (i),  $2d > a + b$

From (ii),  $b > d$

From (iii),  $d > c$

$$\Rightarrow b > d > c$$

$a, b, c$  and  $d$  are 0.1, 0.2, 0.3 and 0.4 in any order.

$d$  cannot be 0.1 or 0.2. ( $\because 2d$  cannot be greater than  $a + b$ )

$d$  can be 0.3 or 0.4, but given  $b > d$ .

$$\Rightarrow b = 0.4, d = 0.3$$

$$2(0.3) > 0.4 + a$$

$$a < 0.2$$

$$a = 0.1, c = 0.2$$

	<b>F(0.1)</b>	<b>R(0.3)</b>	<b>P(0.2)</b>	<b>I(0.4)</b>	<b>F(0.1)</b>
A - One	5	15	10	16	46
Best Ed	4	6	4	8	22
Cosmopolitan	4	6	4	12	26
Dominance	2	6	8	12	28
Education Aid	5	15	8	20	48
Fancy	5	15	8	16	42
Global	3	0	4	8	15
High Q	3	6	4	16	29

Height overall score among the eight colleges is 48.

**QNo:- 54 ,Correct Answer:- D**

**Explanation:-** Let  $a, b, c$  and  $d$  be the weights of parameters  $F, R, P$  and  $I$  respectively.

Given,

$$(i) 30a + 20b + 20c + 40d > 40a + 30b + 20c + 20d$$

$$(ii) 40a + 30b + 20c + 20d > 40a + 20b + 20c + 30d$$

$$(iii) 50a + 50b + 40c + 50d > 50a + 50b + 50c + 40d$$

From (i),  $2d > a + b$

From (ii),  $b > d$

From (iii),  $d > c$

$$\Rightarrow b > d > c$$

$a, b, c$  and  $d$  are 0.1, 0.2, 0.3 and 0.4 in any order.

$d$  cannot be 0.1 or 0.2. ( $\because 2d$  cannot be greater than  $a + b$ )

$d$  can be 0.3 or 0.4, but given  $b > d$ .

$$\Rightarrow b = 0.4, d = 0.3$$

$$2(0.3) > 0.4 + a$$

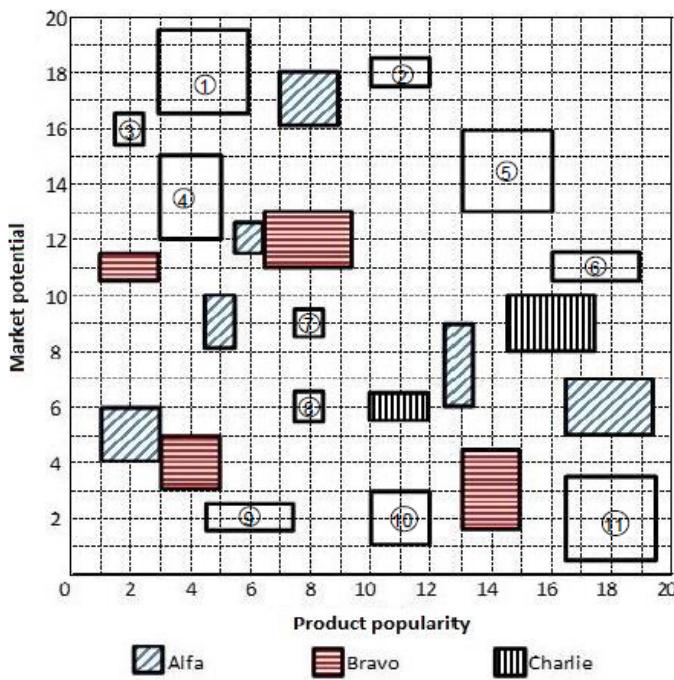
$$a < 0.2$$

$$a = 0.1, c = 0.2$$

	<b>F(0.1)</b>	<b>R(0.3)</b>	<b>P(0.2)</b>	<b>I(0.4)</b>	<b>F(0.1)</b>
A - One	5	15	10	16	46
Best Ed	4	6	4	8	22
Cosmopolitan	4	6	4	12	26
Dominance	2	6	8	12	28
Education Aid	5	15	8	20	48
Fancy	5	15	8	16	42
Global	3	0	4	8	15
High Q	3	6	4	16	29

No college has score between 31 and 40 (both inclusive).

QNo:- 55 ,Correct Answer:- A



**Explanation:-**

From the given information we can find which product belong to which company. In the given figure the products (number) would belong to the following companies

Alfa	Bravo	Charlie
2, 3, 4, 7/8	1, 6, 10	5, 8/7, 9, 11

So also the entire graph can be divided into four equal parts with the bottom left part having products in the No-hope category, the bottom right part with products in the Blockbuster category, the top left part with products in the Doubtful category and the top right part with products in the promising category.

The areas of all the products in the different categories are

$$\text{No-hope} - 4 + 4 + 3 + 2 + 1 + 1 = 15$$

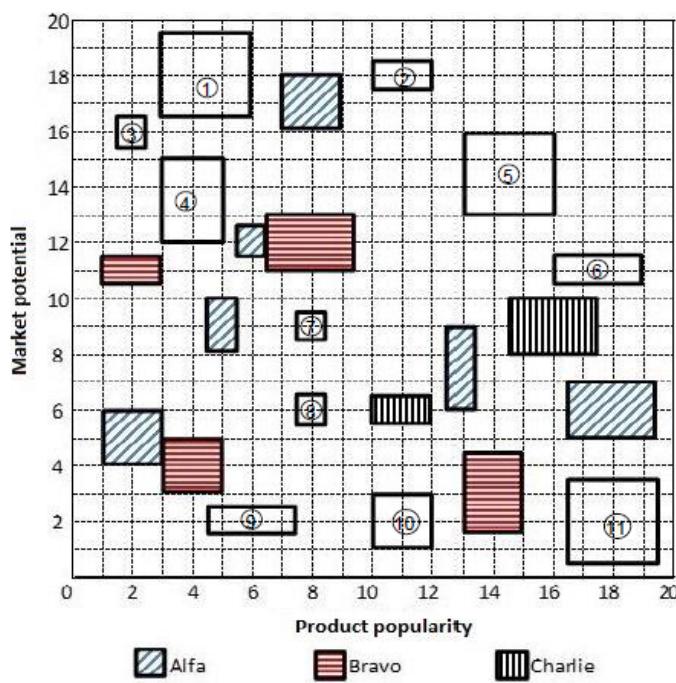
$$\text{Blockbuster} - 2 + 4 + 3 + 6 + 6 + 6 + 9 = 36$$

$$\text{Doubtful} - 2 + 1 + 6 + 6 + 1 + 9 + 4 = 29$$

$$\text{Promising} - 2 + 9 + 3 = 14$$

As the areas is proportional to the revenue the corresponding product, products under Blockbuster category had the highest revenue.

**QNo:- 56 ,Correct Answer:- D**



**Explanation:-**

From the given information we can find which product belong to which company. In the given figure the products (number) would belong to the following companies

Alfa	Bravo	Charlie
2, 3, 4, 7/8	1, 6, 10	5, 8/7, 9, 11

So also the entire graph can be divided into four equal parts with the bottom left part having products in the No-hope category, the bottom right part with products in the Blockbuster category, the top left part with products in the Doubtful category and the top right part with products in the promising category.

The number of products of Bravo in the different categories are

No-hope (bottom left) – 1

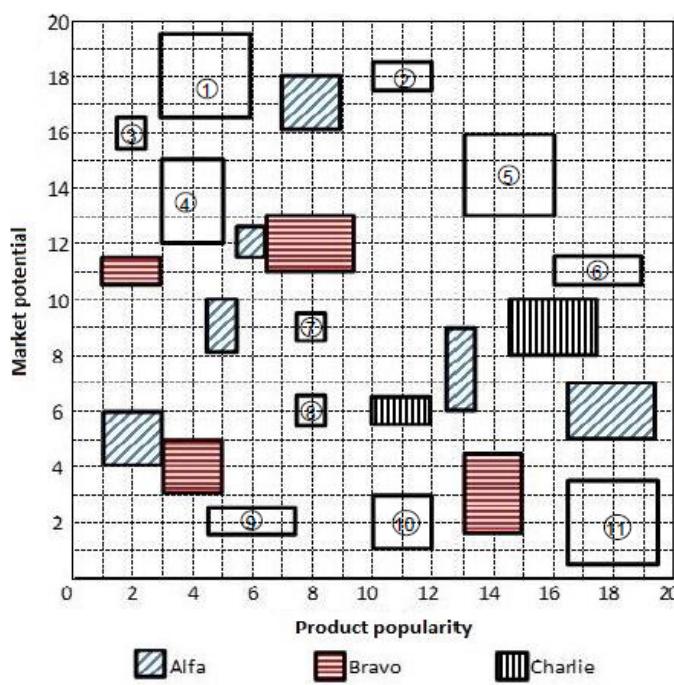
Doubtful (top left) – 3

Promising (top right) – 1

Blockbuster (bottom right) – 2

The correct sequence is 1, 3, 1, 2

**QNo:- 57 ,Correct Answer:- C**


**Explanation:-**

From the given information we can find which product belong to which company. In the given figure the products (number) would belong to the following companies

Alfa	Bravo	Charlie
2, 3, 4, 7/8	1, 6, 10	5, 8/7, 9, 11

So also the entire graph can be divided into four equal parts with the bottom left part having products in the No-hope category, the bottom right part with products in the Blockbuster category, the top left part with products in the Doubtful category and the top right part with products in the promising category.

Revenue of Bravo from No-hope products – 4

Revenue of Charlie from No-hope products – 4.

The statement is true.

Alfa's revenue from Blockbuster products

Charlie revenue from Promising products – 9

The statement is true

Total revenue from No-hope products – 15

Total revenue from Doubtful products – 29

The statement is true

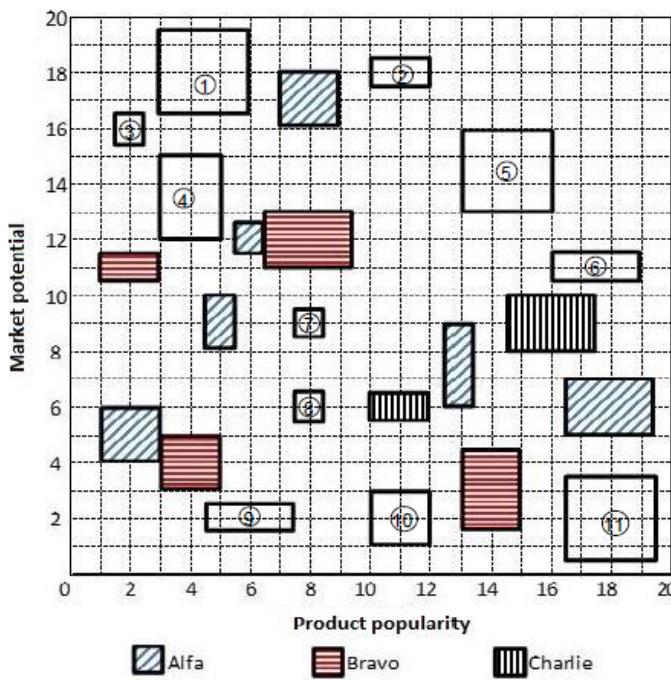
Bravo's revenue from Blockbuster products –  $6 + 4 = 10$

Alfa's revenue from Doubtful products –  $6 + 4 + 1 + 1 = 12$

The statement is not true

Ans : Bravo's revenue from Blockbuster products was greater than Alfa's revenue from Doubtful products

**QNo:- 58 ,Correct Answer:- D**



**Explanation:-**

From the given information we can find which product belong to which company. In the given figure the products (number) would belong to the following companies

Alfa	Bravo	Charlie
2, 3, 4, 7/8	1, 6, 10	5, 8/7, 9, 11

So also the entire graph can be divided into four equal parts with the bottom left part having products in the No-hope category, the bottom right part with products in the Blockbuster category, the top left part with products in the Doubtful category and the top right part with products in the promising category.

The total revenue of Bravo is 4 (No. hope) + 10 (Blockbuster) + 17 (Doubtful) + 3 (Promising) = 34 crore.

**QNo:- 59 ,Correct Answer:- D**

**Explanation:-** Number of young visitors =  $2 \times$  number of middle age visitors

Number of middle age visitors =  $2 \times$  number of old visitors

Total number of tickets sold = total number of visitors = 140

Hence, the number of young visitors = 80, the number of middle age visitors = 40 and the number of old visitors = 20

The given data can be tabulated as follows.

Old = 20	Middle Age = 40	Young = 80	Total = 140
Platinum		Platinum / 2	
Gold	a		
Economy	a	38	55
Total			

Since half of the platinum tickets were purchased by young visitors, the remaining half were purchased by old and middle age visitors. Since these two are equal, half of total number of platinum tickets should be an even number. Among the given values, this is possible only for 32 and 36.

In case of 36, Old- Platinum = 9. In that case  $2a = 11$ . But this is not possible.

Hence, the total number of platinum tickets sold can only be 32.

**QNo:- 60 ,Correct Answer:- 0**

**Explanation:-** Number of young visitors =  $2 \times$  number of middle age visitors

Number of middle age visitors =  $2 \times$  number of old visitors

Total number of tickets sold = total number of visitors = 140

Hence, the number of young visitors = 80, the number of middle age visitors = 40 and the number of old visitors = 20

The given data can be tabulated as follows.

Old = 20	Middle Age = 40	Young = 80	Total = 140
Platinum		Platinum / 2	
Gold	a		
Economy	a	38	55
Total			

Let Old – platinum = Middle aged – Economy = x

We get  $x + 2a = 20$  and  $a + x + 38 = 55$

By solving these two equations we get  $x = 3$ .

**QNo:- 61 ,Correct Answer:- 0**

**Explanation:-** Number of young visitors =  $2 \times$  number of middle age visitors

Number of middle age visitors =  $2 \times$  number of old visitors

Total number of tickets sold = total number of visitors = 140

Hence, the number of young visitors = 80, the number of middle age visitors = 40 and the number of old visitors = 20

The given data can be tabulated as follows.

Old = 20	Middle Age = 40	Young = 80	Total = 140
Platinum		Platinum / 2	
Gold	a		
Economy	a	38	55
Total			

If the number of Old visitors buying Gold tickets was strictly greater than the number of Young visitors buying Gold tickets, then the number of Middle-aged visitors buying Gold tickets was

The maximum possible value of Young - gold =  $x - 1$

Then young – platinum =  $80 - (38 + x - 1) = 43 - x$

Hence, Old – platinum + Middle age – Platinum =  $43 - x$

Total old + Middle age = 60

(Old – platinum + Middle age – platinum) + (Old – gold + Middle age – gold) + (Old – economy + Middle age – economy) = 60

Hence, Old – gold + Middle age – gold = x

Thus, Middle age – gold = 0

**QNo:- 62 ,Correct Answer:- C**

**Explanation:-** Number of young visitors =  $2 \times$  number of middle age visitors

Number of middle age visitors =  $2 \times$  number of old visitors

Total number of tickets sold = total number of visitors = 140

Hence, the number of young visitors = 80, the number of middle age visitors = 40 and the number of old visitors = 20

The given data can be tabulated as follows.

Old = 20	Middle Age = 40	Young = 80	Total = 140
Platinum		Platinum / 2	
Gold a			
Economy a	38	55	
Total			

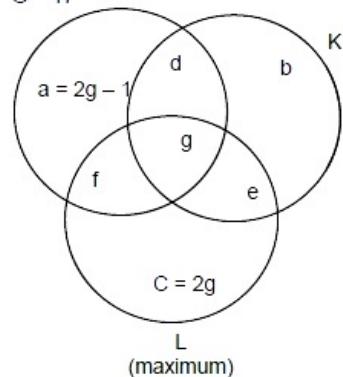
Since Old – Economy + Middle age – economy = 17, these two can never be equal. Hence, the statement that "The numbers of Old and Middle-aged visitors buying Economy tickets were equal" is false.

Ans : "The numbers of Old and Middle-aged visitors buying Economy tickets were equal"

**QNo:- 63 ,Correct Answer:- 4**

**Explanation:-** The given data can be represented as follows.

$$G = 17 \quad \mu = 39$$



$$f + g + d = 10 \text{ (given)}$$

$$g + e = b \text{ (given)}$$

$$\therefore f + g + d = 10, g = 7 = 2g - 1$$

$$\therefore 2g = 8 \therefore f = 4$$

$$\text{Thus, } g = 4, c = 8, a = 7 \text{ and } f + d = 6$$

$$b + e = 39 - (G + c) = 14$$

$$\therefore g + 2e = 14 \text{ Hence, } e = 5 \text{ and } b = 9$$

Since, L is maximum we get the following cases.

Case (i)

$$G = 17 \quad K = 20 \quad L = 21 \quad d = 2 \quad f = 4$$

Case (ii)

$$G = 17 \quad K = 19 \quad L = 22 \quad d = 1 \quad f = 5$$

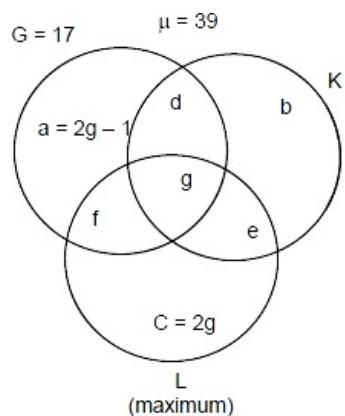
Case (iii)

$$G = 17 \quad K = 18 \quad L = 23 \quad d = 0 \quad f = 6$$

G and L but not K = f = 4.

**QNo:- 64 ,Correct Answer:- D**

**Explanation:-** The given data can be represented as follows.



$$f + g + d = 10 \text{ (given)}$$

$$g + e = b \text{ (given)}$$

$$\therefore f + g + d = 10, g = 7 = 2g - 1$$

$$\therefore 2g = 8 \therefore f = 4$$

$$\text{Thus, } g = 4, c = 8, a = 7 \text{ and } f + d = 6$$

$$b + e = 39 - (G + c) = 14$$

$$\therefore g + 2e = 14 \text{ Hence, } e = 5 \text{ and } b = 9$$

Since, L is maximum we get the following cases.

Case (i)

$$G = 17 K = 20 L = 21 d = 2 f = 4$$

Case (ii)

$$G = 17 K = 19 L = 22 d = 1 f = 5$$

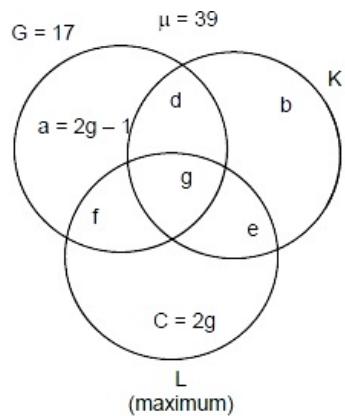
Case (iii)

$$G = 17 K = 18 L = 23 d = 0 f = 6$$

The given condition is possible in case (ii). Hence, the number of students enrolled in L = 22.

QNo:- 65 ,Correct Answer:- 2

**Explanation:-** The given data can be represented as follows.



$$f + g + d = 10 \text{ (given)}$$

$$g + e = b \text{ (given)}$$

$$\because f + g + d = 10, g = 7 = 2g - 1$$

$$\therefore 2g = 8 \therefore f = 4$$

Thus,  $g = 4, c = 8, a = 7$  and  $f + d = 6$

$$b + e = 39 - (G + c) = 14$$

$$\therefore g + 2e = 14 \text{ Hence, } e = 5 \text{ and } b = 9$$

Since,  $L$  is maximum we get the following cases.

Case (i)

$$G = 17 \quad K = 20 \quad L = 21 \quad d = 2 \quad f = 4$$

Case (ii)

$$G = 17 \quad K = 19 \quad L = 22 \quad d = 1 \quad f = 5$$

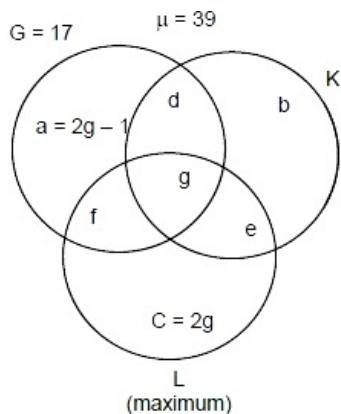
Case (iii)

$$G = 17 \quad K = 18 \quad L = 23 \quad d = 0 \quad f = 6$$

From  $g = 4$ , one person moves to  $f$ , one person to  $d$  and two persons to  $e$ . Then the value of  $G$  and  $K = d + g = 2$ .

**QNo:- 66 ,Correct Answer:- B**

**Explanation:-** The given data can be represented as follows.



$$f + g + d = 10 \text{ (given)}$$

$$g + e = b \text{ (given)}$$

$$\therefore f + g + d = 10, g = 7 = 2g - 1$$

$$\therefore 2g = 8 \therefore f = 4$$

Thus,  $g = 4, c = 8, a = 7$  and  $f + d = 6$

$$b + e = 39 - (G + c) = 14$$

$$\therefore g + 2e = 14 \text{ Hence, } e = 5 \text{ and } b = 9$$

Since, L is maximum we get the following cases.

Case (i)

$$G = 17 K = 20 L = 21 d = 2 f = 4$$

Case (ii)

$$G = 17 K = 19 L = 22 d = 1 f = 5$$

Case (iii)

$$G = 17 K = 18 L = 23 d = 0 f = 6$$

From the above G and L = f = 6.

**QNo:- 67 ,Correct Answer:- C**

**Explanation:-** Since speed is directly proportional to distance at constant time.

So, when Car1 moves for 200km then Car2 moves 100km

Therefore, ratio of their speed Car1:Car2 is 2:1

Similarly, when car 3 moves 200km then car 2 moves 100km

Ratio of their speeds Car2:Car3 is 1:2

Therefore, by combining these 2 ratios we get ratio of Car2 to that of Car1 is 1:4.

**QNo:- 68 ,Correct Answer:- 48**

**Explanation:-** Let the rate at which each inlet of type A brings water be 'x' and from B be 'y' Then, work done can be equated

$$1/2 \times (10x + 45y) = 1(8x + 18y)$$

$$6x = 9y$$

$$\Rightarrow x : y = 3:2;$$

$$\text{Total capacity of tank} = 8x + 18y = 8 \times 3 + 18 \times 2 = 60$$

$$\text{Now for } 7x + 27y = 7 \times 3 + 27 \times 2 = 75$$

$$\text{Time taken} = 60/75 \text{ hrs}$$

$$= 60/75 \times 60 = 48 \text{ minutes}$$

**QNo:- 69 ,Correct Answer:- C**

**Explanation:-**  $10a + b > 3(10b + a)$

$$7a > 29b$$

$$b = 1 \Rightarrow a = 5, 6, 7, 8, 9$$

$$b = 2 \Rightarrow a = 9$$

Total possibilities = 6

**QNo:- 70 ,Correct Answer:- B**

**Explanation:-**

If on Wednesday only A works tank will fill at 8pm means A have to work for 3 hrs. But B does the same work from 5pm-7pm means in 2 hrs. This means their efficiencies be in ratio 2:3. Since work is constant their time be in ratio of 3:2.

Now, on Wednesday A have to work for 3 hrs since he completed the work at 5pm so this means he started the work at 2pm.

So fixed time is 2pm i.e at 2pm tank is emptied

Now A have to work for 6hrs (from 2pm to 8pm)

Similarly have to work for 4hrs (from 2pm to 6pm)

So, together they work in 2hr 24min i.e  $2\text{pm} + 2\text{hr } 24\text{min} = 4:24$

**QNo:- 71 ,Correct Answer:- A**

**Explanation:-** Going with the options,

For 1) Let the sides be 1 and 4

$$\text{Area} = 1 \times 4 = 4$$

$$\text{Perimeter} = 2 * (1+4) = 10$$

$$\text{Therefore, Area}/(\text{Perimeter})^2$$

$$= 4:(10)^2 = 1:25$$

**QNo:- 72 ,Correct Answer:- A**

**Explanation:-** Let  $a$  and  $b$  be the two numbers. We know that for any two numbers

$$\text{AM} \geq \text{GM}$$

$$\Rightarrow a^2 + b^2 /2 \geq ab$$

$$ab \leq 97/2$$

$$ab \leq 48.5$$

Among the options, only 64 is greater than 48.5

**QNo:- 73 ,Correct Answer:- 36**

**Explanation:-**  $2x^2 - ax + 2 > 0$

For real number

$$b^2 - 4ac < 0$$

$$a^2 - 4 \times 2 \times 2 < 0$$

$$a^2 < 16$$

$$-4 < a < 4 \quad \text{--- (1)}$$

$$x^2 - bx + 8 \geq 0$$

$$b^2 - 4(8) \leq 0$$

$$-4\sqrt{2} \leq b \leq 4\sqrt{2}$$

$$\therefore b \text{ is integer } -5 \leq b \leq 5$$

maximum possible value of  $2a - 6b$  is  $2(3) - 6(-5) = 36$

**QNo:- 74 ,Correct Answer:- C**

**Explanation:-** The series is of the form:  $[4(n+1) - 1] [4(n+2) - 1]$

$$\Rightarrow (4n + 3)(4n + 7) \Rightarrow 16n^2 + 40n + 21$$

Since all options have different unit digit so, finding the summation and looking at only the unit digit we get,

$$\Rightarrow 16[n(n+1)(2n+1)/6] + 40[n(n+1)/2] + 21n$$

$$n = 23$$

$$\text{Last digit} = 4 + 0 + 3 = 7$$

**QNo:- 75 ,Correct Answer:- B**

**Explanation:-**  $B = 35(n-1) \Rightarrow B$  will contain all the multiples of 35

$$A = 6^{2n} - 35n - 1; 35n \text{ will always be a multiple of 35, } \Rightarrow 6^{2n} - 1 = (6^n + 1)(6^n - 1)$$

On putting value 1, 2, 3, 4... Each term of A comes out to be a multiple of 35.

However, The lower multiples of 35 are not present in A.

**QNo:- 76 ,Correct Answer:- 1098**

**Explanation:-** Let the number of girls in junior section be  $a$ , then  ${}^aC_2 = 153$

$$a(a-1)/2 = 153 \Rightarrow a(a-1) = 306; a=18$$

Junior section has 25 boys and 18 girls.

Similarly, let number of girls in section 2 be  $b$ ,

$$b(b-1) = 276 \times 2; b = 24$$

Senior section has 27 boys and 24 girls.

$$\text{Number of matches boys play against girls} = 25 \times 18 + 27 \times 24 = 1098$$

**QNo:- 77 ,Correct Answer:- A**

**Explanation:-** Since the chord extends an angle of 60 at the center, it'll form an equilateral triangle with the other two sides being the radius and all angles = 60. Then radius = 5. The chord that extends 120 will be,

$$a^2 = 5^2 + 5^2 - 2 \times 5 \times 5 \times \cos 120 \quad (\text{by cosine rule})$$

$$a = \sqrt{75} = 5\sqrt{3}$$

**QNo:- 78 ,Correct Answer:- B**

**Explanation:-** Area of Semicircle is  $\pi r^2/2$  which is given as  $72\pi$

$$\Rightarrow r = 12$$

Now, Since radius is 12, therefore diameter is 24 which is equal to length of the rectangle i.e.  $AB = 24$

And Area of rectangle is 768 sq. cm and length i.e.  $AB$  is 24 therefore,  $BC = 32$

Perimeter of the leftover portion = half of circumference of the circle + perimeter of the leftover 3 sides

$$\text{Perimeter} = 32 + 32 + 24 + 12\pi = 88 + 12\pi$$

**QNo:- 79 ,Correct Answer:- 4000**

**Explanation:-** Interest to be repaid to Ankit at the end of the year =  $0.08X$

Interest that Gopal would receive from Ishan in two cases are as given.

Case I: if he lends  $X + Y$  Interest received =  $(X + Y) \times 0.1 = 0.1X + 0.1Y$

Interest retained by Gopal after paying to Ankit =  $(0.1X + 0.1Y) - (0.08X) = 0.02X + 0.1Y$

Given that Interest retained by Gopal is same as that accrued by Ankit  $\Rightarrow (0.02X + 0.1Y) = 0.08X$

$$\Rightarrow Y = 0.6X$$

Case II: if he lends  $X + 2Y$  Interest received =  $(X + 2Y) \times 0.1 = 0.1X + 0.2Y$

Interest retained by Gopal after paying to Ankit =  $(0.1X + 0.2Y) - (0.08X) = 0.02X + 0.2Y$

Given that interest retained by Gopal would increase by 150  $\Rightarrow (0.02X + 0.2Y) - (0.02X + 0.1Y) = 150$

$$0.1Y = 150$$

$$\Rightarrow Y = 1500 \text{ and } X = 1500/0.6 = 2500$$

$$\text{Hence } X + Y = 2500 + 1500 = 4000$$

**QNo:- 80 ,Correct Answer:- A**

**Explanation:-**  $4^n > 17^{19}$

$$(4^2)^n > (17)^{38}$$

$$(16)^n > (17)^{38}$$

Now, on substituting we get  $n = 39$

**QNo:- 81 ,Correct Answer:- C**

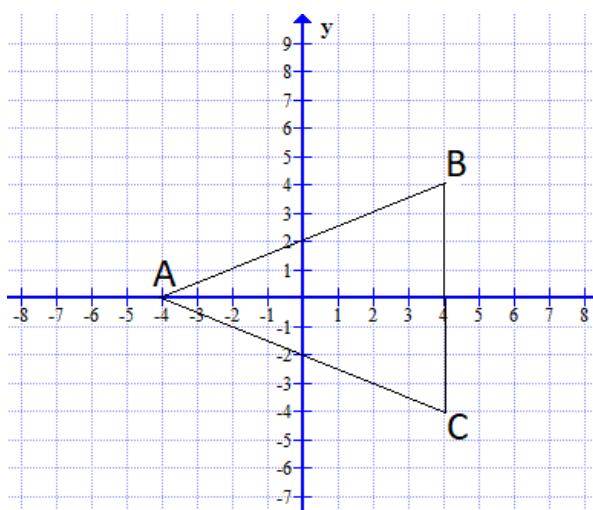
**Explanation:-** A will be at the shortest distance from the origin when it lies at a perpendicular distance of 8 from BC along the X-axis.

As, Area=32

$$1/2 \times 8 \times H = 32$$

$$H=8$$

So, A will be at 4 units from origin,



**QNo:- 82 ,Correct Answer:- A**

**Explanation:-**  $(P\Delta Q) = (1, 4, 5, 6)$  and  $(R\Delta S) = (1, 2, 3, 4, 7, 8, 10)$

$(P\Delta Q)\Delta(R\Delta S) = (2, 3, 5, 6, 7, 8, 10)$

Number of elements = 7

**QNo:- 83 ,Correct Answer:- D**

**Explanation:-**  $p^3 = q^4 = r^5 = s^6 = k;$   
 $p = k^{1/3}; q = k^{1/4}; r = k^{1/5}; s = k^{1/6}$   
 $\log_s(pqr) = \log_k^{1/6} (k^{1/3+1/4+1/5})$   
 $= (47/60) \times (6) \log_k k$  (As we know that  $\log_a^2 a^1 = 1/2$ )  
 Answer = 47/10

**QNo:- 84 ,Correct Answer:- A**

**Explanation:-**

Since both drum 1 and the final mixture have a 7 in the ratio from paint B, the number in the ratio for paint B in drum 2 will also be divisible by 7.  
 Only option 161, is divisible by 7.

**QNo:- 85 ,Correct Answer:- D**

**Explanation:-** Let the new marks be 47 and 56 respectively. Now, we need to calculate the old marks. We know that the old marks are in the ratio of 11:14, and their difference is 9. So, the old marks will be 33 and 42.  
 Bimal's ratio  $\Rightarrow 56:42 = 4:3$

**QNo:- 86 ,Correct Answer:- 105**

**Explanation:-** If arithmetic mean of  $x, y$  and  $z$  is 80  
 Then,  $x+y+z = 240$ ,  
 Similarly,  $x+y+z+u+v = 375$ ,  
 Therefore,  $u+v = 135$ ,  
 $\Rightarrow (x+y)/2 + (y+z)/2 = 135$   
 On Expanding, we get  $x+2y+z = 270$ .  
 Since  $x+y+z = 240$ ,  $y = 30$   
 Therefore,  $x+z = 210$ .  
 Since  $x \geq z$ , minimum value of  $x$  is 105.

**QNo:- 87 ,Correct Answer:- C**

**Explanation:-** Let the strength of A, B and C be  $a, b, c$   
 $= a + 2b + 3c / 6 = 20\%$   
 $\Rightarrow a + 2b + 3c = 120 \text{ -- (1)}$   
 Similarly,  $3a + 2b + c = 180 \text{ -- (2)}$   
 $(1) - (2)$   
 $\Rightarrow c = a - 30 \text{ -- (3)}$   
 $3 \times (2) - (1)$   
 $\Rightarrow b = 105 - 2a \text{ -- (4)}$   
 Now  $D = 2b + 7c / 9$   
 $\Rightarrow (210 - 4a + 7a - 210) / 9$   
 $D = a/3$   
 $\Rightarrow D/A = 1 : 3$

**QNo:- 88 ,Correct Answer:- 5**

**Explanation:-** Since both the cars started with the speed of 100kmph but car 2 started when car1 is already 20 km away from point A. Now this 20km will be travelled in 12min. (Since, speed is 100kmph so he will be travelling 50km in 30 min in which first 20km in 12min)

First 30km - 18 min

Second 50km - 60 min (Speed 50kmph)

Third 50km - 120 min (Speed 25kmph)

Total = 198 min

Now to solve this we have to move car 2 for 198 min.

So, First 50km=30 min

Second 50km=60min

Remaining =198-90=108min

Now for this 108 min he travelled for 45km with a speed of 25kmph.

So, he is 5km away from point B.

**QNo:- 89 ,Correct Answer:- 20**

**Explanation:-**  $f(x)$  will be minimized when  $5x = 52 - 2x^2$ .

This will happen when  $x=4$ .

Therefore, minimum value of  $f(x) = 20$ .

**QNo:- 90 ,Correct Answer:- D**

**Explanation:-** As we know that  $\log_{ba} = \frac{\log a}{\log b}$

Applying the same we can easily take out  $\log 100$  as a common in denominator

$$= \frac{1}{\log 100} (\log 2 - \log 4 + \log 5 - \log 10 + \log 20 - \log 25 + \log 50)$$

Applying  $\log(ab) = \log a + \log b$  and  $\log \frac{a}{b} = \log a - \log b$

$$= \frac{1}{\log 100} (\log (\{2*5*20*50\} / \{4*10*25\})) = \frac{\log 10}{\log 100} = \frac{1}{2}$$

**QNo:- 91 ,Correct Answer:- 24**

**Explanation:-** For  $n=2$  we get,

$$t_1 + t_2 = 39 \dots\dots\dots (1)$$

For  $n=3$

$$t_1 + t_2 + t_3 = 58 \dots\dots\dots (2)$$

Using (1) we get  $t_3 = 19$

For  $n=4$

$$t_1 + t_2 + t_3 + t_4 = 81 \dots\dots\dots (3)$$

Using (2) we get  $t_4 = 23$

For  $n=5$

$$t_1 + t_2 + t_3 + t_4 + t_5 = 108 \dots\dots\dots (4)$$

Using (3) we get  $t_5 = 27$

Proceeding in the same manner, we get  $t_n$  are in an AP with common difference of 4.

Therefore,  $t_{24} = 103$

Therefore  $k=24$

**QNo:- 92 ,Correct Answer:- D**

**Explanation:-**

Given,  $s$  is the concentration of the unknown solution. Let  $y$  be the concentration of the resultant solution. Equal volumes of the resultant solution and ethanol solution of 20% concentration are mixed get a solution of 31.25% concentration.  $\Rightarrow y = 31.25 / 31.25$

$$- 20 = 1/1$$

$$y = 42.5 \%$$

$$\Rightarrow s - 42.5 / 22.5 = 1 / 3$$

$$3s = 150$$

$$= 50\%$$

**QNo:- 93 ,Correct Answer:- 24**

**Explanation:-** Since  $BC$  is the diameter of the circle,  $PC \perp AB$  and  $BQ \perp AC$  (angle in a semicircle)

$$\text{Area of } ABC = \frac{1}{2} \times AB \times PC = \frac{1}{2} \times AC \times BQ$$

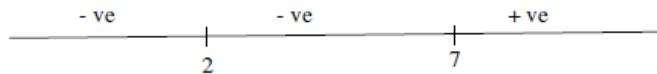
$$= \frac{1}{2} \times 30 \times 20 = \frac{1}{2} \times 25 \times BQ;$$

$$BQ = 24 \text{ cm}$$

**QNo:- 94 ,Correct Answer:- 8**

**Explanation:-** Here  $n = 2$  is a factor of  $n^3 - 11n^2 + 32n - 28 > 0$

$$\text{So } (n - 2)^2(n - 7) > 0$$



The solution of the above inequality is  $(7, \infty)$ . So the least value of  $n$  is 8.

**QNo:- 95 ,Correct Answer:- B**

**Explanation:-** We want to maximize the value of  $a_1$ , subject to the condition that  $a_1$  is the least of the 52 numbers and that the average of 51 numbers (excluding  $a_1$ ) is 1 less than the average of all the 52 numbers. Since  $a_{52}$  is 100 and all the numbers are positive integers, maximizing  $a_1$  entails maximizing  $a_2, a_3, \dots, a_{51}$ .

The only way to do this is to assume that  $a_2, a_3, \dots, a_{52}$  are in an AP with a common difference of 1. Let the average of  $a_2, a_3, \dots, a_{52}$  i.e.  $a_{27}$  be  $A$ . (Note: The average of an odd number of terms in an Arithmetic Progression is equal to the value of the middle-most term)

Since  $a_{52} = a_{27} + 25$  and  $a_{52} = 100$

$$\Rightarrow A = 100 - 25 = 75$$

$$a_2 + a_3 + \dots + a_{52} = 75 \times 51 = 3825$$

$$\text{Given } a_1 + a_2 + \dots + a_{52} = 52(A - 1) = 3848$$

$$\text{Hence } a_1 = 3848 - 3825 = 23$$

**QNo:- 96 ,Correct Answer:- D**

**Explanation:-** Area of parallelogram =  $absin(\text{angle})$

$$\Rightarrow 8 \times s \times \sin(\text{angle}) = 48$$

the maximum value of  $\sin$  is 1 at 90  $\Rightarrow s \geq 6$

**QNo:- 97 ,Correct Answer:- 10**

**Explanation:-**  $N^N = 2^{160} = 2^5 \times 32 = (2^5)^{32}$

$$N^N = 32^{32};$$

$$N = 32;$$

$$N^2 + 2^N = 32^2 + 2^{32};$$

$$(2^5)^2 + 2^{32}$$

$$2^{10} + 2^{32} = 2^{10}(1 + 2^{22});$$

x is 10

**QNo:- 98 ,Correct Answer:- A**

**Explanation:-** Let the total efficiencies be R and G

$$\text{Total Work} = 16(R + G) = 7(R+G) + (0.7R+G)*10$$

$$9(R+G) = 7R+10G$$

$$2R = G$$

$$R/G = 1/2$$

Remaining 9 day's work when Ramesh got sick =  $9 \times 3 = 27$  units

If this 27 units done by Ganesh with efficiency of 2 he will take  $27/2 = 13.5$  days.

**QNo:- 99 ,Correct Answer:- 50**

**Explanation:-** Let the speeds of A and B be  $s_1$  and  $s_2$  respectively. The initial distance between them is 350 km. When they travel in the same direction, the time taken to meet =  $350/s_2-s_1 = 7 \Rightarrow s_2-s_1 = 350/7 = 50$  km/hr

**QNo:- 100 ,Correct Answer:- D**

**Explanation:-** Ratio of Alcohol in the mixture =  $700 / 875 = 4/5$

Applying processes, ratio of alcohol becomes =  $4/5 * 9/10 * 9/10 = .648$  or 64.8 % Percentage of water = 35.2 %