

CAT 2024 Slot - I

SECTION: VERBAL ABILITY AND READING COMPREHENSION

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

Landing in Australia, the British colonists weren't much impressed with the small-bodied, slender-snouted marsupials called bandicoots. "Their muzzle, which is much too long, gives them an air exceedingly stupid," one naturalist noted in 1805. They nicknamed one type the "zebra rat" because of its black-striped rump.

Silly-looking or not, though, the zebra rat-the smallest bandicoot, more commonly known today as the western barred bandicoot-exhibited a genius for survival in the harsh outback, where its ancestors had persisted for some 26 million years. Its births were triggered by rainfall in the bone-dry desert. It carried its breath-mint-size babies in a backward-facing pouch so mothers could forage for food and dig shallow, camouflaged shelters.

Still, these adaptations did not prepare the western barred bandicoot for the colonial-era transformation of its ecosystem, particularly the onslaught of imported British animals, from cattle and rabbits that damaged delicate desert vegetation to ravenous house cats that soon developed a taste for bandicoots. Several of the dozen-odd bandicoot species went extinct, and by the 1940s the western barred bandicoot, whose original range stretched across much of the continent, persisted only on two predator-free islands in Shark Bay, off Australia's western coast. "Our isolated fauna had simply not been exposed to these predators," says Reece Pedler, an ecologist with the Wild Deserts conservation program.

Now Wild Deserts is using descendants of those few thousand island survivors, called Shark Bay bandicoots, in a new effort to seed a mainland bandicoot revival. They've imported 20 bandicoots to a preserve on the edge of the Strzelecki Desert, in the remote interior of New South Wales. This sanctuary is a challenging place, desolate much of the year, with one of the world's most mercurial rainfall patterns-relentless droughts followed by sudden drenching floods.

The imported bandicoots occupy two fenced "exclosures," cleared of invasive rabbits (courtesy of Pedler's sheepdog) and of feral cats (which slunk off once the rabbits disappeared). A third fenced area contains the program's Wild Training Zone, where two other rare marsupials (bilbies, a larger type of bandicoot, and mulgaras, a somewhat fearsome fuzzball known for sucking the brains out of prey) currently share terrain with controlled numbers of cats, learning to evade them. It's unclear whether the Shark Bay bandicoots, which are perhaps even more predator-naïve than their now-extinct mainland bandicoot kin, will be able to make that kind of breakthrough.

For now, though, a recent surge of rainfall has led to a bandicoot joey boom, raising the Wild Deserts population to about 100, with other sanctuaries adding to that number. There are also signs of rebirth in the landscape itself. With their constant digging, the bandicoots trap moisture and allow for seed germination so the cattle-damaged desert can restore itself.

They have a new nickname-a flattering one, this time. "We call them ecosystem engineers," Pedler says.

Q. 1

Which one of the following statements provides a gist of this passage?

- a) The onslaught of animals, such as cattle, rabbits and housecats, brought in by the British led to the extinction of the western barred bandicoot.
- b) Marsupials are going extinct due to the colonial era transformation of the ecosystem which also destroyed natural vegetation.
- c) A type of bandicoots was nearly wiped out by invasive species but rescuers now pin hopes on a remnant island population.
- d) The negligent attitude of the British colonists towards these bandicoots evidenced by the names given to them led to their annihilation.

Answer: (C)

Explanation:

Option C accurately summarizes the bandicoot's near extinction due to invasive species and the hope placed on the island population for conservation. Option A overstates the extinction claim-the bandicoot wasn't entirely wiped out, as Shark Bay populations survived. Option D incorrectly suggests that the colonists' attitudes and naming caused the bandicoot's decline; invasive species caused the damage. Option B generalizes the issue to all marsupials and vegetation destruction, missing the specific focus on the bandicoot.

Q. 2

The text uses the word 'exclosures' because Wild Deserts has adopted a measure of

- a) restoring cattle damaged deserts to green landscapes.
- b) excluding animals to make the islands predator-free.
- c) barring the entry of invasive species.
- d) ridding the main desert of feral cats and large bilbies.

Answer: (C)

Explanation:

Option C accurately describes the purpose of exclosures as fencing areas to bar invasive species like rabbits and feral cats. Option B refers to making islands predator-free, but the exclosures are on the mainland desert, not islands. Option D is partially accurate but incorrect in focus-feral cats

were excluded, but large bilbies are part of the Wild Training Zone and not barred by exclosures. Option A is misleading-the exclosures contribute to environmental restoration, but their primary purpose is to exclude invasive species.

Q. 3

Which one of the following options does NOT represent the characteristics of the western barred bandicoot?

- a) Shallow diggers having an elongated muzzle
- b) Smallest black striped marsupial that uses camouflage and dig
- c) Long thin nose, black striped back, pouch for joeys
- d) Look of a rat but with a baby pouch and a slender snout

Answer: (B)

Explanation:

Option B is incorrect because the passage doesn't call the western barred bandicoot the 'smallest black striped marsupial.' While it is the smallest bandicoot, the 'black striped' characteristic is specifically about its back (rump), not a defining trait of the entire species. The combination of 'black striped marsupial' and 'camouflage' in this option is misleading. Options A, C, and D are all consistent with the passage's descriptions of the bandicoot's long snout, striped rump, backward-facing pouch, and shallow digging behavior.

Q. 4

According to the text, the western barred bandicoots now have a flattering name because they have

- a) aided in altering an arid environment.
- b) grown fivefold in terms of population.
- c) led to a surge and increase of rainfall.
- d) led a revival in preserving the species.

Answer: (A)

Explanation:

Option A correctly reflects that the nickname 'ecosystem engineers' recognizes their role in altering and improving the desert environment through constant digging, trapping moisture, and allowing seed germination. Option D is partly true but the flattering name is specifically linked to their environmental impact, not species preservation. Option C is wrong-the passage attributes the recent

rainfall surge to natural patterns, not the bandicoots. Option B is not linked to their nickname.

Directions for the question. There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

Q. 5

Sentence: Understanding central Asia's role helps developments make more sense not only across Asia but in Europe, the Americas and Africa.

Paragraph: The nations of the Silk Roads are sometimes called 'developing countries', but they are actually some of the world's most highly developed countries, the very crossroads of civilization, in advanced states of disrepair. (1). These countries lie at the centre of global affairs: they have since the beginning of history. Running across the spine of Asia, they form a web of connections fanning out in every direction, routes along which pilgrims and warriors, nomads and merchants have travelled, goods and produce have been bought and sold, and ideas exchanged, adapted and refined. (2). They have carried not only prosperity, but also death. (3). The Silk Roads are the world's central nervous system, connecting otherwise far-flung peoples and places.... (4). It allows us to see patterns and links, causes and effects that remain invisible if one looks only at Europe, or North America.

- a) Option 3
- b) Option 1
- c) Option 2
- d) Option 4

Answer: (D)

Explanation:

Blank 4 is the most suitable placement. The paragraph is discussing the Silk Roads as a crucial and unifying global network, describing how they connect various regions and cultures. The provided sentence extends this idea by emphasizing the broader relevance of Central Asia's role in global history, helping us see connections not only across Asia but also in other continents. This placement reinforces and expands on the main point, maintaining coherence and adding depth to the argument about the Silk Roads' significance. Blanks 1, 2, and 3 are all mismatched with the sentence's broader global perspective.

DIRECTIONS for questions 6-9: The passage below is accompanied by a set of questions. Choose the best answer to each question.

Oftentimes, when economists cross borders, they are less interested in learning from others than in invading their garden plots. Gary Becker, for instance, pioneered the idea of human capital. To do so, he famously tackled topics like crime and domesticity, applying methods honed in the study of markets to domains of nonmarket life. He projected economics outward into new realms: for example, by revealing the extent to which humans calculate marginal utilities when choosing their spouses or stealing from neighbours. At the same time, he did not let other ways of thinking enter his own economic realm: for example, he did not borrow from anthropology or history or let

observations of nonmarket economics inform his homo economicus. Becker was a picture of the imperial economist in the heyday of the discipline's bravura.

Times have changed for the once almighty discipline. Economics has been taken to task, within and beyond its ramparts. Some economists have reached out, imported, borrowed, and collaborated-been less imperial, more open. Consider Thomas Piketty and his outreach to historians. The booming field of behavioural economics-the fusion of economics and social psychology-is another case. Having spawned active subfields, like judgment, decision-making and a turn to experimentation, the field aims to go beyond the caricature of Rational Man to explain how humans make decisions....

It is important to underscore how this flips the way we think about economics. For generations, economists have presumed that people have interests-"preferences," in the neoclassical argot-that get revealed in the course of peoples' choices. Interests come before actions and determine them. If you are hungry, you buy lunch; if you are cold, you get a sweater. If you only have so much money and can't afford to deal with both your growling stomach and your shivering, which need you choose to meet using your scarce savings reveals your preference.

Psychologists take one look at this simple formulation and shake their heads. Increasingly, even some mainstream economists have to admit that homo economicus doesn't always behave like the textbook maximiser; irrational behaviour can't simply be waved away as extra economic expressions of passions over interests, and thus the domain of other disciplines.... This is one place where the humanist can help the economist. If narrative economics is going to help us understand how rivals duke it out, who wins and who loses, we are going to need much more than lessons from epidemiological studies of viruses or intracranial stimuli.

Above all, we need politics and institutions. Shiller [the Nobel prize winning economist] connects perceptions of narratives to changes in behaviour and thence to social outcomes. He completes a circle that was key to behavioural economics and brings in storytelling to make sense of how perceptions get framed. This cycle (perception to behaviour to society) was once mediated or dominated by institutions: the political parties, lobby groups, and media organizations that played a vital role in legitimating, representing, and excluding interests. Yet institutions have been stripped from Shiller's account, to reveal a bare dynamic of emotions and economics, without the

Intermediating place of politics.

Q.6) The author critiques Shiller's approach to behavioural economics for

- a) denigrating the role of institutions while creating a link between behavioural economics and perceptions.
- b) linking emotions and rational behaviour without considering the mediation of social institutions.
- c) ignoring the marginal role that media and politics play in influencing people's behaviour.
- d) relying excessively on storytelling as the main influence on the formation of perceptions.

Answer: (B)

Explanation:

Option B correctly identifies the critique: Shiller links emotions and behavior but overlooks how institutions mediate these dynamics. The passage explicitly states that institutions have been stripped from Shiller's account, leaving a bare dynamic of emotions and economics without the intermediating place of politics. Option A is inaccurate-the critique is about their omission, not deliberate denigration. Option D is misleading-the author doesn't criticize Shiller for overusing storytelling. Option C misrepresents the argument; the author sees media and politics as central, not marginal.

Q.7

"Times have changed for the once almighty discipline." We can infer from this statement and the associated paragraph that the author is being

- a) disparaging of economists' inability to precisely predict market behaviour, and are now borrowing from other disciplines to remedy this.
- b) sarcastic about how economists, who earlier shunned other disciplines, are now beginning to incorporate them in their analyses.
- c) critical of economists' openly borrowing and collaborating across disciplines to explain how humans make decisions.
- d) judgemental about the ability of economic tools to accurately manage crises leading to the downfall of this lofty science.

Answer: (B)

Explanation:

Option B correctly captures the sarcasm about economists' earlier reluctance to engage with other fields and their current embrace of interdisciplinary approaches. The phrase 'once almighty discipline' is ironic, acknowledging that economics was once considered supreme and self-sufficient. Option A focuses on predictive failures, which is not the main tone. Option C suggests the author criticizes interdisciplinary borrowing, but the author does not criticize this shift-the tone is ironic and observational. Option D is too narrow, focusing on crisis management.

Q. 8

We can infer from the passage that the term "homo economicus" refers to someone who

- a) maximises their opportunities based on nonmarket choices.
- b) believes in borrowing and collaborating with other disciplines in their work.
- c) makes rational decisions based on their own preferences.
- d) is not influenced by the preferences and choices of others.

Answer: (C)

Explanation:

Option C correctly describes homo economicus as someone who makes rational decisions based on their preferences, aligning with the passage's description of the neoclassical model where interests come before actions and determine them. Option D suggests independence from others' preferences, but the focus of 'homo economicus' is on individual rationality, not isolation. Option B suggests interdisciplinary collaboration, which is unrelated. Option A refers to nonmarket choices, but 'homo economicus' typically involves market-like decision-making.

Q. 9

In the first paragraph the author is making the point that economists like Becker

- a) used economics to analyse non-market behaviour, without incorporating perspectives from other areas of inquiry.
- b) tended to guard their discipline from poaching by academics from other subject areas.
- c) benefitted from the application of their principles and concepts to non-economic phenomena.
- d) had begun to borrow concepts from other disciplines but were averse to the latter applying economic principles.

Answer: (A)

Explanation:

Option A accurately describes Becker's approach-applying economic tools to non-market behaviors while ignoring insights from other disciplines. The passage explicitly notes that while Becker projected economics outward into new realms, he did not let other ways of thinking enter his economic realm. Option B is too broad-the critique is about refusing to integrate other perspectives, not about guarding against 'poaching.' Option C focuses on benefit, not the limitation highlighted. Option D is incorrect as the passage explicitly states Becker did not borrow from other disciplines.

Directions for the question. *There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.*

Q. 10

Sentence: The brain isn't organized the way you might set up your home office or bathroom medicine cabinet.

Paragraph: (1). You can't just put things anywhere you want to. The evolved architecture of the brain is haphazard and disjointed, and incorporates multiple systems, each of which has a mind of its own. (2). Evolution doesn't design things and it doesn't build systems-it settles on systems that, historically, conveyed a survival benefit. There is no overarching, grand planner engineering the systems so that they work harmoniously together. (3). The brain is more like a big, old house with piecemeal renovations done on every floor, and less like new construction.

- a) Option 4

- b) Option 2
- c) Option 1
- d) Option 3

Answer: (C)

Explanation:

Blank 1 (Option 1) serves as a fitting introduction, contrasting intuitive organization (like a home office) with the brain's evolutionary complexity. The sentence introduces the main idea that the brain is not organized like familiar objects we deliberately set up. The paragraph then flows naturally into explaining why—'You can't just put things anywhere you want to.' Blank 2 would disrupt the flow as the paragraph already transitions into describing the brain's architecture. Blank 3 follows discussion of the lack of harmony, which doesn't suit the introductory nature of the sentence. Blank 4 would weaken the strong 'old house' conclusion.

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

Scientific research shows that many animals are very intelligent and have sensory and motor abilities that dwarf ours. Dogs are able to detect diseases such as cancer and diabetes and warn humans of impending heart attacks and strokes. Elephants, whales, hippopotamuses, giraffes, and alligators use low-frequency sounds to communicate over long distances, often miles. Many animals also display wide-ranging emotions, including joy, happiness, empathy, compassion, grief, and even resentment and embarrassment. It's not surprising that animals share many emotions with us because we also share brain structures, located in the limbic system, that are the seat of our emotions.

Q.11

- a) The advanced sensory and motor abilities of animals is the reason why they can display wide-ranging emotions.
- b) The similarity in brain structure explains why animals show emotions typically associated with humans.
- c) Animals can show emotions which are typically associated with humans.
- d) Animals are more intelligent than us in sensing danger and detecting diseases.

Answer: (B)

Explanation:

Option B accurately links the similarity in brain structure (shared limbic system) to the emotional capabilities shared by animals and humans—capturing both the evidence and the explanation given in the passage. Option A misattributes animals' emotional abilities to their advanced sensory and motor skills, which the passage does not state. Option C mentions animals showing emotions but doesn't explain the underlying reason (shared brain structures), making it incomplete. Option D is

too narrow, focusing only on the intelligence aspect.

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

Q. 12

1. Animals have an interest in fulfilling their basic needs, but also in avoiding suffering, and thus we ought to extend moral consideration.
2. Singer viewed himself as a utilitarian, and presents a direct moral theory concerning animal rights, in contrast to indirect positions, such as welfarist views.
3. He argued for extending moral consideration to animals because, similar to humans, animals have certain significant interests.
4. The event that publicly announced animal rights as a legitimate issue within contemporary philosophy was Peter Singer's Animal Liberation text in 1975.
5. As such, we ought to view their interests alongside and equal to human interests, which results in humans having direct moral duties towards animals.

Answer: (1)

Explanation:

The coherent paragraph flows as: Sentence 4 (introduces Peter Singer's Animal Liberation as a landmark event) → Sentence 2 (introduces Singer's utilitarian, direct moral theory) → Sentence 3 (explains his argument for extending moral consideration based on animals' significant interests) → Sentence 5 (concludes that humans have direct moral duties towards animals). Sentence 1 is the odd one out-it introduces a general statement about animals having basic needs and avoiding suffering that doesn't connect directly with Singer's specific philosophical argument or the historical context provided by the other sentences.

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

Certain codes may, of course, be so widely distributed in a specific language community or culture, and be learned at so early an age, that they appear not to be constructed-the effect of an articulation between sign and referent-but to be 'naturally' given. Simple visual signs appear to have achieved a 'near-universality' in this sense: though evidence remains that even apparently 'natural' visual codes are culture specific. However, this does not mean that no codes have intervened; rather, that the codes have been profoundly naturalized. The operation of naturalized codes reveals not the transparency and 'naturalness' of language but the depth, the habituation and the near-universality of the codes in use. They produce apparently 'natural' recognitions. This has the (ideological) effect of concealing the practices of coding which are present.

Q.13

- a) All codes, linguistic and visual, have a natural origin but some are so widespread that they become universal. This is what hides the mechanism of coding behind signs.
- b) Not all codes are natural but certain codes are naturalized and made to appear universal. Ideology aims to hide the mechanism of coding behind signs.
- c) Language and visual signs are codes. However, some of the codes are so widespread that they not only seem naturally given but also hide the mechanism of coding behind the signs.
- d) Learning linguistic and visual signs at an early age makes all such codes appear natural. This naturalization of codes is the effect of ideology.

Answer: (C)

Explanation:

Option C correctly states that language and visual signs are codes, some of which seem naturally given due to widespread use and early learning, while also highlighting the concealment of the coding mechanism-capturing the full essence of the passage. Option B accurately notes the naturalization of codes but misrepresents ideology as a primary aim to hide the coding mechanism, which is not explicitly stated. Option D focuses on early-age learning but oversimplifies the broader process of naturalization. Option A incorrectly claims all codes have a natural origin, which the passage does not imply-it focuses on naturalization, not natural origins.

DIRECTIONS for questions 14-17: The passage below is accompanied by a set of questions. Choose the best answer to each question.

In the summer of 2022, subscribers to the US streaming service HBO MAX were alarmed to discover that dozens of the platform's offerings-from the Covid-themed heist thriller Locked Down to the recent remake of The Witches-had been quietly removed from the service... The news seemed like vindication to those who had long warned that streaming was more about controlling access to the cultural commons than expanding it, as did reports (since denied by the show's creators) that Netflix had begun editing old episodes of Stranger Things to retroactively improve their visual effects.

What's less clear is whether the commonly prescribed cure for these cultural ills-a return to the material pleasures of physical media-is the right one. While the makers of Blu-ray discs claim they have a shelf life of 100 years, such statistics remain largely theoretical until they come to pass, and are dependent on storage conditions, not to mention the continued availability of playback equipment. The humble DVD has already proved far less resilient, with many early releases already beginning to deteriorate in quality. Digital movie purchases provide even less security. Any film "bought" on iTunes could disappear if you move to another territory with a different rights agreement and try to redownload it. It's a bold new frontier in the commodification of art: the birth of the product recall. After a man took to Twitter to bemoan losing access to Cars 2 after moving from Canada to Australia, Apple clarified that users who downloaded films to their devices would retain permanent access to those downloads, even if they relocated to a hemisphere where the content was subject to a different set of rights agreements. Thanks to the company's ironclad digital rights management technology, however, such files cannot be moved or backed up, locking you into watching with your Apple account.

Anyone who does manage to acquire Digital Rights Management free (DRM-free) copies of their favourite films must nonetheless grapple with ever-changing file format standards, not to mention data decay-the gradual process by which electronic information slowly but surely corrupts. Only

the regular migration of files from hard drive to hard drive can delay the inevitable, in a Sisyphean battle against the ravages of digital time.

In a sense, none of this is new. Charlie Chaplin burned the negative of his 1926 film *A Woman of the Sea* as a tax write-off. Many more films have been lost through accident, negligence or plain indifference. During a heatwave in July 1937, a Fox film vault in New Jersey burned down, destroying a majority of the silent films produced by the studio.

Back then, at least, cinema was defined by its ephemerality: the sense that a film was as good as gone once it left your local cinema. Today, with film studios keen to stress the breadth of their back catalogues (or to put in Hollywood terms, the value of their IPs), audiences may start to wonder why those same studios seem happy to set the vault alight themselves if it'll help next quarter's numbers.

Q.14

Which one of the following statements, if true, would best invalidate the main argument of the passage?

- a) Improved cloud storage services have made it possible for movie collections to now be preserved in perpetuity, without the need to keep migrating the files.
- b) When moving to a different geographical location, customers can easily use Virtual Private Networks (VPNs) to bypass geo-blocking and regain access to their content on any streaming service.
- c) Recent research has irrefutably proven that Blu-Ray discs have a shelf life of at least 100 years.
- d) Studios and streaming services have committed to giving customers perpetual and platform independent access to the original digital content they have paid for.

Answer: (D)

Explanation:

Option D would best invalidate the passage's core argument about the precarious nature of digital media access. If studios and streaming services guaranteed perpetual, platform-independent access to purchased content, the main concerns raised—geo-restrictions, DRM lock-in, content removal—would be directly addressed. Option A addresses only data decay but not DRM or ownership issues. Option B solves geo-blocking but not DRM restrictions or content ownership. Option C only addresses the shelf life of Blu-ray, strengthening the case for physical media but not addressing streaming issues.

Q.15

"Netflix had begun editing old episodes of *Stranger Things* to retroactively improve their visual effects." What is the purpose of this example used in the passage?

- a) To show that art in the digital age, specifically film, is no longer sacrosanct, and may be changed to suit changing tastes or technology.

- b) To show that streaming services are controlling access to the cultural commons rather than expanding it.
- c) To show how unsubstantiated reports are leading to an increase in the level of distrust towards streaming services.
- d) To show a practice that justifies the fears of people who feel streaming services cannot be trusted to be custodians of cultural artefacts like film.

Answer: (D)

Explanation:

Option D correctly identifies the example's purpose: to validate fears about streaming services' reliability in preserving the integrity of cultural works. This example, even though denied by the creators, illustrates why audiences distrust streaming services as custodians of art. Option A is too broad. Option B discusses control over the cultural commons—a broader theme of the passage but not the direct purpose of this specific example. Option C misinterprets the example by suggesting the focus is on unsubstantiated reports leading to distrust, rather than the underlying concern itself.

Q. 16

Which one of the following statements about art best captures the arguments made in the passage?

- a) In the age of online subscription services, it is time to change our understanding of classic works of art being primarily immutable and easily available to the public.
- b) Accepting retroactive changes to works of art is dangerous because it will encourage creators to not put enough effort into the original attempt, given that they can always edit or update their work later.
- c) Works of art belong to the cultural commons and hence must remain available in perpetuity, irrespective of who pays for access to them.
- d) As art is increasingly created, stored and distributed digitally, access to it is counterintuitively likely to be made more difficult by the rapid churn in technology and the whims of host platforms.

Answer: (D)

Explanation:

Option D accurately reflects the main argument: digital art is paradoxically less accessible because of technology's rapid evolution (data decay, changing formats) and platform constraints (DRM, geo-restrictions, content removal). This captures the passage's central irony. Option B focuses on retroactive changes to art, a minor point in the passage. Option C is idealistic—the passage does not argue that art should universally belong to the cultural commons. Option A suggests rethinking art's immutability, which is tangential to the passage's core argument about access and impermanence.

Q. 17

Which of the following statements is suggested by the sentence "Back then, at least, cinema was defined by its ephemerality: the sense that a film was as good as gone once it left your local cinema"?

- a) Today, films are expected to be available for a long time, since they are no longer tied solely to their stay at the local cinema.
- b) Cinema is now no longer as ephemeral as it used to be earlier, because the technology used for creating and preserving films has improved manifold.
- c) Presently, there is no reason why film studios should remove access to films once they have left the local cinema.
- d) Around a century ago, people were more accepting of not having access to films once they left the local cinema.

Answer: (A)

Explanation:

Option A captures the core idea: the shift from cinema's earlier ephemerality to today's expectation of long-term availability. The sentence contrasts past acceptance of films disappearing with today's expectation that films remain accessible. Option D is true historically but is not the central contrast being made—the sentence is about shifting expectations. Option C focuses on criticizing studios but isn't suggested by the given sentence, which highlights the shift in expectations. Option B attributes the change to technology improvements, while the sentence focuses on changing perceptions of film availability.

DIRECTIONS for questions 18-21: The passage below is accompanied by a set of questions. Choose the best answer to each question.

The idea of craftsmanship is not simply nostalgic... Crafts require distinct skills, an all-round approach to work that involves the whole product, rather than individual parts, and an attitude that necessitates devotion to the job and a focus on the communal interest. The concept of craft emphasises the human touch and individual judgment.

Essentially, the crafts concept seems to run against the preponderant ethos of management studies which, as the academics note, have long prioritised efficiency and consistency... Craft skills were portrayed as being primitive and traditionalist.

The contrast between artisanship and efficiency first came to the fore in the 19th century when British manufacturers suddenly faced competition from across the Atlantic as firms developed the "American system" using standardised parts... the worldwide success of the Singer sewing machine showed the potential of a mass-produced device. This process created its own reaction, first in the form of the Arts and Crafts movement of the late 19th century, and then again in the "small is beautiful" movement of the 1970s. A third crafts movement is emerging as people become aware of the environmental impact of conventional industry.

There are two potential markets for those who practise crafts. The first stems from the existence of consumers who are willing to pay a premium price for goods that are deemed to be of extra quality...

The second market lies in those consumers who wish to use their purchases to support local workers, or to reduce their environmental impact by taking goods to craftspeople to be mended, or recycled.

For workers, the appeal of craftsmanship is that it allows them the autonomy to make creative choices, and thus makes a job far more satisfying. In that sense, it could offer hope for the overall labour market. Let the machines automate dull and repetitive tasks and let workers focus purely on their skills, judgment and imagination. As a current example, the academics cite the "agile" manifesto in the software sector, an industry at the heart of technological change. The pioneers behind the original agile manifesto promised to prioritise "individuals and interactions over processes and tools." By bringing together experts from different teams, agile working is designed to improve creativity.

But the broader question is whether crafts can create a lot more jobs than they do today. Demand for crafted products may rise but will it be easy to retrain workers in sectors that might get automated (such as truck drivers) to take advantage? In a world where products and services often have to pass through regulatory hoops, large companies will usually have the advantage.

History also suggests that the link between crafts and creativity is not automatic. Medieval craft guilds were monopolies which resisted new entrants. They were also highly hierarchical with young men required to spend long periods as apprentices and journeymen before they could set up on their own; by that time the innovative spirit may have been knocked out of them. Craft workers can thrive in the modern era, but only if they don't get too organised.

Q.18) We can infer from the passage that medieval crafts guilds resembled mass production in that both

- a) discouraged innovation by restricting entry through strict rules.
- b) did not always employ egalitarian production processes.
- c) did not necessarily promote creativity.
- d) focused excessively on product quality.

Answer: (C)

Explanation:

Option C correctly identifies the similarity between both systems: their failure to promote creativity. The passage explicitly states that 'the link between crafts and creativity is not automatic'- medieval guilds resisted new entrants and knocked out the innovative spirit through long hierarchical apprenticeships. Mass production similarly suppresses individual creativity through standardization. Option A incorrectly attributes restricting entry through strict rules to mass production as well-mass production systems do not inherently discourage entry through strict rules. Option B is partially relevant but the focus of the comparison is on creativity, not egalitarian

processes. Option D is inaccurate.

Q. 19

Which one of the following statements is NOT inconsistent with the views stated in the passage?

- a) Creativity in the crafts could be stifled if the market for artisan goods becomes too organised.
- b) The Arts and Crafts movement was initially inspired by the 'American system' of production.
- c) We need to support the crafts; only then can we retain the creativity intrinsic to their production.
- d) The agile movement in software is a throwback to the tenets of the medieval crafts guilds.

Answer: (A)

Explanation:

Option A is consistent with the passage, which ends by saying 'Craft workers can thrive in the modern era, but only if they don't get too organised.' This directly supports the idea that over-organisation could stifle creativity. Option B is inconsistent-the passage states that the Arts and Crafts movement was a reaction to the 'American system' of production, not inspired by it. Option C is inconsistent-the passage does not explicitly state that supporting crafts is the only way to retain creativity. Option D is inconsistent-the agile movement is linked to modern craftsmanship and creativity, not to the restrictive and hierarchical tenets of medieval craft guilds.

Q. 20

The author questions the ability of crafts to create substantial employment opportunities presently because

- a) the low scale of crafts production will not be able to absorb the mass of redundant labour.
- b) regulatory requirements could make it difficult for small crafts outfits to compete.
- c) workers made redundant by automation are unlikely to opt for crafts-related work.
- d) crafts guilds tend to resist new entrants and are unlikely to accept large numbers of trainees.

Answer: (B)

Explanation:

Option B best reflects the passage's argument about employment challenges. The passage states that 'in a world where products and services often have to pass through regulatory hoops, large companies will usually have the advantage'-directly suggesting regulatory requirements hinder small crafts businesses. Option C is not supported-the passage doesn't imply workers would be unwilling to switch to crafts. Option A focuses on scale of production, but the primary issue raised is regulatory challenges. Option D refers to historical guild issues and does not directly address current employment challenges.

Q. 21

The most recent revival in interest in the crafts is a result of the emergence of all of the following EXCEPT:

- a) a niche market for discerning buyers of quality products.
- b) support for individual creations as opposed to mass-produced objects.
- c) a greater interest in buying locally produced goods.
- d) concerns about the environmental impact of mass production.

Answer: (B)

Explanation:

Option B is the exception-while the passage emphasises the human touch in crafts, it does not explicitly state that the most recent revival is due to support for individual creations over mass production. The passage identifies the third crafts movement as emerging because 'people become aware of the environmental impact of conventional industry.' Options C and D are directly mentioned as motivators (supporting local workers, reducing environmental impact). Option A accurately reflects the niche market described for premium-quality craft goods.

Directions for the question. There is a sentence that is missing in the paragraph below. Look at the paragraph and decide where (option 1, 2, 3, or 4) the following sentence would best fit.

Q. 22

Sentence: Comprehending a wide range of emotions, Renaissance music nevertheless portrayed all emotions in a balanced and moderate fashion.

Paragraph: A volume of translated Italian madrigals were published in London during the year of 1588. This sudden public interest facilitated a surge of English Madrigal writing as well as a spurt of other secular music writing and publication. __ (1). This music boom lasted for thirty years and was as much a golden age of music as British literature was with Shakespeare and Queen Elizabeth I. __ (2). The rebirth in both literature and music originated in Italy and migrated to England; the English madrigal became more humorous and lighter in England as compared to Italy. Renaissance music was mostly polyphonic in texture. Extreme contrasts in dynamics, rhythm, and tone colour do not occur. (4). The rhythms in Renaissance music tend to have a smooth, soft flow instead of a sharp, well-defined pulse of accents.

- a) Option 3
- b) Option 4
- c) Option 1
- d) Option 2

Answer: (A)

Explanation:

Blank 3 (Option 3) is the best fit. This position follows the discussion of polyphonic texture in Renaissance music. The missing sentence, which focuses on the portrayal of emotions in a balanced and moderate fashion, ties well with the idea of Renaissance music's structural and expressive qualities-specifically following the mention of 'extreme contrasts in dynamics, rhythm, and tone colour do not occur.' It transitions smoothly into the subsequent discussion about smooth rhythms. Blank 1 disrupts the historical account of the music boom. Blank 2 would interrupt the cultural migration narrative. Blank 4 would interrupt the discussion of rhythm and dynamics.

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

Cartographers design and create maps to communicate information about phenomena located somewhere on our planet. In the past, cartographers did not worry too much about who was going to read their maps. Although some simple 'usability' research was done-like comparing whether circle or bar symbols worked best-cartographers knew how to make maps. This has changed now, however, due to all kinds of societal and technological developments. Today, map readers are more demanding-mostly because of the tools they use to read maps. Cartographers, who are also influenced by these trends, are now more interested in seeing if their products are efficient, effective, and appreciated.

Q.23

- a) New technological developments have prompted cartographers to experiment with their maps by applying these new innovations.
- b) Today, cartographers also need to look into the usability of maps because of the new technological developments.
- c) Maps are being used for a variety of reasons and therefore map readers have become more demanding.
- d) Modern mapmakers evaluate a map's effectiveness efficiency and satisfaction of the user through a series of experiments.

Answer: (B)

Explanation:

Option B directly captures the essence of the passage, emphasizing that technological developments have made it necessary for cartographers to consider the usability of maps- something that was less of a concern in the past. Option A incorrectly states that cartographers experiment with new innovations-the key shift is about usability focus, not experimentation. Option C is too vague and doesn't capture the role of technological developments. Option D focuses too heavily on experiments, which is not the main emphasis-the passage talks more about the shift in focus due to societal and technological changes.

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

Q.24

1. Urbanites also have more and better options for getting around: Uber is ubiquitous; easy-to-rent dockless bicycles are spreading; battery-powered scooters will be next.
2. When more people use buses or trains the service usually improves because public-transport agencies run more buses and trains.
3. Worsening services on public transport, terrorist attacks in some urban metros and a rise in fares have been blamed for this trend.
4. It seems more likely that public transport is being squeezed structurally as people's need to travel is diminishing as a result of smartphones, videoconferencing, online shopping and so on.
5. There has been a puzzling decline in the use of urban public transport in many countries in the west, despite the growth in urban populations and rising employment.

Answer: (2)

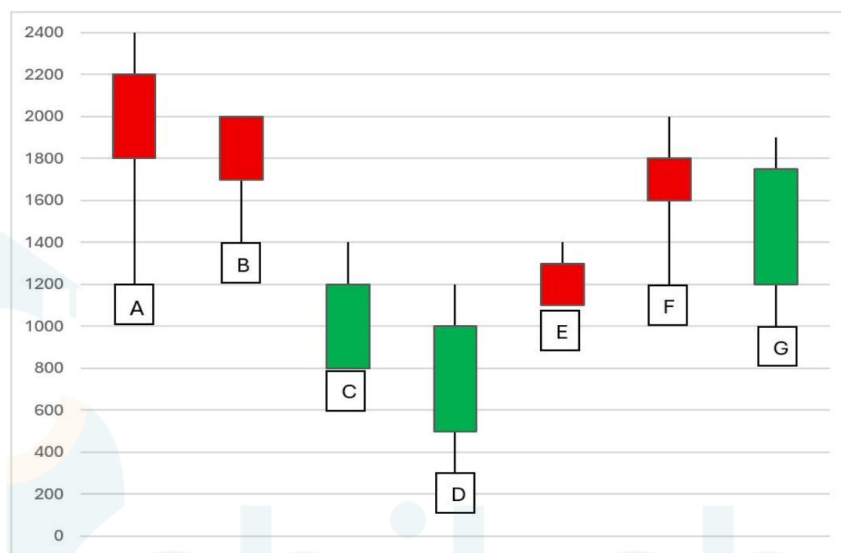
Explanation:

The coherent paragraph flows as: Sentence 5 (introduces the central idea: puzzling decline in urban public transport) → Sentence 3 (explains why—worsening services, terrorist attacks, rising fares) → Sentence 4 (suggests a structural shift due to smartphones, videoconferencing, etc.) → Sentence 1 (explains that urbanites now have better alternatives like Uber, bikes, scooters). Sentence 2 is the odd one out—it discusses public transportation improving when more people use it, which contradicts and doesn't fit the theme of decline in usage or the availability of alternatives.

SECTION: DATA INTERPRETATION & LOGICAL REASONING

DIRECTIONS for questions 25-28: Read the information given below and answer the question that follows

The chart below shows the price data for seven shares - A, B, C, D, E, F, and G as a candlestick plot for a particular day. The vertical axis shows the price of the share in rupees. A share whose closing price (price at the end of the day) is more than its opening price (price at the start of the day) is called a bullish share; otherwise, it is called a bearish share. All bullish and bearish shares are shown in green and red colour respectively.



Daily Share Price Variability (SPV) is defined as $(\text{Day's high price} - \text{Day's low price}) / (\text{Average of the opening and closing prices during the day})$.

Q.25) Which among the shares A, C, D and F had the highest SPV on that day?

- a) F
- b) A
- c) C
- d) D

Answer: (D)

Explanation:

Daily Share Price Variability (SPV) for A = $(2400 - 1200)/2000 = 1200/2000 = 3/5$

Daily Share Price Variability (SPV) for C = $(1400 - 800)/1000 = 600/1000 = 3/5$

Daily Share Price Variability (SPV) for F = $(2000 - 1200)/1700 = 800/1700 = 8/17$

Daily Share Price Variability (SPV) for D = $(1200 - 300)/750 = 900/750 = 6/5$

We can see that value of Daily Share Price Variability (SPV) for D is max as it is the only value which is greater than 1. All other values are less than 1. Hence option D.

Q. 26

Daily Share Price Variability (SPV) is defined as (Day's high price - Day's low price) / (Average of the opening and closing prices during the day). How many shares had an SPV greater than 0.5 on that day?

Answer: (4)

Explanation:

Daily Share Price Variability (SPV) for A = $(2400 - 1200)/2000 = 1200/2000 = 3/5 = 0.6$

Daily Share Price Variability (SPV) for C = $(1400 - 800)/1000 = 600/1000 = 3/5 = 0.6$

Daily Share Price Variability (SPV) for F = $(2000 - 1200)/1700 = 800/1700 = 8/17 = 0.47$

Daily Share Price Variability (SPV) for D = $(1200 - 300)/750 = 900/750 = 6/5 = 1.2$

Daily Share Price Variability (SPV) for B = $(2000 - 1400)/1850 = 600/1850 = 12/37 = 0.32$

Daily Share Price Variability (SPV) for E = $(1400 - 1100)/1200 = 300/1200 = 1/4 = 0.25$

Daily Share Price Variability (SPV) for G = $(1900 - 1000)/1450 = 900/1450 = 18/29 = 0.62$

From the above table, we can see that value of SPV of 4 shares i.e A, C, D and G is greater than 0.5. Hence 4 is the answer.

Q. 27

Daily loss for a share is defined as (Opening price - Closing price) / (Opening price). Which among the shares A, B, F and G had the highest daily loss on that day?

- a) F
- b) B
- c) A
- d) G

Answer: (C)

Explanation:

Daily Loss for A = $(2200 - 1800)/2200 = 400/2200 = 4/22 = 2/11 = 0.18$

Daily Loss for B = $(2000 - 1700)/2000 = 300/2000 = 3/20 = 0.15$

Daily Loss for F = $(1800 - 1600)/1800 = 200/1800 = 2/18 = 1/9 = 0.11$

Daily Loss for G = $(1200 - 1700)/1200 = -500/1200 = -5/12 = -0.42$

From the above table, we can see that value of Daily Loss for A is maximum. Hence option C.

Q. 28

What would have been the percentage wealth gain for a trader, who bought equal numbers of all bullish shares at opening price and sold them at their day's high?

- a) 72%
- b) 80%
- c) 50%
- d) 100%

Answer: (B)

Explanation:

Let us assume he purchases one share each of C, D and G. CP of one share of C = 800 and SP of one share of C = 1400 CP of one share of D = 500 and SP of one share of D = 1200 CP of one share of G = 1200 and SP of one share of G = 1900 So Total Cost of purchasing one share of each of C, D and G = $800 + 500 + 1200 = 2500$ Total Selling Price of one share of each of C, D and G = $1400 + 1200 + 1900 = 4500$.

Hence, Percentage Gain = $(4500 - 2500)/2500 \times 100 = 2000/2500 \times 100 = 80\%$

DIRECTIONS for questions 29-33: Read the information given below and answer the question that follows.

Two students, Amiya and Ramya are the only candidates in an election for the position of class representative. Students will vote based on the intensity level of Amiya's and Ramya's campaigns and the type of campaigns they run. Each campaign is said to have a level of 1 if it is a staid campaign and a level of 2 if it is a vigorous campaign. Campaigns can be of two types, they can either focus on issues, or on attacking the other candidate.

If Amiya and Ramya both run campaigns focusing on issues, then The percentage of students voting in the election will be 20 times the sum of the levels of campaigning of the two students. For example, if Amiya and Ramya both run vigorous campaigns, then $20 \times (2 + 2)\%$, that is, 80% of the students will vote in the election. - Among voting students, the percentage of votes for each candidate will be proportional to the levels of their campaigns. For example, if Amiya runs a staid (i.e., level 1) campaign while Ramya runs a vigorous (i.e., level 2) campaign, then Amiya will receive $\frac{1}{3}$ of the votes cast, and Ramya will receive the other $\frac{2}{3}$.

The above-mentioned percentages change as follows if at least one of them runs a campaign attacking their opponent.

- If Amiya runs a campaign attacking Ramya and Ramya runs a campaign focusing on issues, then 10% of the students who would have otherwise voted for Amiya will vote for Ramya, and another 10% who would have otherwise voted for Amiya, will not vote at all.
- If Ramya runs a campaign attacking Amiya and Amiya runs a campaign focusing on issues, then 20% of the students who would have otherwise voted for Ramya will vote for Amiya, and another 5% who would have otherwise voted for Ramya, will not vote at all.
- If both run campaigns attacking each other, then 10% of the students who would have otherwise voted for them had they run campaigns focusing on issues, will not vote at all.

Q.29)

If both of them run staid campaigns attacking the other, then what percentage of students will vote in the election?

- a) 60%
- b) 64%
- c) 40%
- d) 36%

Answer: (D)

Explanation:

If both of them run staid campaigns focussing on issues, then the percentage of students voting in the election will be 20 times the sum of the levels of campaigning of the two students. So the percentage would be $20(1 + 1)\% = 40\%$. But as both of them run staid campaigns attacking the other, then 10% of 40% will not vote at all. Hence answer would be 90% of 40% which is equal to 36%.

Q. 30

What is the minimum percentage of students who will vote in the election?

- a) 36%
- b) 38%
- c) 32%
- d) 40%

Answer: (D)

Explanation:

Minimum percentage of students who will vote will be obtained when they run staid campaign as it of level 1. Also if they run staid campaigns attacking the other, then percentage voting would be further reduced. So minimum percentage will be obtained as 90% of $20(1 + 1)\% = 90\%$ of $40\% = 36\%$.

Q. 31

If Amiya runs a campaign focusing on issues, then what is the maximum percentage of votes that she can get?

- a) 44%
- b) 40%
- c) 48%
- d) 36%

Answer: (C)

Explanation:

If both of them run vigorous campaigns focussing on issues, then the percentage of students voting in the election will be 20 times the sum of the levels of campaigning of the two students. So the percentage would be $20(2 + 2)\% = 80\%$. Hence each of them would get 40% votes. It is given that Amiya runs a campaign focusing on issues. To maximise percentage of votes she gets, will be obtained when Ramya run a campaign attacking their opponent. So the reduction in the percentage of votes obtained by Ramya would be 20% of 40% = 8% which would be added to percentage of votes of Amiya. So Amiya would get $40\% + 8\% = 48\%$ votes. Also 5% who would have otherwise voted for Ramya, will not vote at all. Hence total reduction in the percentage of votes for Ramya would be $8\% + 5\%$ of $40\% = 10\%$. So answer of this question is 48%.

Q. 32

If Ramya runs a campaign attacking Amiya, then what is the minimum percentage of votes that she is guaranteed to get?

- a) 15%

- b) 30%
- c) 12%
- d) 18%

Answer: (A)

Explanation:

Minimum percentage of students who will vote will be obtained when they run staid campaign as it of level 1. If both of them run staid campaigns focussing on issues, then the percentage of students voting in the election will be 20 times the sum of the levels of campaigning of the two students. So the percentage would be $20(1 + 1)\% = 40\%$. Hence each of them would get 20% votes. It is given that Ramya runs a campaign attacking their opponent. So the reduction in the percentage of votes obtained by Ramya would be 20% of 20% = 4% which would be added to percentage of votes of Amiya. Also 5% who would have otherwise voted for Ramya, will not vote at all. Hence total reduction in the percentage of votes for Ramya would be $4\% + 5\% \text{ of } 20\% = 4\% + 1\% = 5\%$. So minimum percentage of votes that she is guaranteed to get will be $20\% - 5\% = 15\%$.

Q. 33

What is the maximum possible voting margin with which one of the candidates can win?

- a) 29%
- b) 26%
- c) 20%
- d) 28%

Answer: (A)

Explanation:

Maximum margin occurs when Amiya runs vigorous (level 2) issue-focused and Ramya runs staid (level 1) attacking. Voting % = $20 \times (2 + 1) = 60\%$. Amiya gets $\frac{2}{3} \times 60\% = 40\%$, Ramya gets $\frac{1}{3} \times 60\% = 20\%$. With Ramya attacking: 20% of Ramya's 20% = 4% switch to Amiya; 5% of Ramya's 20% = 1% don't vote. Amiya = $40\% + 4\% = 44\%$; Ramya = $20\% - 4\% - 1\% = 15\%$. Maximum margin = $44\% - 15\% = 29\%$.

DIRECTIONS for questions 34-38: Read the information given below and answer the question that follows.

The game of QUIET is played between two teams. Six teams, numbered 1, 2, 3, 4, 5, and 6, play in a QUIET tournament. These teams are divided equally into two groups. In the tournament, each team plays every other team in the same group only once, and each team in the other group exactly twice. The tournament has several rounds, each of which consists of a few games. Every team plays exactly one game in each round.

The following additional facts are known about the schedule of games in the tournament.

- (1) Each team played against a team from the other group in Round 8.
- (2) Rounds 4 and 7 had identical match-ups; Rounds 5 and 8 had identical match-ups.
- (3) Team 4 played Team 6 in both Round 1 and Round 2.
- (4) Team 1 played Team 5 ONLY once, in Round 2.
- (5) Team 3 played Team 4 in Round 3; Team 1 played Team 6 in Round 6.
- (6) In Round 8, Team 3 played Team 6, and Team 2 played Team 5.

Q.34) How many rounds were there in the tournament?

Answer: (8)

Explanation:

It is given that the 6 teams are divided into two groups containing 3 teams each. As each team in the same group plays every other team once and in the other group twice, so there would be 3 matches among teams of same group and 6 matches among teams of different group. Hence we can find the total matches in the tournament as $3 + 3 + 6 + 6 + 6 = 24$. Also every team plays exactly one game in one round means each round will have 3 matches involving each team. Hence there will be 8 rounds in the tournament.

Now we will further analyse the given information: As we can see that Team 3 played against Team 6 twice, Team 2 played against Team 5 twice and Team 1 played against Team 4 twice, so Teams 3 & 6, 2 & 5 and 1 & 4 are of different groups. Now considering points 3 and 4, we get the information that Teams 4 and 6 are of different groups and Teams 1 and 5 are of same group. Hence we can say that Teams 1, 5 and 6 make a group (say Group I) and correspondingly Teams 2, 3 and 4 (say Group II) make the other group. So we can list down the matches which will be played among teams of Group I and Group II

Group I	Group II
Team 1 Vs Team 6	Team 2 Vs Team 3
Team 1 Vs Team 5	Team 2 Vs Team 4
Team 5 Vs Team 6	Team 3 Vs Team 4

Also we can make a list of matches which were played between teams of different groups:

Team 3 Vs Team 6
Team 2 Vs Team 5
Team 1 Vs Team 4
Team 3 Vs Team 5
Team 1 Vs Team 3

Team 2 Vs Team 6
Team 1 Vs Team 2
Team 4 Vs Team 6
Team 4 Vs Team 5

From point 6 , it is given that Team 3 played Team 8 and Team 2 played Team 5. Clubbing this information with the information in point 1 that each team played against a team from the other group in Round 8 , we can surely conclude that the 3rd match of Round 8 must have been played between Team 1 and 4.

Also as per point 2 , match ups of Round 5 and Round 8 were identical. Hence we get the details of matches played in Round 5 . Now using information given in points 3,4,5 and 6 , we will find the details of matches played in various rounds and put the information in a table where alphabet T stands for Team:

Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
T4 Vs T6	T4 Vs T6	T3 Vs T4		T3 Vs T6	T1 Vs T6		T3 Vs T6
	T1 Vs T5			T2 Vs T5			T2 Vs T5
-	-			T1 Vs T4			T1 Vs T4

As it is given that every team plays exactly one game in each round, so we can see that T6 would be definitely there in Round 4 and Round 7. Considering the list of matches given for different groups, only T2 is left to play against T6. Hence T2 and T6 would play against each other in Round 4 and 7.

Also match between T2 and T4 is to be played only once. This will be necessarily played in Round 6 as T4 is already playing in Rounds 1, 2 and 3.

Also match between T1 and T2 is to be played twice. This will be necessarily played in Round 1 and Round 3. It means match between T5 and T6 which is to be played only once will be in Round 3.

Also match between T4 and T5 is to be played twice. This will be necessarily played in Round 4 and Round 7. It means match between T1 and T3 which is to be played twice would also be played in Round 4 and Round 7. So after filling all the above information, we get the final table as follows:

Round 1	Round 2	Round 3	Round 4	Round 5	Round 6	Round 7	Round 8
T4 Vs T6	T4 Vs T6	T3 Vs T4	T1 Vs T3	T3 Vs T6	T1 Vs T6	T1 Vs T3	T3 Vs T6
T3 Vs T5	T1 Vs T5	T5 Vs T6	T2 Vs T6	T2 Vs T5	T2 Vs T4	T2 Vs T6	T2 Vs T5
T1 Vs T2	T2 Vs T3	T1 Vs T2	T4 Vs T5	T1 Vs T4	T3 Vs T5	T4 Vs T5	T1 Vs T4

Q. 35

What is the number of the team that played Team 1 in Round 5?

Answer: (4)

Explanation:

From the complete schedule derived: Groups are {1,5,6} and {2,3,4}. Round 5 matches are identical to Round 8 matches (T3 vs T6, T2 vs T5, T1 vs T4). Therefore, Team 4 played Team 1 in Round 5.

Q. 36

Which team among the teams numbered 2, 3, 4, and 5 was not part of the same group?

- a) 3
- b) 2
- c) 4
- d) 5

Answer: (D)

Explanation:

From the given facts: Teams 3 & 6, 2 & 5, and 1 & 4 are from different groups (they play each other twice). Also, Teams 4 and 6 are from different groups and Teams 1 and 5 are in the same group. Therefore, Group I = {1, 5, 6} and Group II = {2, 3, 4}. Team 5 (from Group I) was not part of the same group as Teams 2, 3, and 4 (all in Group II).

Q. 37

What is the number of the team that played Team 1 in Round 7?

Answer: (3)

Explanation:

From the complete schedule: Round 7 match-ups are identical to Round 4. Round 4 matches include T1 vs T3, T2 vs T6, and T4 vs T5. Therefore, Team 3 played Team 1 in Round 7.

Q. 38

What is the number of the team that played Team 6 in Round 3?

Answer: (5)

Explanation:

From the complete schedule: Round 3 matches are T3 vs T4, T5 vs T6, and T1 vs T2. Therefore, Team 5 played Team 6 in Round 3.

DIRECTIONS for questions 39-42: Read the information given below and answer the question that follows

Six web surfers M, N, O, P, X, and Y each had 30 stars which they distributed among four bloggers A, B, C, and D. The number of stars received by A and B from the six web surfers is shown in the figure below.



Q.39)

What was the total number of stars received by D?

Answer: (45)

Explanation:

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

Total stars = $6 \times 30 = 180$. Since all four bloggers received equal totals, each received $180/4 = 45$ stars.

Q. 40

What was the number of stars received by D from Y?

- a) cannot be determined
- b) 5
- c) 0
- d) 10

Answer: (B)

Explanation:

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45

C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

From the analysis: C received 15 stars from M and D received 5 stars from M (satisfying the condition that each blogger received a different number from M). Since D received more stars from Y than C (Condition 5), and Y distributed among C and D only (with C getting 0 from Y), D received 5 stars from Y. The final table confirms D gets 5 from Y.

Q. 41

How many surfers distributed their stars among exactly 2 bloggers?

Answer: (2)

Explanation:

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45

D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

From the final distribution table: N distributed stars to A (25) and D (5) only—2 bloggers. P distributed stars to A (5) and B (25) only—2 bloggers. O and X each gave all 30 stars to a single blogger (C or D). M distributed among A, C, and D. Y distributed among A, B, C, and D. Therefore, exactly 2 surfers (N and P) distributed their stars among exactly 2 bloggers.

Q. 42

Which of the following can be determined with certainty? I. The number of stars received by C from M II. The number of stars received by D from O

- a) Only I
- b) Both I and II
- c) Only II
- d) Neither I nor II

Answer: (A)

Explanation:

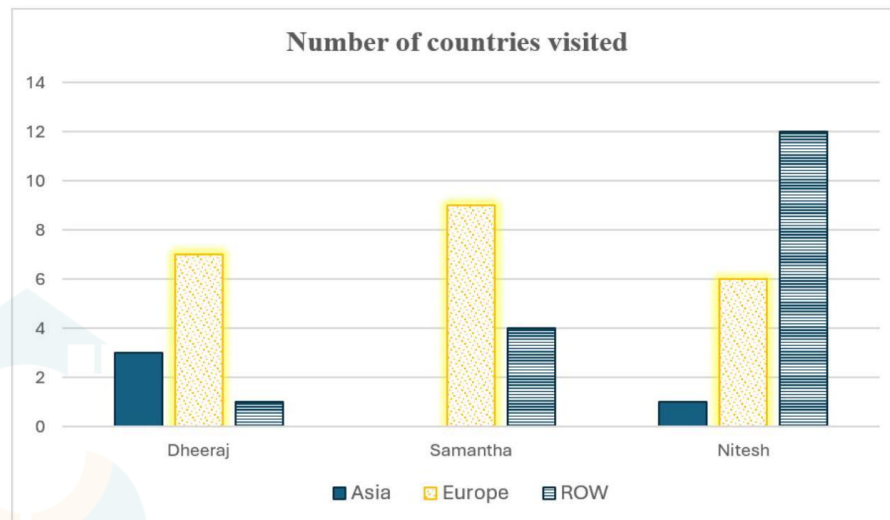
	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

	M	N	O	P	X	Y	Total
A	10	25	0	5	0	5	45
B	0	0	0	25	0	20	45
C	15	0	30/0	0	0/30	0	45
D	5	5	0/30	0	30/0	5	45
Total	30	30	30	30	30	30	180

From the analysis: C received 15 stars from M-this can be uniquely determined (if C got 5 from M, D would get 15 from M, but then the totals don't work out). So Statement I can be determined with certainty. However, for D from O, O gave all 30 stars to either C or D (Condition 4 states two surfers gave all to a single blogger-these are O and X). O could have given 30 to C or 30 to D; we cannot determine which with certainty. Statement II cannot be determined.

DIRECTIONS for questions 43-46: Read the information given below and answer the question that follows.

The chart below provides complete information about the number of countries visited by Dheeraj, Samantha and Nitesh, in Asia, Europe and the rest of the world (ROW).



The following additional facts are known about the countries visited by them.

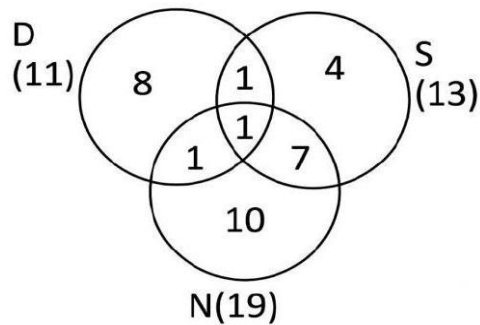
- 32 countries were visited by at least one of them.
- USA (in ROW) is the only country that was visited by all three of them
- China (in Asia) is the only country that was visited by both Dheeraj and Nitesh, but not by Samantha.
- France (in Europe) is the only country outside Asia, which was visited by both Dheeraj and Samantha, but not by Nitesh.
- Half of the countries visited by both Samantha and Nitesh are in Europe.

Q.43

How many countries in Asia were visited by at least one of Dheeraj, Samantha and Nitesh?

Answer: (3)

Explanation:



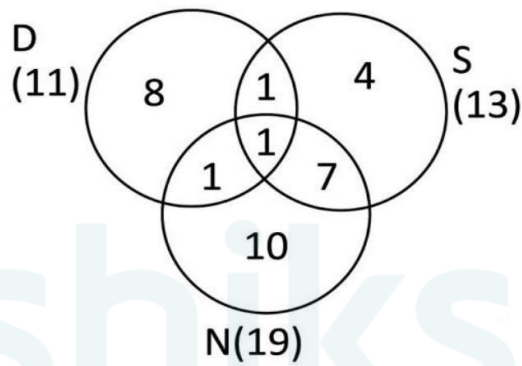
Using the Venn diagram analysis: In Asia-Only Dheeraj = 2, Only Nitesh = 0, Only D & N (China) = 1. Total Asia = 2 + 0 + 1 = 3 countries.

Q. 44

How many countries in Europe were visited only by Nitesh?

Answer: (2)

Explanation:



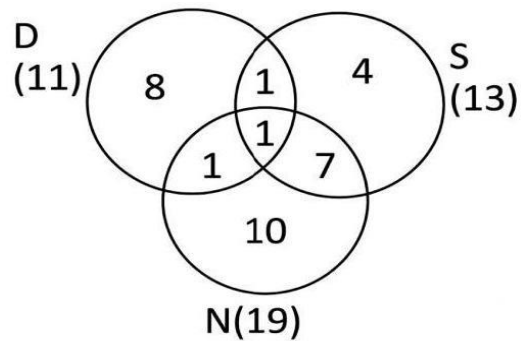
From the complete country distribution table: In Europe-Only Dheeraj = 6, Only Samantha = 4, Only Nitesh = 2, Only D & S (France) = 1, Only S & N = 4, Only D & N = 0, D & S & N = 0. Total Europe = 17. Nitesh visited 2 countries in Europe alone.

Q. 45

How many countries in the ROW were visited by both Nitesh and Samantha?

Answer: (4)

Explanation:



From the analysis: $f(\text{Samantha \& Nitesh only}) = 7$. Using Condition 5: half of S & N countries are in Europe, so 4 in Europe and 3 in ROW. Adding USA (all three) = 1 in ROW. Total ROW visited by both Nitesh and Samantha = $3 + 1 = 4$ countries.

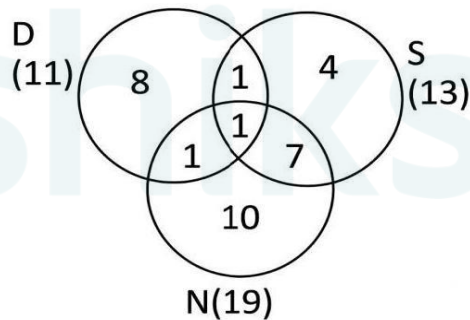
Q. 46

How many countries in Europe were visited by exactly one of Dheeraj, Samantha and Nitesh?

- a) 10
- b) 12
- c) 5
- d) 14

Answer: (B)

Explanation:



From the distribution table: Countries in Europe visited by exactly one person = Only Dheeraj (6) + Only Samantha (4) + Only Nitesh (2) = 12 countries.

SECTION: QUANTITATIVE ABILITY

Q. 47

In the XY-plane, the area, in sq. units, of the region defined by the inequalities $y \geq x + 4$ and $-4 \leq x^2 + y^2 + 4(x - y) \leq 0$ is

- a) π
- b) 2π
- c) 4π
- d) 3π

Answer: (B)

Explanation:

The inequality $x^2 + y^2 + 4(x - y) \leq 0$ gives $x^2 + y^2 + 4x - 4y \leq 0$,

which can be written as $(x + 2)^2 + (y - 2)^2 \leq 8$ – a circle with centre $(-2, 2)$ and radius $2\sqrt{2}$. The lower bound $-4 \leq x^2 + y^2 + 4(x - y)$ combined with the circle gives an annular-like region.

The line $y \geq x + 4$ (i.e., $x - y \leq -4$) passes through the circle.

The centre $(-2, 2)$ satisfies $x - y = -4$, so the line passes through the centre.

The region satisfying $y \geq x + 4$ is exactly half the circle. Area = $(1/2) \times \pi \times r^2 = (1/2) \times \pi \times 4 = 2\pi$.

Q. 48

The sum of all real values of k for which $(1/8)^k \times (1/32768)^{(1/3)} = (1/8) \times (1/32768)^{(1/k)}$ is

- a) $4/3$
- b) $-4/3$
- c) $2/3$
- d) $-2/3$

Answer: (D)

Explanation:

Note that $32768 = 8^5$.

So $(1/32768)^{(1/3)} = (1/8^5)^{(1/3)} = (1/8)^{(5/3)}$

and $(1/32768)^{(1/k)} = (1/8)^{(5/k)}$.

The equation becomes $(1/8)^k \times (1/8)^{5/3} = (1/8)^1 \times (1/8)^{5/k}$,

giving $(1/8)^{k+5/3} = (1/8)^{1+5/k}$.

Equating exponents: $k + 5/3 = 1 + 5/k \rightarrow k - 1 = 5/k - 5/3 \rightarrow 3k^2 + 2k - 15 = 0$

(after multiplying through). Sum of roots = $-2/3$.

Q. 49

The sum of all four-digit numbers that can be formed with the distinct non-zero digits a, b, c , and d , with each digit appearing exactly once in every number, is $153310 + n$, where n is a single digit natural number. Then, the value of $(a + b + c + d + n)$ is

Answer: (31)

Explanation:

Total 4 -digit numbers = $4! = 24$.

Each digit appears $24/4 = 6$ times in each place (thousands, hundreds, tens, units).

Sum = $6 \times 1111 \times (a + b + c + d) = 6666(a + b + c + d)$.

Setting $6666(a+b+c+d) = 153310 + n$: $153310 \div 6666 \approx 23.00 \dots \rightarrow 6666 \times 23 = 153318$.
So $153310 + n = 153318$,

giving $n = 8$. Therefore $a + b + c + d = 23$ and $a + b + c + d + n = 23 + 8 = 31$.

Q. 50

Renu would take 15 days working 4 hours per day to complete a certain task whereas Seema would take 8 days working 5 hours per day to complete the same task. They decide to work together. Seema agrees to work for double the number of hours per day as Renu, while Renu agrees to work for double the number of days as Seema. If Renu works 2 hours per day, then the number of days Seema will work is

Answer: (6)

Explanation:

Total work: Renu's capacity = $15 \times 4 = 60\text{hrs}$;

Seema's capacity = $8 \times 5 = 40\text{hrs}$.

LCM = 120 units of work.

Renu's efficiency = $120/60 = 2 \text{ units/hr}$;

Seema's = $120/40 = 3 \text{ units/hr}$.

Renu works 2 hrs/day $\rightarrow$ Seema works 4 hrs/day.

Let Seema work x days $\rightarrow$ Renu works $2x$ days.

Work equation: $2 \text{ units/hr} \times 2 \text{ hrs/day} \times 2x \text{ days} + 3 \text{ units/hr} \times 4 \text{ hrs/day} \times x \text{ days} = 120$. $8x + 12x = 120 \rightarrow 20x = 120 \rightarrow x = 6$ days.

Q. 51

For any natural number n , let a_n be the largest integer not exceeding $\sqrt{n}$. Then the value of $a_1 + a_2 + \dots + a_{50}$ is

Answer: (217)

Explanation:

$a_n = \text{floor}(\sqrt{n})$.

Grouping: $n = 1$ to $3 \rightarrow a_n = 1$ (3 values): $1 \times 3 = 3$;

$n = 4$ to $8 \rightarrow a_n = 2$ (5 values): $2 \times 5 = 10$; $n = 9$ to $15 \rightarrow a_n = 3$ (7 values):

$3 \times 7 = 21$; $n = 16$ to $24 \rightarrow a_n = 4$ (9 values):

$4 \times 9 = 36$; $n = 25$ to $35 \rightarrow a_n = 5$ (11 values): $5 \times 11 = 55$; $n = 36$ to $48 \rightarrow a_n = 6$ (13 values):

$6 \times 13 = 78$; $n = 49$ to $50 \rightarrow a_n = 7$ (2 values):

$7 \times 2 = 14$. Total = $3 + 10 + 21 + 36 + 55 + 78 + 14 = 217$.

Q. 52

The surface area of a closed rectangular box, which is inscribed in a sphere, is 846 sq cm, and the sum of the lengths of all its edges is 144 cm. The volume, in cubic cm, of the sphere is

- a) 750π
- b) $1125\pi\sqrt{2}$
- c) 1125π
- d) $750\pi\sqrt{2}$

Answer: (B)

Explanation:

$2(lb + bh + hl) = 846$ and $4(l + b + h) = 144$, so $l + b + h = 36$. Then $l^2 + b^2 + h^2 = (l + b + h)^2 - 2(lb + bh + hl) = 36^2 - 846 = 1296 - 846 = 450$. The body diagonal of the cuboid = diameter of the sphere = $\sqrt{l^2 + b^2 + h^2} = \sqrt{450}$. Radius $R = \sqrt{450}/2 = \sqrt{450}/4$. Volume = $(4/3)\pi R^3 = (4/3)\pi(\sqrt{450}/4)^3 = (4/3)\pi \times (450^{3/2})/8 = (4/3)\pi \times (450\sqrt{450})/8 = (\pi/6) \times 450 \times \sqrt{450} = 75\pi \times \sqrt{450} = 75\pi \times 15\sqrt{2} = 1125\pi\sqrt{2}$.

Q. 53

If x is a positive real number such that $4\log_{10} x + 4\log_{100} x + 8\log_{1000} x = 13$, then the greatest integer not exceeding x is

Answer: (31)

Explanation:

$4\log_{10} x + 4\log_{100} x + 8\log_{1000} x = 13$. Converting: $\log_{100} x = (1/2)\log_{10} x$ and $\log_{1000} x = (1/3)\log_{10} x$. Let $k = \log_{10} x$: $4k + 4(k/2) + 8(k/3) = 13 \rightarrow 4k + 2k + (8/3)k = 13 \rightarrow (12k + 6k + 8k)/3 = 13 \rightarrow 26k/3 = 13 \rightarrow k = 3/2$. So $x = 10^{3/2} = 10\sqrt{10} \approx 31.62$. Greatest integer not exceeding $x = 31$.

Q. 54

If $(a + b\sqrt{n})$ is the positive square root of $(29 - 12\sqrt{5})$, where a and b are integers, and n is a natural number, then the maximum possible value of $(a + b + n)$ is

- a) 22
- b) 4
- c) 6
- d) 18

Answer: (D)

Explanation:

We need $(a + b\sqrt{n})^2 = 29 - 12\sqrt{5}$.

Testing $(3 - 2\sqrt{5})^2$: $9 + 20 - 12\sqrt{5} = 29 - 12\sqrt{5}$ ✓.

Here $a = 3$, $b = -2$, $n = 5$: $a + b + n = 3 - 2 + 5 = 6$.

Testing $(-3 + \sqrt{20})^2$: $9 + 20 - 12\sqrt{5} = 29 - 12\sqrt{5}$.

The positive root is $(-3 + \sqrt{20})$ since $\sqrt{20} \approx 4.47 > 3$.

Here $a = -3$, $b = 1$, $n = 20$: $a + b + n = -3 + 1 + 20 = 18$.

Maximum possible value = 18.

Q. 55

A shop wants to sell a certain quantity (in kg) of grains. It sells half the quantity and an additional 3 kg to the first customer. Then, it sells half of the remaining quantity and an additional 3 kg to the second customer. Finally, when the shop sells half of the remaining quantity and an additional 3 kg to the third customer, there are no grains left. The initial quantity, in kg, of grains is

- a) 50
- b) 18
- c) 42
- d) 36

Answer: (C)

Explanation:

Working backwards from zero.

After 3rd customer: $x/2 - 3 = 0 \rightarrow x = 6$ (quantity before 3rd customer).

After 2nd customer: $x/2 - 3 = 6 \rightarrow x = 18$ (quantity before 2nd customer).

After 1st customer: $x/2 - 3 = 18 \rightarrow x = 42$ (initial quantity).

Initial quantity = 42 kg.

Q. 56

Let x, y , and z be real numbers satisfying $4(x^2 + y^2 + z^2) = a$, $4(x - y - z) = 3 + a$. Then a equals

- a) 1
- b) 3
- c) 4
- d) $1\frac{1}{3}$

Answer: (B)

Explanation:

From the equations: $4(x^2 + y^2 + z^2) = a$ and $4(x - y - z) = 3 + a$.

Subtracting: $4(x^2 + y^2 + z^2) - 4(x - y - z) = -3$.

So $4x^2 - 4x + 4y^2 + 4y + 4z^2 + 4z = -3$.

Adding $1 + 1 + 1 = 3$

to complete squares: $(2x - 1)^2 + (2y + 1)^2 + (2z + 1)^2 = 0$.

This gives $x = 1/2, y = -1/2, z = -1/2$.

Then $a = 4(1/4 + 1/4 + 1/4) = 4 \times (3/4) = 3$.

Q. 57

Consider two sets $A = \{2, 3, 5, 7, 11, 13\}$ and $B = \{1, 8, 27\}$. Let f be a function from A to B such that for every element b in B , there is at least one element a in A such that $f(a) = b$. Then, the total number of such functions f is

- a) 665
- b) 667
- c) 537
- d) 540

Answer: (D)

Explanation:

We need onto functions from A (6 elements) to B (3 elements).

Using inclusion-exclusion: Number of onto functions $= 3^6 - C(3,1) \times 2^6 + C(3,2) \times 1^6 - C(3,3) \times 0^6 = 729 - 3 \times 64 + 3 \times 1 - 0 = 729 - 192 + 3 = 540$.

Q. 58

The selling price of a product is fixed to ensure 40% profit. If the product had cost 40% less and had been sold for 5 rupees less, then the resulting profit would have been 50%. The original selling price, in rupees, of the product is

- a) 20
- b) 15
- c) 14
- d) 10

Answer: (C)

Explanation:

Let original CP = 100 (units). Original SP = 140. New CP = 60, New SP = $150\% \times 60 = 90$.
Difference in SP: $140 - 90 = 50$ units = Rs5.

So 1 unit = Rs0.10. Original SP = 140 units = Rs 14.

Q. 59

There are four numbers such that average of first two numbers is 1 more than the first number, average of first three numbers is 2 more than average of first two numbers, and average of first four numbers is 3 more than average of first three numbers. Then, the difference between the largest and the smallest numbers is

Answer: (15)

Explanation:

Let the four numbers be p, q, r, s . Condition 1: $(p + q)/2 = p + 1 \rightarrow q = p + 2$.

Condition 2: $(p + q + r)/3 = (p + q)/2 + 2 \rightarrow r = p + 7$.

Condition 3: $(p + q + r + s)/4 = (p + q + r)/3 + 3 \rightarrow s = p + 15$.

Numbers are $p, p + 2, p + 7, p + 15$. Difference between largest and smallest = $p + 15 - p = 15$.

Q. 60

An amount of Rs 10000 is deposited in bank A for a certain number of years at a simple interest of 5% per annum. On maturity, the total amount received is deposited in bank B for another 5 years at a simple interest of 6% per annum. If the interests received from bank A and bank B are in the ratio 10: 13, then the investment period, in years, in bank A is

- a) 6
- b) 4
- c) 3
- d) 5

Answer: (A)

Explanation:

Bank A: $P = 10000, r = 5\%, \text{time} = T \text{ years. } SI_A = 10000 \times 5 \times T / 100 = 500T$.

Maturity amount = $10000 + 500 T$.

Bank B: $P = 10000 + 500 T, r = 6\%, \text{time} = 5 \text{ years. } SI_B = (10000 + 500 T) \times 6 \times 5 / 100 = 3000 + 150 T$.

Ratio: $SI_A / SI_B = \frac{10}{13} \rightarrow 13 \times 500 T = 10 \times (3000 + 150 T) \rightarrow 6500 T = 30000 + 1500 T$
 $\rightarrow 5000 T = 30000 \rightarrow$

$T = 6 \text{ years.}$

Q. 61

A fruit seller has a total of 187 fruits consisting of apples, mangoes and oranges. The number of apples and mangoes are in the ratio 5:2. After she sells 75 apples, 26 mangoes and half of the oranges, the ratio of number of unsold apples to number of unsold oranges becomes 3:2. The total number of unsold fruits is

Answer: (66)

Explanation:

Let apples = $5x$, mangoes = $2x$. Oranges = $187 - 7x$.

After selling: unsold apples = $5x - 75$, unsold oranges = $(187 - 7x)/2$.

Ratio: $(5x - 75)/((187 - 7x)/2) = 3/2 \rightarrow 2(5x - 75) \times 2 = 3(187 - 7x) \rightarrow 20x - 300 = 561 - 21x \rightarrow 41x = 861 \rightarrow x = 21$.

Apples = 105, Mangoes = 42, Oranges = 40.

After selling: $30 + 16 + 20 = 66$ unsold fruits.

Q. 62

ABCD is a rectangle with sides $AB = 56$ cm and $BC = 45$ cm, and E is the midpoint of side CD. Then, the length, in cm, of radius of incircle of $\triangle ADE$ is

Answer: (10)

Explanation:

E is midpoint of CD , so $DE = 28$. $AD = 45$.

By Pythagoras: $AE = \sqrt{(AD^2 + DE^2)} = \sqrt{(2025 + 784)} = \sqrt{2809} = 53$.

Area of $\triangle ADE = (1/2) \times 28 \times 45 = 630$.

Semi-perimeter $s = (45 + 28 + 53)/2 = 63$.

In radius $r = \text{Area} / s = 630/63 = 10$ cm.

Q. 63

If the equations $x^2 + mx + 9 = 0$, $x^2 + nx + 17 = 0$ and $x^2 + (m + n)x + 35 = 0$ have a common negative root, then the value of $(2m + 3n)$ is

Answer: (38)

Explanation:

Let α be the common negative root.

Adding equations (i) and (ii):

$$2\alpha^2 + (m + n)\alpha + 26 = 0.$$

Subtracting equation (iii):

$$a^2 - 9 = 0 \rightarrow a = \pm 3.$$

Since α is negative, $\alpha = -3$.

Substituting in equation (i):

$$9 - 3m + 9 = 0 \rightarrow m = 6. \text{ From (ii)-(i):}$$

$$(n - m)a + 8 = 0 \rightarrow -3(n - 6) + 8 = 0 \rightarrow n = 26/3.$$

$$\text{Then } 2m + 3n = 12 + 26 = 38.$$

Q. 64

In September, the incomes of Kamal, Amal and Vimal are in the ratio 8:6:5. They rent a house together, and Kamal pays 15%, Amal pays 12% and Vimal pays 18% of their respective incomes to cover the total house rent in that month. In October, the house rent remains unchanged while their incomes increase by 10%, 12% and 15%, respectively. In October, the percentage of their total income that will be paid as house rent, is nearest to

- a) 15.18
- b) 13.26
- c) 12.75
- d) 14.84

Answer: (B)

Explanation:

Let incomes be $8k$, $6k$, $5k$.

$$\text{September rent} = 0.15 \times 8k + 0.12 \times 6k + 0.18 \times 5k = 1.2k + 0.72k + 0.9k = 2.82k.$$

October incomes: $8.8k$, $6.72k$, $5.75k$.

Total October income = $21.27k$. Rent unchanged = $2.82k$.

$$\text{Percentage} = (2.82k/21.27k) \times 100 \approx 13.26\%.$$

Q. 65

Suppose $x_1, x_2, x_3, \dots, x_{13}$ are in arithmetic progression such that $x_5 = -4$ and $2x_6 + 2x_9 = x_{11} + x_{13}$. Then, x_{100} equals

- a) -196
- b) 206
- c) 204
- d) -194

Answer: (D)

Explanation:

Let first term = a and common difference = d . $x_5 = a + 4d = -4 \dots$

(i). Condition: $2x_6 + 2x_9 = x_{11} + x_{13} \rightarrow 2(a + 5d) + 2(a + 8d) = (a + 10d) + (a + 12d) \rightarrow 4a + 26d = 2a + 22d \rightarrow 2a + 4d = 0 \rightarrow a + 2d = 0 \dots$

(ii). From (i) and (ii): $d = -2, a = 4$. $x_{100} = a + 99d = 4 + 99 \times (-2) = 4 - 198 = -194$.

Q. 66

A glass is filled with milk. Two-thirds of its content is poured out and replaced with water. If this process of pouring out two-thirds the content and replacing with water is repeated three more times, then the final ratio of milk to water in the glass, is

- a) 1:26
- b) 1:80
- c) 1:27
- d) 1:81

Answer: (B)

Explanation:

After each operation, the fraction of milk remaining is multiplied by $(1 - 2/3) = 1/3$.

The process is repeated 4 times total (once + three more).

Milk fraction after 4 operations = $(1/3)^4 = 1/81$. Water fraction = $80/81$.

Ratio of milk to water = $1/81 : 80/81 = 1 : 80$.

Q. 67

Two places A and B are 45 kms apart and connected by a straight road. Anil goes from A to B while Sunil goes from B to A. Starting at the same time, they cross each other in exactly 1 hour 30 minutes. If Anil reaches B exactly 1 hour 15 minutes after Sunil reaches A, the speed of Anil, in km per hour, is

- a) 18
- b) 14
- c) 12
- d) 16

Answer: (C)

Explanation:

Using the property: $t_{\text{meeting}} = \sqrt{t_A \times t_S}$ where t_A and t_S are Anil's and Sunil's total travel times.

Meeting time $t = 3/2$ hrs.

Let $t_S = x$ hrs; then $t_A = x + 5/4$ hrs. $3/2 = \sqrt{(x + 5/4) \times x}$.

Squaring: $9/4 = x^2 + 5x/4$. $9x^2 + 5x - 9 = 0 \dots$

solving: $(4x + 9)(x - 1) = 0$,

so $x = 1$. $t_S = 1$ hr, $t_A = 1 + 5/4 = 9/4$ hrs.

Speed of Anil = $\frac{45}{\frac{9}{4}} = 45 \times \frac{4}{9} = 20$

$t_A = x + 5/4 = 1 + 5/4 = 9/4$.

Speed = $45 \div (9/4) = 20$. $4x^2 + 5x - 9 = 0 \rightarrow (4x + 9)(x - 1) = 0, x = 1$. $t_A = 1 + 5/4 = 9/4$.

But given answer is 12 .

$t = 3/2$, let $t_A = x$, $t_S = x$: $t_{\text{meeting}} = 3/2 = \sqrt{t_A \times t_S}$.

Anil total time = $3/2 + t_A$, Sunil = $3/2 + t_S$. Difference = $5/4$. $x = 1$, $t_A = 9/4$ hours.

Speed of Anil = $45/(15/4) = 12$ km/h.

Q. 68

When 10^{100} is divided by 7 , the remainder is

- a) 1
- b) 3
- c) 4
- d) 6

Answer: (C)

Explanation:

By Euler's theorem, $\phi(7) = 6$.

So $10^6 \equiv 1 \pmod{7}$. $10^{100} = 10^{(6 \times 16 + 4)} = (10^6)^{16} \times 10^4 \equiv 1^{16} \times 10^4 \pmod{7}$. $10^4 = 10000$. $10000 \div 7 = 1428$ remainder 4.

So $10^{100} \equiv 4 \pmod{7}$.

The remainder is 4.