Mock Test Series 1.0

Mock Test – 02

VARC

Directions (1–4): Read the given passage and answer the questions that follow:

Play is so important to a child's development that it is promoted by the United Nations 1989 Convention on the Rights of the Child, Article 31.1, which recognizes "the right of the child to rest and leisure, to engage in play and recreational activities appropriate to the age of the child and to participate freely in cultural life and the arts". Recognizing that children need time to engage in self-driven play is of essence among parents, caregivers and educators. Play promotes the cognitive, social, emotional and physical development of the child hence it should not be underestimated. Children also develop and strengthen skills such as language development, problem solving, negotiating, and sequencing skills which will be used in further learning.

The role of play in children development has been illustrated in various models and theories. For instance, Jean Piaget's models of child development and learning are based on the perception that when a child grows, it develops cognition structures and mental images (schemes) or linked concepts to understand and respond to physical conditions in the environment. This are necessitated through play activities thus according to Piaget, a child's structure in cognition develops from innate reflexes to complex mental activities.

According to Almon J. Piaget identifies four developmental stages which include Sensory motor where the child at birth to two years builds concepts about how reality works with the surrounding environment. At this stage, a child doesn't have object permanence (knowledge that physical objects exist when not sighted). In the pre-occupational stage, the child doesn't conceptualize abstractly and needs physical circumstances which are concrete (age of seven to 11 years). At two to seven years, the child is in the concrete operational stage where he begins to conceptualize and explain physical experiences by logical structures and can also engage in abstract problem solving. In the formal operations stage, cognition structures are adult like and encompass conceptual reasoning.

On the basis of the above stages therefore, Piaget develops the cognitive theory of play which outlines the cognitive principles of how cognition can be built in children. According to this theory, Repetition of experiences through play necessitates assimilation in the child's structures of cognition thus the child sustains a mental equilibrium. New or different experiences cause loss of equilibrium and change the child's cognitive structure to accommodate new conditions hence more and more structures of cognition are erected. Formalized learning as well as language development is enhanced in playing children. Coolhan K. et al. suggests that opportunities for learning oral communication is presented to the child and this early development of language will later be useful in reading and writing. In addition, children develop problem-solving skills as they play. Some of the playing activities they engage in require critical thinking skills like building with blocks, playing with water and sand, doing puzzles, or constructing and designing their imaginative play area. Free child driven play will make a child curious about his or her world and this facilitates further learning. Therefore according to Ginsburg K. (2001), when allowed to pursue areas of their own interest, children are likely to develop a positive attitude towards learning. According to Jean Piaget, Play creates an atmosphere which is relaxed where learning can take place easily.

In addition, Piaget suggests that play is not similar to learning and for development in cognition to occur, there has to be assimilation and adaptation. He further refers to play as assimilation in the absence of accommodation. Jean Piaget outlines four types of play namely physical or sensory motor play where a child engages in repetition of physical activity such as swinging of the feet or back throwing of the head for sheer enjoyment of doing so. In symbolic play, the child has a mental representation of non present realities. In this type of play Piaget suggests, "It is primarily affective conflicts that appear in symbolic play.

If there is a scene at lunch, for example, one can be sure that an hour or two afterward it will be recreated with dolls and will be brought to a happier solution. If the child has been frightened by a dog, in a symbolic game things will be arranged so that dogs will no longer be mean or children will become brave".

Examples of types of play which encompass Piaget's types include; Games of pivots (Construction) which Involve learning accidentally from symbolic play. On this type of play, Piaget suggested that they are "initially imbued with play symbolism but tend later to constitute genuine adaptations or solutions to problems and intelligent creations" Piaget, 1962. Other games include Games having arbitrary rules, games involving two or more players, board games with rules, sports and card games.

1. All of the following can be inferred from the passage, EXCEPT:
(a) Play promotes the emotional, physical, and cognitive development of a child.
(b) Children strengthen their skills and language development through play.
(c) Play is not an effective method for children to learn and develop.
(d) Playing activities require critical thinking skills such as problem solving and negotiation.

2. What is the style of the passage?
(a) Descriptive
(b) Expressive
(c) Narrative
(d) Analytical

3. What is the tone of the passage?
(a) Critical
(b) Positive
(c) Neutral
(d) Negating

4. What is the main theme of the passage?
(a) The importance of play in children's physical development
(b) The role of play in children's language development
(c) The impact of play on children's cognitive development
(d) The significance of play in children's emotional development

Directions (5–8): Read the given passage and answer the questions that follow:

Pakistan lies in a region that has been a subject of worldwide attention and political tensions since 9/11. The democratic government was overthrown by a military coup in 1999. A submissive government was formed in 2002 after allegedly massively rigged elections. In the past 60 years, dictatorship has ruled for more than 30 years in Pakistan. And whenever there has been parliamentary system, the civilian governments have been heavily influenced by military. In effect, military has governed Pakistan throughout 60 years. Past 8 years of dictatorship rule have brought Pakistan to a number of conflicts. Amid military operations in tribal areas, suicide bombings and political instability; human rights, freedom of press and media have also suffered greatly. With a parliament often referred to as "rubber stamp" and "puppet", the establishment tried to crush every element which raised voice against it. In response to an attempt by the government to overthrow the bold-looking judiciary in March 2007, the country saw a massive movement of lawyers, students, journalists and civil society. Currently there are thousands of missing persons, including journalists, judges, lawyers and other civilian right activists either missing or under detention.

US influence in politics, foreign and internal policies of Pakistan has always been prominent. President Musharraf claimed in a TV interview that then US Secretary of state Richard Armitage threatened to bomb Pakistan to "Stone Age" if American forces were not allowed to use its bases for military operations in Afghanistan following 9//11 attacks. President, as opposed to wishes of 160 million Pakistanis, single handedly took a decision to save his rule which is not strange in any dictator ruled states. It is believed that each government, whether democratic or autocratic, is formed after active US intervention. US policymakers keep a close watch on process of elections, results and formulation of governments.

Consequently, Pakistan's foreign policy has been, on most occasions, a dictation from US government. At present,

Pakistan is struggling for commencement of a democratic process after partially fair elections on Feb 16 2008, in which the anti-Musharraf political parties gained massive success. Amid formulation of new government, the arrival and meetings with political leaders of several US senators and others officials such as Negro Ponte have raised several questions about self reliance and independence of new government setup. One of the major reasons why the previous government setup failed to gain votes in present elections is said to be its heavily US-inspired foreign policy which led to coalition with US in war on terror, and military operations inside Pakistan's western tribal areas against alleged militants.

Apart from foreign policy, issues of freedom of press, media and judiciary and terrorism are the greatest challenges lying ahead of new government. Pakistan is also facing concerns about human rights violations and women abuse. There have been positive signs in these respects. The newly elected speaker of National Assembly is a female candidate from Pakistan Peoples Party, which is mainstream successful party after elections. But the problem of abuse against women finds its roots in un-educated population in backward areas of Pakistan. The situation demands continuation of democratic process, and long term policies of education and health. Nevertheless, people have expectations from new government regarding current social issues. Several judges who were detained have been released by new government and more independent stance on war on terror is expected as opposed to US idea of use of force.

5. Which of the following, if true, would best WEAKEN the argument that US influence in Pakistan's politics and foreign policy has been prominent?

(a) The US has never intervened in the formation of Pakistani governments.
(b) Pakistani citizens have shown strong support for the new government.
(c) The new government has taken a more independent stance on the war on terror.
(d) Pakistani citizens have become more educated and tolerant of other cultures.

6. All of the following can be assumed from the passage EXCEPT:

(a) The US has exerted significant influence on the formation of Pakistani governments.
(b) Pakistan's foreign policy is often dictated by the US government.
(c) The new government has taken a stance against US policy on the war on terror.
(d) Pakistan is facing a number of social issues.

7. What is the TONE of the passage?

(a) Optimistic
(b) Pessimistic
(c) Indifferent
(d) Neutral

8. What can be the best TITLE of the passage?

(a) Political Tensions in Pakistan
(b) US Influence on Pakistan's Policies
(c) Challenges Facing the New Government in Pakistan
(d) Education and Health: The Key to Solving Pakistan's Issues

Directions (9–12): Read the given passage and answer the questions that follow:

Nanotechnology- it is the technique of engineering matter at an atomic level. This technology is quite different from any other ever witnessed before. To justify how difference this technique is, the way to attaining different compound that human beings have practiced for centuries involves mixing quantities of different compounds to produce one compound containing elements of all the mixed compounds, but exhibiting different features.

This is what formidable scientists call innovation. Nevertheless, not anymore, this kind of innovation is intriguing because from one atom, creating several other atoms with unique structures is possible.

In agriculture, the use of nanotechnology in genetic engineering to attain maximum food production has surpassed the local agricultural methods. In addition, it is considered as its exact opposite. People consume the GMOs without any knowledge of their negative effects like severe death of human cell, brain cells and cancerous effects. Locally produced food result in none of the

mentioned effects, in fact, they are safe for consumption. This justifies that nanotechnology is different.

The structure of nanorobots and body cell – the body cell has a nucleus that is considered as the largest organelle. Due to its size, it is able to accommodate a medical nanorobot. Its structure is made of nucleolus that is encompassed by a nuclear membrane and its location is in the cytoplasm. The main function of a nuclear is the storage of genetic data of a person.

Nanorobots are assumed to have the take the rectangular or circular shapes for the purpose of studies. Its volume is 69.250 micron3, surface area of 102.778 micron2, a mass of 80.239pg when dry, width measuring 4.18 microns, a height of 3.28 microns and a length of 5.05 microns. Bloodstream nanorobots are designed to be capable of floating and have a limited trans-device diameter to allow free passage through even the smallest capillary vessels in human beings.

Using nanorobots to repair cells- The nanorobots are designed both internally and externally to suit their purpose. It has a section called proboscis manipulator, sensors, vaults and receivers with different functions. The proboscis is a large manipulator with an axial position designed to extract existing chromatin in the nucleus. After a while, the nanorobot replaces the old chromatin by introducing a new dose from within itself into the nucleus through a mechanism called conduit flow.

This is the mechanism used by nanorobots to repair cells, by emptying nucleus and refilling a new dose of chromatin inside the emptied nucleus after a while. The chromatin being discharged into the cell is stored in a section of the nanorobot called the vault. Chromatin that has been sucked out the nucleus is also stored in the other vault.

Strategy of cell repairing- to obtain the chromatin set that is to be replaced, a new set must be manufactured by first obtaining the structure of the old chromatin using ex vivo, an equipment that reads the DNA structures. The complete DNA structure is thereafter passed to a manufacturing equipment to produce chromatin and store them inside the chromallocyte (nanorobot).

The process begins with obtaining randomly selected samples of DNA from various human organs through a genome CRT procedure. One of the methods for DNA samples involve using chromallocyte nanorobots specifically designed to obtain the DNA without any rupture. After obtaining the samples, they test for viability and the most viable DNA sample structure is manufactured through the above-mentioned process.

Benefits of cell repairing by nanorobots- as it has been explained in the above contexts, the purpose of Nanomedicine is to create more efficient and blameless cells in the sense that all unwanted components of the initial cell are removed using nanorobots. Using this concept, chromosomes containing pathogens like cancer and other genetically inherited anomalies can be removed out of a DNA structure. Therefore, the benefit of this technique is disease prevention at the DNA structure level.

A side effect of cell repairing nanorobots- it is indicated that cell engineering has grave effects on human beings. Most of the food products consumed by humans contain nanosilver. This component is said to be highly toxic and could result in various cancerous diseases. From an environmental point of view, nanosilver is toxic to nitrifying bacteria. Detergents contain this compound and its introduction to the environment in the form of water disposal poses a devastating environmental risk.

9. The passage is LEAST likely to support which of the following statements?

(a) Nanotechnology is a powerful tool in agriculture for genetic engineering.
(b) Nanotechnology is less safe for consumption compared to locally produced food.
(c) Nanorobots have a specific design to repair cells.
(d) Nanosilver is toxic to the environment.

10. What is the source of the following passage?

(a) A research paper in the field of Nanomedicine
(b) An article in a scientific journal
(c) A chapter in a science book
(d) A popular science magazine article

11. Based on the passage, all of the following can be assumed, EXCEPT:

(a) Nanotechnology can produce different compounds from one atom.
(b) GMOs can cause severe death of human cells, brain cells and cancerous effects.

(c) Nanorobots are designed to float in the bloodstream.
(d) Nanorobots can be used to repair cells by replacing the old chromatin with a new dose from within itself.

12. What is the tone of the passage?
(a) Enthusiastic
(b) Skeptical
(c) Objectively informative
(d) Condemnatory

Directions (13–16): Read the given passage and answer the questions that follow:

Literature, cinematography, creativity, philosophy, and, in general, the culture of postmodernism have had a tremendous impact on modern society and the perception of some familiar things, such as time, parent-child relationships, and space. The postmodern literature authors abandon the classical understanding of linear narrative and prefer a cyclical or rhizomatic version (the term belongs to Felix Guattari and Gilles Deleuze). In a new way in postmodern literature, the authors boldly describe their own intimate experiences concerning previously taboo topics.

Their works are full of reflections of human experience and deeply personal experiences. These experiences are applied to universal human knowledge or each person's experience individually. For the first time, the authors started talking about the horrors of war and the animal fear that a person experiences. Authors no longer romanticized the war; its participants were not described as heroes. An ordinary person, yesterday's student or worker, turned out to be in the war.

Sylvia Plath and Anne Sexton paid considerable attention to mental problems in their prose and poetry. In addition, their diaries, especially the diaries of Sylvia Plath, in which she vividly describes her relationship with her father, became creative property. Sylvia Plath calls her father God or an opportunity to speak with God. It refers the reader to another author, the psychoanalyst Jacques Lacan, a severe postmodern figure. For Lacan and later developing his ideas and supporting him Slavoj Zižek (in particular in the work of Hegel in a connected brain), the Christian God is the figure of the Father. With the figure, the child has innate contradictions, which he tries to solve during his (or her) life; these sayings are related to Sigmund Freud.

Ann Sexton and Sylvia Plath turned their personal experiences of spiritual excitement, sex life, love failures, and perception of themselves and their bodies into creativity. For them, creativity was therapy and a fight against their fears and mental disorders. For the publishers of the 70s, their works were too personal because they described too detailed and precise relationships with loved ones, including the experience of violence and cruelty.

Another example of postmodernism in literature is Amy Tan and The Joy Luck Club. It is not only the emotional experiences and the hard life of people who have gone through the revolution and the civil war that deserves attention here. Tang boldly talks about the hard-hitting details of the past of the main characters, who made many mistakes, disdained their principles, acted meanly, but at the same time tried to save themselves at all costs. Tang's work is composed in a bizarre form that is characteristic of this genre. The Tang novella resembles fragments folded logically, stories that are almost not intertwined but proceed from similar circumstances or meet in the same result. It is the rhizome, the root from which the plots and lives of different people, subsequently brought together by fate, come. The Tang characters are randomly brought together in the United States and create a hobby club to play mahjong. The symmetry of the form in which Tang writes the piece is similar to the mahjong.

Emotionality and courage in expressing feelings are some of the techniques of postmodern literature, which strives to be close to any reader. It is easier to become a creator within this work and become the author of a unique performance. Sylvia Plath, through her works, demonstrated committed mistakes, suffering from depression and mental disorders. Ann Sexton battled depression and bipolar disorder by creating interesting results in which she did not try to idealize herself and others. Amy Tan, in her work The Joy Luck Club, not only works with a bizarre and complex form of writing but also tells a large-scale story of an entire nation (in the faces of several main characters), faced with destruction and war and ended up in one place by accident.

13. What is the style of the passage?

(a) Realistic (b) Romantic
(c) Postmodern (d) Narrative

14. Based on the passage, what is the tone of the passage?
(a) Optimistic (b) Brave
(c) Critical (d) Sympathetic

15. What is the central idea of the passage?
(a) The impact of postmodernism on modern society and its perception of familiar things
(b) The creative works of Sylvia Plath, Anne Sexton, and Amy Tan
(c) The influence of Jacques Lacan and Slavoj Zižek on postmodern literature
(d) The techniques used in postmodern literature to appeal to the reader

16. All of the following can be inferred from the passage, EXCEPT:
(a) Postmodern authors express their personal experiences through their works.
(b) Postmodern authors use traditional linear narratives in their works.
(c) Creativity helps postmodern authors cope with mental health issues.
(d) Postmodern authors discuss previously taboo topics in their works.

17. Carefully read the statements in the questions below and arrange them in a logical order of sequence meaningfully.
1. The infant demonstrates an innate ability to hold its breath when submerged in water and grasps objects with enough strength to nearly support its own weight.
2. A healthy newborn is equipped with more than a dozen reflexes that are crucial for its survival.
3. Newborns possess powerful learning mechanisms that enable them to adapt and interact effectively with their environment, even if it is different from that of their distant ancestors.
4. When something brushes its cheek, the newborn turns its head in that direction and proceeds to suck whatever enters its mouth.

18. Carefully read the statements in the questions below and arrange them in a logical order of sequence meaningfully.
1. The significant loss of life among children in medieval Europe underscores the vulnerability of the young population to various health threats and the harsh realities faced by families during this time.
2. The high mortality rates in medieval Europe can be attributed to factors such as malnutrition, childhood illnesses like measles and diarrhoea, and epidemic diseases that particularly affected the very young.
3. The devastating impact of child mortality is exemplified by King Edward I, who lost seven of his 16 children before they reached the age of seven.
4. In medieval Europe, approximately 30 per cent of babies did not survive past their first birthday, and an additional 20 per cent failed to reach adulthood.
5. Another striking example of high child mortality rates during this period is Catherine of Siena's mother, who gave birth to at least 23 children, but only eight survived to adulthood.

19. Carefully read the statements in the questions below and arrange them in a logical order of sequence meaningfully.
1. A TED-Ed animation demonstrates the concept of prisoner's dilemmas using whimsical felt stop-motion and gingerbread men faced with the challenge of preserving the maximum number of their limbs.
2. Through the illustration of prisoner's dilemma scenarios, the TED-Ed animation helps viewers better understand the complexities of these thought experiments and their real-world consequences.
3. Prisoner's dilemmas involve two rational agents who must decide between betraying

one another for a large individual reward or cooperating for a smaller shared reward, without the ability to communicate with each other.

4. As one of the most well-known examples of game theory, prisoner's dilemmas have significant real-life implications, particularly in matters of government and diplomacy.
5. In these thought experiments, there is a critical condition – if both agents choose to betray each other, they end up with nothing.

20. Carefully read the statements in the questions below and arrange them in a logical order of sequence meaningfully.

1. My exposure to philosophers who considered education as a critical aspect of human life only occurred when I traveled to Russia to research the philosophical culture of the Soviet Union.
2. During my time as an undergraduate at Keele University in the late 1970s and as a doctoral student at Oxford in the 1980s, I did not encounter any philosophers organizing lectures or seminars on the philosophy of education.
3. In the tradition of analytic philosophy, there is a particularly noticeable lack of interest in education.
4. In contrast to the analytic philosophers I encountered in the UK, Russian thinkers believed that no serious philosopher could afford to neglect the importance of education.

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

Sentence: Yet the unpredictability of trade fluctuations has made implementing such strategies challenging.

Paragraph: The evolution of the global economy has seen the rise of new markets and the emergence of unpredictable shifts in trade relations. Countries around the world are adapting, implementing new policies, and developing strategies to respond to these changes. ____(1)____. The development of technology, especially in areas like AI and robotics, have greatly influenced the way countries trade and communicate. ____(2)____. For instance, in Japan, the government has been implementing policies to promote its technology sector and to use it as a leverage in global trade. ____(3)____. As a result, they have managed to create a niche for themselves in the global market. ____(4)____.

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

22. Between the years of 1914 and 1930 the psychiatrist and founder of analytical psychology Carl Gustav Jung undertook what he later termed a 'voluntary confrontation with his unconscious'. Employing certain techniques of active imagination that became part of his theory of human development, Jung incited visions, dreams and other manifestations of his imagination, which he recorded in writing and pictures. For some years, he kept the results of this process secret, though he described them to close friends and family as the most important work of his life. Late in his career, he set about collecting and transcribing these dreams and visions.The product was the 'Liber Novus' or 'New Book', now known simply as The Red Book. Despite requests for access from some of the leading thinkers and intellectuals of the 20th century, very few people outside of Jung's close family were allowed to see it before its eventual publication in 2009. It has since been recognised as one of the great creative acts of the century, a magnificent and visionary illuminated manuscript equal to the works of William Blake.

Which of the following best summarizes the passage?

(a) Carl Gustav Jung's exploration of his unconscious through active imagination led to

his major life work, the unpublished 'Liber Novus', now recognized as a seminal contribution to 20th century thought.

(b) Carl Gustav Jung, a renowned psychiatrist, was known for his secretive nature, particularly with respect to his work, the 'Liber Novus', which remained unseen by many until its publication in 2009.

(c) The 'Liber Novus', a product of Carl Gustav Jung's introspective approach to psychiatry, became an influential book of the 20th century, admired for its vision and creativity, and compared to the works of William Blake.

(d) The creation of 'Liber Novus' by Carl Gustav Jung represents an era of psychology where introspection was used as a tool, influencing many great thinkers of the 20th century.

23. Read the below passage and answer the question that follows:

Current challenges faced by Myer Holdings Limited are mainly caused by restrictions imposed on businesses and changes in customer behavior due to the COVID-19 pandemic. The company experienced poor sales, which is why it closed all its stores from March 2020 to May 2020 and focused on transitioning to the online marketplace. An increase in online orders has presented a challenge of order fulfillment. An establishment of an online presence has also urged the company to improve its outbound logistics to ensure that customers can receive their online orders. Further, during the pandemic, supply chains are inevitably disrupted, making it vital for businesses to help them recover as quickly as possible. Thus, Myer has also faced the issue of improving its inbound logistics in response to disruptions. Finally, due to a decrease in revenue, Myer is presented with the challenge of reviewing its customer service and store footprint. In other words, Myer focuses on re-evaluating its operations strategy.

Which of the following best summarizes the passage?

(a) Myer Holdings Limited is facing difficulties in order fulfillment due to the COVID-19 pandemic.

(b) The COVID-19 pandemic has led to a reduction in revenue and changes in customer behavior for Myer Holdings Limited.

(c) Myer Holdings Limited is transitioning to an online marketplace and improving its supply chains to overcome the challenges posed by the COVID-19 pandemic.

(d) Myer Holdings Limited is facing challenges in improving its customer service and store footprint due to the COVID-19 pandemic.

24. Read the below passage and answer the question that follows:

Financial statement analysis tools encompass ratio, vertical, and horizontal analysis. Therefore, this section will seek to explore the pros and cons of the mentioned financial analysis tools. Ratio analysis helps in the determination of efficiency in operations and in analyzing the financial budget of the organization. However, the ratio analysis tool is useful only when the competitor organization is of the same size and type. Similarly, it ignores the current and future data trends and focuses on past data hence, not an effective analysis tool. The vertical financial analysis tool provides an easier way to compare financial statements within an organization as well as between different organizations. Nevertheless, the vertical analysis tool does not measure the liquidity of the organization. The horizontal analysis tool allows for easy interpretation of organizations' comprehensive information as well as monitoring growth and financial patterns. Nevertheless, horizontal analysis is seen as inconsistent due to ever-changing accounting principles and factors. Financial statement analysis facilitates the financial plans and management of an organization by reviewing the cash flows, liability, business trends, and budget preparation. Different financial statement analysis methods are utilized in an attempt to obtain organizational data and information regarding the assets, liabilities, profits

garnered, losses incurred, growth, and competition patterns.

Which of the following best summarizes the passage?

(a) Financial statement analysis only encompasses horizontal analysis
(b) Ratio analysis is an ineffective financial analysis tool
(c) Financial statement analysis methods aim to obtain data and information about various aspects of an organization
(d) Vertical analysis is the most effective financial analysis tool

LRDI

Directions (25–29): Read the following information and answer the question the follows:

In the mall, there are Seven frequent visitors. Their statements were recorded on their visit on Friday which are as follows:

Jaimin : I was the first to come in and the next 2 were Riya and Neha. When I left the mall, Jatin and Vipul were present. Deepika left the mall with me.

Neha : I went to the mall for a short period of time. Jaimin, Riya and deepika were present there

Jatin : When I entered the mall with Vipul, Jaimin and someone else was there.

Riya : I left immediately after Neha left.

Pratham : I had some urgent work so I was not there for a long time. Jatin and Deepika were the only 2 present there.

Deepika : I met Jaimin, Riya, Neha and Vipul during my first visit. But I got some work so I went out with Jaimin. When I went again Jatin and Vipul were there.

Vipul : I do not remember anything about my mall visit.

25. Who among Jatin and Deepika first entered the mall?

(a) Jatin
(b) Deepika
(c) Both at the same time
(d) Cannot be determined

26. How many of the seven members did Vipul meet?

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

27. Who was the last person to leave the mall?

(a) Jaimin (b) Jatin
(c) Deepika (d) Cannot be determined

28. Who was there with Jaimin in the mall when Jatin and Vipul entered the mall?

(a) Deepika (b) Riya
(c) Neha (d) Pratham

29. Who was the last to enter the mall?

(a) Deepika (b) Riya
(c) Neha (d) Pratham

Directions (30–34): Read the following information and answer the question the follows:

A faculty member of a renowned JEE coaching institute was tasked with assessing seven students from different states – named A, B, C, D, E, F, and G - for potential inclusion in their special batch. To maintain impartiality, each student was given a distinct roll number, ranging from 1 to 7. The faculty member evaluated these students on a 10-point scale based on their interview performances, with '10' being the highest score and '1' the lowest. Each student received a unique rating.

Additional known details are as follows:

(i) The student assigned roll number 4 is from state F.
(ii) The student from state C received the highest score, which is an even number.
(iii) The student with roll number 1 scored twice as much as the student with roll number 6.
(iv) Only two students received even-numbered scores. The student from state A scored 5 points more than the student with roll number 3.
(v) The student with roll number 2 received the lowest score but is not from state A.
(vi) The student with roll number 7 scored higher than the student with roll number 5 but lower than the student with roll number 1.
(vii) The student from state F scored higher than the student from state G but lower than the student from state E. None of these three students received an even-numbered score.
(viii) The student assigned roll number 6 is from state B.

30. If the ratings got by all the seven students are arranged in ascending order, then what is the minimum possible second number in that list?
(a) 2 (b) 4
(c) 3 (d) None of these

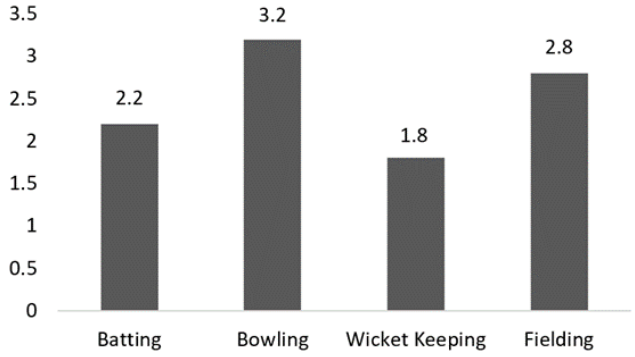
31. What is the maximum possible sum of the ratings got by all the students?

32. If the rating of the student from state D is 2, then what is the absolute difference between the ratings of the students who belong to state G and state A?

33. If the rating of the student from state G is 3, then the sum of the ratings of the those who got even numbered ratings is

34. Consider the condition of the above question to be true. Then what is the sum of the ratings of the people from state G & E?

Directions (35–39): Read the following information and answer the question the follows:
In a local park a cricket match was going on between two teams, these players didn't know that 5 national team selectors were speculating Ram (one of the players playing with them). The names of selectors are A, B, C, D and E. Ram was graded by these 5 selectors on the following parameters: Batting, Bowling, wicket keeping and fielding from 1(lowest) to 4(highest). While grading Ram on four attributes, no selector gave the same grade to two attributes.
The graph below shows the average grade of each of the attributes.



The following table shows the attribute which was not given grade 1 or 4 by the selectors.

A	Bowling, Wicket keeping
B	Bowling, Wicket keeping
C	Batting, Fielding
D	Batting, Fielding
E	Bowling, Wicket keeping

35. How many selectors gave a higher grade to 'Wicketkeeping' than 'Bowling'?
(a) 0 (b) 1
(c) 2 (d) Cannot be determined

36. Which of the following could be an accurate list of grades given by A, If A and B both gave same grade in Batting?
(a) Batting – 1, Bowling – 3, Wicketkeeping – 2, Fielding – 4
(b) Batting – 4, Bowling – 3, Wicketkeeping – 2, Fielding – 1
(c) Batting – 4, Bowling – 2, Wicket keeping – 3, Fielding – 1
(d) Both b) and c)

37. If for 'Wicket keeping', A graded higher than E, which of the following could be an accurate list of the grades given by B?
(a) Batting – 4, Bowling – 3, Wicket keeping – 2, Fielding – 1

(b) Batting – 1, Bowling – 3, Wicket keeping – 2, Fielding – 4
(c) Batting – 1, Bowling – 2, Wicket keeping – 3, Fielding – 4
(d) Both a) and b)

38. If E's grade were not considered, what could be the average grade received by attribute 'Fielding'?
(a) 2.5 (b) 2.6
(c) 3.25 (d) Either (b) or (c)

39. If A's grade were not considered, what would be the average grade received by attribute 'Batting?
(a) 2.5
(b) 2.6
(c) 2.25
(d) Either (b) or (c)

Directions (40–44): Read the following information and answer the question the follows:

Pranjal wants to convert his two storey house that has 5 rooms each in two floors into a hotel. Being a mathematics enthusiast, he was fascinated with prime numbers so he decided to number his rooms for the first floor with five consecutive prime numbers in ascending order in the first 100 natural numbers and five consecutive prime numbers in ascending order in 100's for the second floor.

He was also unconcerned about other people's preference for such sequences so he decided to number his room in such a way as to have as many prime numbers as possible. He wants to go with the numbers such that the average of all numbers of the rooms put together would also be a prime number.

His friend Vanshika told him blithely that such a sequence of five consecutive prime numbers whose average is also prime, is possible for the first floor only. For the second floor, he can put a sequence of only three consecutive prime numbers in 100's whose average is also a prime number.

Pranjal generated the maximum amount of contempt possible with his eyes and found that out of those three consecutive prime numbers in 100's, two of them are exactly 100 more than the two numbers of the first series of prime numbers in the first 100 natural numbers. So he finally decided to convert all five rooms of the first floor and three rooms of the second floor into a hotel.

Further it's known that the digital sum of room number 5 is 8.

40. What is the digital sum of room number 6?

41. How many cases for the rooms on the second floor are possible?
(a) 3 (b) 2
(c) either 3 or 2 (d) None of these

42. What will be the sum of digits of the next prime number to room number 8?

43. What is the numerical difference between room numbered 4 and room numbered 8?

44. Which of the following can be the difference between any two rooms on any of the floors?
(a) 90 (b) 108
(c) 100 (d) 101

QUANT

45. A robot which can detect colours are rotating in a constant speed around the circular base of a cylindrical wall of radius r and of infinite height. Two circular LED lights having the same radius are placed in the same plain where the base of the cylinder lies. The two LED lights are tangential to the base circle of the cylinder and their centres are collinear with the centre of the base of the cylinder. One of the two LED lights are red and the other one is green. If the probability of the robot detecting the green light alone is $\frac{1}{3}$, then find the probability of detecting both green & red lights together by the robot?
(a) $\frac{1}{2}$ (b) $\frac{1}{3}$
(c) $\frac{1}{4}$ (d) $\frac{1}{6}$

46. Tap A alone can completely fill an empty pool in 16 hours and efficiency of tap B in filling is 4 times the efficiency of A. Initially, the pool was empty and taps A and B were opened together simultaneously for two hours after which both taps were closed. Remaining part of pool was then filled by tap C alone in 12 hours. Find the time (in hours) required by tap C alone to completely fill the empty pool.

47. There are three beakers A, B, and C with nitric acid concentrations of 18%, 16%, and 21%, respectively. Himani combined 120 ml of A with 160 ml of B. If he needs the final solution's concentration to be between 17 and 19 percent, what is the sum of the maximum and minimum amounts of C (in ml) that he can add to the solution of A and B?

48. A vertical pole is standing just behind a hemispherical dome of radius R such that the foot of the pole is on the periphery of the base of the dome. Rajan who is facing the pole is standing at a point which is at a distance of R from the closest point of the base of the dome. The base of the pole, the center of the dome & Rajan are on the same straight line. In this position Rajan cannot see any part of the pole, but if he takes a step back, he will be able to see some portion of the pole. If Rajan goes to his right by $R\sqrt{3}$ distance, then what portion of the pole he will be able to see?

(a) $\left(1-\frac{1}{\sqrt{3}}\right)$ of the pole

(b) $\left(1-\frac{1}{\sqrt{2}}\right)$ of the pole

(c) $\frac{1}{\sqrt{3}}$ of the pole

(d) $\frac{1}{\sqrt{2}}$ of the pole

49. In a triangle, three sides are of length a, b & c. If $\frac{(a+b)}{12}=\frac{(b+c)}{11}=\frac{(c+a)}{13}$ and the inradius of the triangle is 8 cm then find the diameter of the circumcircle of ABC (in cm).

50. In a class of 20 students, all students have a different weight. 60% of the students in the class are boys and the rest of the students are girls. The weight of the boy who weighs the most is 82 kg and the weight of the boy who weighs the least is 53 kg. The weight of the girl who weighs the most is 65 kg and the weight of the girl who weighs the least is 47 kg. What is the maximum possible difference between the average weight of the boys and the average weight of the girls? (Round off to nearest possible integer) It is known that all the weights are natural numbers.

51. The simple interest to compound interest ratio on a certain sum compounded annually is 12 : 13. What is the value of (m + n) if the compound interest to simple interest ratio in three years is m : n, where m and n are co-primes?

52. 600 workers are set to build Antilla tower. In 15 weeks, they completed 60% of the assigned work but due to orders from government MCD department demolished 20% of the work (deemed as illegal construction) done by them till now. Builder then approach high court and got a clean chit so the job is resumed by 260 workers. How much more time (in weeks) would be taken by them to complete the remaining work?

53. A & B are moving in a straight line but in opposite directions. C, who is standing in the same straight line as the line of motion of A & B, fired two gunshots at an interval of 10s. A & B heard the gunshots at an interval of 9 sec & 12 sec respectively. Find the ratio of speed of A & B if it is given that the speed of sound is 330 m/s.

(a) 3 : 4 (b) 1 : 1

(c) 2 : 3 (d) 10 : 11

54. If the sum of the last two digits of 67^{1668} is p, then for how many values of x satisfying $\sqrt{-x^2+4x-3} > p-2x, 4x$ is an integer?

55. Find the maximum value of x where x is a natural number so that $[\log_2 1]+[\log_2 2]+[\log_2 3]+...+[\log_2 x] \le 1000$ where [.] represents box function.

56. If the graphs of the lines 3x - 4y + 5 = 0 and 8x - 6y + 11 = 0 intersect at the point P(a, b), then the value of $16(a^3 + b^3 + a(b - 5))$ is:

57. Aman, Rohit, and Samson went to buy some pens, erasers, and rulers. Aman bought some pens and erasers in the ratio 5 : 3, Rohit bought some rulers and erasers in ratio 3 : 2 and Samson bought some pens and rulers in ratio 3 : 5. If together they bought more pens than rulers and more rulers than erasers, then what is the minimum number of items bought by the three friends?

(a) 29 (b) 21
(c) 34 (d) 26

58. A dishonest shopkeeper while purchasing rice uses a faulty weighing machine M1 which shows 80% reading of the actual weight. While selling he uses another faulty weighing machine M2 which shows 120% reading of an actual weight. He purchased rice R1 at 50 INR/kg. Before selling he mixes a low-quality rice R2 purchased using M1 at 30 INR/kg. If he mixes R1 & R2 in the ratio of 3 : 1 and sells it at a profit of 50% then what should be the % discount that he should give on the marked-up price of 50 INR/kg?

(a) 0% (b) 10%
(c) 20% (d) 25%

59. Trevor and Adani have less than 125 shares together. If Adani gives Trevor a certain number of shares, then Trevor would have 5 times as many shares as Adani. Instead, if Trevor gives the same number of shares to Adani, then Trevor would have 4 times as many shares as Adani. If the minimum number of shares, Trevor and Adani have together is more than 70, what can be the number of shares together with them?

60. A rectangle is cut from a semi-circular metal sheet of radius r. What is the minimum area left in the semi-circular sheet?

(a) $r^2\left(\frac{\pi}{2}-0.8\right)$ (b) $r^2\left(\frac{\pi}{2}-1\right)$
(c) $r^2\left(\frac{\pi}{2}-0.5\right)$ (d) $r^2\left(\frac{\pi}{2}-1.2\right)$

61. There are 5 army men in country bunglewood, once they were measuring their height and found out that the average of heights of 4 shortest persons among them is 160 cm, and average of heights of tallest persons among them is 180 cm, then what could be the absolute difference between the minimum and the maximum possible average height overall?

62. In a work-shop there are four different tools Hammer, Screwdriver, Plier and Drill. It is known that, there are 191 tools except Hammers, 178 tools except Screwdrivers, 169 tools except Pliers and 161 tools except Drills. What is the total number of tools in the work-shop?

63. A sunglass company bears an expense of Rs. 240 for producing every sunglass. Also, they have to pay an additional fixed cost of Rs. 25,000, which does not depend on the number of sunglasses produced. If they are able to sell a sunglass to customers during the summer season, they sell it for Rs. 340. If they fail to do so, they have to sell each sunglass for Rs. 200 to scrap collection companies. If they are able to sell only 1,400 out of 1,700 sunglasses, they have made in the summer season, then they have made a profit of Rs. _____:B

64. Let $f: R-\left\{\frac{3}{2}\right\} \to R, f_1(x)=\frac{3x+5}{2x-3}$ and

$f_2(x) = f_1(f_1(x)), f_3(x) = f_1(f_2(x)) \ldots f_n(x) = f_1(f_{n-1}(x))$. Then the value of $S = \sum_{i=1}^{1011} \log_3 P_i$ where $P_i = \left|\left|f_i(1)\right| + \left|f_{(2023-i)}(1)\right|\right|$

65. If 4.5 times the perimeter of a square is 12 cm less than $11\sqrt{2}$ times its length of the diagonal, then the side length of the square is S. What is the perimeter of the square whose side length is $1 + \frac{2}{S} + \frac{3}{S^2} + \frac{4}{S^3} + \ldots$ for $\frac{1}{|S|} < 1$?

66. A number when successively divided by 9, 5 and 4 leaves remainders 5, 3 and 3 respectively. Find the sum of the respective remainders when the order of the divisors is reversed.

VARC

1.	(c)	5.	(a)	9.	(b)	13.	(c)	17.	(2413)	21.	(b)
2.	(d)	6.	(c)	10.	(a)	14.	(d)	18.	(42351)	22.	(c)
3.	(b)	7.	(b)	11.	(b)	15.	(b)	19.	(35412)	23.	(b)
4.	(c)	8.	(c)	12.	(c)	16.	(b)	20.	(3214)	24.	(c)

LRDI

25.	(b)	29.	(d)	33.	(18)	37.	(d)	41.	(d)
26.	(c)	30.	(a)	34.	(8)	38.	(c)	42.	(10)
27.	(d)	31.	(43)	35.	(b)	39.	(a)	43.	(96)
28.	(a)	32	(6)	36.	(a)	40.	(5)	44.	(d)

QUANT

45.	(b)	50.	(23)	55.	(299)	60.	(b)	65.	(9)
46.	(32)	51.	(235)	56.	(58)	61.	(12)	66.	(12)
47.	(310)	52	(30)	57.	(c)	62.	(233)		
48.	(b)	53.	(c)	58.	(b)	63.	(103000)		
49.	(35)	54.	(4)	59.	(120)	64.	(2022)		

Hints & Solutions

VARC

1. (c)

The correct answer is C. Play is not an effective method for children to learn and develop.

This statement is incorrect because the passage clearly states that play is essential for a child's development, and that it is recognized by the United Nations Convention on the Rights of the Child. Piaget's cognitive theory of play, which is mentioned in the passage, states that repetition of experiences through play necessitates assimilation in the child's structures of cognition, and that play facilitates further learning. Furthermore, Coolhan K. et al. suggests that children develop problem-solving skills as they play and that they also engage in activities requiring critical thinking skills such as building with blocks, playing with water and sand, doing puzzles, or constructing and designing their imaginative play area. Thus, option C is not true.

Option A is true because the passage states that play promotes the cognitive, social, emotional and physical development of the child, and that children also develop and strengthen skills such as language development, problem solving, negotiating, and sequencing skills which will be used in further learning.

Option B is true because the passage states that children strengthen their skills and language development through play, and Piaget's cognitive theory of play outlines the cognitive principles of how cognition can be built in children. Furthermore, Coolhan K. et al. suggests that opportunities for learning oral communication is presented to the child and this early development of language will later be useful in reading and writing.

Option D is true because the passage states that playing activities require critical thinking skills such as problem solving and negotiation, and that children develop problem-solving skills as they play. Some of the playing activities they engage in require critical thinking skills like building with blocks, playing with water and sand, doing puzzles, or constructing and designing their imaginative play area.

2. (d)

This answer is correct because the passage takes an analytical approach to discussing the importance of play in a child's development, and the various models and theories associated with it. The passage draws heavily from Jean Piaget's models of child development and learning, which are based on the perception that a child's structures of cognition develop from innate reflexes to complex mental activities. Furthermore, the passage outlines the cognitive principles of how cognition can be built in children through the repetition of experiences, and discusses the importance of allowing a child to pursue areas of their own interest. The passage also looks at the role of play in language development, problem solving, and negotiation. Therefore, this passage follows an analytical approach, making option D the correct answer.

Option A is incorrect because while the passage does provide a descriptive overview of the importance of play and its benefits in a child's development, it does not take a descriptive approach to discussing the topic.

Option B is incorrect because this passage does not take an expressive approach, where the purpose is to express emotions, feelings, and opinions. The passage is largely focused on factual information, and does not express any feelings or opinions on the topic.

Option C is incorrect because the passage does not take a narrative approach. It does not tell a story, but rather examines the role of play in a child's

development from various theoretical and practical perspectives.

3. (b)

This answer is correct because the overall tone of the passage is positive. The author begins by discussing the importance of play, which is recognized by the United Nations 1989 Convention on the Rights of the Child, and is seen as something that should not be underestimated. The author goes on to discuss the benefits of play, including language development, problem solving, negotiating, and sequencing skills, and how it can create a positive attitude towards learning. The author also notes how play can facilitate further learning, and how it creates a relaxed atmosphere in which learning can take place. Therefore, the overall tone of the passage is positive, making option B the correct answer.

Option A is incorrect because the passage does not take a critical approach. It does not criticize the importance of play, or discuss any drawbacks of it; instead, it simply discusses the importance of play for a child's development in a positive way.

Option C is incorrect because the passage does not take a neutral approach. The author is clearly in favor of play and its importance in a child's development, and does not take a balanced stance on the topic.

Option D is incorrect because the passage does not take a negating approach. The author does not offer any opinions or arguments against play, but instead focuses on its importance and benefits.

4. (c)

The passage discusses the importance of play in children's development and focuses mainly on its impact on the cognitive development of children. The passage cites the 1989 United Nations Convention on the Rights of the Child, Article 31.1, which recognizes the right of children to engage in play and recreational activities, as evidence of the importance of play in children's development. The passage then describes various theories, such as Jean Piaget's models of child development, which illustrate the role of play in children's cognitive development.

According to Piaget, play is necessary for the development of cognition structures and mental images in children, and repetition of experiences through play leads to assimilation in the child's cognition structures. Play also promotes language development, problem-solving skills, and abstract problem-solving abilities, among other cognitive skills. Piaget also outlines four types of play, including physical or sensory motor play and symbolic play, that are necessary for cognitive development.

Therefore, the main theme of the passage is the impact of play on children's cognitive development.

Option A) The importance of play in children's physical development is not entirely incorrect, but it is not the main focus of the passage, as the emphasis is mainly on the cognitive impact of play.

Option B) The role of play in children's language development is not the main theme of the passage but is one aspect of the cognitive impact of play.

Option D) The significance of play in children's emotional development is not the main theme of the passage but is also an aspect of the impact of play on children's development.

5. (a)

This answer is correct because if the US had not intervened in the formation of Pakistani governments, then it could be argued that US influence in Pakistan's politics and foreign policy had not been prominent. This would weaken the argument that US influence has been prominent, making option A the correct answer.

Option B is incorrect because the strong support for the new government does not necessarily imply a lack of US influence. It is possible that US intervention may have indirectly contributed to the success of the new government.

Option C is incorrect because the new government's stance on the war on terror does not necessarily weaken the argument that US influence has been prominent in Pakistan's politics and foreign policy. US intervention could have influenced the new government's stance on the war on terror.

Option D is incorrect because increased education and tolerance of other cultures in Pakistan does not necessarily weaken the argument that US influence in Pakistan's politics and foreign policy has been prominent. Education and tolerance can be beneficial in many ways, but they do not necessarily imply a lack of US influence in the country.

6. **(c)**

This answer is correct because the passage does not explicitly state that the new government has taken a stance against US policy on the war on terror. The passage does state that the new government has taken a more independent stance on the war on terror, but this does not mean that the government has taken a stance against US policy. Therefore, option C is the correct answer.

Option A is incorrect because the passage states that it is believed that each government, whether democratic or autocratic, is formed after active US intervention, which implies that the US has exerted significant influence on the formation of Pakistani governments.

Option B is incorrect because the passage states that Pakistan's foreign policy has been, on most occasions, a dictation from US government, which implies that Pakistan's foreign policy is often dictated by the US government.

Option D is incorrect because the passage states that Pakistan is facing concerns about human rights violations and women abuse, which implies that Pakistan is facing a number of social issues.

7. **(b)**

The tone of the passage can be described as pessimistic. This is because the passage focuses on the history of political unrest in Pakistan, the hardships faced by the people, and the lack of freedom of press, media and judiciary. The passage also mentions the heavy US influence on the country's politics, foreign and internal policies, as well as the military operations in tribal areas and human rights violations. Furthermore, the speaker expresses doubt in the new government's ability to bring independence and self-reliance to the country.

Option A is incorrect because the passage does not express any optimism.

Option C is incorrect because the passage does not express any indifferent attitude.

Option D is incorrect because although the passage does not express strong emotions, the content of the passage is still focused on the negative aspects of the political situation in Pakistan, which implies a more pessimistic tone than a neutral one.

8. **(c)**

The main theme of the passage is about the challenges facing the new government in Pakistan after the 2008 elections. The challenges include issues such as human rights violations, terrorism, freedom of press, media and judiciary, and women abuse. The passage highlights the importance of continuing the democratic process, implementing long-term policies in education and health, and addressing the expectations of the people regarding social issues. The newly elected speaker of the National Assembly being a female candidate from a mainstream political party and the release of detained judges by the new government are mentioned as positive signs. The passage also briefly touches upon the issue of US influence on Pakistan's policies and the consequences of the country's foreign policy being heavily US-inspired.

Option A. Political Tensions in Pakistan - This option is not correct as the title does not encompass the entire scope of the challenges facing the new government in Pakistan. It only

focuses on one aspect of the situation in the country, which is political tensions.

Option B. US Influence on Pakistan's Policies - This option is not correct as the title is too narrow and only focuses on one aspect of the challenges facing the new government. The US influence on Pakistan's policies is only mentioned briefly in the passage and is not the main focus of the topic.

Option D. Education and Health: The Key to Solving Pakistan's Issues - This option is not correct as the title only focuses on one aspect of the challenges facing the new government in Pakistan. The passage mentions education and health as important factors for solving the country's issues, but it does not solely focus on them. The title does not encompass the other challenges facing the new government such as human rights violations, terrorism, freedom of press, media and judiciary, and women abuse.

In conclusion, the best title for the passage would be C. Challenges Facing the New Government in Pakistan, as it encompasses the main theme of the passage and highlights the various challenges facing the new government in the country after the 2008 elections.

9. (b)

A. Nanotechnology is a powerful tool in agriculture for genetic engineering:

The passage mentions that the use of nanotechnology in genetic engineering for maximum food production has surpassed local agricultural methods. This statement is supported by the passage and therefore, option A is not the correct answer.

B. Nanotechnology is less safe for consumption compared to locally produced food:

The passage mentions that people consume GMOs without knowledge of their negative effects like severe death of human cells, brain cells, and cancerous effects. Locally produced food results in none of these effects, and they are safe for consumption. This statement is supported by the passage and therefore, option B is the correct answer.

C. Nanorobots have a specific design to repair cells:

The passage mentions that nanorobots are designed both internally and externally to suit their purpose and have a proboscis manipulator, sensors, vaults, and receivers with different functions. The nanorobots repair cells by extracting existing chromatin in the nucleus, replacing it with a new dose from within, and storing the old chromatin in a vault. This statement is supported by the passage and therefore, option C is not the correct answer.

D. Nanosilver is toxic to the environment:

The passage mentions that nanosilver, a component found in most food products consumed by humans, is highly toxic and could result in various cancerous diseases. It also mentions that from an environmental point of view, nanosilver is toxic to nitrifying bacteria and its introduction to the environment in the form of water disposal poses a devastating environmental risk. This statement is supported by the passage and therefore, option E is not the correct answer.

In conclusion, the passage is LEAST likely to support statement B: "Nanotechnology is less safe for consumption compared to locally produced food." This is because the passage mentions that locally produced food is safe for consumption, while GMOs produced using nanotechnology have negative effects like severe death of human cells, brain cells, and cancerous effects.

10. (a)

The passage provides an in-depth and technical overview of the field of Nanomedicine and nanotechnology. It covers a range of topics, including the use of nanotechnology in agriculture, the structure of nanorobots and body cells, the mechanism of repairing cells using nanorobots, the strategy of cell repairing, the benefits of repairing cells using nanorobots, and the side effects of

using nanorobots. The information presented is specific, technical, and detailed, which suggests that it was sourced from a research paper or a similar scholarly publication.

Option B, an article in a scientific journal, could be a possibility, but a research paper is a better fit for the type and depth of information presented in the passage. Option C, a chapter in a science book, could also be a possibility, but the level of detail and specificity in the passage suggests that it was sourced from a specialized publication in the field of Nanomedicine. Option D, a popular science magazine article, is not likely to provide the same level of technical detail and information as a research paper or a scientific journal article.

Therefore, based on the information presented, it is most likely that the source of the passage is a research paper in the field of Nanomedicine.

11. (b)

The passage mentions that nanotechnology can produce different compounds from one atom, Nanorobots are designed to float in the bloodstream, and Nanorobots can be used to repair cells by replacing the old chromatin with a new dose from within itself. Therefore, these statements can all be assumed based on the passage.

Option A can be assumed from the passage because it states that nanotechnology can produce different compounds from one atom. This means that nanotechnology can be used to create and manipulate different types of molecules, including those that can be used for repairing cells.

Option C can be assumed from the passage because it states that nanorobots are designed to float in the bloodstream. This means that nanorobots can be used for medical purposes due to their ability to move through the bloodstream and interact with cells.

Option D can be assumed from the passage because it states that nanorobots can be used to repair cells by replacing the old chromatin with a new dose from within itself. This means that nanorobots can be used to replace damaged or mutated cells with healthy ones, potentially providing a medical solution to certain diseases.

Option B is not true because while the passage mentions that GMOs can have negative effects, it does not provide any evidence that these negative effects include severe death of human cells, brain cells or cancerous effects. In fact, the passage states that local foods, which are not GMOs, do not have these effects. Therefore, it cannot be assumed that GMOs can cause severe death of human cells, brain cells or cancerous effects.

12. (c)

The tone of the passage is objectively informative, as it presents information about nanotechnology in a neutral and impartial manner. The author is not expressing any personal opinions or emotions about the topic, but is simply providing information about the different aspects of nanotechnology, including its uses, benefits, and potential side effects.

Explanations for why other options are not correct:

A) Enthusiastic - The tone of the passage is not enthusiastic, as the author does not express any excitement or admiration for nanotechnology. Instead, the author presents the information in a neutral and impartial manner.

B) Skeptical - The tone of the passage is not skeptical, as the author does not express any doubt or disbelief about the topic. Instead, the author presents the information in a straightforward and objective manner.

D) Condemnatory - The tone of the passage is not condemnatory, as the author does not express any disapproval or criticism of nanotechnology. Instead, the author presents the information in a neutral and impartial manner, including both the benefits and potential side effects of the technology.

13. (c)

The passage is about the impact of postmodernism on literature and society, and how postmodern literature authors approach their works. The style of the passage reflects the postmodern style in literature, which is characterized by abandonment of the classical understanding of linear narrative, and the preference for a cyclical or rhizomatic version. The authors describe their intimate experiences concerning previously taboo topics, and use their works as reflections of human experience and deeply personal experiences.

Option A) Realistic is not correct as postmodern literature is not characterized by realism and often explores themes that are not rooted in reality.

Option B) Romantic is not correct as postmodern literature often challenges the romantic ideals and instead focuses on portraying the realities of human experiences, even the negative aspects.

Option D) Narrative is not correct as postmodern literature often challenges the traditional narrative structure, opting for fragmented and cyclical forms instead of linear narrative.

14. (d)

The passage mentions that postmodern literature authors "boldly describe their own intimate experiences concerning previously taboo topics" and that they "pay considerable attention to mental problems in their prose and poetry." It also mentions that Sylvia Plath and Anne Sexton turned their personal experiences into creativity and that Amy Tan's work "tells a large-scale story of an entire nation." These examples show that the tone of the passage is sympathetic, as it is focused on understanding and empathizing with the struggles and experiences of people in the postmodern literature genre.

Option A is incorrect because the passage does not present a particularly optimistic tone. While it mentions that people in the postmodern literature genre have turned personal experiences into creativity, it also mentions that these experiences often involved struggles.

Option B is incorrect because the passage does not have a particularly brave tone. While it mentions that postmodern authors have "boldly" described personal experiences, it is not necessarily focusing on their bravery in doing so.

Option C is incorrect because the passage does not have a particularly critical tone. While it mentions that Sylvia Plath, Anne Sexton and Amy Tan have described personal experiences and struggles, it does not criticize or judge them for doing so.

15. (b)

The passage primarily focuses on the creative works of Sylvia Plath, Anne Sexton, and Amy Tan and their representation of postmodernism in literature. The authors talk about how these writers have used their personal experiences to create works that reflect on human experience and emotion. Sylvia Plath and Anne Sexton's works talk about mental health and their experiences with it, while Amy Tan's work, The Joy Luck Club, focuses on the experiences of people who have gone through destruction and war.

Option A is not entirely correct as the passage mentions the impact of postmodernism on modern society and perception but only in the context of how these writers have represented it in their works.

Option C is not entirely correct as the passage mentions Jacques Lacan and Slavoj Zižek's influence, but only in the context of how Sylvia Plath refers to her father as God and connects it to their ideas. Option D is partially correct as the passage mentions that postmodern literature uses techniques such as emotionality and courage in expressing feelings to appeal to the reader, but it is not the central idea of the passage. The central idea of the passage is the creative works of Sylvia Plath, Anne Sexton, and Amy Tan and their representation of postmodernism in literature.

16. (b)

The passage clearly states that postmodern literature authors "abandon the classical understanding of linear narrative and prefer a cyclical or rhizomatic version." Therefore, Option B is incorrect, as it is directly contradicted by the passage.

Option A is correct, as the passage mentions that postmodern authors "boldly describe their own intimate experiences concerning previously taboo topics." This implies that they express their personal experiences through their works.

Option C is correct, as the passage mentions that Sylvia Plath and Anne Sexton "turned their personal experiences…into creativity" and that for them, creativity was a form of therapy.

Option D is correct, as the passage mentions that postmodern authors "boldly describe their own intimate experiences concerning previously taboo topics."

17. (2413)

The passage provided discusses the reflexes of a healthy newborn and how these reflexes, as well as their learning mechanisms, are important for their survival and interaction with the world. To create a logical sequence of statements from the passage, we must ensure that each statement flows naturally into the next, with a clear progression of ideas.

Statement-2 is placed first because it introduces the primary topic - newborn reflexes and their importance for survival. By starting with an overview, we set the context for the following statements, which will delve into specific examples of these reflexes.

Statement-4 offers a detailed example of one of the reflexes mentioned in the statement-2. This follows logically from the introductory statement as it begins to illustrate the practical application of these reflexes, giving the reader a concrete example of how they manifest in a newborn's behavior.

Continuing from the statement-4, statement-1 provides additional examples of newborn reflexes. This allows the reader to gain a deeper understanding of the range and diversity of these reflexes and their importance for the infant's survival and development.

Statement-3 broadens the scope of the discussion by not only focusing on reflexes but also emphasizing the newborn's adaptive learning capabilities. This statement is placed last because it serves as a conclusion that ties the previous examples together and highlights the significance of both reflexes and learning mechanisms in the context of the infant's interaction with their environment.

In summary, the sequence follows a logical order by starting with an introduction to the topic, providing specific examples of reflexes, and concluding with a broader perspective on the role of learning mechanisms in a newborn's adaptation to their environment. This progression ensures a coherent and meaningful presentation of the passage's main ideas.

18. (42351)

The correct sequence is 42351.

Statement-4 introduces the topic by providing an overview of child mortality rates in medieval Europe. This statement sets the stage for the subsequent statements, which will discuss the reasons behind these high rates and provide specific examples.

Statement-2 logically follows the statement-4 by explaining the main factors contributing to the high mortality rates among children in medieval Europe. This statement helps the reader understand why so many children did not survive to adulthood during this time.

Statement-3 introduces a historical example (King Edward I) to illustrate the devastating impact of child mortality on individual families. This example adds a personal and relatable dimension to the topic, allowing the reader to grasp the severity of the situation.

Statement-5 provides another historical example (Catherine of Siena's mother) to further emphasize the high child mortality rates in medieval Europe. Including multiple examples strengthens the argument and reinforces the importance of understanding the challenges faced by families during this period.

Finally, statement 1 serves as a conclusion that highlights the vulnerability of young children in medieval Europe and the harsh realities faced by families. This statement ties the previous examples and explanations together and underscores the significance of the topic.

The sequence follows a logical order by starting with an introduction to child mortality rates in medieval Europe, discussing the contributing factors, providing specific historical examples to illustrate the issue, and concluding with a statement that highlights the vulnerability of young children and the challenges faced by families during this time. This structure ensures a coherent and meaningful presentation of the passage's main ideas.

19. (35412)

The correct sequence is 35412.

Statement-3 introduces the concept of prisoner's dilemmas and provides an overview of the scenario involving two rational agents making a decision. This sets the stage for the subsequent statements, which will discuss the conditions and implications of these thought experiments.

Statement-5 logically follows the introduction by explaining the critical condition in prisoner's dilemmas – the potential for both agents to end up with nothing if they both betray each other. This statement highlights the risks involved in these scenarios and adds complexity to the decision-making process.

Statement-4 broadens the scope of the discussion by addressing the real-life implications of prisoner's dilemmas, particularly in the realms of government and diplomacy. This statement helps the reader understand the significance and relevance of these thought experiments beyond the theoretical realm.

Statement-1 introduces the TED-Ed animation, which uses a creative and engaging approach to illustrate the concept of prisoner's dilemmas. This statement serves as a transition from discussing the theoretical aspects of the topic to providing a tangible example of how the concept can be presented and explored.

Finally, statement-2 serves as a conclusion that highlights the purpose and effectiveness of the TED-Ed animation in helping viewers understand the complexities of prisoner's dilemmas and their real-world implications. This statement ties together the previous statements and emphasizes the value of using accessible and engaging methods to explain complex concepts.

The sequence follows a logical order by introducing the concept of prisoner's dilemmas, discussing the critical conditions and real-life implications, presenting the TED-Ed animation as an illustrative example, and concluding with a statement that highlights the effectiveness of the animation in conveying the complexities of the topic. This structure ensures a coherent and meaningful presentation of the passage's main ideas.

20. (3214)

The correct sequence is 3214.

Statement-3 introduces the primary topic of discussion, which is the lack of interest in education within the tradition of analytic philosophy. This sets the stage for the forthcoming statements, which will provide personal experiences and contrasting viewpoints on the matter.

Statement-2 offers a personal anecdote from the author's time at Keele University and Oxford, where they did not witness any philosophy-related educational events. This statement reinforces the observation made in the first statement and

provides evidence for the lack of interest in education within the analytic philosophy tradition.
Statement-1 marks a turning point in the narrative by introducing the author's experience in Russia. This is a crucial statement as it establishes a contrast between the attitudes toward education in the analytic philosophy tradition and those encountered in Russia.
Statement-4 explicitly highlights the difference in perspectives between the analytic philosophers in the UK and the Russian thinkers. By emphasizing that Russian philosophers consider education an essential aspect of human life, the statement reinforces the central argument that there is a marked lack of interest in education within the analytic philosophy tradition.
The sequence follows a logical order by first introducing the main topic, providing personal anecdotes to support the claim, introducing a contrasting viewpoint from another culture, and finally emphasizing the difference between the two perspectives. This structure allows the reader to understand the significance of the issue and the contrast in attitudes towards education in different philosophical traditions.

21. **(b)**

The sentence: "Yet the unpredictability of trade fluctuations has made implementing such strategies challenging" fits into the context of the paragraph by tying the ideas of strategies, unpredictability in global trade, and the challenges faced by countries. The phrase "such strategies" implies that the sentence should come after the mention of strategies being employed. Looking at the paragraph, these strategies are mentioned after position 1. Therefore, the sentence can either fit into position 2 or position 3. However, the mention of a specific country's actions (Japan in this case) comes after position 2, which suggests a shift in the topic. Thus, the best fit for the sentence is at position 2, which links the general discussion of global strategies to the specific example of Japan.
Thus, the correct option is B.

22. **(c)**

Each of the options shares similarities with the passage, making it more challenging to identify the correct summary. However, the depth and complexity of the passage require careful analysis to differentiate the most accurate summary from the partially accurate or misleading ones.
A) This option encapsulates the overall narrative, highlighting Jung's introspective process, his creation of 'Liber Novus', and the ultimate recognition of this work as a major contribution. However, the option lacks detail about the secretive nature of the book until its publication, making it a less comprehensive summary.
B) This option overemphasizes the secretive aspect of Jung's work and fails to mention the introspective methods Jung used to create the 'Liber Novus', which is an integral part of the passage. It also neglects the significance of the work and its comparison to William Blake, which lessens its accuracy as a summary.
C) This option is the most comprehensive and accurate summary of the passage. It highlights the introspective techniques used by Jung, the creation of the 'Liber Novus', the secretive nature surrounding it until its publication, and its eventual recognition as an influential and creative masterpiece comparable to the works of William Blake.
D) This option deviates from the passage by suggesting the 'Liber Novus' influenced many great thinkers of the 20th century. The passage states that many intellectuals sought access to the book, but it does not provide evidence of its influence on these thinkers. This claim is more speculative and less grounded in the specifics of the passage, making it less accurate as a summary.
Therefore, the correct answer is C. While all the options contain elements of the passage, option C best captures the overall narrative, key details, and

tone of the passage, providing the most comprehensive and accurate summary.

23. (b)

The passage clearly states that Myer Holdings Limited is facing challenges due to restrictions imposed on businesses and changes in customer behavior as a result of the COVID-19 pandemic. The company experienced poor sales, which led to the closure of all its stores and a transition to the online marketplace. The increase in online orders has presented the challenge of order fulfillment and the company is working on improving its outbound logistics to meet the demands of its customers. Furthermore, the disruptions in supply chains have led to difficulties in improving the inbound logistics. Finally, due to the decrease in revenue, Myer is reviewing its customer service and store footprint in order to re-evaluate its operations strategy. Hence, option B is correct.

Option A: While order fulfillment is mentioned as a challenge faced by Myer Holdings Limited, it is not the main focus of the passage.

Option C: This option accurately summarizes the passage, but it is not the best choice as it does not cover all the challenges faced by Myer Holdings Limited.

Option D: This option accurately summarizes a specific aspect of the challenges faced by Myer Holdings Limited, but it is not the best choice as it does not cover all the challenges faced by the company.

24. (c)

Option C) Financial statement analysis methods aim to obtain data and information about various aspects of an organization is the best option that summarizes the passage. This option correctly explains that the main purpose of financial statement analysis is to gather data and information about an organization's assets, liabilities, profits, losses, growth, and competition patterns.

Option A) Financial statement analysis only encompasses horizontal analysis is not correct because the passage mentions that financial statement analysis tools also include ratio and vertical analysis.

Option B) Ratio analysis is an ineffective financial analysis tool is partially correct because the passage mentions that ratio analysis has some limitations, such as it being useful only when the competitor organization is of the same size and type and ignoring current and future data trends. However, this option does not fully summarize the passage.

Option D) Vertical analysis is the most effective financial analysis tool is not correct because the passage mentions that while vertical analysis provides an easier way to compare financial statements, it does not measure the liquidity of the organization.

LRDI

25. (b)

First we will try to find out the event in the everyone's statement then we will relate the statement to find the answer

Jaimin	Event 1 - Jaimin comes first Event 2 - Riya and Neha come in 2nd and 3rd Jaimin leaves with Deepika. Jatin and Vipul were there when they left.
Neha	Event - Neha enters Neha meet jaimin, riya and deepika
Jatin	Event - Jatin and Vipul enters Jaimin and someone else were there.
Riya	Event x - Neha leaves Event (x+1) - Riya leaves
Deepika	Event - Deepika enters Deepika meet Riya, Neha, Jatin and Vipul on her first visit Event - Deepika leaves with Jaimin Event - Deepika re-enters

	Jatin and Vipul were there when Deepika enters again
Pratham	Event - Pratham enters Jatin and Deepika were present in the mall
Vipul	No information was provided by Vipul

Now we know, the first 3 persons to enter were Jaimin, Riya and Neha. When Jatin and Vipul entered Jaimin, someone was there. Also, Deepika met Jaimin, Neha, Riya, Jatin and Vipul.
This implies that:
Event 1 - Jaimin comes first
Event 2 - Riya and Neha come in 2nd and 3rd
Event 3 - Deepika enters
Event 4 - Neha leaves
Event 5 - Riya leaves
Event 6 - Vipul and Jatin enters (At that time only Jaimin and Deepika were there)
Event 7 - Jaimin and Deepika leaves
Event 8 - Deepika re-enters (As when see entered Vipul and Jatin was still there)
Event 9 - Vipul leaves (as when pratham enters only Jatin and Deepika were there)
Event 10 - Pratham enters
Event 11 - Pratham leaves
After that no information is provided.
Hence, Deepika enters the mall first.

26. (c)

First we will try to find out the event in the everyone's statement then we will relate the statement to find the answer

Jaimin	Event 1 - Jaimin comes first Event 2 - Riya and Neha come in 2nd and 3rd Jaimin leaves with Deepika. Jatin and Vipul were there when they left.
Neha	Event - Neha enters Neha meet jaimin, riya and deepika
Jatin	Event - Jatin and Vipul enters Jaimin and someone else were there.
Riya	Event x - Neha leaves
	Event (x+1) - Riya leaves
Deepika	Event - Deepika enters Deepika meet Riya, Neha, Jatin and Vipul on her first visit Event - Deepika leaves with Jaimin Event - Deepika re-enters Jatin and Vipul were there when Deepika enters again
Pratham	Event - Pratham enters Jatin and Deepika were present in the mall
Vipul	No information was provided by Vipul

Now we know, the first 3 persons to enter were Jaimin, Riya and Neha. When Jatin and Vipul entered Jaimin, someone was there. Also, Deepika met Jaimin, Neha, Riya, Jatin and Vipul.
This implies that:
Event 1 - Jaimin comes first
Event 2 - Riya and Neha come in 2nd and 3rd
Event 3 - Deepika enters
Event 4 - Neha leaves
Event 5 - Riya leaves
Event 6 - Vipul and Jatin enters (At that time only Jaimin and Deepika were there)
Event 7 - Jaimin and Deepika leaves
Event 8 - Deepika re-enters (As when see entered Vipul and Jatin was still there)
Event 9 - Vipul leaves (as when pratham enters only Jatin and Deepika were there)
Event 10 - Pratham enters
Event 11 - Pratham leaves
After that no information is provided.
Vipul during the mall visit met with 3 members Jatin, Jaimin and Deepika.

27. (d)

First we will try to find out the event in the everyone's statement then we will relate the statement to find the answer

Jaimin	Event 1 - Jaimin comes first Event 2 - Riya and Neha come in 2nd and 3rd

	Jaimin leaves with Deepika. Jatin and Vipul were there when they left.
Neha	Event - Neha enters Neha meet jaimin, riya and deepika
Jatin	Event - Jatin and Vipul enters Jaimin and someone else were there.
Riya	Event x - Neha leaves Event (x+1) - Riya leaves
Deepika	Event - Deepika enters Deepika meet Riya, Neha, Jatin and Vipul on her first visit Event - Deepika leaves with Jaimin Event - Deepika re-enters Jatin and Vipul were there when Deepika enters again
Pratham	Event - Pratham enters Jatin and Deepika were present in the mall
Vipul	No information was provided by Vipul

Now we know, the first 3 persons to enter were Jaimin, Riya and Neha. When Jatin and Vipul entered Jaimin, someone was there. Also, Deepika met Jaimin, Neha, Riya, Jatin and Vipul.
This implies that:
Event 1 - Jaimin comes first
Event 2 - Riya and Neha come in 2nd and 3rd
Event 3 - Deepika enters
Event 4 - Neha leaves
Event 5 - Riya leaves
Event 6 - Vipul and Jatin enters (At that time only Jaimin and Deepika were there)
Event 7 - Jaimin and Deepika leaves
Event 8 - Deepika re-enters (As when see entered Vipul and Jatin was still there)
Event 9 - Vipul leaves (as when pratham enters only Jatin and Deepika were there)
Event 10 - Pratham enters
Event 11 - Pratham leaves
After that no information is provided.
So, we cannot determine who was the last person. It can be Deepika or Jatin.

28. (a)

First we will try to find out the event in the everyone's statement then we will relate the statement to find the answer

Jaimin	Event 1 - Jaimin comes first Event 2 - Riya and Neha come in 2nd and 3rd Jaimin leaves with Deepika. Jatin and Vipul were there when they left.
Neha	Event - Neha enters Neha meet jaimin, riya and deepika
Jatin	Event - Jatin and Vipul enters Jaimin and someone else were there.
Riya	Event x - Neha leaves Event (x+1) - Riya leaves
Deepika	Event - Deepika enters Deepika meet Riya, Neha, Jatin and Vipul on her first visit Event - Deepika leaves with Jaimin Event - Deepika re-enters Jatin and Vipul were there when Deepika enters again
Pratham	Event - Pratham enters Jatin and Deepika were present in the mall
Vipul	No information was provided by Vipul

Now we know, the first 3 persons to enter were Jaimin, Riya and Neha. When Jatin and Vipul entered Jaimin, someone was there. Also, Deepika met Jaimin, Neha, Riya, Jatin and Vipul.
This implies that:
Event 1 - Jaimin comes first
Event 2 - Riya and Neha come in 2nd and 3rd
Event 3 - Deepika enters
Event 4 - Neha leaves
Event 5 - Riya leaves
Event 6 - Vipul and Jatin enters (At that time only Jaimin and Deepika were there)
Event 7 - Jaimin and Deepika leaves
Event 8 - Deepika re-enters (As when see entered Vipul and Jatin was still there)
Event 9 - Vipul leaves (as when pratham enters only Jatin and Deepika were there)

Event 10 - Pratham enters
Event 11 - Pratham leaves
After that no information is provided.
Deepika was there with Jaimin when Jatin and Vipul arrived.

29. (d)

First we will try to find out the event in the everyone's statement then we will relate the statement to find the answer

Jaimin	Event 1 - Jaimin comes first Event 2 - Riya and Neha come in 2nd and 3rd Jaimin leaves with Deepika. Jatin and Vipul were there when they left.
Neha	Event - Neha enters Neha meet jaimin, riya and deepika
Jatin	Event - Jatin and Vipul enters Jaimin and someone else were there.
Riya	Event x - Neha leaves Event (x+1) - Riya leaves
Deepika	Event - Deepika enters Deepika meet Riya, Neha, Jatin and Vipul on her first visit Event - Deepika leaves with Jaimin Event - Deepika re-enters Jatin and Vipul were there when Deepika enters again
Pratham	Event - Pratham enters Jatin and Deepika were present in the mall
Vipul	No information was provided by Vipul

Now we know, the first 3 persons to enter were Jaimin, Riya and Neha. When Jatin and Vipul entered Jaimin, someone was there. Also, Deepika met Jaimin, Neha, Riya, Jatin and Vipul.
This implies that:
Event 1 - Jaimin comes first
Event 2 - Riya and Neha come in 2nd and 3rd
Event 3 - Deepika enters
Event 4 - Neha leaves
Event 5 - Riya leaves
Event 6 - Vipul and Jatin enters (At that time only Jaimin and Deepika were there)
Event 7 - Jaimin and Deepika leaves
Event 8 - Deepika re-enters (As when see entered Vipul and Jatin was still there)
Event 9 - Vipul leaves (as when pratham enters only Jatin and Deepika were there)
Event 10 - Pratham enters
Event 11 - Pratham leaves
After that no information is provided.
Pratham was the last to enter the mall.

30. (a)

By statement (i), students with roll number 4 belong to F.
By statement (iv), only two students got even ratings and since there are 7 students, therefore, 5 of them got odd ratings, i.e., 1, 3, 5, 7, 9.
By statement (ii), students from state C got the highest rating that has to be 10, since it is even
By statement (v), students with roll number 2, got the lowest rating, i.e., 1.

Roll no.	State	Rating
1		
2		1
3		
4	F	
5		
6	B	
7		

By statement (iii) rating of the student (with roll number 1) = 2 × rating of the student (with roll number 5)
Hence, possible combinations are (6, 3) and (10, 5) (Both cannot be even, like (4, 2), (8, 4) because a student must have a rating of 10 and only two students in total have even ratings).
Case 1: (roll number 1 rating, roll number 5 rating) = (6, 3), then it will contradict statement (iv), as rating (roll number 1) > rating (roll number 7) > rating (roll number 5)
Therefore, the rating of roll number 7 has to be 5, and then roll number 3 will have a rating of 10, but it will contradict statement (iv) as rating of student

(from state A) = 5 + rating of student (roll number 3).

Therefore, (roll number 1 rating, roll number 5 rating) = (10, 5) and so students with roll number 1 belong to state C.

Roll no.	State	Rating
1	C	10
2		1
3		
4	F	
5		
6	B	5
7		

Now, by statement (iv), rating of student (state A) = 5 + rating of student (roll number 3), therefore possible combinations are (7, 2), (8, 3), (9, 4)

Subcase 1: (7, 2)

Let rating of the student from state E, F and G be e, f and g respectively, then by studying statement (vii), e > f > g, and all of them are odd.

f can be only 3, then g will be 1 and then e will be 9, and rating of students from state A is 7 (Given) and since rating of student with roll number 7 is greater than that of student with roll number 5, therefore

Table:

Roll no.	State	Rating
1	C	10
2	G	1
3	D	2
4	F	3
5	A	7
6	B	5
7	E	9

Subcase 2: (8, 3)

Again e > f > g, therefore f will be 7, e will be 9 and g could be 1 or 3.

Roll no.	State	Rating
1	C	10
2	D/G	1
3	G/D	3
4	F	7
5	A	8
6	B	5
7	E	9

Subcase 3: (9, 4)

Roll no.	State	Rating
1	C	10
2	G	1
3	D	4
4	F	3
5	E	7
6	B	5
7	A	9

Minimum possible second number is 2 i.e., in subcase 1.

31. (43)

By statement (i), students with roll number 4 belong to F.

By statement (iv), only two students got even ratings and since there are 7 students, therefore, 5 of them got odd ratings, i.e., 1, 3, 5, 7, 9.

By statement (ii), students from state C got the highest rating that has to be 10, since it is even

By statement (v), students with roll number 2, got the lowest rating, i.e., 1.

Roll no.	State	Rating
1		
2		1
3		
4	F	
5		
6	B	
7		

By statement (iii) rating of the student (with roll number 1) = 2 × rating of the student (with roll number 5)

Hence, possible combinations are (6, 3) and (10, 5) (Both cannot be even, like (4, 2), (8, 4) because a student must have a rating of 10 and only two students in total have even ratings).

Case 1: (roll number 1 rating, roll number 5 rating) = (6, 3), then it will contradict statement (iv), as

rating (roll number 1) > rating (roll number 7) > rating (roll number 5)

Therefore, the rating of roll number 7 has to be 5, and then roll number 3 will have a rating of 10, but it will contradict statement (iv) as rating of student (from state A) = 5 + rating of student (roll number 3).

Therefore, (roll number 1 rating, roll number 5 rating) = (10, 5) and so students with roll number 1 belong to state C.

Roll no.	State	Rating
1	C	10
2		1
3		
4	F	
5		
6	B	5
7		

Now, by statement (iv), rating of student (state A) = 5 + rating of student (roll number 3), therefore possible combinations are (7, 2), (8, 3), (9, 4)

Subcase 1: (7, 2)

Let rating of the student from state E, F and G be e, f and g respectively, then by studying statement (vii), e > f > g, and all of them are odd.

f can be only 3, then g will be 1 and then e will be 9, and rating of students from state A is 7 (Given) and since rating of student with roll number 7 is greater than that of student with roll number 5, therefore

Table:

Roll no.	State	Rating
1	C	10
2	G	1
3	D	2
4	F	3
5	A	7
6	B	5
7	E	9

Subcase 2: (8, 3)

Again e > f > g, therefore f will be 7, e will be 9 and g could be 1 or 3.

Roll no.	State	Rating
1	C	10
2	D/G	1
3	G/D	3
4	F	7
5	A	8
6	B	5
7	E	9

Subcase 3: (9, 4)

Roll no.	State	Rating
1	C	10
2	G	1
3	D	4
4	F	3
5	E	7
6	B	5
7	A	9

Maximum possible sum can be found from case 2 i.e., 43.

32. (6)

By statement (i), students with roll number 4 belong to F.

By statement (iv), only two students got even ratings and since there are 7 students, therefore, 5 of them got odd ratings, i.e., 1, 3, 5, 7, 9.

By statement (ii), students from state C got the highest rating that has to be 10, since it is even

By statement (v), students with roll number 2, got the lowest rating, i.e., 1.

Roll no.	State	Rating
1		
2		1
3		
4	F	
5		
6	B	
7		

By statement (iii) rating of the student (with roll number 1) = 2 × rating of the student (with roll number 5)

Hence, possible combinations are (6, 3) and (10, 5) (Both cannot be even, like (4, 2), (8, 4) because a student must have a rating of 10 and only two students in total have even ratings).

Case 1: (roll number 1 rating, roll number 5 rating) = (6, 3), then it will contradict statement (iv), as rating (roll number 1) > rating (roll number 7) > rating (roll number 5)

Therefore, the rating of roll number 7 has to be 5, and then roll number 3 will have a rating of 10, but it will contradict statement (iv) as rating of student (from state A) = 5 + rating of student (roll number 3).

Therefore, (roll number 1 rating, roll number 5 rating) = (10, 5) and so students with roll number 1 belong to state C.

Roll no.	State	Rating
1	C	10
2		1
3		
4	F	
5		
6	B	5
7		

Now, by statement (iv), rating of student (state A) = 5 + rating of student (roll number 3), therefore possible combinations are (7, 2), (8, 3), (9, 4)

Subcase 1: (7, 2)

Let rating of the student from state E, F and G be e, f and g respectively, then by studying statement (vii), e > f > g, and all of them are odd.

f can be only 3, then g will be 1 and then e will be 9, and rating of students from state A is 7 (Given) and since rating of student with roll number 7 is greater than that of student with roll number 5, therefore

Table:

Roll no.	State	Rating
1	C	10
2	G	1
3	D	2
4	F	3
5	A	7
6	B	5
7	E	9

Subcase 2: (8, 3)

Again e > f > g, therefore f will be 7, e will be 9 and g could be 1 or 3.

Roll no.	State	Rating
1	C	10
2	D/G	1
3	G/D	3
4	F	7
5	A	8
6	B	5
7	E	9

Subcase 3: (9, 4)

Roll no.	State	Rating
1	C	10
2	G	1
3	D	4
4	F	3
5	E	7
6	B	5
7	A	9

Question is asking about case 1, required difference = 7 – 1 = 6

33. (18)

By statement (i), students with roll number 4 belong to F.

By statement (iv), only two students got even ratings and since there are 7 students, therefore, 5 of them got odd ratings, i.e., 1, 3, 5, 7, 9.

By statement (ii), students from state C got the highest rating that has to be 10, since it is even

By statement (v), students with roll number 2, got the lowest rating, i.e., 1.

Roll no.	State	Rating
1		
2		1
3		
4	F	

5		
6	B	
7		

By statement (iii) rating of the student (with roll number 1) = 2 × rating of the student (with roll number 5)

Hence, possible combinations are (6, 3) and (10, 5) (Both cannot be even, like (4, 2), (8, 4) because a student must have a rating of 10 and only two students in total have even ratings).

Case 1: (roll number 1 rating, roll number 5 rating) = (6, 3), then it will contradict statement (iv), as rating (roll number 1) > rating (roll number 7) > rating (roll number 5)

Therefore, the rating of roll number 7 has to be 5, and then roll number 3 will have a rating of 10, but it will contradict statement (iv) as rating of student (from state A) = 5 + rating of student (roll number 3).

Therefore, (roll number 1 rating, roll number 5 rating) = (10, 5) and so students with roll number 1 belong to state C.

Roll no.	State	Rating
1	C	10
2		1
3		
4	F	
5		
6	B	5
7		

Now, by statement (iv), rating of student (state A) = 5 + rating of student (roll number 3), therefore possible combinations are (7, 2), (8, 3), (9, 4)

Subcase 1: (7, 2)

Let rating of the student from state E, F and G be e, f and g respectively, then by studying statement (vii), e > f > g, and all of them are odd.

f can be only 3, then g will be 1 and then e will be 9, and rating of students from state A is 7 (Given) and since rating of student with roll number 7 is greater than that of student with roll number 5, therefore

Table:

Roll no.	State	Rating
1	C	10
2	G	1
3	D	2
4	F	3
5	A	7
6	B	5
7	E	9

Subcase 2: (8, 3)

Again e > f > g, therefore f will be 7, e will be 9 and g could be 1 or 3.

Roll no.	State	Rating
1	C	10
2	D/G	1
3	G/D	3
4	F	7
5	A	8
6	B	5
7	E	9

Subcase 3: (9, 4)

Roll no.	State	Rating
1	C	10
2	G	1
3	D	4
4	F	3
5	E	7
6	B	5
7	A	9

Rating of students from state G is 3 in case 2.

The required sum = 10 + 8 = 18.

34. **(8)**

From the table below we can state that the sum of the ratings from state G & E is (1+7) = 8

Roll no.	State	Rating
1	C	10
2	G	1
3	D	4
4	F	3
5	E	7

6	B	5
7	A	9

35. (b)

From the bar graph –

The graph gives the average grade for each attribute given by the five selectors. We can calculate the total that each has got.

Batting = 2.2 × 5 = 11

Bowling = 3.2 × 5 = 16

Wicket keeping = 1.8 × 5 = 9

Fielding = 2.8 × 5 = 14

As the table gives the list of attributes that were not marked 1 or 4 by selectors. That is marked as 2 or 3; The following inference can be drawn:

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	1/4	4/1	3/2
D	2/3	1/4	4/1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

To find total grade for the attribute Wicket keeping as 9, you cannot take the highest grade from any of the selectors.

As, Wicket keeping = A + B + C + D + E = 9; the grade for C and D will be 1;

So, Sum (A, B, E) = Sum (2, 2, 3) =7, where grade for A/ B/ E is either 2 or 3;

Similarly, to find total grade of Bowling = A + B + C + D + E = 16; the grade for C = D = 4;

So, Sum (A, B, E) = Sum (2, 3, 3) = 8, where grade for A/ B/ E is either 2 or 3.

Hence grade for E in Bowling and Wicket Keeping is either 2 or 3.

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

So, the table for wicket keeping and bowling would be –

	Bowling	Wicket keeping
A/B/E	2	3
A/B/E	3	2
C	4	1
D	4	1
A/B/E	3	2
Total	16	9

Only one selector gave a higher grade to wicketkeeping than bowling.

Answer: - (b)

36. (a)

From the bar graph –

The graph gives the average grade for each attribute given by the five selectors. We can calculate the total that each has got.

Batting = 2.2 × 5 = 11

Bowling = 3.2 × 5 = 16

Wicket keeping = 1.8 × 5 = 9

Fielding = 2.8 × 5 = 14

As the table gives the list of attributes that were not marked 1 or 4 by selectors. That is marked as 2 or 3; The following inference can be drawn:

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	1/4	4/1	3/2
D	2/3	1/4	4/1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

To find total grade for the attribute Wicket keeping as 9, you cannot take the highest grade from any of the selectors.

As, Wicket keeping = A + B + C + D + E = 9; the grade for C and D will be 1;

So, Sum (A, B, E) = Sum (2, 2, 3) =7, where grade for A/ B/ E is either 2 or 3;

Similarly, to find total grade of Bowling = A + B + C + D + E = 16; the grade for C = D = 4;
So, Sum (A, B, E) = Sum (2, 3, 3) = 8, where grade for A/ B/ E is either 2 or 3.
Hence grade for E in Bowling and Wicket Keeping is either 2 or 3.

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

Condition: A and B gave the same grade to attribute Batting.
First, let us get a handle of the grades of batting.

	Batting
A	1/4
B	1/4
C	2/3
D	2/3
E	1/4
Total	11

Since A and B gave the same grade to attribute Batting, either A = B = 1 OR A = B = 4
Now, if A = B = 4, then
A + B + C + D + E = 11
A + B = 4 + 4 = 8; C + D + E = 3, that would be C = D = E = 1, which is not possible.
So, for A = B = 1, the grade table will be: -

	Batting	Bowling	Wicket keeping	Fielding
A	1	2/3	3/2	4
B	1	2/3	3/2	4
C	2/3	4	1	3/2
D	3/2	4	1	2/3
E	4	2/3	3/2	1
Total	11	16	9	14

Therefore, A must grade batting as 1. That eliminates option b), c) and d).
Answer: - (a)

37. (d)

From the bar graph –
The graph gives the average grade for each attribute given by the five selectors. We can calculate the total that each has got.
Batting = 2.2 × 5 = 11
Bowling = 3.2 × 5 = 16
Wicket keeping = 1.8 × 5 = 9
Fielding = 2.8 × 5 = 14
As the table gives the list of attributes that were not marked 1 or 4 by selectors. That is marked as 2 or 3; The following inference can be drawn:

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	1/4	4/1	3/2
D	2/3	1/4	4/1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

To find total grade for the attribute Wicket keeping as 9, you cannot take highest grade from any of the selectors.
As, Wicket keeping = A + B + C + D + E = 9; the grade for C and D will be 1;
So, Sum (A, B, E) = Sum (2, 2, 3) =7, where grade for A/ B/ E is either 2 or 3;
Similarly, to find total grade of Bowling = A + B + C + D + E = 16; the grade for C = D = 4;
So, Sum (A, B, E) = Sum (2, 3, 3) = 8, where grade for A/ B/ E is either 2 or 3.
Hence grade for E in Bowling and Wicket Keeping is either 2 or 3.

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2

E	1/4	2/3	3/2	4/1
Total	11	16	9	14

As per the condition in above question, for Wicket Keeping A = 3, E = 2, So B = 2; Accordingly

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2	3	4/1
B	1/4	3	2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2
E	1/4	3	2	4/1
Total	11	16	9	14

So, for B, Bowling – 3 and Wicket keeping – 2
Hence, Batting – 4, Fielding – 1 or Batting – 1, Fielding – 4
So, option(a) and (b) both will be satisfied.
Answer: - (d)

38. **(c)**

From the bar graph –
The graph gives the average grade for each attribute given by the five selectors. We can calculate the total that each has got.
Batting = 2.2 × 5 = 11
Bowling = 3.2 × 5 = 16
Wicket keeping = 1.8 × 5 = 9
Fielding = 2.8 × 5 = 14
As the table gives the list of attributes that were not marked 1 or 4 by selectors. That is marked as 2 or 3; The following inference can be drawn:

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	1/4	4/1	3/2
D	2/3	1/4	4/1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

To find total grade for the attribute Wicket keeping as 9, you cannot take highest grade from any of the selectors.

As, Wicket keeping = A + B + C + D + E = 9; the grade for C and D will be 1;
So, Sum (A, B, E) = Sum (2, 2, 3) =7, where grade for A/ B/ E is either 2 or 3;
Similarly, to find total grade of Bowling = A + B + C + D + E = 16; the grade for C = D = 4;
So, Sum (A, B, E) = Sum (2, 3, 3) = 8, where grade for A/ B/ E is either 2 or 3.
Hence grade for E in Bowling and Wicket Keeping is either 2 or 3.

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

Not considering grades for E in fielding, the total grade will be,

(i) 14 – 1 = 13; So, Average will be, $\frac{13}{4} = 3.25$

(ii) 14 – 4 = 10; So, Average will be, $\frac{10}{4} = 2.5$

Answer: - (c)

39. **(a)**

From the bar graph –
The graph gives the average grade for each attribute given by the five selectors. We can calculate the total that each has got.
Batting = 2.2 × 5 = 11
Bowling = 3.2 × 5 = 16
Wicket keeping = 1.8 × 5 = 9
Fielding = 2.8 × 5 = 14
As the table gives the list of attributes that were not marked 1 or 4 by selectors. That is marked as 2 or 3; The following inference can be drawn:

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1

C	2/3	1/4	4/1	3/2
D	2/3	1/4	4/1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

To find total grade for the attribute Wicket keeping as 9, you cannot take the highest grade from any of the selectors.

As, Wicket keeping = A + B + C + D + E = 9; the grade for C and D will be 1;

So, Sum (A, B, E) = Sum (2, 2, 3) =7, where grade for A/ B/ E is either 2 or 3;

Similarly, to find total grade of Bowling = A + B + C + D + E = 16; the grade for C = D = 4;

So, Sum (A, B, E) = Sum (2, 3, 3) = 8, where grade for A/ B/ E is either 2 or 3.

Hence grade for E in Bowling and Wicket Keeping is either 2 or 3.

	Batting	Bowling	Wicket keeping	Fielding
A	1/4	2/3	3/2	4/1
B	1/4	2/3	3/2	4/1
C	2/3	4	1	3/2
D	2/3	4	1	3/2
E	1/4	2/3	3/2	4/1
Total	11	16	9	14

Not considering grades for A in batting, the total grade will be,

(i) 11 – 1 = 10; So, Average will be, $\frac{10}{4} = 2.5$

(ii) 11 – 4 = 7; So, Average will be, $\frac{7}{4} = 1.75$

Answer: - (a)

40. (5)

We have to first find 5 consecutive prime numbers in the first 100 natural numbers such that their average is also prime. So let's write down all the prime numbers in first 100 natural numbers

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Now it's given that the digital sum of room number 3 is 8 so we can deduce that room number three will be either 17, 53, 71, 83.

Also it is known that room number 3 is the average of five consecutive rooms.

So if 17 is room number 5 then the series will be 5, 7, 11, 13, 17 whose average should be 11 but it is not true so this case can be rejected.

Similarly for 53, the series will be 37, 41, 43, 47, 53 whose average is not 43 so this case can also be rejected.And for room number 5 to be 71, then the series of rooms will be 53, 59, 61, 67, 71 and can be seen in this case also that average is not 61 so this case is also goes for a toss.

Now if room number 5 is 89 then the series will be 71, 73, 79, 83, 89 and we can see 79 is the average of this series hence this case is correct for the first 5 rooms.

Now for the next series of three rooms for the second floor, two rooms are exactly 100 more than the two of the rooms on the first floor.

Now on the second floor, two rooms can be either of 171, 173, 179, 183, 189. We have to check which of these rooms is prime numbered and which is not. So 171, 183 and 189 are divisible by 3 so clearly not prime numbers so two of the numbers will be 173 and 179. So the third prime numbered room can be either 167 or 185 because it will follow an AP. 185 is a multiple of 5 so it can be neglected hence 3 rooms for the second floor will be 167, 173 and 179.

Now all the questions can be answered easily.

For First Floor

Room Number	Number Assigned
1st Room	71
2nd Room	73
3rd Room	79
4th Room	83
5th Room	89

For Second Floor

Room Number	Number Assigned
6th Room	167
7th Room	173
8th Room	179

Room numberied 6 is 167 so its digital sum will be 5.

41. (d)

We have to first find 5 consecutive prime numbers in the first 100 natural numbers such that their average is also prime. So let's write down all the prime numbers in first 100 natural numbers

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Now it's given that the digital sum of room number 3 is 8 so we can deduce that room number three will be either 17, 53, 71, 83.

Also it is known that room number 3 is the average of five consecutive rooms.

So if 17 is room number 5 then the series will be 5, 7, 11, 13, 17 whose average should be 11 but it is not true so this case can be rejected.

Similarly for 53, the series will be 37, 41, 43, 47, 53 whose average is not 43 so this case can also be rejected. And for room number 5 to be 71, then the series of rooms will be 53, 59, 61, 67, 71 and can be seen in this case also that average is not 61 so this case is also goes for a toss.

Now if room number 5 is 89 then the series will be 71, 73, 79, 83, 89 and we can see 79 is the average of this series hence this case is correct for the first 5 rooms.

Now for the next series of three rooms for the second floor, two rooms are exactly 100 more than the two of the rooms on the first floor.

Now on the second floor, two rooms can be either of 171, 173, 179, 183, 189. We have to check which of these rooms is prime numbered and which is not. So 171, 183 and 189 are divisible by 3 so clearly not prime numbers so two of the numbers will be 173 and 179. So the third prime numbered room can be either 167 or 185 because it will follow an AP. 185 is a multiple of 5 so it can be neglected hence 3 rooms for the second floor will be 167, 173 and 179.

Now all the questions can be answered easily.

For First Floor

Room Number	Number Assigned
1st Room	71
2nd Room	73
3rd Room	79
4th Room	83
5th Romm	89

For Second Floor

Room Number	Number Assigned
6th Room	167
7th Room	173
8th Room	179

Hence we can see only one case for the second floor is possible.

42. (10)

We have to first find 5 consecutive prime numbers in the first 100 natural numbers such that their average is also prime. So let's write down all the prime numbers in first 100 natural numbers

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Now it's given that the digital sum of room number 3 is 8 so we can deduce that room number three will be either 17, 53, 71, 83.

Also it is known that room number 3 is the average of five consecutive rooms.

So if 17 is room number 5 then the series will be 5, 7, 11, 13, 17 whose average should be 11 but it is not true so this case can be rejected.
Similarly for 53, the series will be 37, 41, 43, 47, 53 whose average is not 43 so this case can also be rejected.And for room number 5 to be 71, then the series of rooms will be 53, 59, 61, 67, 71 and can be seen in this case also that average is not 61 so this case is also goes for a toss.
Now if room number 5 is 89 then the series will be 71, 73, 79, 83, 89 and we can see 79 is the average of this series hence this case is correct for the first 5 rooms.
Now for the next series of three rooms for the second floor, two rooms are exactly 100 more than the two of the rooms on the first floor.
Now on the second floor, two rooms can be either of 171, 173, 179, 183, 189. We have to check which of these rooms is prime numbered and which is not. So 171, 183 and 189 are divisible by 3 so clearly not prime numbers so two of the numbers will be 173 and 179. So the third prime numbered room can be either 167 or 185 because it will follow an AP. 185 is a multiple of 5 so it can be neglected hence 3 rooms for the second floor will be 167, 173 and 179.
Now all the questions can be answered easily.
For First Floor

Room Number	Number Assigned
1st Room	71
2nd Room	73
3rd Room	79
4th Room	83
5th Romm	89

For Second Floor

Room Number	Number Assigned
6th Room	167
7th Room	173
8th Room	179

So the next prime number from 179 is 181. Hence the sum of digits of 181 is 10.
Note: To check whether a number is prime or not, simply take its square root and check its divisibility by all the prime numbers less than its square root.
To check 181, take its square root. It will be 13.xx, now check whether 181 is divisible by any of the prime numbers less than 13 or not. We can see it's not divisible by any number so 181 is a prime number

43. (96)
We have to first find 5 consecutive prime numbers in the first 100 natural numbers such that their average is also prime. So let's write down all the prime numbers in first 100 natural numbers
2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97
Now it's given that the digital sum of room number 3 is 8 so we can deduce that room number three will be either 17, 53, 71, 83.
Also it is known that room number 3 is the average of five consecutive rooms.
So if 17 is room number 5 then the series will be 5, 7, 11, 13, 17 whose average should be 11 but it is not true so this case can be rejected.
Similarly for 53, the series will be 37, 41, 43, 47, 53 whose average is not 43 so this case can also be rejected. And for room number 5 to be 71, then the series of rooms will be 53, 59, 61, 67, 71 and can be seen in this case also that average is not 61 so this case is also goes for a toss.
Now if room number 5 is 89 then the series will be 71, 73, 79, 83, 89 and we can see 79 is the average of this series hence this case is correct for the first 5 rooms.

Now for the next series of three rooms for the second floor, two rooms are exactly 100 more than the two of the rooms on the first floor.

Now on the second floor, two rooms can be either of 171, 173, 179, 183, 189. We have to check which of these rooms is prime numbered and which is not. So 171, 183 and 189 are divisible by 3 so clearly not prime numbers so two of the numbers will be 173 and 179. So the third prime numbered room can be either 167 or 185 because it will follow an AP. 185 is a multiple of 5 so it can be neglected hence 3 rooms for the second floor will be 167, 173 and 179.

Now all the questions can be answered easily.

For First Floor

Room Number	Number Assigned
1st Room	71
2nd Room	73
3rd Room	79
4th Room	83
5th Romm	89

For Second Floor

Room Number	Number Assigned
6th Room	167
7th Room	173
8th Room	179

Room Number 4 is 83 and Room number 8 is 179 hence the numerical difference is 96.

44. (d)

We have to first find 5 consecutive prime numbers in the first 100 natural numbers such that their average is also prime. So let's write down all the prime numbers in first 100 natural numbers

2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37, 41, 43, 47, 53, 59, 61, 67, 71, 73, 79, 83, 89, 97

Now it's given that the digital sum of room number 3 is 8 so we can deduce that room number three will be either 17, 53, 71, 83.

Also it is known that room number 3 is the average of five consecutive rooms.

So if 17 is room number 5 then the series will be 5, 7, 11, 13, 17 whose average should be 11 but it is not true so this case can be rejected.

Similarly for 53, the series will be 37, 41, 43, 47, 53 whose average is not 43 so this case can also be rejected.And for room number 5 to be 71, then the series of rooms will be 53, 59, 61, 67, 71 and can be seen in this case also that average is not 61 so this case is also goes for a toss.

Now if room number 5 is 89 then the series will be 71, 73, 79, 83, 89 and we can see 79 is the average of this series hence this case is correct for the first 5 rooms.

Now for the next series of three rooms for the second floor, two rooms are exactly 100 more than the two of the rooms on the first floor.

Now on the second floor, two rooms can be either of 171, 173, 179, 183, 189. We have to check which of these rooms is prime numbered and which is not. So 171, 183 and 189 are divisible by 3 so clearly not prime numbers so two of the numbers will be 173 and 179. So the third prime numbered room can be either 167 or 185 because it will follow an AP. 185 is a multiple of 5 so it can be neglected hence 3 rooms for the second floor will be 167, 173 and 179.

Now all the questions can be answered easily.

For First Floor

Room Number	Number Assigned
1st Room	71
2nd Room	73
3rd Room	79

4th Room	83
5th Romm	89

For Second Floor

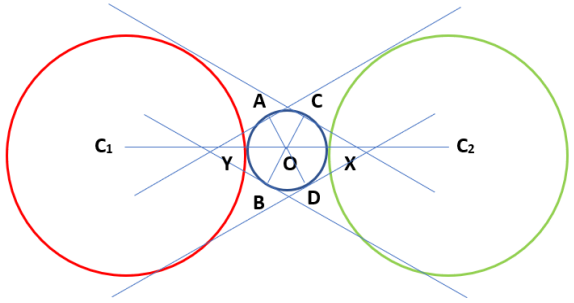
Room Number	Number Assigned
6th Room	167
7th Room	173
8th Room	179

Difference between two prime numbers (except 2) will always be an even number so it can't be odd. Hence 101 is not possible.

QUANT

45. (b)

The probability of detecting green light = Probability of detecting only green light + Probability of detecting both green light & red light together.



In the above diagram, A & B are the point of tangency of the common tangents of the middle and the right circle. C & D are the point of tangency of the common tangents of the middle and left circle. X & Y are the touching points of the middle circle with the right and left circle respectively.

O is the centre of the middle circle. C1 and C2 are the centers of the left and right circles respectively.

Let us assume that the robot is rotating anti-clock-wise. Then between AXB arc, it will be able to detect green light and between DYC arc it will be able to see red light.

In the AC & BD arc it will be able to see both green and red light together.

So, in the CXD arc it will be able to see only the green light.

Given that,

Arc(CXD)/Perimeter of the circle centring O = $\frac{1}{3}$

$\Rightarrow \angle COD = 120°$

As the two circles centring C1 and C2 are having same radius, so, $\angle AOB = 120°$

Thus, $\angle AOC + \angle BOD = 360° - (\angle AOB + \angle COD)$

$\Rightarrow \angle AOC + \angle BOD = 360° - (120° + 120°) = 120°$

So, the probability of seeing both the lights by the robot = $\frac{120°}{360°} = \frac{1}{3}$ (Option B)

46. (32)

Time taken by Tap A alone to completely fill the empty pool = 16 hours

Efficiency of tap B = 4 × efficiency of tap A

$$\frac{(\text{Efficiency of tap B})}{(\text{Efficiency of tap A})} = \frac{4}{1}$$

$$\frac{(\text{Time taken by tap B})}{(\text{Time taken by tap A})} = \frac{1}{4}$$

[Since, time and efficiency are inversely proportional to each other]

Time taken by tap B alone to completely fill the empty pool $= \frac{16}{4} = 4$ hours

Let total capacity of pool LCM of 4 and 16 = 16 m^3

Efficiency of tap A = 1 m^3/hr

Efficiency of tap B = 4 m^3/hr

Part of pool filled by tap A and tap B in two hours together = (1 + 4) × 2 = 10 m^3

Remaining part = 16 - 10 = 6 m^3

Remaining part is completed by tap C alone in 12 hours

Efficiency of tap C = $\frac{6}{12}$ = 0.5 m^3/hr

Time required by tap C alone to completely fill the empty pool = $\frac{16}{0.5}$ = 32 hours

47. (310)

Himani will add the minimum amount of C when he needs a solution of 17%.

Let x be the minimum amount of C he needs to add to the solution.

Thus,

0.18*120 + 0.16*160 + 0.21x = 0.17(280 + x)

Thus, 18*120 + 16*160 + 21x = 17(280 + x)

2160 + 2560 + 21x = 4760 + 17x

=> 4x = 40

Thus, x = 10 is the minimum amount of C he needs to add.

He will add the maximum amount of C when he needs a solution of concentration 19%.

Let y be the maximum amount of C that Harish can add.

Thus,

0.18*120 + 0.16*160 + 0.21y = 0.19(280 + y)

18*120 + 16*160 + 21y = 19(280+y)

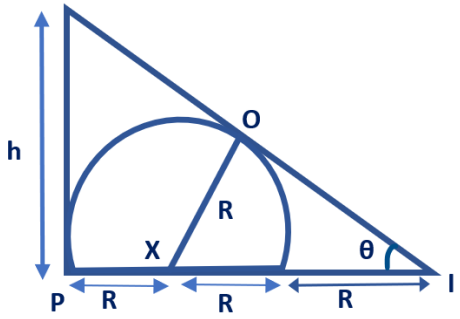
4720 + 21y = 5320 + 19y

2y = 600

=> y = 300 is the maximum amount of C that can be added.

Hence, x + y = 10 + 300 = 310 is the required answer.

48. (b)



Let I be the initial position of Rajan. At point I, Rajan cannot see the pole. If he steps back, he can see the pole.

So, the line joining the top of the pole and I is tangent to the semi-circle.

Let's assumes the height of the pole = h.

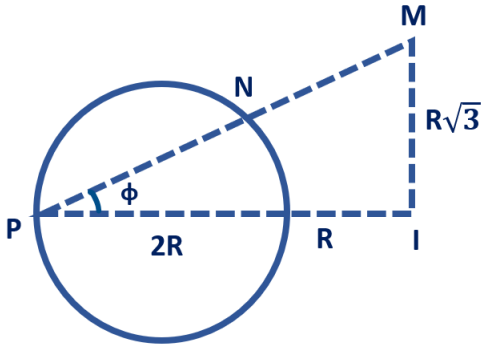
So, $\frac{h}{3R} = \frac{R}{OI} = \tan\theta$

$\Rightarrow \frac{h}{3R} = \frac{R}{\sqrt{4R^2 - R^2}} = \tan\theta$

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

$\Rightarrow h = R\sqrt{3}$

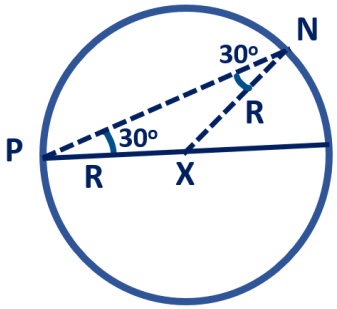
Now, if Rajan moves by $R\sqrt{3}$ to the right, then he will reach M. The top view looks like below:



Then, $\frac{MI}{PI} = \tan\phi$

$\Rightarrow \frac{R\sqrt{3}}{3R} = \tan\phi$

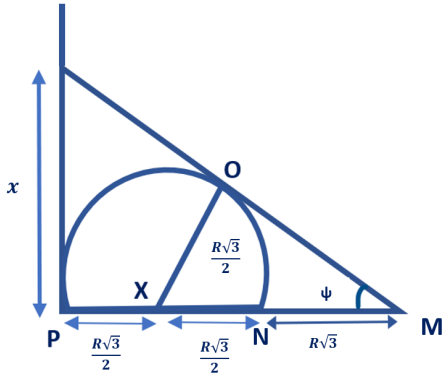
$\Rightarrow \phi = 30°$

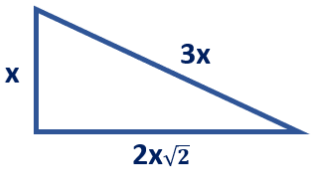


$$\frac{PN}{(\sin 60°)} = \frac{R}{(\text{Sin}\,30°)}$$

$$\Rightarrow PN = \frac{2R\sqrt{3}}{2} = R\sqrt{3}$$

Now, let us analyse what portion of the pole will be visible from N.





$$\tan\psi = \frac{1}{2\sqrt{2}} = \frac{x}{(2R\sqrt{3})}$$

Therefore,

$$\Rightarrow x = \frac{R\sqrt{3}}{\sqrt{2}}$$

$$\Rightarrow x = \frac{h}{\sqrt{2}}$$

So, Rajan will be able to see only $h - \frac{h}{\sqrt{2}}$

$$= h \times \left(1 - \frac{1}{\sqrt{2}}\right)$$

49. (35)

Given that,

$$\frac{(a+b)}{12} = \frac{(b+c)}{11} = \frac{(c+a)}{13} = k\,(\text{say})$$

=> a + b = 12k .... (i)

b + c = 11k .... (ii)

and

c + a = 13k .... (iii)

(i) + (ii) + (iii) we have,

2(a + b + c) = 36k

=> a + b +c = 18k .... (iv)

$$\Rightarrow S = \frac{(a+b+c)}{2} = 9k$$

Also, (iv) – (i) =>

c = 6k

Again, (iv) – (ii) =>

a = 7k

Also, (iv) – (iii) =>

b = 5k

Now, $r = \frac{\Delta}{s} = 8$

$$\Rightarrow \frac{\sqrt{s(s-a)(s-b)(s-c)}}{s} = 8$$

$$\Rightarrow \frac{\sqrt{9k(9k-6k)(9k-5k)(9k-7k)}}{9k} = 8$$

$$\Rightarrow \frac{6\sqrt{6k}}{9} = 8$$

$$\Rightarrow k = \frac{4\times 3}{\sqrt{6}}$$

Therefore, the circumradius $R = \frac{abc}{4\Delta}$

$$= \frac{6k \times 7k \times 5k}{4 \times k^2 \times 6\sqrt{6}}$$

$$= \frac{35 \times 4 \times 3}{4 \times 6}$$

$$= \frac{35}{2}$$

Hence, the required diameter = 2R = 35 cm.

50. (23)

To maximize the difference between the average weight of the boys and the average weight of the girls, we will have to maximize the average weight of the boys and minimize the average weight of the girls.

The average weight of the boys will be maximum when the weight of the boys is 82, 81, 80, 79, 78, 77, 76, 75, 74, 73, 72 and 53 kg.

Thus, the maximum average weight of the boys

$$= \frac{(82+81+80+79+78+77+76+75+74+73+72+53)}{12} = 75$$

The average weight of the girls will be minimum when the weight of the girls is 47, 48, 49, 50, 51, 52, 54 and 65 (53 is not possible as it is the weight of a boy) Thus, the minimum average weight of the girls

$$= \frac{(47+48+49+50+51+52+54+65)}{8} = 52$$

Thus, the maximum possible difference between the average weight of the boys and the average weight of the girls = 75 - 52 = 23.

51. (235)

We know that, for the first year, SI = CI.

Also, SI is equal in each year. So, if SI in two years is 12x, SI in the first year = 6x and SI in the second year = 6x

Therefore, CI in the first year = 6x

CI in the second year = 13x - 6x = 7x

CI in the third year $= 7x * \left(\frac{7x}{6}\right) = \frac{49x}{6}$

Total CI in three years $= 6x + 7x + \frac{49x}{6} = \frac{127x}{6}$

Total SI in three years = 18x

Required ratio $= \frac{127x}{6:18x}$

= 127x : 108x

= 127 : 108

Therefore, m = 127 and n = 108

And, (m + n) = (127 + 108) = 235

52. (30)

It is given that 600 workers completed 60% of the assigned work in 15 weeks.

Hence total work $= \frac{5}{3} * 15 * 600$ = 15000 men weeks

It is given that 20% of the completed work is washed away hence the remaining work that is to be completed = $15000 - \frac{4}{5} * 15 * 600 = 7800$ men weeks

The remaining work is to be completed by only 260 workers hence total time taken to complete the remaining work $= \frac{7800}{260} = 30$ weeks.

Therefore, option c is the correct answer.

53. (c)

Let's assume that A's speed is a m/s and that of B is b m/s

To further simplify the problem, let's assume that A & B started at the same point and the initial distance between A & C is 3300 m when both A & B heard the first gunshot.

Had both A & B stood still, they would have heard the gunshots after 10 s.

As we have assumed that the distance between A & C is 3300m, by the time the first gunshot reached A & B, the second gunshot just started travelling from C.

So,
For A, as he is moving towards C, he met the sound after 9 s.
So,
$9a + 9 * 330 = 3300$

$\Rightarrow a = \frac{110}{3}$ m/s

Similarly for By,
$12 * 330 - 12b = 3300$

$\Rightarrow b = \frac{660}{12} = \frac{110}{2}$

So, speed of A : speed of B = $\frac{110}{3} : \frac{110}{2} = 2:3$

54. (4)

The last two digits of 9867^{1668} is equivalent to the last two digits of $(...21)^{\frac{1668}{4}} = (....21)^{417}$.

Now, the unit's digit of a number ending with 1 is 1.
Also, the ten's digit can be obtained as ($2 \times 7 = 14$) i.e., 4.
Therefore, the last two digits of 9867^{1668} are 4, 1.
Then, the sum of the last two digits = 4 + 1 = 5

Now, $\sqrt{-x^2+4x-3} > 5-2x$, since p = 5

Let, f(x) $= \sqrt{-x^2+4x-3}$

Then, $\sqrt{-x^2+4x-3} \geq 0$

$\Rightarrow \sqrt{-\left(x^2-4x+3\right)} \geq 0$

$\Rightarrow \sqrt{-(x-1)(x-3)} \geq 0$

$\Rightarrow -(x-1)(x-3) \geq 0$

$\Rightarrow (x-1)(x-3) \leq 0$

$\Rightarrow 1 \leq x \leq 3$

Now, let g(x) = 5 - 2x

Then, either $g(x) \geq 0$ or, $g(x) < 0$
i.e., $5 - 2x \geq 0$ or, $5 - 2x < 0$
$\Rightarrow x \leq \frac{5}{2}$ or, $x > \frac{5}{2}$

Now, two cases can be arrived when f(x) > g(x).
Case 1: $f(x) \geq 0, g(x) \geq 0$

$\Rightarrow 1 \leq x \leq 3$, and $x \leq \frac{5}{2}$ …. (i)

Case 2: $f(x) \geq 0, g(x) < 0$

$\Rightarrow 1 \leq x \leq 3$, and $x > \frac{5}{2}$ ….. (ii)

Assuming Case 1-

Therefore, $\sqrt{-x^2+4x-3} > 5-2x$
$\Rightarrow -x^2 + 4x - 3 > (5 - 2x)^2$
$\Rightarrow -x^2 + 4x - 3 > 25 - 20x + 4x^2$

$\Rightarrow 5x^2 - 24x + 28 < 0$

$\Rightarrow 5x^2 - 10x - 14x + 28 < 0$

$\Rightarrow 5x(x-2) - 14(x-2) < 0$

$\Rightarrow (5x - 14)(x-2) < 0$

$5x - 14 < 0$ and $x - 2 > 0$

$\Rightarrow x < \frac{14}{5}$ and $x > 2$

$\Rightarrow x \in (2, \frac{14}{5})$

i.e., $2 < x < \frac{14}{5}$ …. (iii)

Therefore, when $1 \leq x \leq \frac{5}{2}$, f(x) > g(x) is possible if $2 < x < \frac{14}{5}$.

$\Rightarrow 2 < x \leq \frac{5}{2}$

Case II-

When $\frac{5}{2} < x \leq 3$, then $f(x) \geq 0$, $g(x) < 0$

Thus, $f(x) > g(x)$ implies $x \in (2, 3]$

Now, 4x will be integer if x = 2.5, 2.25, 2.75 and 3

Hence, x can have 4 values for which 4x is an integer.

55. (299)

Let us assume that $x = (2^{n+1} - 1)$

$$S = \left[\log_2 1\right] + \left[\log_2 2\right] + \left[\log_2 3\right] + \ldots + \left[\log_2 \left(2^{n+1} - 1\right)\right]$$

$$S = 0 + \underbrace{(1+1)}_{2 \text{ times}} + \underbrace{(2+2+2+2)}_{2^2 \text{ times}} + \underbrace{(3+3+3+\ldots)}_{2^3 \text{ times}}$$

$$+\ldots. + \underbrace{(n+n+n+\ldots)}_{2^n \text{ times}}$$

$S = (0 \times 2^0 + 1 \times 2^1 + 2 \times 2^2 + 3 \times 2^3 + \ldots + n \times 2^n)$

$$S = \sum_{n=0}^{n} n.2^n \quad \ldots\ldots(i)$$

$$\Rightarrow \frac{S}{2} = \sum_{n=0}^{n} n.2^{n-1} \quad \ldots\ldots(ii)$$

$S = 1 \times 2 + 2 \times 2^2 + 3 \times 2^3 + 4 \times 2^4 + \ldots. + (n - 1) \times 2^{n-1} + n \times 2^n$

$\frac{S}{2} = 1 + 2 \times 2 + 3 \times 2^2 + 4 \times 2^3 + 5 \times 2^4 + \ldots + n \times 2^{n-1}$

$\frac{S}{2} = -1 - 2 - 2^2 - 2^3 - 2^4 - \ldots\ldots - 2^{n-1} + n \times 2^n$

$\Rightarrow \frac{S}{2} = n \times 2^n - (1 + 2 + 2^2 + 2^3 + \ldots + 2^{n-1})$

$\Rightarrow \frac{S}{2} = n \times 2^n - (2^n - 1)$

$\Rightarrow S = (n-1) \times 2^{n+1} + 2 \leq 1000$

$\Rightarrow (n - 1) \times 2^{n+1} \leq 998$

If $n = 7$, then $(n - 1) \times 2^{n+1} = 640 < 998$

If $n = 8$, then $7 \times 256 > 1000$

So, $n = 7$

Now, Let $S_1 = S + \left[\log_2 2^{n+1}\right] + \left[\log_2 2^{n+1} + 1\right]$

$+\ldots + \left[\log_2 2^{n+1} + y\right]$, where $2^{n+1} + y < 2^{n+2} - 1$

Then,

$S_1 = (n - 1) \times 2^{n+1} + 2 + (n + 1)(y + 1)$

As, $n = 7$, $S_1 = 642 + 8(y + 1)$

$642 + 8(y + 1) \leq 1000$

$\Rightarrow (y + 1) \leq 44$

$\Rightarrow y \leq 43$

Hence, $x_{max} = 2^8 + 4^3$

$= 299$

56. (58)

As the two lines intersect each other at point P, so we can solve the equations representing the lines to get coordinates of point P. So,

$3x - 4y + 5 = 0$ and $8x - 6y + 11 = 0$

$3x = 4y - 5$

$$x = \frac{(4y - 5)}{3}$$

Putting this in the second equation, we get:

$$\frac{8(4y - 5)}{3 - 6y} + 11 = 0$$

$32y - 40 - 18y + 33 = 0$

$14y = 7$

$$y = \frac{1}{2}$$

So, $x = -1$

$a = -1$, $b = \frac{1}{2}$

$$16\left(a^3 + b^3 + a(b - 5)\right) = 16 \times \left(-1 + \frac{1}{8} - \left(\frac{1}{2} - 5\right)\right)$$

$$= 16 \times \frac{(-7 + 36)}{8}$$

$$= 16 \times \frac{29}{8}$$

$= 58$

57. **(c)**

Let the number of items bought by Aman be 8x, Rohit be 5y and Samson be 8z.

Thus, the number of pens bought will be 5x + 3z, the number of erasers bought will be 3x + 2y and the number of rulers bought will be 3y + 5z.

We are given that,

5x + 3z > 3y + 5z and 3y + 5z > 3x + 2y

5x + 3z > 3y + 5z 5x > 3y + 2z {Therefore, we can say that the value of x is greater than at least one of y and z}

We have to find out the minimum value of 8x + 5y + 8z. x, y, z are positive natural numbers since these are used to represent the ratio equivalent.

Case 1: When x = 2, y = 1 and z = 1

Then, we can see that 5x + 3z > 3y + 5z. But 3y + 5z = 3x + 2y which is incorrect as we have to ensure that 3y + 5z > 3x + 2y.

Case 2: When x = 2, y = 2 and z = 1

Then, we can see that 5x + 3z > 3y + 5z and 3y + 5z > 3x + 2y. Therefore, this is a possible solution.

We can find out the value of 8x + 5y + 8z

= 8 * 2 + 5 * 2 + 8 * 1 = 34.

Case 3: When x = 2, y = 1 and z = 2

Then, we can see that 5x + 3z > 3y + 5z and 3y + 5z > 3x + 2y. Therefore, this is also a possible solution.

We can find out the value of 8x + 5y + 8z

= 8 * 2 + 5 * 1 + 8 * 2 = 37.

Now if we increase the value of x then the value of '8x + 5y + 8z' will increase further. Therefore, we can say that the minimum value of 8x + 5y + 8z = 34. Hence, option c is the correct answer.

58. **(b)**

The dishonest shopkeeper had purchased 1/0.8 kg = 1.25 kg of R1 rice at 50 INR/kg.

So, his cost price is 50 INR/1.25kg = 40 INR/kg.

He purchased 1.25 kg of R2 rice at 30 INR/kg.

So, his cost price for R2 rice is 30 INR/1.25 = 24 INR/kg.

R1 & R2 rice is mixed in the ratio of 3 : 1.

Thus, the cost price of the mixture is $\frac{(40*3+24*1)}{4}$ INR/kg = 36 INR/kg.

While selling he sells rice of actual weight 1 kg, showing 1.2 kg to his customer.

So, when he sells 1/1.2 kg of rice, his cost price is $\frac{36}{1.2}$ INR = 30 INR.

To get 50% profit, the selling price should be 30*1.5 INR = 45 INR.

Thus, the discount offered will be $\left(1-\frac{45}{50}\right)$ *100% = 10%

59. **(120)**

Let Trevor and Adani have x and y number of shares respectively. It is given x + y < 125. Let the number of shares they exchanged be k.

Then, (x + k) = 5(y-k)

And (x - k) = 4(y + k)

i.e., x - 5y = -6k and x- 4y = 5k

$$\frac{(x-5y)}{(x-4y)}=-\frac{6}{5}$$

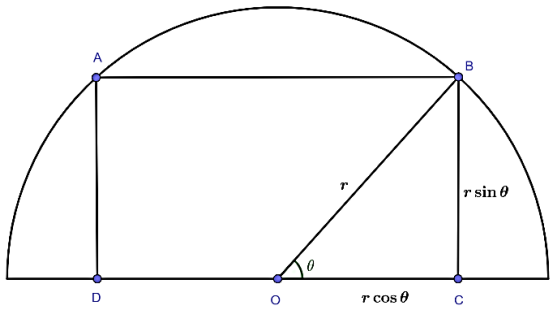
Cancelling k, we get 11x = 49y

x : y = 49 : 11.

Therefore, possible sum of numbers is 60 & 120.

Since, 60 is not possible, so the answer is 120.

60. **(b)**



The area of the rectangle ABCD = BC × CD = Δ

= r sin θ × 2r cos θ

= r^2 sin 2θ

Max $(\Delta) = r^2$

Thus, the minimum area of the remaining sheet

$$= \frac{\pi r^2}{2} - r^2$$

$$= r^2\left(\frac{\pi}{2} - 1\right)$$

61. (12)

Let us say that the persons height in increasing order of heights is a, b, c, d and e. The average of a, b, c and d is 160 cm, whereas the average of b, c, d and e is 180 cm.

The sum of a, b, c and d is 640 cm, and the sum of b, c, d and e is 720 cm.

Total of heights of all people = 640 + e = 720 + a

Or we can say that, e is 80 more than a.

The total weight is 640 + e. So, the highest value of e will correspond to the highest possible average. The highest possible value of e occurs when it is 80 higher than the highest possible value for a, which is 160.

So, the highest average is $\frac{(640+240)}{5} = 176$

This will be the case when the heights are 160, 160, 160, 160 and 240 cm

Conversely, the least possible value for the average occurs when a is the least. This happens when e is the least too.

The least possible value of e is 180 = 720/4

So, the least possible value of a is 100.

The least possible average $= \frac{(720+100)}{5} = 164$

This will be the case when the heights are 100, 180, 180, 180 and 180 cm.

Hence the required answer is = 176 – 164 = 12

62. (233)

Let's suppose number of Hammer, Screwdriver, Plier and Drill in the work-shop be a, b, c and d respectively.

Hence according to the first condition, b + c + d = 191 …. (1)

Similarly, a + c + d = 178 …. (2)

Also, a + b + d = 169 …. (3)

And, a + b + c = 161 …. (4)

Adding all the above four equations we will get,

3(a + b + c + d) = 191 + 178 + 169 + 161

=> a + b + c + d = 233

63. (103000)

Since, they made 1700 sunglasses costing ₹ 240 each and an additional ₹ 25000 expense on them.

Thus, total Cost = (1700 × 240) + 25000

= ₹ 433000

Now we will calculate the revenue they earned from selling them. As, they are able to sell 1400 sunglasses in the summer season ₹340 each.

So, the revenue earned by them during the summer season = ₹340 × 1400

= ₹ 476000

Also, the left over 300 pieces of sunglasses would have been sold by the company in off season 200 each.

Revenue earned through these 300 sunglasses

= 300 × 200

= ₹ 60000

Total Revenue = ₹ 476000 + ₹60000 = ₹536000

Profit = Revenue – Cost

= ₹ 536000 – 433000

= ₹ 103000

64. (2022)

Since $f_1(x) = \frac{3x+5}{2x-3}$

Then $f_2(x) = f_1(f_1(x)) = \frac{\{3f_1(x)+5\}}{2f_1(x)-3} = x$

Hence, $f_2(x) = f_4(x) = ... = f_{2022}(x) = x$

and $f_1(x) = f_3(x) = ... = f_{2021}(x) = \frac{3x+5}{2x-3}$

Then $|f_1(1)| + |f_{2022}(1)| = 1 + |-8| = 9$

$|f_2(1)| + |f_{2021}(1)| = 1 + |-8| = 9$

$|f_{1011}(1)| + |f_{102}(1)| = 1 + |-8| = 9$

Hence, $P_i = 9$ for all $1 \le 1011$
So, $\log_3 P_i = 2$
So, S = 2 * 1011 = 2022
Option (b) is correct.

65. **(9)**

Let the side of the square be 'a' cm
Perimeter of square = 4a cm
Diagonal of square $= a\sqrt{2}$ cm
Now,

$\Rightarrow 4.5 \times 4a = 11\sqrt{2} \times a\sqrt{2} - 12$

$\Rightarrow 18a = 22a - 12$
$\Rightarrow 4a = 12$
$\Rightarrow a = 3$
$\therefore$ The side of the square is 3 cm.
i.e., S = 3. (Given)
Now, $1 + \frac{2}{S} + \frac{3}{S^2} + \frac{4}{S^3} + \ldots$

$= \left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right) + \left(\frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)$ ….)

$+ \left(\frac{1}{S^2} + \frac{1}{S^3} + \ldots\right) + \ldots$

$= \left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)$

$+ \frac{1}{S}\left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)$

$+ \frac{1}{S^2}\left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right) + \ldots$

$= \left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)\left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)$

$= \left(1 + \frac{1}{S} + \frac{1}{S^2} + \frac{1}{S^3} + \ldots\right)^2$

$= \left(\frac{1}{1 - \frac{1}{S}}\right)^2$

$= \left(\frac{1}{1 - \frac{1}{3}}\right)^2$

$= \left(\frac{3}{2}\right)^2$

$= \frac{9}{4}$

Hence, the required perimeter $= 4 \times \frac{9}{4} = 9$ cm

66. **(12)**

9	5	4	**Divisors**
5	3	3	**Remainders**

So, the smallest number that satisfy the given condition is $\{(5 \times 3) + 3\} \times 9 + 5 = 167$.
The general form of numbers that satisfy the given condition is got by adding the LCM of divisors, which is 180, to 167.
i.e., the general form is 180k + 167, k = 0, 1, 2, 3, ….
Therefore, the smallest number is 167.
Now, the remainders when 167 is successively divided by 4, 5, and 9 respectively are as follows:
The remainder when 167 is divided by 4 is 3 and the quotient is 41.
The remainder when 41 is divided by 5 is 1 and the quotient is 8.
The remainder when 8 is divided by 9 is 8 and the quotient is 0.
Hence, the sum of the remainders = 3 + 1 + 8 = 12

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