

Mock Test Series 1.0

Mock Test – 01

VARC

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

From the late Middle Ages and beyond, a network of foreign correspondents has existed across the majority of Europe, spreading news from far-flung places across a chain of set routes. However, there was news from abroad before there were correspondents, and, similarly, we are now entering another age where these reporters, like many employed in journalism, risk inexistence. Partially responsible are economic cuts that see foreign desks shrink, the accumulating risk to journalists abroad and the appreciation of diversity that is increasing dependence upon foreign nationals instead. Also, the invasion of technology, including social media, mobile phones and new models of low-cost online news, feeds fruitful change as well as faults. In addition to these influences, this essay seeks to deliberate ethical considerations, like the representation of marginalised communities, race and distant suffering, in order to conclude the importance of the foreign correspondents now.

Information about international matters will forever be important. Thus, to appreciate what relevance foreign correspondents still have within its distribution, it is necessary to pinpoint the scope of the competition. In general, this is the Internet and all it prompts. For example, the innovative online resources reporting separately to the skeleton of traditional news; like blog aggregator Global Voices, well-known archive Wikileaks, mapping service Ushahid, or even Facebook's empire to name a few. In spite of this digital revolution though, the way in which the Internet affects the representation of faraway countries remains in its infancy. It enables people to obtain additional sources of news, but the average consumer does not bother. To demonstrate, 95% of those who consume news online do so through domestic newscast websites and, even in this day and age, just 53.6% of the population is online. Plus, for those paying attention to these pioneering applications custom-built for 'citizen

journalists', they must tread through infinite clutter because ensuring these moderns newscasts are thoroughly verified is a tough task. Furthermore, the statistics cited are in line with the theory of Imaginary Cosmopolitanism, whereby we think we have an extensive viewpoint because of the possibility of worldwide connectivity, but we disregard that the majority of our social network consumption is in fact local. With this in mind, the public remain dependent on traditional media, including foreign correspondents, for that vital international perspective.

However, the other edge to technical innovation, specifically how it can be exploited by traditional news agencies, is also a threat to foreign correspondence, particularly after today's tendency for rooftop journalism. This expression was coined to describe the countless journalists based abroad, habitually amongst conflict, who still hardly get the chance to see what is taking place in that location. This is intended to safeguard foreign correspondents, partly due to facts like the death toll of journalists rising to an alarming total of 80 during 2018. However, this step concerning protection does hamper them in the process. In fact, it is frequently critiqued that though foreign correspondents occasionally break big news, and occasionally deliver detailed breakdowns, for the most part they just compose inconsequential feature after feature within the fortifications of a guesthouse. Nonetheless, novel communication technology does not make up for the fact that "someone stuck next to a dish for hours on end is the last creature on earth to have learned anything.". Additionally, even though foreign correspondents are a part of conventional journalism, the established media are increasingly favouring yet another contender: everyday people. For example, Britain's BBC has its universal UGC Hub that files material sent in by the general public and, in terms of acquiring more remote information, BBC World Service provided mobile phones to Northern Nigerian villages, with a designated attendant per community, to effortlessly learn about potential governmental confrontation concerning land rights with the villages. Now, considering that it can cost between

\$200,000 and \$300,000 a year to uphold a foreign bureau, the preference for citizen journalism is fathomable. However, the advantage of a foreign correspondent over a local civilian is that they are competent in first aid, functioning efficiently in hostile environments and equipped should they be taken hostage. In theory, this is likely to assure fewer threats and faster dispatches. In addition to safety, which is recognisably a priority, journalists adhere to ethical codes and professional principles that the average person would not contemplate, they are also trained in multimedia, which is cost-effective as agencies are can then employ less people. So, in spite of a digital revolution, along with civilian reporters and their potential to dispense international information, foreign correspondents remain imperative.

1. Based on the passage, what is the current status of foreign correspondents in the journalism industry?
 - (a) Foreign correspondents are becoming obsolete and losing their significance.
 - (b) Foreign correspondents are becoming increasingly important in the journalism industry.
 - (c) Foreign correspondents are becoming obsolete, but their significance is being replaced by civilian reporters.
 - (d) Foreign correspondents are losing their significance, but the average consumer remains dependent on them.
2. Which one of the following proclamations most cogently encapsulates the quintessential crux of the discourse articulated in the passage?
 - (a) The rise of internet and citizen journalism has rendered foreign correspondents obsolete.
 - (b) Despite multiple challenges and technological advancements, foreign correspondents remain critical in providing reliable international news.
 - (c) Foreign correspondents are threatened by the dangers of being stationed abroad and economic cuts.
 - (d) Rooftop journalism is the new face of foreign correspondence in today's digital age.

3. What assumption can be made about the role of foreign correspondents in journalism?
 - (a) Foreign correspondents are becoming increasingly irrelevant due to advancements in technology and the rise of citizen journalism.
 - (b) The Internet has limited effect on the representation of foreign countries in the news.
 - (c) Traditional media and foreign correspondents still play a crucial role in providing international news to the public.
 - (d) The use of technology by traditional news agencies is both a threat and an opportunity for foreign correspondents.
4. Which of the following, if true, would undermine the importance of foreign correspondents in journalism?
 - (a) The majority of people who consume news online do so through domestic newscast websites.
 - (b) The average person is not trained in multimedia.
 - (c) The cost of upholding a foreign bureau can range between \$200,000 to \$300,000 per year.
 - (d) Foreign correspondents are equipped to handle hostile environments and are trained in first aid.

Directions (5–7): Read the given passage and answer the questions that follow:

Numerous problems now causing the failure of India's infrastructure are land clearance issues; insufficient compensation, unclear regulations, access to financing etc. After all, Indian's philosophical attitude and the democracy system contribute a deep-rooted cause on the failure. Comparing with China, China used infrastructure as a policy instrument and political tool to reduce poverty and generate growth trading off with the cost of enlarged inequality and huge regional disparity, while India emphasis more on redistribution which proved to be unsuccessful for it is self-destroying the impetus to generate robust and sustained growth. China managed to have strong integration and coordination between policy-making and implementation. India is more technical



rather than political driven and adopt a more participatory and democratic approach, causing duplication of responsibilities and weakened accountability among different levels of government and political parties, resulting in inefficient implementation and resource allocation.

Nevertheless, Indian Government did have a strong will in growing infrastructure. Structural and procedural reforms at various government levels have been taken place to facilitate infrastructure growth. Apart from local private capital and return from public user fees, Indian Government acknowledge that foreign investment is major source of investment into infrastructure sector, therefore she is providing more flexibility towards capital flow and is setting policy to lower the risk and increase private capital return.

Though the potential is promising, India inevitably face different present and future challenges during the path. Over the subsidy and investment issues, a good economic as well as incentive balance between tax-payers, public users, private local and foreign investors must be strived for. Consequently, pricing, tax regimes, stability in exchange rate and real interest rates will be the other conditions to formulate the model. Also, a transparent and equitable regulatory framework, reliable judicial system with efficient dispute resolution mechanism will be vital. Given Indian democracy has got its stand in the decade of poverty, it will be a real challenge for this system to prove that it can lead the way to growing prosperity over this transition path.

5. What is the main purpose of the author in the passage?
- (a) To highlight the challenges faced by India in growing its infrastructure.
 - (b) To analyze the potential of foreign investment in the Indian infrastructure sector.
 - (c) To contrast the approach taken by China and India towards infrastructure growth.
 - (d) To advocate for a transparent and equitable regulatory framework in India.
6. All of the following statements can be inferred from the passage, EXCEPT:

- I. India's infrastructure problems are caused by issues with land clearance, insufficient compensation, and unclear regulations.
 - II. The Indian government recognizes foreign investment as a major source of funding for infrastructure growth.
 - III. The Indian government is implementing reforms to increase infrastructure growth.
 - IV. India's emphasis on redistribution has proven to be unsuccessful in generating robust and sustained growth.
 - V. India's democracy system is a contributing factor to the success of the country's infrastructure.
- (a) Only I (b) Only III
(c) Only V (d) Only II, IV

7. What is most likely the passage is a part of?
- (a) A news article on the state of India's infrastructure
 - (b) A research paper on comparative development in India and China
 - (c) A policy brief on the government's approach to infrastructure growth
 - (d) An economic analysis of the challenges facing India's infrastructure sector

Directions (8–12): Read the given passage and answer the questions that follow:

Whether you're facing a large crowd, a handful of colleagues at a conference table, a job recruiter over Zoom, or trying to hold your own during a family fight, the all-too-common experience of speech anxiety can feel like a frustrating act of self-betrayal. You wish to share your knowledge, beliefs and feelings. Yet the moment you decide it is time to communicate them, the words ... don't ... seem. To Want. To Come. Out. Of. Your Mouth.

Think about our usual ways of describing the problem: 'I'm shy.' 'I suffer from speech anxiety.' 'I just don't know how to be myself in front of a group.' We often act as though the problem stems from a psychological or emotional shortcoming within us. After years of watching our looser-tongued peers express their ideas and passions, it's easy to become resentful and alienated. These negative feelings can reinforce our original reaction: There's too

much stuff inside of me that I can't express! There's something wrong with me.

This diagnosis would have seemed utterly baffling to the ancient Greek educators and philosophers who invented language theory in the 4th century BCE, and then taught it to virtually every student in the West for 2,000 years until a couple of centuries ago. From the ancient perspective, public speaking, like writing or, for that matter, military prowess, was considered an art form – teachable, learnable, and utterly unrelated to issues of innate character or emotional makeup. To them, the idea of expecting the average, speech-ignorant person to be reliably eloquent would be like expecting an untrained adolescent to perform like a seasoned warrior on the battlefield. Their take holds true today – it's unrealistic to expect yourself to be competent, much less masterful, in an art form you've never been taught to practise.

Under the larger discipline of rhetoric (the study of persuasion in all its forms), students in antiquity spent years acquiring a strategic understanding of how to temper logic, emotions and words with poise. Speaking well depended upon learning how to analyse all sides of an argument and assaying all possible avenues of commonality with one's audience before expressing an opinion. Similar to our approach to reading and writing today, speech training was a comprehensive, critical approach to knowledge, with an additional emphasis on psychology and social interaction.

The average American today speaks around 16,000 words a day. If you consider the role of speech in family life, social interactions and on the job, it's easy to see that now, as much as ever, the ability to communicate effectively is the single most critical skill we possess. If we speak in ways that are off-putting, vague or hard to understand, it doesn't matter how smart, hardworking or even good we might be: people will find us difficult to understand and work with. Our usefulness to others will decline with every strained interaction. By contrast, if we speak clearly and well, people will find us easy to understand. They'll 'get' us. They'll like us.

Recently, I worked with an architect who complained: 'I went to school for years, thinking that after graduation, my job would be to design stuff. The reality is that probably 90 per cent of my time goes towards explaining ideas, working on presentations and managing discussions

between teams and clients.' Her observation holds true across virtually every advanced occupation. Brilliant as you might be while toiling at your work station, and as important as your solo endeavours are, your social and team value is judged by your ability to skilfully handle phone calls, Zoom meetings, sales and technical presentations, and client interactions. If this sounds far-fetched, how many high-ranking executives can you recall who have poor public speaking skills?

8. In the author's viewpoint, why is it defensible that contemporary society displays a lesser proficiency in communication skills?

- In today's society, the necessity for conventional communication skills has been superseded by the proliferation of technologically advanced communication modalities.
- The contemporary educational paradigm fails to underscore the importance of communication skills as an integral component of overall learning.
- The emphasis of modern society is predominantly on the acquisition of technical and vocational skills to ensure a promising future.
- In the digital age, the need for face-to-face communication skills has significantly diminished due to the prevalence of written digital communication.

9. Which of the statements will the author agree with?

- All high-ranking executives have good public speaking skills
 - If one can't put across his ideas in a clear & succinct manner his value decreases
 - An average American today, has poorer communication skills as compared to an Asian
 - The study of Rhetoric was essential in ancient Greece for developing communication skills
- (a) 1, 2, 4 (b) 1, 2, 3
(c) 2, 4 (d) 2

10. Which subject would the next paragraph cover considering, this is piece is from a larger essay?
- What can be done in order to improve Communication skills?
 - State of communication skills in today's educational curriculum
 - Need for communicational skills in tech-driven society
 - Advantages of having good communication skills in society
11. Which among the subsequent propositions would present an efficacious remediation for the predicament elucidated by the author?
- Implementing a nationwide mandate necessitating the acquisition of communication skills for every citizen.
 - Rejuvenating the academic syllabus to encapsulate requisite communication capabilities and their pragmatic implementation in real-world scenarios.
 - Reorienting the traditional pedagogical methodologies towards incorporating comprehensive skill-based training.
 - Augmenting the investment in the development and widespread distribution of artificial intelligence communication assistants.
12. Based on the passage, which of the following inferences can be drawn regarding speech anxiety and public speaking skills?
- The ancient Greek educators believed that public speaking skills were innate and tied to one's emotional makeup.
 - The ancient Greeks viewed public speaking as an art form that can be learned and is not related to one's innate character.
 - Rhetoric was not a significant part of ancient education and focused primarily on grammar and vocabulary.
 - Modern high-ranking executives mostly have poor public speaking skills due to a lack of formal training in rhetoric.

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

What is a Role Model? That's a great question. I had to look it up. A Role Model is a person whose behavior, example, or success is or can be emulated by others, especially by younger people. Growing up I didn't have a very good role model. My mother and father divorced at a very young age. My brother and I are 7 years apart, so he was never around and took off at a very young age to raise himself. My mother who has severe Bi- Polar disorder was in many different relationships with men after my father left. She was also never home. Her excuse was that she had to work to support us. My dad, who wanted nothing to do with my mother, deserted me. I never met any of his family and my mother's parents lived very far away, therefore, I had no one to look up to or ask for help. My mother was very abusive mentally. I felt she was such a nasty person because I was just an inconvenience in her life and didn't understand till much older that she was mentally sick. I learned at a very young age to care for myself and, like my brother, moved out at 13 years of age. I had to quit school and get a job to take care of myself. Needless to say, it was very hard to get a good job with no education so I ended up waiting tables in many dumpy places until I met my first husband; I was eighteen. I ended up in long term abusive relationships with promises to care for me and I would have no worries ever again. I believed him, or I should I say, I wanted to believe him. I made a promise to myself that my children would have a good role model, a great childhood, and a strong foundation to build their lives and would never have to go through what I had to survive. At 18 with my first husband, we decided to have a baby. In the back of my mind I was concerned that my child would end up with the genetic disposition of my mother, but I was normal. I didn't give it much thought after that. I wanted to have children of my own; someone who would love me and I would love unconditionally. My son was born, who is now eighteen, and ended up with the disease. He was diagnosed at 3 years of age with ADHD and ODD. They didn't want to diagnose, or I should say, they couldn't diagnose, Bi-Polar that young, but I knew. I left his father a few years later due to the increase in domestic abuse. Everything he promised he wouldn't do, he did. I was alone trying to raise a child with no help, afraid to get into another relationship, for that matter, no one wanted a relationship with me. I had baggage. I had a child with severe behavior problems. Seven years later I meet another man who didn't care about my son or my mother. He said that he would love me and made all the same promises my

first husband did. A year later we talked about having another child. I told him all my fears and he comforted me. Shortly after my daughter was born my husband turned to drugs. I thought to myself, I can't seem to get out of this cycle. More thoughts were, even if I didn't have my mother's illness, was I walking in her footsteps? You can see the identical path. My brother and I are seven years apart, my mom married twice. Was this all just coincidental? I stayed with my drug addicted husband for all most 10 years because I thought it was best for my children and I knew how hard my daughter would take the separation, as well as my son, whose father was never around. I finally came to the conclusion that I had to do what was best for me or I was not going to be around to take care of the two things I loved most, my children.

13. Among the subsequent assertions, which statement, if proven accurate, would epitomize the most unswerving amplification of the propositions embedded within the narrative?
- An absence of salubrious exemplars during juvenile stages accentuates the predisposition towards contentious affiliations in the epoch of maturity.
 - All individuals grappling with the psychological variance of bipolar disorder are invariably subjected to abusive liaisons.
 - Singularly those individuals diagnosed with attention deficit hyperactivity disorder (ADHD) or oppositional defiant disorder (ODD) are susceptible to confront maltreatment within relationships.
 - Desertion by progenitors during formative years culminates in a susceptibility towards narcotic dependence during the period of adulthood.
14. What is the main idea of the passage?
- The author's childhood experiences and how it has shaped her beliefs about being a role model for her children
 - The impact of mental illness on the author's family relationships
 - The author's journey from a troubled childhood to a stable adult life
 - The effects of domestic abuse on the author's relationships

15. What is the tone of the passage?
- Despondent
 - Resolute
 - Hopeful
 - Disillusioned
16. Each of the subsequent propositions could be plausibly inferred from the text, save for one exception:
- The author's maternal figure suffered from a severe psychological condition.
 - The author was subjected to psychological maltreatment from her mother.
 - The author's father harbored a longing to remain an integral part of her life.
 - The author's early life was marked by significant challenges and difficulties.
17. Carefully read the statements in the questions below and arrange them in a logical order.
- As nationalism rises across the globe, many see 'cultural exchange' as the antidote to nationalist xenophobia.
 - Cultural exchange is often assumed to be progressive, but it has neither an inherent politics nor an inevitable outcome.
 - Rather than resulting in greater cosmopolitanism, Indo-Iranian exchange fostered modern nationalism.
 - Such exchange was, in fact, an integral part of the emergence of national literatures, cultures and identities in Iran and South Asia.
- 2143
 - 2314
 - 3124
 - 4123
18. Carefully read the statements in the questions below and arrange them in a logical order.
- The government used crafty legislation, such as the anti-terrorism law of 2009, to silence criticism of the political order and suppress dissent.
 - The situation in Ethiopia highlights the broader issue of government censorship and

suppression of free speech, particularly in countries with diverse ethnic populations where the voices of minority groups are often suppressed.

3. Ethiopia's ethnic groups faced subjugation and political marginalization, particularly among the largest groups, the Oromos and the Amharas.
4. As a result of the government's suppression of dissent, prisons became overcrowded with individuals such as bloggers, activists, opposition politicians, and journalists who reported on governmental abuses.

19. Carefully read the statements in the questions below and arrange them in a logical order.

1. At the beginning of the 20th century, western interest in opium ignored the societal problems it would cause and was largely driven by the promise of economic gain.
2. The Opium Wars (Anglo-Chinese Wars) were a conflict between China and Great Britain caused by opium trade control and laws introduced by China against British India.
3. A movement for opium control emerged around 1900 both within and outside of China, with the domestic drive being essential for even modest reform.
4. The relationship between China and the West, particularly Great Britain, concerning opium was primarily shaped by economic considerations.

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

1. Hong Xiuquan established the Taiping Heavenly Kingdom, which quickly gained control over significant parts of southern China.

2. The rebellion was led by Hong Xiuquan and had a large number of participants.
3. The capital of the Taiping Heavenly Kingdom was named Nanjing.
4. Taiping Rebellion was a large-scale rebellion that took place from 1850 to 1864.

21. Read the following passage and answer the question that follows:

Sabatier states that the various defining terms in the ACF include policy subsystems that involve the group of actors that interact with an element of constancy in a functional policy domain, which in this case is the immigration system transferring into the UK Border Control. Thus, all the players and positions in the whole transitional issue make up a policy subsystem. There are two types of subsystems; the first being the Nascent subsystem that is in the process of forming such as the one in discussion. The other type is the mature subsystem that has existed for a period of ten years or more. Policy subsystems arise from the fact that there are new issues emerging or the conceptualisations of new issues and this is the case with the need for a more effective Border Control authority or immigration system in the UK. The other term is advocacy coalition that is basically a group of people sharing the same belief system. The goal of these advocacy coalitions is usually to change the actions of the government and redirect them to accomplish certain policy reforms.

Which of the following best summarizes the passage?

- (a) Sabatier describes the two types of policy subsystems in the UK.
- (b) The advocacy coalition is the main focus of the passage.
- (c) The concept of policy subsystems and advocacy coalitions is discussed in relation to the UK immigration system.
- (d) Sabatier argues that the formation of policy subsystems is driven by the need for policy reforms.

22. Read the following passage and answer the question that follows:

Why does our world contain so much evil? Why does it contain any evil at all? These questions and many others, particularly the presence of evil, reflects the most persistent argument raised against theism. The problem of evil is usually seen as the problem of how the existence of God can be reconciled with the existence of evil in the world. The problem simply stems from basic beliefs or assumptions pertaining to the attributes of God: God is perfectly good, omniscient, and omnipotent. From this, such a God should want to prevent evil, yet much evil exists. There have been many proposed solutions to problem of evil, one being the free will defense/argument. According to this argument, God must allow His creatures to do evil sometimes in order to promote free will. So even if God wants to prevent evil, he cannot because free will is important. The free will defense successfully solves the problem. Some critics believe that this argument fails due to the fact that God could give us free will and still stop people from doing evil. But if that were the case, people would not really have free will; they would know they could not freely do anything they wanted. In this paper I will further explain the problem of evil and examine the concept of the free will argument. Furthermore, I will present J. L. Mackie's argument regarding the issue, while exploring Alvin Plantinga's defense. Despite Plantinga's success and acceptance, his free will defense still presents a conflict between reasoning and the characteristics of God.

Which of the following best summarizes the passage?

- (a) The problem of evil is an argument raised against theism that questions why existence of evil is seen in the world despite God being perfect and omniscient.
- (b) According to the free will defence, God allows His creatures to do evil sometimes in order to promote free will.

- (c) J. L. Mackie presents an argument regarding the issue of evil, while Alvin Plantinga offers a defense.
- (d) Despite Plantinga's successful defense, the free will defense still presents a conflict between reasoning and the characteristics of God.

23. Which of the following statements is ODD ONE OUT?

- (a) Philosophers have emphasized the importance of the self in metaphysical discussions.
- (b) Probability rule has to be applied in a situation of a hit and run incident.
- (c) Bennett (1998) states that luck emerges as an equalizing force when outcome is determined by chance.
- (d) There is no fairness in giving verdict in a legal system when events can't be predicted.

24. Which of the following is the ODD ONE OUT?

- 1. Oriental and western philosophies developed in isolation from each other.
- 2. Works of ancient Greek philosophers, such as Socrates, and some oriental philosophies, such as Taoism, do have some common ideas and concepts.
- 3. Taoism worshiped Toa as the first-cause of the universe and developed the philosophy, which worshiped Tao and promoted the self-perfection of individuals to meet Taoist ideals.
- 4. Socrates stood on the ground that individuals should seek wisdom as the way of self-perfection, taking care of their souls to reach harmony and spiritual balance.
- 5. On the other hand, differences between oriental and western philosophies are distinctive.

LRDI

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

Five film stars Ranbir, Varun, Kartik, Arjun and Siddharth are working on five different films with five different actresses Kiara, Sara, Shradha, Nora and Jhanvi.

The director of each film decided to set a record by making the film as early as possible.

- (1) Shradha's studio is between Ranbir and Siddharth's studio
- (2) Varun's director who doesn't have Shradha as an actress took $\frac{3}{4}$ days taken by Arjun's director
- (3) Siddharth studio no. is 417
- (4) Kartik's film took more days than Ranbir. while Ranbir's film took more days than Shradha's film.
- (5) The director from studio 418 took 16 lesser days then the director from studio 415.
- (6) Nora's film took 8 days more than Ranbir's film and 2 days more than Jhanvi's film.
- (7) Kiara's studio number is 416.
- (8) Kaira's film took 8 days less than Shradha's film and Kartik's film took maximum no. of days to complete.

25. Who is the opposite of Sara in the film?
(a) Ranbir (b) Varun
(c) Kartik (d) Siddharth
26. Which of the following pairs is in studio number 418?
(a) Shradha and Ranbir (b) Shradha and Arjun
(c) Kartik and Sara (d) Varun and Kaira
27. The director of which studio made the film in the least no. of days?
(a) studio 415 (b) studio 416
(c) studio 417 (d) studio 418
28. Siddharth's film was completed in:
(a) 44 days (b) 30 days
(c) 46 days (d) cannot be determined
29. Kartik's opposite was?
(a) Nora (b) Jhanvi
(c) Shradha (d) Sara

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

In a group of 600 people residing in five different cities (Chennai, Shillong, Bangalore, Mumbai, and Pune), each person owns at least one flat. The following conditions apply to the ownership of flats:

- (a) Any person with a flat in Chennai also has a flat in Bangalore.
- (b) Any person with a flat in Pune also has a flat in Mumbai.
- (c) Any person with a flat in Shillong also has a flat in Chennai.
- (d) No person with a flat in Mumbai has a flat in Chennai.

Additionally, the following information is known:

- (i) The number of people with a flat in Shillong is twice the number of people with a flat in only Mumbai.
- (ii) The number of people with a flat in only Bangalore is forty less than the number of people with a flat in exactly one city.
- (iii) The number of people with a flat in Pune is six more than the number of people with a flat in Chennai.
- (iv) The number of people with a flat in at least three cities is 290.
- (v) The number of people with a flat in Chennai is 180 more than the number of people with a flat in only Mumbai.
- (vi) The number of people with a flat in Bangalore is two hundred more than the number of people with a flat in Mumbai.

30. How many people have their own flat in exactly one in city?
31. How many people have their own flat in Bangalore and exactly in one other city?
32. Among the persons who have their own flat in Bangalore, how many persons have their own flat in Mumbai?
33. How many people have their own flat in both Pune and Chennai?
(a) Can't be determined (b) 16
(c) 10 (d) 0

34. How many people who have their own flat in Pune also have their own flat in exactly two other cities?

Directions (35–39): Read the following information and answer the question the follows:

On a cloudy Sunday morning, a young man committed a dacoity and managed to escape. Vikram, the investigating officer assigned to the case, arrived at the crime scene. Upon investigation, he gathered information about the suspect's appearance: brown hair, brown complexion, a mole on the right cheek, and a pink eye patch on the left eye.

Vikram returned to the investigating headquarters and searched the available database, which only had partial information about seven individuals: Akram, Biru, Chandan, Dipak, Elina, Faruq, and Govind. The database contained limited details related to the suspects' characteristics. Based on this partial information, Vikram deduced that the culprit must be one of the seven individuals.

Here are the additional details gathered from the database:

1. Among the seven individuals, four have brown hair, and three have black hair.
2. Four individuals have a brown complexion, while three have an olive complexion.
3. Three individuals have a mole on their right cheek, and four have a mole on their left cheek.
4. Three individuals wear an eye patch over their right eye, and four wear an eye patch over their left eye.
5. Five individuals wear a pink eye patch, while two wear a black eye patch.

Vikram also obtained the following information:

- I. None of the individuals have all the characteristics mentioned above in common.
- II. Chandan, who has the same complexion as Dipak, wears the eye patch on a different eye compared to Dipak.
- III. Biru has black hair, and a mole on his left cheek, and wears an eye patch over his right eye.
- IV. There are exactly two individuals with black hair and a mole on their right cheek, and exactly three individuals who wear a pink eye patch and have brown hair.

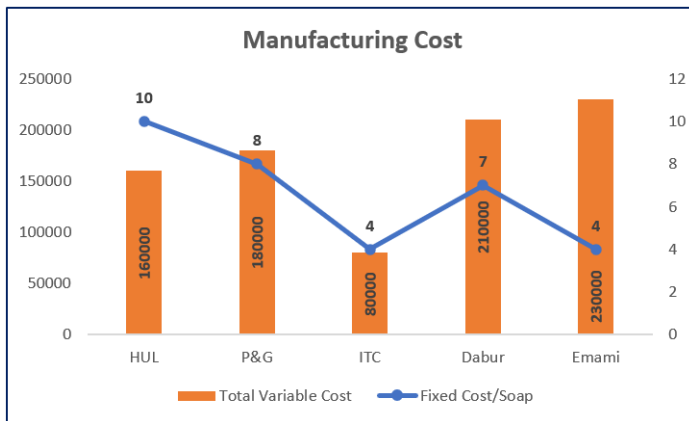
- V. There are exactly three individuals with a mole on their right cheek and wear an eye patch over their left eye.
- VI. There are exactly three individuals who wear an eye patch over their right eye and have a brown complexion.
- VII. Dipak wears a black eye patch, while Govind has a brown complexion.
- VIII. Akram has a mole on his left cheek, while Elina does not wear a black eye patch.

35. Who among the seven persons is the dacoit?
(a) Govind (b) Chandan
(c) Akram (d) Faruq
36. How many people wear a pink eye patch and have a mole on their right cheek?
(a) 0 (b) 1
(c) 2 (d) More than 2
37. Who among the following is of olive complexion and has a mole on his right cheek?
(a) Elina
(b) Akram
(c) Chandan
(d) More than one of the above
38. Who among the following is of olive complexion and wears an eye patch over his/her left eye?
(a) Akram
(b) Govind
(c) Faruq
(d) More than one of the above
39. Vikram received information that a person with Brown hair, a mole on his left cheek and an eye patch over his right eye committed a different dacoity. How many of the seven persons match the description of this dacoit?
(a) 0 (b) 1
(c) 2 (d) More than 2

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

Five big FMCG companies, HUL, P&G, ITC, Dabur and Emami produce soaps in India. The Total Cost for each company comprises two components – Fixed Cost and Variable Cost. During the month of August'22, the number of soaps manufactured by the five companies, HUL, P&G, ITC, Dabur and Emami, are in the ratio 2 : 4 : 5 : 7 : 9, respectively.

The following bar graphs provide, for each company, the average Fixed Cost incurred per unit manufactured during the month and the Total Variable Cost incurred during the month. The costs are shown in rupees.



40. The total cost incurred by the companies are sorted in the descending order. The company with the highest cost is at number 1 position and the company with the least total cost is at the rank 5 position. If the difference between the rank of Dabur and P&G is 2, then find the minimum possible profit by ITC if they sell one soap at 20 INR. Assume no other cost than Manufacturing cost to calculate the profit.

- (a) 28%
- (b) 39%
- (c) 42%
- (d) 49%

41. The total cost incurred by the companies are sorted in the descending order. The company with the highest cost is at number 1 position and the company with the least total cost is at the rank 5 position. Position of how many companies can be uniquely determined?

42. Variable cost of one of the companies is 6 INR/soap. It is given that all the companies produce an integral number of soaps which are divisible by 5000. Then find out the difference between the cheapest and the costliest soap in the market if all the companies sell at a 100% profit.

- (a) 40
- (b) 29.3
- (c) 37.60
- (d) 42.10

43. In the last question, which company has the highest revenue and which company has the 4th highest revenue? [Select the option which represents the right order]

$$\text{Revenue} = \text{Selling Price} \times \text{Quantity}$$

- (a) Emami, Dabur
- (b) Dabur, HUL
- (c) Dabur, P&G
- (d) Emami, P&G

44. In the last question, if all the companies sell the soaps at 30 INR/Soap, then which company will have the 2nd highest % profit?

- (a) ITC
- (b) Emami
- (c) Dabur
- (d) P&G

QUANT

45. Pepto and Piggy are two grocery delivery apps which deliver groceries with 10 min and 15 min from the ordering respectively with 100% probability. The probability of Pepto delivering

grocery within t min from ordering is $\frac{t}{10}$ whereas the probability of Piggy delivering grocery within t

min from ordering is $\frac{t}{15}$. If $P(X, Y)$ denotes probability of X delivering faster than Y then find

the value of $\frac{P(\text{Pepto, Piggy})}{P(\text{Piggy, pepto})}$ given the order of the same items was placed simultaneously in both the apps:

46. Let's say n is 3 digit number abc where a, b, c are digits in hundred's place, ten's place & unit's place respectively. $F(n)$ is defined as
 $F(n) = a + b + c$ if $(a + b + c) < 10$
 $= F(a + b + c)$ if $(a + b + c) \geq 10$
 $G(n)$ is defined as the remainder when the number n is divided by 9
Find out the number of 3 digit numbers for which $F(n) + G(n)$ is a perfect square.
47. PQR Company has launched a Multi-Level-Marketing (MLM) scheme in which one person can sell products for the company and can also keep many people under him as a distributor who can again sell the products of PQR Company and can keep people (different from the ones already included in the MLM Scheme) under them. This branching can happen infinitely. For selling a product the seller gets 30% commission on the MRP. If a person A who is just above B on the chain and B directly reports to him, gets 10% commission of whatever B earns from either selling or commissions from immediate lower layer. This way of income is common for every people in the MLM branch. If the company PQR produces a product at ₹160 cost whose MRP is ₹300, then what can be the minimum profit margin of the company (in %)? [Assume that all the products are sold at MRP and no discounts are given by the sellers on MRP.]
48. How many distinct real solutions the quadratic equation $3x^2 + |x| + [x - 1] - x + 1 = 0$ has, if $[.]$ represents the greatest integer function of x ?
49. A Grand Food Festival organized by "Khayega India" was won by the contestant who had prepared a meal for a complete family. The meal consisted of a chapati of right triangular shape and

a circular pizza inscribed in it. The point of contact of the pizza with the longest side of the chapati divided it in the ratio of 3 : 2. If the sum of all the sides of the chapatti be 36 cm. Find the radius of the pizza?

50. p, q are the irrational roots of the equation $x^3 + 1 = 2x^2$
- $$f_n(p, q) = \frac{(p^n - q^n)}{(p - q)}$$
- If
- Then find the value of $f_1(p, q) + f_2(p, q) + f_3(p, q) + \dots + f_{2020}(p, q)$ is-
- (a) $f_{2021}(p, q) + 1$
(b) $f_{2021}(p, q) - 1$
(c) $f_{2022}(p, q) + 1$
(d) $f_{2022}(p, q) - 1$
51. $[1] + [2] + [3] + \dots + [n^3] = \left(1 + \frac{1}{3} + \frac{1}{3^2} + \dots\right) n^3$
- Find n where n is an integer where $[.]$ is the greatest integer function.
- (a) 5
(b) 6
(c) 7
(d) 8
52. While attempting a particular mock test on quadratic equations, Ajitesh wrongly read the coefficient of x and thus got the solutions as 11 and -8. Further, one more student Sankritya made a mistake in writing down the constant term and thus got the solutions of the same quadratic equations as -11 and 9. What would have been the correct roots of the quadratic equation?
- (a) $(-1 + \sqrt{89})$ and $-(1 + \sqrt{89})$
(b) $(-1 + \sqrt{87})$ and $-(1 + \sqrt{87})$
(c) $(-1 + \sqrt{91})$ and $-(1 + \sqrt{91})$
(d) $(-1 + \sqrt{93})$ and $-(1 + \sqrt{93})$

53. Virat is the distributor of Coca-Cola. He buys every bottle of coke at \$1. In order to recycle the bottles, Coca-Cola gives 1 bottle of coke free to Virat for every 3 empty coke bottles submitted by him. He sells the coke at \$1 and his customers always return the bottle. Then how much profit Virat will get (in \$) if he bought Coca-Cola worth \$3000 and sold all of them?

54. Two circular paths intersect each other at two distinct points A & B. The area of the right circle is 200% more than that of the left one and the centres of the two circles are at a distance twice the radius of the smaller circle. Ramesh & Suresh start their morning walk from the point A where Ramesh walks along the periphery of the left circle in the counter-clock-wise direction and Suresh walks along the periphery of the right circle in the clock-wise direction. If they meet for the very first time while crossing B for the first time after 10 seconds from the start then when they will meet at point B for the 3rd time? (in seconds)

55. Two rectangles having the same area are inscribed in a semicircle of radius R such that one of the sides of both the rectangles lie on the diameter of the semicircle. Then what is the area of the circle which circumscribes the common area of the two rectangles? It is given that the common zone between the two rectangles divides one of the rectangles into 3 equal parts.

- (a) $\frac{\pi R^2}{8}$ (b) $\frac{\pi R^2}{5}$
(c) $\frac{\pi R^2}{3}$ (d) $\frac{1}{4}(1 - \pi R^2)$

56. Vinit works in R&D of a Sanitizer Company. He wants to revolutionize the sanitizer spray by making it 100% safe for children, currently they mix 3 varieties of elements costing Rs. 20/kg, Rs. 17/kg, and Rs. 18/kg in the ratio of $x : y : z$ respectively. y is the geometric mean of x and y and x is less than y . The company marks up the

price of the sanitizer by 66.67% and then provides a discount of 20%, earning a profit of Rs.6 on every kg of the sanitizer sold. One day, Vinit figured out that if they mix these three elements in the ratio $z : x : y$ (instead of $x : y : z$) it will have no harmful impact on children. The company sells the new sanitizer at the usual selling price as previous one. What is the profit in Rs. per kg of the mixture sold?

57. Pipe P, Q & R can fill water in a tank in 20 min, 30 min and 60 min respectively. Pipe A, B & C can empty the tank in 30 min, 40 min and 120 min. The inlet pipes and the outlet pipes are put in "On" and "Off" mode in every alternate minute. In the first minute pipe P, Q & R are opened and in the second minute A, B & C are opened when pipes P, Q & R are closed. Again, on the 3rd minute P, Q, R are opened and A, B & C are closed. This went on till the tank is filled with water completely. There is also a hole H at the bottom of the tank which can drain the entire water out of the full tank in 120 min. The hole drained out water throughout until got fixed by the end of 60th minute. When (in minutes) the tank will be filled? [Write the closest integer if the answer is in fraction]

58. Let $g(x)g(y) = g(x + y)$
Also, it is given that $g(5) = 32$; $g(7) = 128$

$$\text{Find } 2 \left[\frac{g(-2023)}{(1 + g(-2023))} + \frac{g(-2021)}{(1 + g(-2021))} + \frac{g(-2020)}{(1 + g(-2020))} + \dots + \frac{g(2023)}{(1 + g(2023))} \right] = ?$$

59. In a right-angle triangle having circumradius 2.5 cm and the smallest side of 3 cm following 3 figures were drawn-

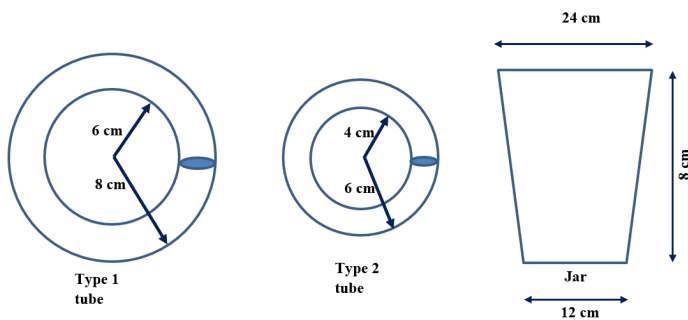
R₁ : R₁ is the largest possible rectangle inside the triangle having one side on the hypotenuses.
R₂ : R₂ is the largest possible rectangle inside the triangle having one side on the smallest side

C_1 : The largest possible circle inside the triangle
Let the area of R_1 , R_2 & C_1 are A_1 , A_2 & A_3 respectively. A is the area of the right-angle triangle. Then which is/are the right statement(s) about A_1 , A_2 , A_3 –

1. $A_1 < A_2 < A_3$
 2. $A_1 = A_2 < A_3$
 3. $A_1 : A_2 : A_3 = 1 : 1 : \pi$
 4. $A_1 : A_2 : A_3 = 1 : \sqrt{2} : \pi$
 5. $A_1 : A = 1 : 2$
- (a) Only 1 is true
(b) 1 & 3 are true
(c) 1, 3 & 5 are true
(d) 2, 3 & 5 are true

60. Two types of circular tube as shown in the figure is completely filled with a liquid. There are total 7 Type 1 tubes and 13 Type 2 tubes. The liquid is taken out of all the tubes and kept in an empty jar

as shown in the figure. If $\frac{1}{\pi}$ of the total liquid got wasted while transferring to the jar, then find the height of the liquid in the jar.



- (a) 2
(b) 3
(c) 4
(d) 6

61. A is the area bound by the following curves-

$$L_1 \equiv |y| \leq \sqrt{3}$$

$$L_2 \equiv \sqrt{3}|x| + |y| \leq 2\sqrt{3}$$

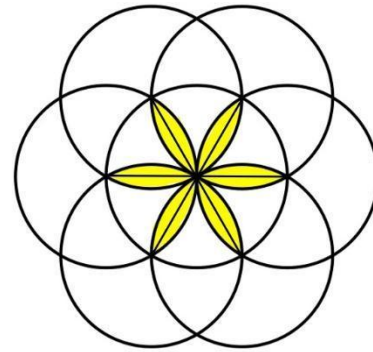
$x = \alpha$ divides A into 2 parts in the ratio of 1:2.
Find α

1. $\alpha = \frac{1}{2}$
2. $\alpha = -\frac{1}{2}$

3. α is the common ratio of an infinite GP whose n th term is equal to the sum of all the numbers from $(n+1)$ th term
 4. 2α is the sum of reciprocals of the roots of $x^2 - x - 1 = 0$
- (a) Only option 1 is right
(b) Only option 2 is right
(c) Both Options 2 & 4 are right
(d) 1, 2, 3, 4 are right

62. k is the minimum value of the expression $(x^4 + 1) + (x^8 + 1) + (x^{12} + 1) + \dots + (x^{144} + 1) - 37x^{36}$; where x is a real number.
If, $a + 2b + 3c + 4b + 5e \leq (k + 1)$; where a, b, c, d, e are distinct natural numbers. Then find the number of possible permutations of (a, b, c, d, e)

63. Find the area bounded by the region highlighted in the picture below (in sq. unit). The radius of each of the circles is 1 unit and all the outside circles pass through the centre of the inside circle.



- (a) $3\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)$
(b) $6\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right)$
(c) $6\left(\frac{\pi}{3} - \frac{\sqrt{3}}{4}\right)$
(d) $3\left(\frac{\pi}{3} - \frac{\sqrt{3}}{2}\right)$

64. Subham has an initial capital of Rs. 25,000. Out of this, she invests Rs. 10,000 at 7.5% in the ABI bank, Rs. 4,000 at 4.5% in the BBI bank and the remaining amount at $x\%$ in DBI bank, each rate being simple interest per annum. Her combined annual interest income from these investments is equal to 6% of the initial capital. If he had placed

his full initial cash in the DBI bank, her yearly interest income would have been (in Rs.):

65. Sunita and Danish are playing a dice game where each of them rolled a fair dice thrice. Whatever numbers come while rolling the dice thrice, Sunita used to multiply the outcomes and write all the natural numbers which are less than or equal to it without any repetition in an ascending manner. Danish then removed all the numbers which will have a common factor greater than 1 to the largest number in the sequence. Let N be the count of the number of terms in the sequence thus formed after Danish's editing. Then which of the following cannot be the value of N ?
- | | |
|--------------|----------------|
| I. 25 | II. 42 |
| III. 100 | IV. 120 |
| (a) I & II | (b) II & III |
| (c) III & IV | (d) I, II & IV |
66. If the average weight of the class VI, VII, and VIII is 48.75 kg, and Class VII contains 20 students of average weight 45 kg, class VIII contains $(X + 1)$

students of average weight 60 kg and class VI contains $(X - 9)$ students of average weight 36 kg, then what is the total number of students in class VI, VII, and VIII together?

**VARC**

1.	(b)	5.	(c)	9.	(c)	13.	(a)	17.	(a)	21.	(c)
2.	(b)	6.	(c)	10.	(b)	14.	(a)	18.	(3142)	22.	(a)
3.	(c)	7.	(b)	11.	(b)	15.	(d)	19.	(2143)	23.	(c)
4.	(b)	8.	(b)	12.	(b)	16.	(c)	20.	(4213)	24.	(5)

LRDI

25.	(a)	29.	(a)	33.	(d)	37.	(a)	41.	(3)
26.	(b)	30.	(76)	34.	(210)	38.	(d)	42.	(c)
27.	(b)	31.	(218)	35.	(b)	39.	(c)	43.	(b)
28.	(c)	32.	(288)	36.	(c)	40.	(b)	44.	(b)

QUANT

45.	(2)	50.	(d)	55.	(a)	60.	(c)	65.	(d)
46.	(300)	51.	(b)	56.	(5)	61.	(d)	66.	(80)
47.	(25)	52.	(a)	57.	(85)	62.	(13)		
48.	(2)	53.	(1499)	58.	(4047)	63.	(b)		
49.	(3)	54.	(130)	59.	(d)	64.	(1295)		

Hints & Solutions

VARC

1. (b)

The passage highlights several factors that are affecting the status of foreign correspondents in the journalism industry, such as economic cuts, technology, and ethical considerations. However, despite these challenges, the importance of foreign correspondents is emphasized throughout the passage. The author argues that while the Internet and other innovative online resources offer additional sources of news, most consumers still depend on traditional media for their international perspective. Moreover, the advantages that foreign correspondents have over local civilians, such as their competence in first aid, ability to function in hostile environments, adherence to ethical codes and professional principles, and multimedia training, make them essential to the journalism industry. The author concludes that foreign correspondents remain imperative in spite of the digital revolution and the rise of civilian reporters. Hence, option B is correct.

A. The passage does not state that foreign correspondents are becoming obsolete and losing their significance, but instead argues the opposite.

C. The passage acknowledges that civilian reporters have the potential to dispense international information, but it also states that foreign correspondents remain imperative.

D. The passage mentions that the average consumer remains dependent on traditional media, including foreign correspondents, for their international perspective, but it does not state that they are losing their significance.

2. (b)

The passage as a whole explores the evolving role and importance of foreign correspondents amidst

various challenges and advancements in the digital age.

Option A is incorrect as it contradicts the main argument of the passage. The author argues the continued importance of foreign correspondents despite the rise of the internet and citizen journalism, not their obsolescence.

Option C, while true, does not encapsulate the main argument of the passage. It only addresses part of the challenges faced by foreign correspondents but doesn't comment on their ongoing relevance.

Option D also doesn't cover the main point of the passage. Rooftop journalism is mentioned as a current trend, but it's not presented as the central theme of the passage.

Option B captures the central theme of the passage accurately. It covers both the challenges faced by foreign correspondents and their continued relevance in the news industry, in line with the overall argument of the passage.

3. (c)

The passage argues that despite the advancements in technology and the rise of citizen journalism, foreign correspondents still play a crucial role in providing international news to the public. Despite the Internet providing access to additional sources of news, the majority of news consumed online is still from domestic newscast websites. Furthermore, the public remains dependent on traditional media for an international perspective, as verified news is difficult to find amidst the clutter on the Internet.

Although the use of technology by traditional news agencies is both a threat and an opportunity for foreign correspondents, the advantage of a foreign correspondent over a local civilian is their expertise in safety, adherence to ethical codes and professional principles, and training in multimedia. These factors make foreign correspondents

imperative in the distribution of international news, despite the rise of citizen journalism and technological advancements. Hence, option C is correct.

Option A is incorrect because while the rise of technology and citizen journalism presents challenges to the role of foreign correspondents, the passage argues that they are still crucial in providing international news to the public.

Option B is incorrect because while the Internet enables access to additional sources of news, the majority of news consumed online is still from domestic newscast websites and ensuring the veracity of the news is difficult.

Option D is partially correct, but not as comprehensive as the correct answer. The passage does discuss the threats and opportunities posed by technology, but ultimately argues that the role of foreign correspondents in providing international news remains crucial.

4. (b)

A) The majority of people who consume news online do so through domestic newscast websites.

This statement is directly mentioned in the passage and supports the argument that the public remains dependent on traditional media, including foreign correspondents, for an international perspective. This option is not correct because it is not undermining the importance of foreign correspondents.

B) The average person is not trained in multimedia.

This statement is not directly mentioned in the passage, but it can be inferred from the argument that journalists adhere to ethical codes and professional principles that the average person would not consider, and they are also trained in multimedia. This option is correct because if the average person were trained in multimedia, the advantage of a foreign correspondent over a local civilian would be diminished, and the need for foreign correspondents would be less.

C) The cost of upholding a foreign bureau can range between \$200,000 to \$300,000 per year.

This statement is directly mentioned in the passage and supports the argument that the preference for citizen journalism is understandable. This option is not correct because it does not undermine the importance of foreign correspondents, but rather highlights the cost of maintaining them.

D) Foreign correspondents are equipped to handle hostile environments and are trained in first aid.

This statement is directly mentioned in the passage and supports the argument that foreign correspondents remain important because of their safety and training. This option is not correct because it does not undermine the importance of foreign correspondents, but rather highlights their advantages over local civilians.

5. (c)

The author's main purpose is to highlight the contrast between the approach taken by China and India towards infrastructure growth. The author compares the Chinese model of using infrastructure as a policy instrument and political tool to reduce poverty and generate growth, with the Indian approach of emphasizing redistribution. The author also highlights that India's democratic approach has led to duplication of responsibilities and weakened accountability among different levels of government, resulting in inefficient implementation. The author does touch upon the challenges faced by India in growing its infrastructure, the potential of foreign investment, and the need for a transparent and equitable regulatory framework, but these are not the main focus of the author's argument. Hence, option C is correct.

Option A: While the author does mention the challenges faced by India in growing its infrastructure, it is not the main focus of the argument.

Option B: The author mentions the importance of foreign investment in the Indian infrastructure

sector, but this is not the main purpose of the argument.

Option D: The author mentions the need for a transparent and equitable regulatory framework in India, but this is not the main focus of the argument. The author's main purpose is to highlight the contrast between the approach taken by China and India towards infrastructure growth.

6. (c)

Statement-I: "India's infrastructure problems are caused by issues with land clearance, insufficient compensation, and unclear regulations" can be inferred from the passage as it states "Numerous problems now causing the failure of India's infrastructure are land clearance issues; insufficient compensation, unclear regulations, access to financing etc."

Statement-II: "The Indian government recognizes foreign investment as a major source of funding for infrastructure growth" can be inferred from the passage as it states "Apart from local private capital and return from public user fees, Indian Government acknowledge that foreign investment is major source of investment into infrastructure sector, therefore she is providing more flexibility towards capital flow and is setting policy to lower the risk and increase private capital return."

Statement-III: "The Indian government is implementing reforms to increase infrastructure growth" can be inferred from the passage as it states "Nevertheless, Indian Government did have a strong will in growing infrastructure. Structural and procedural reforms at various government levels have been taken place to facilitate infrastructure growth."

Statement-IV: "India's emphasis on redistribution has proven to be unsuccessful in generating robust and sustained growth" can be inferred from the passage as it states "Comparing with China, China used infrastructure as a policy instrument and political tool to reduce poverty and generate growth trading off with the cost of enlarged

inequality and huge regional disparity, while India emphasis more on redistribution which proved to be unsuccessful for it is self-destroying the impetus to generate robust and sustained growth."

However, Statement-V: "India's democracy system is a contributing factor to the success of the country's infrastructure" cannot be inferred from the passage as it states "After all, Indian's philosophical attitude and the democracy system contribute a deep-rooted cause on the failure." The author is suggesting that India's democracy system is a contributing factor to the failure of the country's infrastructure, not the success.

The author also mentions that India's approach, which is more participatory and democratic, causes duplication of responsibilities and weakened accountability among different levels of government and political parties, resulting in inefficient implementation and resource allocation. This supports the idea that the democracy system is a contributing factor to the failure of the country's infrastructure.

7. (b)

Option A, "A news article on the state of India's infrastructure" is not the most likely as the passage provides in-depth analysis of India's infrastructure problems, comparing it to China's approach, discussing the government's efforts to improve the sector, and highlighting the challenges that need to be addressed. This level of detail and analysis is typically not found in a news article, which generally provides a concise overview of the subject.

Option B, "A research paper on comparative development in India and China" is the most likely as the passage compares the development approaches of India and China, pointing out their strengths and weaknesses, and explaining how India's democracy and philosophical attitude are contributing to the failure of its infrastructure. The passage provides a comprehensive analysis of the

subject, making it a likely candidate for a research paper.

Option C, "A policy brief on the government's approach to infrastructure growth" is not the most likely as the passage not only discusses the government's approach but also provides a critical analysis of India's infrastructure problems, comparing it to China, and highlighting the challenges that need to be addressed. A policy brief would typically focus more narrowly on government policies and actions, and would not provide as in-depth an analysis of the broader context and challenges facing the sector.

Option D, "An economic analysis of the challenges facing India's infrastructure sector" is not the most likely as the passage provides a comprehensive analysis of the subject, including political, philosophical, and regulatory factors, in addition to economic ones. An economic analysis would typically focus more narrowly on economic factors such as investment, pricing, and tax regimes, and would not provide as in-depth an analysis of the broader political and philosophical context.

In conclusion, the passage is most likely a part of a research paper on comparative development in India and China as it provides a comprehensive analysis of India's infrastructure problems, comparing it to China, and highlighting the challenges that need to be addressed. The level of detail and analysis, as well as the comparative perspective, make it a likely candidate for a research paper.

8. (b)

Option A – This option is incorrect because it suggests that "modern man doesn't need to learn ways of communication," which is not a theme presented in the passage. The last paragraph emphasizes the significance of skillful communication, even in technology-mediated contexts, such as phone calls and Zoom meetings. This statement contradicts the assumption that

technology has completely replaced the need for traditional communication skills.

Option B – A segment of the passage states, "Under the larger discipline of rhetoric (the study of persuasion in all its forms), students in antiquity spent years acquiring a strategic understanding of how to temper logic, emotions and words with poise..." In contrast, the author suggests that such a comprehensive approach to speech training is lacking in the contemporary educational system. This sentiment aligns precisely with this option, hence, this option is correct.

Option C – The passage does not provide evidence to support the assertion that modern society primarily concentrates on technical and vocational skills to ensure a prosperous future. As such, this option is not grounded in the text and is, therefore, incorrect.

Option D – While this option may appear plausible, it is, in fact, incorrect. The passage emphasizes the importance of effective oral communication skills in a variety of contexts, not just face-to-face interactions, including phone calls and Zoom meetings. This suggests that the prevalence of written digital communication hasn't replaced the need for skillful oral communication. Thus, this option is invalid.

9. (c)

Answer – C

Statement 1 – "If this sounds far-fetched, how many high-ranking executives can you recall who have poor public speaking skills?"

The author does suggest that most high-ranking executives have good public speaking skills but we cannot conclude that 'All high ranking' officials will have good public speaking skills. Hence, this statement is extreme and is incorrect.

Statement 2 – "Brilliant as you might be while toiling at your work station, and as important as your solo endeavours are, your social and team value is judged by your ability to skilfully handle

phone calls, zoom meetings, sales and technical presentations, and client interactions”

From the above excerpt we can understand that a person’s interaction skills determine his/her social and team value. Hence, this statement is correct.

Statement 3 – The passage doesn’t make a comparison between the communication skills of an American and Asian. Hence, this statement is out of context and incorrect.

Statement 4 – “Under the larger discipline of rhetoric (the study of persuasion in all its forms), students in antiquity spent years acquiring a strategic understanding of how to temper logic, emotions and words with poise. Speaking well depended upon learning how to analyse all sides of an argument and assaying all possible avenues of commonality with one’s audience before expressing an opinion. Similar to our approach to reading and writing today, speech training was a comprehensive, critical approach to knowledge, with an additional emphasis on psychology and social interaction.”

Antiquity means in ancient times. From this excerpt we understand that the study of rhetoric was important in ancient Greece and speech training was critical in the same. Hence, this statement is correct.

As Statement 2 & 4 are correct, the correct option is C.

10. (b)

Answer – B

Let us refer to the last paragraph of the passage.

“Her observation holds true across virtually every advanced occupation. Brilliant as you might be while toiling at your work station, and as important as your solo endeavours are, your social and team value is judged by your ability to skilfully handle phone calls, Zoom meetings, sales and technical presentations, and client interactions. If this sounds far-fetched, how many high-ranking executives can you recall who have poor public speaking skills?”

In the previous paragraphs we have established that unlike ancient Greece we don’t place emphasis on comprehensive speech training and in the last paragraph we establish the need for good public speaking skills. It helps a person gain social and team value in virtually every advanced occupation. Now that we have developed the premise that what is the missing link between the present and past in terms of speech training, and we have also outlined the importance of public speaking skills the logical follow-up will be about the current state of communication training in today’s curriculum and what can be done to improve it as to help people work efficiently in advanced occupations. This idea is best reflected in option B.

11. (b)

In the text, the author delineates, "If we speak in ways that are off-putting, vague or hard to understand... people will find us difficult to understand and work with. Our usefulness to others will decline with every strained interaction." Efficacy and value, as outlined, are primarily determined through proficient communication skills. Further, the author emphasizes, "Their take holds true today – it’s unrealistic to expect yourself to be competent, much less masterful, in an art form you’ve never been taught to practise... speech training was a comprehensive, critical approach to knowledge, with an additional emphasis on psychology and social interaction." Therefore, the necessity for mastery in public speaking, an art form unemphasized in the current curriculum, is underscored.

Option A – The author makes it explicit that practising speaking skills is crucial and it needs to be inculcated and fostered, just as was done in ancient times. Hence, merely implementing a compulsory mandate would not necessarily ensure masterful speaking skills. Therefore, this option is not valid.

Option B – The author highlights that the training and practice of speaking skills will help individuals become proficient public speakers, which in turn will elevate their performance in advanced occupations. Thus, it is logically coherent to reform the curriculum to equip students with necessary speaking skills. This proposition aligns perfectly with the author's argument, making this the correct answer.

Option C – While this option might seem plausible, it lacks specificity concerning the comprehensive speech training, the primary focus of the author's argument. Therefore, this option, being too general and not directly addressing the issue at hand, is incorrect.

Option D – Despite being a creative solution, this option is irrelevant as it is not mentioned or suggested in the passage. Moreover, the emphasis in the passage is on personal skill development and practice, rather than reliance on artificial intelligence. Hence, this option is invalid.

12. (b)

A) This option is incorrect because it is the opposite of what the passage states. The ancient Greeks did not believe that public speaking skills were innate or tied to one's emotional makeup. According to BANE Theory, this option is Alien, as it does not accurately represent the views of ancient Greek educators as described in the passage.

B) This option is correct. The passage states, "From the ancient perspective, public speaking, like writing or, for that matter, military prowess, was considered an art form – teachable, learnable, and utterly unrelated to issues of innate character or emotional makeup." The ancient Greeks believed that public speaking was an art form that could be learned and taught, and was not dependent on one's innate character.

C) This option is incorrect. The passage states that rhetoric, which includes public speaking, was a significant part of ancient education: "students in

antiquity spent years acquiring a strategic understanding of how to temper logic, emotions and words with poise." This option is Narrow according to BANE Theory because it does not encompass the full scope of rhetoric in ancient education, which included not just grammar and vocabulary but also psychology and social interaction.

D) This option is incorrect and can be easily eliminated. The passage does not suggest that modern high-ranking executives mostly have poor public speaking skills. In fact, it implies that effective communication is a critical skill in high-ranking positions: "If this sounds far-fetched, how many high-ranking executives can you recall who have poor public speaking skills?" According to BANE Theory, this option is Extreme, as it exaggerates the prevalence of poor public speaking skills among executives.

13. (a)

The central theorem of the narrative encircles the author's tumultuous rearing bereft of role models, and its subsequent ramifications on her relationships during adulthood.

Option A: This assertion echoes the experiences and hypothesis delineated by the author within the narrative. She had to negotiate with the dearth of positive role models during childhood, which subsequently precipitated problematic affiliations during adulthood. Consequently, this assertion is validated.

Option B: This postulate, bearing an extreme and broad character, insinuates that all individuals confronting the mental divergence of bipolar disorder are invariably prone to abusive relationships, a supposition that cannot be extracted from the narrative.

Option C: The narrative refrains from asserting a direct correlation between the diagnosis of ADHD or ODD and the risk of being ensnared in abusive relationships. Therefore, this postulate is invalidated.

Option D: Even though the author shares her experiences of desertion and her second spouse's descent into substance abuse, the narrative doesn't intimate a direct causal nexus between the two phenomena. Consequently, this assertion is refuted.

14. (a)

A. The author's childhood experiences and how it has shaped her beliefs about being a role model for her children is the correct answer. The passage details the author's experiences growing up without a positive role model and how it has influenced her desire to provide a better childhood for her own children. The author's experiences with mental illness, domestic abuse, and difficult relationships are all part of her journey to becoming a good role model for her children. Hence, option A is correct.

B. The impact of mental illness on the author's family relationships is not the main idea of the passage, although the author's mother's Bi-Polar disorder does play a role in her experiences. The impact of mental illness is just one aspect of the author's childhood experiences and is not the focus of the passage. Hence, option B is not correct.

C. The author's journey from a troubled childhood to a stable adult life is not the main idea of the passage, although the passage does touch upon this topic. The focus of the passage is on the author's experiences growing up without a positive role model and how it has influenced her desire to provide a better childhood for her own children. The author's journey from a troubled childhood to a stable adult life is just one part of this larger narrative. Hence, option C is not correct.

D. The effects of domestic abuse on the author's relationships is not the main idea of the passage, although the author's experiences with domestic abuse play a role in her journey. The focus of the passage is on the author's experiences growing up without a positive role model and how it has influenced her desire to provide a better childhood

for her own children. The effects of domestic abuse are just one aspect of the author's experiences and are not the focus of the passage. Hence, option D is not correct.

15. (d)

The tone of the passage is D. Disillusioned.

The author describes a difficult childhood, abusive relationships, and a pattern of bad choices in partners. They mention feeling like they are walking in their mother's footsteps and being afraid that their own struggles with mental illness will impact their children. The author finally comes to the conclusion that they must make a change for their own well-being, but this is not presented in a hopeful or positive light. Instead, it is portrayed as a difficult decision made out of a sense of necessity. This creates a tone of disillusionment, indicating disappointment or discouragement with their experiences and the circumstances they find themselves in.

A. Despondent - The tone of the passage can be seen as sad and hopeless, but it doesn't quite capture the full range of emotions present. The author describes a difficult childhood, abusive relationships, and the challenges of raising children with mental health issues. However, the author also describes their determination to provide a better life for their children, which suggests a level of resilience and perseverance, rather than simply feeling despondent.

B. Resolute: The tone of the passage is not resolute. Resolute means determined and unwavering in purpose, which is not reflected in the author's experiences described in the passage. The author has faced a series of challenges in their life, including abusive relationships, mental health issues, and struggles to provide for their children. There is a sense of uncertainty and hopelessness in their experiences, which is not characteristic of a resolute tone.

C. Hopeful: The tone of the passage is not hopeful. Hope is the feeling of expectation and desire for a

certain thing to happen. In the passage, the author reflects on their experiences and struggles, and there is a sense of disillusionment and despair, which is not indicative of a hopeful tone. The author is not optimistic about their future or the future of their children, and there is a sense of hopelessness in their experiences.

16. (c)

Through the narration of the text, the author's father is characterized as a figure who absconded, exhibiting no desire to maintain any association with the maternal figure. Moreover, the author underscores her lack of interaction with her father's family. Such narratives signal an absence of intention on the author's father's part to remain actively involved in her life, thereby solidifying the inaccuracy of option C.

Option A finds a basis in the text as it outlines the author's mother's affliction with severe Bi-Polar disorder, indicative of a significant mental health issue.

Option B is confirmed by the text's disclosure of the author's mother's psychologically abusive behavior.

Option D is evidenced by the text's illustration of the author's early years filled with adversity, marked by parental absence, prematurely leaving school, and the need for self-reliance from a tender age of 13.

17. (a)

The logical sequence of the statements should be:
 $2 \rightarrow 1 \rightarrow 4 \rightarrow 3$

Statement-2 should come first as it introduces the topic of discussion - cultural exchange - and challenges the assumption that cultural exchange is inherently progressive.

Statement-1 should follow, as it presents the contrasting view that cultural exchange might be seen as an antidote to nationalist xenophobia. This statement builds upon the initial assertion and

provides context for the contemporary relevance of the issue.

Statement-4 introduces a historical example (Iran and South Asia) to illustrate the point that cultural exchange has played a significant role in the development of national literatures, cultures, and identities. Placing this statement here helps to ground the discussion in real-world examples.

Finally, statement-3 concludes the sequence by highlighting the unexpected outcome of the Indo-Iranian exchange - fostering modern nationalism rather than promoting cosmopolitanism. This statement effectively reinforces the main point that cultural exchange does not have an inherent politics or an inevitable outcome.

The sequence of these statements presents a coherent argument that questions the commonly held assumption that cultural exchange is inherently progressive and offers an alternative perspective based on historical evidence.

18. (3142)

The correct sequence is 3142. This sequence is correct as it follows the chronological progression of events and provides a clear explanation of the situation in Ethiopia. Statement-3 sets the stage by highlighting the subjugation and political marginalization faced by Ethiopia's ethnic groups. Statement-1 then explains how the government used legislation to silence dissent. Statement-4 provides the consequences of this suppression, showing how prisons became overcrowded with individuals who reported on governmental abuses. Finally, Statement-2 contextualizes the situation in Ethiopia within the larger issue of government censorship and suppression of free speech.

19. (2143)

The correct sequence is 2143. This sequence is correct because it provides a clear understanding of the origin and context of the Opium Wars.

Statement 2 highlights the conflict between China and Great Britain and its cause related to opium trade control and laws. Statement 1 mentions the western interest in opium at the beginning of the 20th century, which was largely driven by the promise of economic gain. Statement 4 emphasizes the primary factor that shaped Sino-Western relations concerning opium, particularly with Great Britain. Finally, Statement 3 mentions the emergence of the opium control movement around 1900, both domestically and internationally, with the domestic drive being critical for any form of reform. This sequence provides a comprehensive overview of the Opium Wars and the context surrounding them, making it a logically consistent arrangement of statements.

20. (4213)

The correct sequence is 4213. This sequence is correct because statement 4 starts with the background of the Taiping Rebellion and provides information about the scale and duration of the rebellion. Statement 2 highlights the leader of the rebellion, Hong Xiuquan, and the number of participants. Statement 1 mentions the establishment of the Taiping Heavenly Kingdom by Hong Xiuquan and its quick gain of control over important parts of southern China. Statement 3 specifies the capital of the kingdom, which was named Nanjing. This sequence provides a clear understanding of the Taiping Rebellion and its outcome, making it a logically consistent arrangement of statements.

21. (c)

Option C is the correct answer as the passage describes the concepts of policy subsystems and advocacy coalitions in relation to the UK immigration system. The passage explains that policy subsystems consist of actors and positions involved in a functional policy domain and are categorized into nascent and mature subsystems. The advocacy coalition is defined as a group of

people sharing the same belief system and aims to change government actions towards policy reforms.

Option A only describes the two types of policy subsystems but does not mention their relation to the UK immigration system.

Option B focuses only on the advocacy coalition but does not mention its connection to the policy subsystems.

Option D states that Sabatier argues that the formation of policy subsystems is driven by the need for policy reforms but does not mention the concept of advocacy coalitions.

22. (a)

Option A is the best summary of the passage because it accurately encapsulates the main topics discussed in the passage. The passage talks about the problem of evil, which is seen as an argument raised against theism that questions why existence of evil is seen in the world despite God being perfect and omniscient. It also talks about the free will defense, which is the idea that God must allow His creatures to do evil sometimes in order to promote free will. Finally, the passage mentions J.L. Mackie and Alvin Plantinga's argument and the conflict between reasoning and the characteristics of God. Option A is the only option that accurately summarizes all of these topics.

Option B is incorrect because it does not mention the problem of evil or the arguments of Mackie and Plantinga.

Option C is incorrect because it does not mention the problem of evil or the free will defense.

Option D is incorrect because it does not mention the problem of evil or the arguments of Mackie and Plantinga.

23. (c)

C. Bennett (1998) states that luck emerges as an equalizing force when outcome is determined by chance. is ODD ONE OUT because it is the only statement that directly quotes a source and

mentions a specific person. The other statements do not mention any sources or specific individuals, and instead discuss abstract concepts and ideas. Bennett's statement adds a specific viewpoint and perspective to the overall discussion, making it stand out as distinct from the other statements.

The other statements, A, B, and D, are all general statements about the themes discussed in the passage. Statement A discusses the emphasis that philosophers have placed on the self in metaphysical discussions. Statement B highlights the importance of applying the probability rule in a legal situation. Statement D mentions the lack of fairness in giving a verdict in such a situation. These statements all fit within the context of the discussion about unpredictability and fairness in legal systems, and therefore do not stand out as ODD ONE OUT in the same way that statement C does.

24. (5)

Statement 5 is the odd one out because while the other four statements are talking about the differences and similarities between Oriental and Western philosophies, Statement 5 is talking about the geographical and cultural distance between Oriental and Western civilizations. Statement 1 is talking about the isolation of Oriental and Western philosophies, Statement 2 is talking about the common ideas and concepts of Oriental and Western philosophies, Statement 3 is talking about Taoism and Statement 4 is talking about Socrates. Therefore, Statement 5 is the odd one out.

LRDI

25. (a)

We have to make a grid to solve this question
In this table, from clue 4, 2 and 1 we get that Ranbir, Siddharth, Kartik and Varun are not working with Shradha.

We know that Shradha's number is between Siddharth (417) and Ranbir and since 416 is of

Kaira. so, Shradha will have 418 and Ranbir will have 419.

Clue 6 concludes that Ranbir is neither with Nora nor with Jhanvi.

From clue 8 we can say that Kiara and Kartik did not do a film together

	Kaira (416)	Sara (419)	Shradha (418)	Nora	Jhanvi
Ranbir (419)	X	✓	X	X	X
Varun	✓	X	X	X	X
Kartik	X	X	X		
Arjun (418)	X	X	✓	X	X
Siddharth (417)	X	X	X		

So, from this we can conclude that Sara is with Ranbir.

26. (b)

We have to make a grid to solve this question

In this table, from clue 4, 2 and 1 we get that Ranbir, Siddharth, Kartik and Varun are not working with Shradha.

We know that Shradha's number is between Siddharth (417) and Ranbir and since 416 is of Kiara. so, Shradha will have 418 and Ranbir will have 419.

Clue 6 concludes that Ranbir is neither with Nora nor with Jhanvi.

From clue 8 we can say that Kiara and Kartik did not do a film together

	Kaira (416)	Sara (419)	Shradha (418)	Nora	Jhanvi
Ranbir (419)	X	✓	X	X	X
Varun	✓	X	X	X	X

Kartik	X	X	X		
Arjun (418)	X	X	✓	X	X
Siddharth (417)	X	X	X		

So, from this we can conclude Shradha and Arjun are in studio no. 418.

27. (b)

We have to make a grid to solve this question

In this table, from clue 4,2 and 1 we get that Ranbir, Siddharth, Kartik and Varun are not working with Shradha

We know that Shradha' number is between Siddharth (417) and Ranbir and since 416 is of Kaira. so, Shradha will have 418 and Ranbir will have 419.

Clue 6 concludes that Ranbir is neither with Nora nor with Jhanvi.

From clue 8 we can say that Kaira and Kartik did not do a film together

	Kaira (416)	Sara (419)	Shradha (418)	Nora (415)	Jhanvi (417)
Ranbir (419)	X	✓	X	X	X
Varun (416)	✓	X	X	X	X
Kartik (415)	X	X	X	✓	X
Arjun (418)	X	X	✓	X	X
Siddharth (417)	X	X	X	X	✓

So to further go in the question, we can say that Arjun-Shradha(418) film was completed in x days.

From clue 2, we can say Varun's film took $\frac{3}{4}x$ days

Clue 5 concludes that director in studio 415 took $x + 16$ days to complete the film

From clue 8 we can say that Kiara film took $x - 8$ days to complete and Kartik took the highest no. of days to complete the film

This implies that Kartik was in studio 415 and took $x + 16$ days to complete the film which is the highest.

We know that Kiara and Varun did the film together so,

$$x - 8 = \frac{3}{4}x$$

$$4x - 32 = 3x$$

$$x = 32 \text{ days}$$

So, Shradha-Arjun film took 32 days to complete

Kaira-Varun film took 24 days to complete

Kartik film took 48 days to complete

From Clue 6, it states that Nora's film took more days than Jhanvi's film. which conclude that Nora was with Kartik in studio 415.

and Jhanvi was with Siddharth in studio 417. there film took 46 days to complete (clue 6)

Ranbir and Sara film took 40 days to complete

So, we can conclude that Varun-Kaira's film from studio 416 took the least time.

28.

(c)

We have to make a grid to solve this question

In this table, from clue 4,2 and 1 we get that Ranbir, Siddharth, Kartik and Varun are not working with Shradha

We know that Shradha' number is between Siddharth (417) and Ranbir and since 416 is of Kaira. so, Shradha will have 418 and Ranbir will have 419.

Clue 6 concludes that Ranbir is neither with Nora nor with Jhanvi.

From clue 8 we can say that Kiara and Kartik did not do a film together

	Kaira (416)	Sara (419)	Shradha (418)	Nora (415)	Jhanvi (417)
Ranbir (419)	X	✓	X	X	X
Varun (416)	✓	X	X	X	X
Kartik (415)	X	X	X	✓	X
Arjun (418)	X	X	✓	X	X
Siddharth (417)	X	X	X	X	✓

So to further go in the question,
we can say that Arjun-Shradha(418) film was
completed in x days

From clue 2, we can say Varun's film took $\frac{3}{4}x$
days

Clue 5 concludes that director in studio 415 took x
+ 16 days to complete the film

From clue 8 we can say that Kiara film took x - 8
days to complete and Kartik took the highest no.
of days to complete the film

This implies that Kartik was in studio 415 and
took x + 16 days to complete the film which is the
highest.

We know that Kiara and Varun did the film
together so,

$$x - 8 = \frac{3}{4}x$$

$$4x - 32 = 3x$$

$$x = 32 \text{ days}$$

So, Shradha-Arjun film took 32 days to complete

Kaira-Varun film took 24 days to complete

Kartik film took 48 days to complete

From Clue 6, it states that Nora's film took more
days than Jhanvi's film. Which concludes that
Nora was with Kartik in studio 415.

and Jhanvi was with Siddharth in studio 417. there
film took 46 days to complete (clue 6)

Ranbir and Sara film took 40 days to complete

29. (a)

We have to make a grid to solve this question

In this table, from clue 4, 2 and 1 we get that
Ranbir, Siddharth, Kartik and Varun are not
working with Shradha

We know that Shradha' number is between
Siddharth (417) and Ranbir and since 416 is of
Kaira. so, Shradha will have 418 and Ranbir will
have 419.

Clue 6 concludes that Ranbir is neither with Nora
nor with Jhanvi.

From clue 8 we can say that Kaira and Kartik did
not do a film together

	Kaira (416)	Sara (419)	Shradha (418)	Nora (415)	Jhanvi (417)
Ranbir (419)	X	✓	X	X	X
Varun (416)	✓	X	X	X	X
Kartik (415)	X	X	X	✓	X
Arjun (418)	X	X	✓	X	X
Siddharth (417)	X	X	X	X	✓

So to further go in the question,

we can say that Arjun-Shradha(418) film was
completed in x days

From clue 2, we can say Varun's film took $\frac{3}{4}x$
days

Clue 5 concludes that director in studio 415 took x
+ 16 days to complete the film

From clue 8 we can say that Kiara film took $x - 8$ days to complete and Kartik took the highest no. of days to complete the film

This implies that Kartik was in studio 415 and took $x+16$ days to complete the film which is the highest.

We know that Kiara and Varun did the film together so,

$$x - 8 = \frac{3}{4}x$$

$$4x - 32 = 3x$$

$$x = 32 \text{ days}$$

So, Shradha-Arjun film took 32 days to complete

Kaira-Varun film took 24 days to complete

Kartik film took 48 days to complete

From Clue 6, it states that Nora's film took more days than Jhanvi's film. Which concludes that Nora was with Kartik in studio 415.

and Jhanvi was with Siddharth in studio 417. there film took 46 days to complete (clue 6)

Ranbir and Sara's film took 40 days to complete.

Answer is Option a - Sara

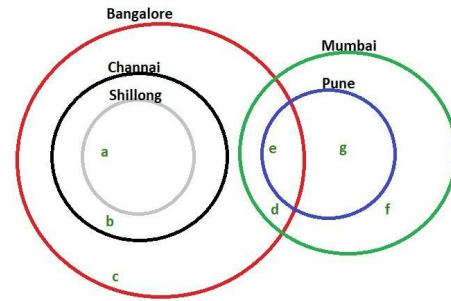
30. (76)

The below Venn diagram represents the set of persons who have their own flat in Chennai, Shillong, Bangalore, Mumbai, and Pune respectively.

All the people who have their own flat in Chennai also have their own flat in Bangalore. Hence, Chennai is a subset of Bangalore. All the people who have their own flat in Shillong also have their own flat in Chennai. Hence, Shillong is a subset of Chennai. All the people who have their own flat in Pune also have their own flat in Mumbai. Hence, Pune is a subset of Mumbai.

None of the people who have their own flat in Mumbai have their own flat in Chennai. Hence, there will be no overlap between Mumbai and Chennai (since Pune is a subset of Mumbai, there will be no overlap between Pune and Chennai as well).

The following diagram represents the five sets:



From (i), $a = 2f$

From (ii), $c = c + f - 40 \Rightarrow f = 40$

Hence, $a = 80$ (From (i))

From (iii), $e + g = 6 + a + b \Rightarrow e + g = b + 86$ (as $a = 80$)

From (iv), $a + e = 290 \Rightarrow e = 210$

Hence, $210 + g = b + 86 \Rightarrow b = g + 124$

From (v), $a + b = 180 + f \Rightarrow b = 140$

Hence, $g = b - 124$

$$\Rightarrow g = 16$$

From (vi), $a + b + c + d + e = 200 + d + e + g + f \Rightarrow c = 36$

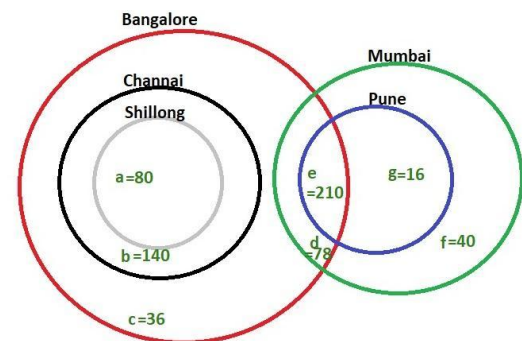
Since the total number of persons was 600,

$$d = 600 - (a + b + c + e + f + g)$$

$$\Rightarrow d = 600 - (80 + 140 + 36 + 210 + 40 + 16) = 600 - 522$$

$$\Rightarrow d = 78$$

The following diagram presents the values:



The number of persons who has their own flat in exactly one city = $40 + 36 = 76$

Ans: 76

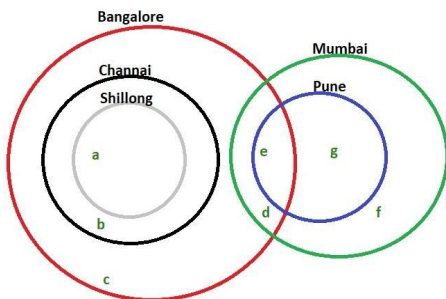
31. (218)

The below Venn diagram represents the set of persons who have their own flat in Chennai, Shillong, Bangalore, Mumbai, and Pune respectively.

All the people who have their own flat in Chennai also have their own flat in Bangalore. Hence, Chennai is a subset of Bangalore. All the people who have their own flat in Shillong also have their own flat in Chennai. Hence, Shillong is a subset of Chennai. All the people who have their own flat in Pune also have their own flat in Mumbai. Hence, Pune is a subset of Mumbai.

None of the people who have their own flat in Mumbai have their own flat in Chennai. Hence, there will be no overlap between Mumbai and Chennai (since Pune is a subset of Mumbai, there will be no overlap between Pune and Chennai as well).

The following diagram represents the five sets:



From (i), $a = 2f$

From (ii), $c = c + f - 40 \Rightarrow f = 40$

Hence, $a = 80$ (From (i))

From (iii), $e + g = 6 + a + b \Rightarrow e + g = b + 86$ (as $a = 80$)

From (iv), $a + e = 290 \Rightarrow e = 210$

Hence, $210 + g = b + 86 \Rightarrow b = g + 124$

From (v), $a + b = 180 + f \Rightarrow b = 140$

Hence, $g = b - 124$

$\Rightarrow g = 16$

From (vi), $a + b + c + d + e = 200 + d + e + g + f$
 $\Rightarrow c = 36$

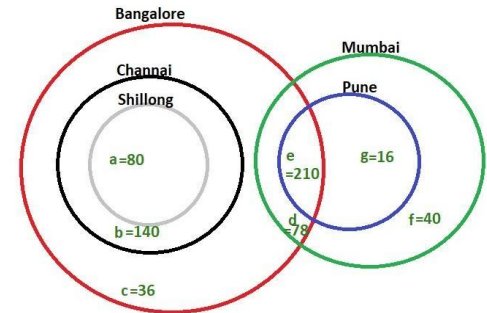
Since the total number of persons was 600,

$d = 600 - (a + b + c + e + f + g)$

$\Rightarrow d = 600 - (80 + 140 + 36 + 210 + 40 + 16) = 600 - 522$

$\Rightarrow d = 78$

The following diagram presents the values:



The number of persons who has their own flat in Bangalore and exactly in one other city is $140 + 78 = 218$

Ans: 218

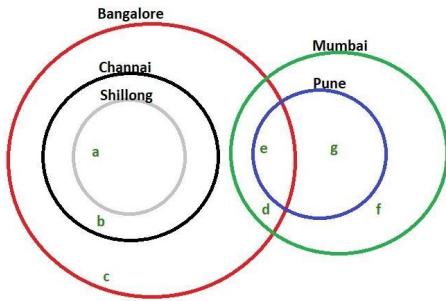
32. (288)

The below Venn diagram represents the set of persons who have their own flat in Chennai, Shillong, Bangalore, Mumbai, and Pune respectively.

All the people who have their own flat in Chennai also have their own flat in Bangalore. Hence, Chennai is a subset of Bangalore. All the people who have their own flat in Shillong also have their own flat in Chennai. Hence, Shillong is a subset of Chennai. All the people who have their own flat in Pune also have their own flat in Mumbai. Hence, Pune is a subset of Mumbai.

None of the people who have their own flat in Mumbai have their own flat in Chennai. Hence, there will be no overlap between Mumbai and Chennai (since Pune is a subset of Mumbai, there will be no overlap between Pune and Chennai as well).

The following diagram represents the five sets:



From (i), $a = 2f$

From (ii), $c = c + f - 40 \Rightarrow f = 40$

Hence, $a = 80$ (From (i))

From (iii), $e + g = 6 + a + b \Rightarrow e + g = b + 86$ (as $a = 80$)

From (iv), $a + e = 290 \Rightarrow e = 210$

Hence, $210 + g = b + 86 \Rightarrow b = g + 124$

From (v), $a + b = 180 + f \Rightarrow b = 140$

Hence, $g = b - 124$

$\Rightarrow g = 16$

From (vi), $a + b + c + d + e = 200 + d + e + g + f$
 $\Rightarrow c = 36$

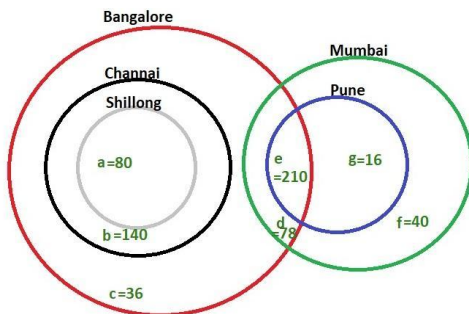
Since the total number of persons was 600,

$d = 600 - (a + b + c + e + f + g)$

$\Rightarrow d = 600 - (80 + 140 + 36 + 210 + 40 + 16) = 600 - 522$

$\Rightarrow d = 78$

The following diagram presents the values:



The person has their own flat in Mumbai among the persons who has their own flat in Bangalore is $210 + 78 = 288$

Ans: 288

33.

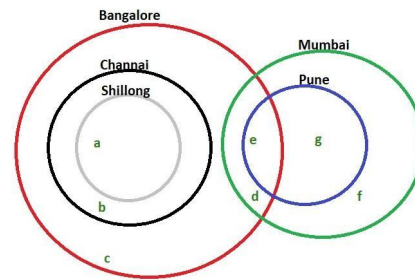
(d)

The below Venn diagram represents the set of persons who have their own flat in Chennai, Shillong, Bangalore, Mumbai, and Pune respectively.

All the people who have their own flat in Chennai also have their own flat in Bangalore. Hence, Chennai is a subset of Bangalore. All the people who have their own flat in Shillong also have their own flat in Chennai. Hence, Shillong is a subset of Chennai. All the people who have their own flat in Pune also have their own flat in Mumbai. Hence, Pune is a subset of Mumbai.

None of the people who have their own flat in Mumbai have their own flat in Chennai. Hence, there will be no overlap between Mumbai and Chennai (since Pune is a subset of Mumbai, there will be no overlap between Pune and Chennai as well).

The following diagram represents the five sets:



From (i), $a = 2f$

From (ii), $c = c + f - 40 \Rightarrow f = 40$

Hence, $a = 80$ (From (i))

From (iii), $e + g = 6 + a + b \Rightarrow e + g = b + 86$ (as $a = 80$)

From (iv), $a + e = 290 \Rightarrow e = 210$

Hence, $210 + g = b + 86 \Rightarrow b = g + 124$

From (v), $a + b = 180 + f \Rightarrow b = 140$

Hence, $g = b - 124$

$\Rightarrow g = 16$

From (vi), $a + b + c + d + e = 200 + d + e + g + f$
 $\Rightarrow c = 36$

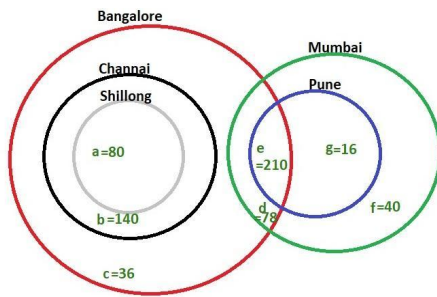
Since the total number of persons was 600,

$d = 600 - (a + b + c + e + f + g)$

$\Rightarrow d = 600 - (80 + 140 + 36 + 210 + 40 + 16) = 600 - 522$

$\Rightarrow d = 78$

The following diagram presents the values:



None of the persons has their own flat in both Pune and Chennai.

Ans: 0

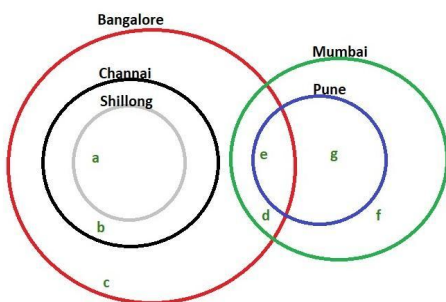
34. (210)

The below Venn diagram represents the set of persons who have their own flat in Chennai, Shillong, Bangalore, Mumbai, and Pune respectively.

All the people who have their own flat in Chennai also have their own flat in Bangalore. Hence, Chennai is a subset of Bangalore. All the people who have their own flat in Shillong also have their own flat in Chennai. Hence, Shillong is a subset of Chennai. All the people who have their own flat in Pune also have their own flat in Mumbai. Hence, Pune is a subset of Mumbai.

None of the people who have their own flat in Mumbai have their own flat in Chennai. Hence, there will be no overlap between Mumbai and Chennai (since Pune is a subset of Mumbai, there will be no overlap between Pune and Chennai as well).

The following diagram represents the five sets:



From (i), $a = 2f$

From (ii), $c = c + f - 40 \Rightarrow f = 40$

Hence, $a = 80$ (From (i))

From (iii), $e + g = 6 + a + b \Rightarrow e + g = b + 86$ (as $a = 80$)

From (iv), $a + e = 290 \Rightarrow e = 210$

Hence, $210 + g = b + 86 \Rightarrow b = g + 124$

From (v), $a + b = 180 + f \Rightarrow b = 140$

Hence, $g = b - 124$

$\Rightarrow g = 16$

From (vi), $a + b + c + d + e = 200 + d + e + g + f \Rightarrow c = 36$

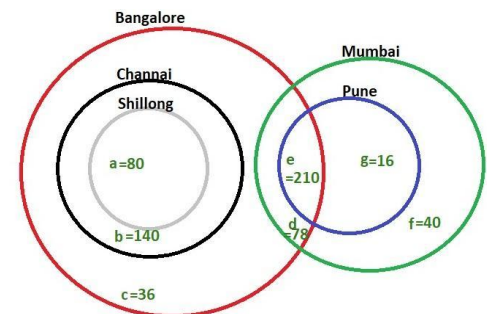
Since the total number of persons was 600,

$d = 600 - (a + b + c + e + f + g)$

$\Rightarrow d = 600 - (80 + 140 + 36 + 210 + 40 + 16) = 600 - 522$

$\Rightarrow d = 78$

The following diagram presents the values:



Persons who have their own flat in Pune also have their own flat in exactly two other cities (which are Bangalore and Mumbai) are 210.

Ans: 210

35. (b)

From (iv), two persons have black hair and a mole on their right cheek. Hence, the third person with black hair must have a mole on his left cheek. Among the persons with brown hair, one must have a mole on his right cheek, while three must have a mole on their left cheek.

From (v), three persons have a mole on their right cheek and wear an eye patch over their left eye. However, there are only three people who have a mole on their right cheek. Hence, all these three persons must be wearing an eye patch over their left eye.

From (iii), Biru has black hair, a mole on his left cheek, and an eye patch over his right eye. However, there is only one person with black hair and a mole on the left cheek. Hence, this person must be Biru.

Also, the dacoit has brown hair, a mole on the right cheek, and of brown complexion. However, there is only one person who has a mole on the right cheek and has brown hair. Hence, this person must have a brown complexion. This person has an eye patch over the left eye and must be a dacoit. Among the three persons with Brown hair and a mole on the left cheek, there must be two persons with eye patches over their right eye and one person with eye patches over their left eye.

From (vi), everyone who wears an eye patch over the right eye is of brown complexion. Hence, the remaining three persons must be of olive complexion.

From (i), no two persons have the same characteristics. Hence, among the two persons Elina and Faruq, one person must wear a pink eye patch and one person a Black eye patch.

Among the last two persons, one must have a pink eye patch and one must have a black eye patch. Since there are two persons with black eye patches, the remaining persons must have pink eye patches.

From (ii), Chandan has the same complexion as Dipak but wears his eye patch on a different side. All the persons with Olive complexions wear eye patches on the left eye. Hence, Chandan and Dipak must both be of Brown complexions.

From (vii), Dipak wears a black eye patch. There is only one person with a brown complexion and a black eye patch. Hence, Dipak must be this person. Chandan has to be of Brown complexion and must wear an eye patch on the left eye. There is only one person who satisfies this condition. This must be Chandan.

Among the remaining persons, there is only one person left with a Brown complexion. From (vii), this must be Govind. Among the remaining persons, there is only one person with a mole on the left cheek. This must be Akram (from (viii)). Among the remaining persons, there is only one person who does not wear a Black eye patch and this must be Elina.

The following table provides this information:

Person	Complexion	Hair Colour	Mole	Eye Patch Colour	Eye Patch
Akram	Olive	Brown	Left	Pink	Left
Biru	Brown	Black	Left	Pink	Right
Chandan	Brown	Brown	Right	Pink	Left
Dipak	Brown	Brown	Left	Black	Right
Elina	Olive	Black	Right	Pink	Left
Faruq	Olive	Black	Right	Black	Left
Govind	Brown	Brown	Left	Pink	Right

Chandan is the dacoit.

Answer: (b)

36. (c)

From (iv), two persons have black hair and a mole on their right cheek. Hence, the third person with black hair must have a mole on his left cheek. Among the persons with brown hair, one must have a mole on his right cheek, while three must have a mole on their left cheek.

From (v), three persons have a mole on their right cheek and wear an eye patch over their left eye. However, there are only three people who have a mole on their right cheek. Hence, all these three persons must be wearing an eye patch over their left eye.

From (iii), Biru has black hair, a mole on his left cheek, and an eye patch over his right eye. However, there is only one person with black hair and a mole on the left cheek. Hence, this person must be Biru.

Also, the dacoit has brown hair, a mole on the right cheek, and of brown complexion. However, there is only one person who has a mole on the right cheek and has brown hair. Hence, this person must have a brown complexion. This person has an eye patch over the left eye and must be a dacoit. Among the three persons with Brown hair and a mole on the left cheek, there must be two persons with eye patches over their right eye and one person with eye patches over their left eye.

From (vi), everyone who wears an eye patch over the right eye is of brown complexion. Hence, the remaining three persons must be of olive complexion.

From (i), no two persons have the same characteristics. Hence, among the two persons Elina and Faruq, one person must wear a pink eye patch and one person a Black eye patch.

Among the last two persons, one must have a pink eye patch and one must have a black eye patch. Since there are two persons with black eye patches, the remaining persons must have pink eye patches.

From (ii), Chandan has the same complexion as Dipak but wears his eye patch on a different side. All the persons with Olive complexions wear eye patches on the left eye. Hence, Chandan and Dipak must both be of Brown complexions.

From (vii), Dipak wears a black eye patch. There is only one person with a brown complexion and a black eye patch. Hence, Dipak must be this person. Chandan has to be of Brown complexion and must wear an eye patch on the left eye. There is only one person who satisfies this condition. This must be Chandan.

Among the remaining persons, there is only one person left with a Brown complexion. From (vii), this must be Govind. Among the remaining persons, there is only one person with a mole on the left cheek. This must be Akram (from (viii)). Among the remaining persons, there is only one person who does not wear a Black eye patch and this must be Elina.

The following table provides this information:

Person	Complexion	Hair Colour	Mole	Eye Patch Colour	Eye Patch
Akram	Olive	Brown	Left	Pink	Left
Biru	Brown	Black	Left	Pink	Right
Chandan	Brown	Brown	Right	Pink	Left
Dipak	Brown	Brown	Left	Black	Right
Elina	Olive	Black	Right	Pink	Left
Faruq	Olive	Black	Right	Black	Left
Govind	Brown	Brown	Left	Pink	Right

Two persons Chandan and Elina wear pink eye patches and have a mole on their right cheek.

Answer: - (c)

37. (a)

From (iv), two persons have black hair and a mole on their right cheek. Hence, the third person with black hair must have a mole on his left cheek. Among the persons with brown hair, one must have a mole on his right cheek, while three must have a mole on their left cheek.

From (v), three persons have a mole on their right cheek and wear an eye patch over their left eye. However, there are only three people who have a mole on their right cheek. Hence, all these three persons must be wearing an eye patch over their left eye.

From (iii), Biru has black hair, a mole on his left cheek, and an eye patch over his right eye. However, there is only one person with black hair and a mole on the left cheek. Hence, this person must be Biru.

Also, the dacoit has brown hair, a mole on the right cheek, and of brown complexion. However, there is only one person who has a mole on the right cheek and has brown hair. Hence, this person must have a brown complexion. This person has an eye patch over the left eye and must be a dacoit. Among the three persons with Brown hair and a mole on the left cheek, there must be two persons with eye patches over their right eye and one person with eye patches over their left eye.

From (vi), everyone who wears an eye patch over the right eye is of brown complexion. Hence, the remaining three persons must be of olive complexion.

From (i), no two persons have the same characteristics. Hence, among the two persons Elina and Faruq, one person must wear a pink eye patch and one person a Black eye patch.

Among the last two persons, one must have a pink eye patch and one must have a black eye patch. Since there are two persons with black eye patches, the remaining persons must have pink eye patches.

From (ii), Chandan has the same complexion as Dipak but wears his eye patch on a different side. All the persons with Olive complexions wear eye patches on the left eye. Hence, Chandan and Dipak must both be of Brown complexions.

From (vii), Dipak wears a black eye patch. There is only one person with a brown complexion and a black eye patch. Hence, Dipak must be this person. Chandan has to be of Brown complexion and must wear an eye patch on the left eye. There is only one person who satisfies this condition. This must be Chandan.

Among the remaining persons, there is only one person left with a Brown complexion. From (vii), this must be Govind. Among the remaining persons, there is only one person with a mole on the left cheek. This must be Akram (from (viii)). Among the remaining persons, there is only one person who does not wear a Black eye patch and this must be Elina.

The following table provides this information:

Person	Complexion	Hair Colour	Mole	Eye Patch Colour	Eye Patch
Akram	Olive	Brown	Left	Pink	Left
Biru	Brown	Black	Left	Pink	Right
Chandan	Brown	Brown	Right	Pink	Left
Dipak	Brown	Brown	Left	Black	Right
Elina	Olive	Black	Right	Pink	Left
Faruq	Olive	Black	Right	Black	Left
Govind	Brown	Brown	Left	Pink	Right

Elina is of olive complexion and has a mole on the right cheek.

Answer: -(a)

38. (d)

From (iv), two persons have black hair and a mole on their right cheek. Hence, the third person with black hair must have a mole on his left cheek. Among the persons with brown hair, one must have a mole on his right cheek, while three must have a mole on their left cheek.

From (v), three persons have a mole on their right cheek and wear an eye patch over their left eye. However, there are only three people who have a mole on their right cheek. Hence, all these three persons must be wearing an eye patch over their left eye.

From (iii), Biru has black hair, a mole on his left cheek, and an eye patch over his right eye. However, there is only one person with black hair and a mole on the left cheek. Hence, this person must be Biru.

Also, the dacoit has brown hair, a mole on the right cheek, and of brown complexion. However, there is only one person who has a mole on the right cheek and has brown hair. Hence, this person must have a brown complexion. This person has an eye patch over the left eye and must be a dacoit. Among the three persons with Brown hair and a mole on the left cheek, there must be two persons with eye patches over their right eye and one person with eye patches over their left eye.

From (vi), everyone who wears an eye patch over the right eye is of brown complexion. Hence, the remaining three persons must be of olive complexion.

From (i), no two persons have the same characteristics. Hence, among the two persons Elina and Faruq, one person must wear a pink eye patch and one person a Black eye patch.

Among the last two persons, one must have a pink eye patch and one must have a black eye patch. Since there are two persons with black eye patches, the remaining persons must have pink eye patches.

From (ii), Chandan has the same complexion as Dipak but wears his eye patch on a different side. All the persons with Olive complexions wear eye patches on the left eye. Hence, Chandan and Dipak must both be of Brown complexions.

From (vii), Dipak wears a black eye patch. There is only one person with a brown complexion and a black eye patch. Hence, Dipak must be this person. Chandan has to be of Brown complexion and must wear an eye patch on the left eye. There is only one person who satisfies this condition. This must be Chandan.

Among the remaining persons, there is only one person left with a Brown complexion. From (vii), this must be Govind. Among the remaining persons, there is only one person with a mole on the left cheek. This must be Akram (from (viii)). Among the remaining persons, there is only one person who does not wear a Black eye patch and this must be Elina.

The following table provides this information:

Person	Complexion	Hair Colour	Mole	Eye Patch Colour	Eye Patch
Akram	Olive	Brown	Left	Pink	Left
Biru	Brown	Black	Left	Pink	Right
Chandan	Brown	Brown	Right	Pink	Left
Dipak	Brown	Brown	Left	Black	Right
Elina	Olive	Black	Right	Pink	Left
Faruq	Olive	Black	Right	Black	Left
Govind	Brown	Brown	Left	Pink	Right

Akram and Faruq both are wearing eye patches over their left eyes and of olive complexion. So, the answer is more than one.

Answer: - (d)

39. (c)

From (iv), two persons have black hair and a mole on their right cheek. Hence, the third person with black hair must have a mole on his left cheek. Among the persons with brown hair, one must have a mole on his right cheek, while three must have a mole on their left cheek.

From (v), three persons have a mole on their right cheek and wear an eye patch over left eye. However, there are only three persons who have a mole on their right cheek. Hence, all these three persons must be wearing an eye patch over their left eye.

From (iii), Biru has black hair, a mole on his left cheek, and an eye patch over his right eye. However, there is only one person with black hair and a mole on the left cheek. Hence, this person must be Biru.

Also, the dacoit has brown hair, a mole on the right cheek, and of brown complexion. However, there is only one person who has a mole on the right cheek and has brown hair. Hence, this person must have a brown complexion. This person has an eye patch over the left eye and must be a dacoit. Among the three persons with Brown hair and a mole on the left cheek, there must be two persons with eye patches over their right eye and one person with eye patches over their left eye.

From (vi), everyone who wears an eye patch over the right eye is of brown complexion. Hence, the remaining three persons must be of olive complexion.

From (i), no two persons have the same characteristics. Hence, among the two persons Elina and Faruq, one person must wear a pink eye patch and one person a Black eye patch.

Among the last two persons, one must have a pink eye patch and one must have a black eye patch. Since there are two persons with black eye patches, the remaining persons must have pink eye patches.

From (ii), Chandan has the same complexion as Dipak but wears his eye patch on a different side. All the persons with Olive complexions wear eye patches on the left eye. Hence, Chandan and Dipak must both be of Brown complexions.

From (vii), Dipak wears a black eye patch. There is only one person with a brown complexion and a black eye patch. Hence, Dipak must be this person. Chandan has to be of Brown complexion and must wear an eye patch on the left eye. There is only one person who satisfies this condition. This must be Chandan.

Among the remaining persons, there is only one person left with a Brown complexion. From (vii), this must be Govind. Among the remaining persons, there is only one person with a mole on the left cheek. This must be Akram (from (viii)). Among the remaining persons, there is only one person who does not wear a Black eye patch and this must be Elina.

The following table provides this information:

Person	Complexion	Hair Colour	Mole	Eye Patch Colour	Eye Patch
Akram	Olive	Brown	Left	Pink	Left
Biru	Brown	Black	Left	Pink	Right
Chandan	Brown	Brown	Right	Pink	Left
Dipak	Brown	Brown	Left	Black	Right
Elina	Olive	Black	Right	Pink	Left
Faruq	Olive	Black	Right	Black	Left
Govind	Brown	Brown	Left	Pink	Right

Dipak and Govind are the two persons, matches the given description.

40. (b)

From the data given in the passage, below table can be inferred-

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost
HUL	2x	$2x \times 10$	160000	$20x + 160000$
P&G	4x	$4x \times 8$	180000	$32x + 180000$
ITC	5x	$5x \times 4$	80000	$20x + 80000$

Dabur	7x	7x × 7	210000	49x + 210000
Emami	9x	9x × 4	230000	36x + 230000

As we can see from the above table, P&G's rank should be better than HUL & ITC and worse than that of Dabur and Emami. So, P&G's rank has to be 3. As given in the question, the difference between P&G and Emami's rank is 2. Thus, Dabur's rank is (3 - 2) = 1.

So,

$$36x + 230000 < 49x + 210000$$

$$\Rightarrow x \geq 1539$$

To find the minimum profit incurred by ITC, x should assume the least value. So, x = 1539.

Thus, the per unit cost of ITC soaps

$$= \frac{(20x + 80000)}{5x} = (4 + 10.396) \text{ INR/unit}$$

$$= 14.396 \text{ INR/unit}$$

$$\text{Thus, the profit is } \frac{20 - 14.396}{14.396} \times 100 \approx 39\%$$

Hence, option "b" is the right answer.

41. (3)

From the data given in the passage, below table can be inferred-

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost
HUL	2x	2x × 10	160000	20x + 160000
P&G	4x	4x × 8	180000	32x + 180000
ITC	5x	5x × 4	80000	20x + 80000
Dabur	7x	7x × 7	210000	49x + 210000
Emami	9x	9x × 4	230000	36x + 230000

Position of 3 companies can uniquely be determined. They are-
P&G – 3rd position

HUL – 4th position

ITC – 5th position.

42. (c)

From the data given in the passage, below table can be inferred-

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost
HUL	2x	2x × 10	160000	20x + 160000
P&G	4x	4x × 8	180000	32x + 180000
ITC	5x	5x × 4	80000	20x + 80000
Dabur	7x	7x × 7	210000	49x + 210000
Emami	9x	9x × 4	230000	36x + 230000

There are 2 companies whose variable cost is divisible by 6. They are P&G and Dabur.

Let us assume that P&G is the company whose variable cost per soap is 6 INR.

This means,

$$24x = 180000$$

$$x = 7500$$

This is not possible as 5 × 7500 = number of soaps produced by ITC is not divisible by 5000.

So, Dabur's per soap's variable cost has to be 6 INR.

So,

$$42x = 210000$$

$$x = 5000$$

The below table shows the total cost of all the companies for manufacturing one soap.

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost	Per unit cost	Selling Price/Unit
HUL	10000	100000	160000	260000	26.00	52.00
P&G	20000	160000	180000	340000	17.00	34.00
ITC	25000	100000	80000	180000	7.20	14.40
Dabur	35000	245000	210000	455000	13.00	26.00
Emami	45000	180000	230000	410000	9.11	18.22

Hence, the maximum difference between the selling price is (52 – 14.40) INR = 37.60 INR

43. (b)

From the data given in the passage, below table can be inferred-

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost
HUL	2x	$2x \times 10$	160000	$20x + 160000$
P&G	4x	$4x \times 8$	180000	$32x + 180000$
ITC	5x	$5x \times 4$	80000	$20x + 80000$
Dabur	7x	$7x \times 7$	210000	$49x + 210000$
Emami	9x	$9x \times 4$	230000	$36x + 230000$

There are 2 companies whose variable cost is divisible by 6. They are P&G and Dabur.

Let us assume that P&G is the company whose variable cost per soap is 6 INR.

This means,

$$24x = 180000$$

$$x = 7500$$

This is not possible as $5 \times 7500 =$ number of soaps produced by ITC is not divisible by 5000.

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Dabur	35000	245000	210000	455000	13.00	26.00
Emami	45000	180000	230000	410000	9.11	18.22

The company having the highest cost will have the highest revenue and the company having the 4th highest cost will have the 4th highest revenue.

So, Dabur is having the highest revenue and HUL is having the 4th highest revenue.

From the data given in the passage, below table can be inferred-

Company	Units Produced	Fixed Cost	Variable Cost	Total Cost
HUL	2x	$2x \times 10$	160000	$20x + 160000$
P&G	4x	$4x \times 8$	180000	$32x + 180000$
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$$24x = 180000$$

$$x = 7500$$

This is not possible as $5 \times 7500 =$ number of soaps produced by ITC is not divisible by 5000.

So, Dabur's per soap's variable cost has to be 6 INR.

So,

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The below table shows the total cost of all the companies for manufacturing one soap.

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Emami	45000	180000	230000	410000	9.11	18.22

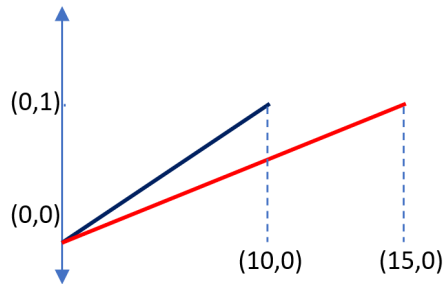
Lower the per unit cost, higher will be the profit. So the second highest profit (in terms of %) will be enjoyed by Emami.

QUANT

44. (b)

45. (2)

Let us draw the probability of delivering within t min for both Pepto and Piggy



The dark blue straight line represents the probability of delivery of Pepto within t min from the order.

The red straight line represents the probability of delivery of Piggy within t min from the order.

The probability of Piggy delivering between 10

min to 15 min is P_1

$$= 1 - \left(\frac{10}{15}\right) = 1 - \frac{2}{3} = \frac{1}{3}$$

When Piggy delivers between 10 min to 15 min, Pepto delivers before Piggy as Pepto always delivers on or before 10 min.

Now let us consider when Piggy delivers with 10

min. The probability of that being $\frac{10}{15} = \frac{2}{3}$.

There can be two possibilities when Piggy delivers within 10 min-

1. Piggy delivering before Pepto (P_2)
2. Pepto delivering before Piggy (P_3)

So, $P_2 + P_3 = \frac{2}{3}$

$$\Rightarrow P_3 = \left(\frac{2}{3} - P_2\right)$$

$$P(\text{Pepto, Piggy}) = P_1 + P_3 = \left(\frac{1}{3}\right) + P_3 = \left(\frac{1}{3}\right) + \left(\frac{2}{3}\right) - P_2 = 1 - P_2$$

$$P(\text{Piggy, Pepto}) = P_2$$

So, we need to find the value of P_2 to solve this question.

Let us assume that Piggy delivered at the t th minute where $0 \leq t \leq 10$

The probability of Piggy delivering before Pepto given that Piggy delivered at the t th minute = $P_t =$

$$\frac{(10-t)}{10} \quad \text{where } 0 \leq t \leq 10$$

P_t has a linear relationship with t . t can vary from 0 to 10 min. The probability of Piggy delivering before Pepto where t can be varied between 0 to

$$10 \text{ and } 0 \leq t \leq 10 \text{ is } P_5^* \left(\frac{10}{15}\right) = \left(\frac{1}{2}\right) * \left(\frac{2}{3}\right) =$$

$$\frac{1}{3} = P_2$$

Reason for taking $t = 5$ is –

1. P_t has a linear relationship with t .
2. t can assume any value from 0 to 10

Thus, for the entire range of $0 \leq t \leq 10$, we will have to consider the value of P_t where t

$$t = \frac{(0+10)}{2} \text{ min}$$

$$= 5 \text{ min}$$

So,

$$P(\text{Piggy, Pepto}) = P_2 = \frac{1}{3}$$

$$P(\text{Pepto, Piggy}) = 1 - P_2 = \frac{2}{3}$$

Hence,

$$\frac{P(\text{Pepto, Piggy})}{P(\text{Piggy, Pepto})} = 2 \quad (\text{Answer})$$

46. (300)

Given that –

$$F(n) = a + b + c \text{ if } (a + b + c) < 10$$

$$= F(a + b + c) \text{ if } (a + b + c) \geq 10$$

So, $F(n)$ can assume values from 1 to 9 and $F(n)$ is nothing but the digital sum of n where n is a 3 digit number.

$G(n)$ can assume value from 0 to 8.

From the properties of digital sum of a number, we know that if a number is not divisible by 9, the digital sum of the number is the remainder when the number is divided by 9 and 9 when the number is divisible by 9.

So, $F(n) + G(n)$ can assume a maximum value of 16 which is a perfect square.

The other values it can assume are 4 & 9

1 is not possible as it is not possible to get the remainder 0 and digital sum 1.

Hence, only the below combinations are possible-

$$4 = 2 + 2$$

$$9 = 9 + 0$$

$$16 = 8 + 8$$

Which means any number which gives a remainder of 0, 2 or 8 satisfy the condition.

So, out of every 9 consecutive numbers starting 100; there exist 3 numbers which give either a 0, 2 or 8 as a remainder when divided by 9.

$$\frac{(999 - 100 + 1)}{9} = 300.$$

Hence, the total count is

47. (25)

PQR will have the least profit if the product was sold by the person who is in the bottom most position of the pyramid.

The profits distributed as commission is

$$(30\% + 10\% * 30\% + 10\% * 10\% * 30\% + \dots)$$

$$= 30\% * (1 + 10\% + (10\%)^2 + \dots)$$

$$= 30\% * \left(\frac{1}{(1 - 10\%)} \right)$$

$$= \frac{100\%}{3}$$

The true selling price of the company is

$$= \left(100\% - \frac{100\%}{3} \right) * ₹300 = ₹200$$

$$\% \text{ Profit} = \frac{(\text{Rs.}200 - \text{Rs.}160)}{\text{Rs.}160} = 25\%$$

48. (2)

Let's assume $x \geq 0$.

$$\text{So, } 3x^2 + [x - 1] + 1 = 0$$

When $x \geq 0$, there can be two possibilities:

Case 1: $1 > x > 0$

$$\text{Then, } 3x^2 + [x - 1] + 1 = 0$$

$$\Rightarrow 3x^2 - 1 + 1 = 0$$

$$\Rightarrow 3x^2 = 0$$

$$\Rightarrow x = 0, 0$$

Case 2: $x \geq 1$

$$3x^2 + [x - 1] + 1 = 0$$

$$3x^2 > 0 \text{ as } x \geq 1$$

$$[x - 1] \geq 0 \text{ as } x \geq 1$$

$$\Rightarrow 1 > 0$$

$$\text{So, } 3x^2 + [x - 1] + 1 > 0$$

Thus, no solution is possible for $x \geq 1$

Now, let's assume $x < 0$.

There can be two cases when $x < 0$.

Case 1: $-1 \leq x < 0$

$$\text{Then, } 3x^2 - 2x + 1 + [x - 1] = 0$$

$$\Rightarrow 3x^2 - 2x - 1 = 0$$

$$\Rightarrow 3x^2 - 3x + x - 1 = 0$$

$$\Rightarrow x = 1, -\frac{1}{3}$$

x cannot be 1, as we have assumed that $x < 0$.

Case 2: $x < -1$

$$\text{Then, } 3x^2 - 2x + 1 = -[x - 1]$$

$$\Rightarrow 3x^2 - 2x + 1 = -[x] + 1$$

$$\Rightarrow 3x^2 - 2x = -[x]$$

For, $x < -1$

$$3x^2 > 0$$

$$-2x > 0$$

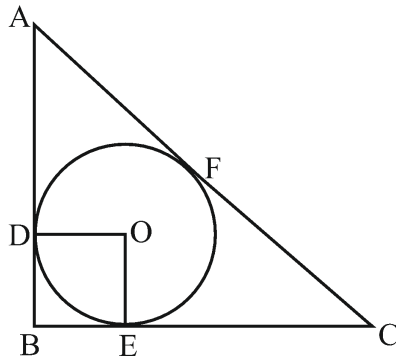
$$\text{And, } 3x^2 - 2x > -[x]$$

Thus, no solution is possible.

Hence, the possible solutions are 0, 0, $-\frac{1}{3}$.

Thus, the number of distinct real solutions is 2.

49. (3)



Let ABC be our chapati right angled at B and a pizza inscribed in it dividing the longest side i.e. the hypotenuse in the ratio of 3 : 2.

So, we have $AF : FC = 3 : 2$

Further, let D and E be the points of the contact of the incircle with the sides AB and BC respectively.

Now, $AD = AF$ as tangents to the circle are equal, Similarly $BD = BE$ and $CE = CF$

Let the length of BE be x, therefore the ratio of $AF : FC : BE$ would be 3 : 2 : x

Therefore, the perimeter of triangle ABC would be $(3k + 2k) + (2k + xk) + (xk + 3k) = 36$

$$10k + 2xk = 36$$

$$2k(5 + x) = 36$$

$$k(5 + x) = 18$$

Further, By Pythagoras theorem we have

$$AB^2 + BC^2 = AC^2$$

$$(xk + 3k)^2 + (2k + xk)^2 = (3k + 2k)^2$$

$$9 + x^2 + 6x + x^2 + 4 + 4x = 25$$

$$2x^2 + 10x - 12 = 0$$

$$x^2 + 5x - 6 = 0$$

$$(x + 6)(x - 1) = 0$$

$$x = 6 \text{ and } 1$$

As x cannot be negative

Therefore $x = 1$

Therefore, we have $k(5+1) = 18$

or $k = 3$

Hence, $BE = BD = 3$

Now, as ODBE will be a square, therefore its inradius = $BE = BD = 3$

50. (d)

$$x^3 + 1 = 2x^2$$

$$\Rightarrow (x - 1)(x^2 - x - 1) = 0$$

As p, q are the irrational roots of the equation,

$$p + q = 1$$

$$pq = -1$$

$$f_n(p, q) = \frac{(p^n - q^n)}{(p - q)}$$

$$f_1(p, q) + f_2(p, q) + f_3(p, q) + \dots + f_{2020}(p, q)$$

$$= \frac{\{(p^1 + p^2 + p^3 + p^4 + \dots + p^{2020}) - (q^1 + q^2 + q^3 + q^4 + \dots + q^{2020})\}}{(p - q)}$$

$$= \frac{\left\{ \frac{p(p^{2020} - 1)}{(p - 1)} - \frac{q(q^{2020} - 1)}{(q - 1)} \right\}}{(p - q)}$$

After putting $p + q = 1$ & $pq = -1$ we get-

$$f_n(p, q) = \frac{(p^n - q^n)}{(p - q)}$$

$$= \frac{(p^{2022} - q^{2022})}{(p - q)} - 1$$

$$= f_{2022}(p, q) - 1$$

So, option d is the right choice.

51. (b)

$$\left(1 + \frac{1}{3} + \frac{1}{3^2} + \dots\right)n^3 = \frac{3n^3}{2}$$

$$[x] = 0 \text{ for all } x < 10$$

$$[x] = 1 \text{ for all } x \text{ where } 9 < x < 100$$

So,

$$[1] + [2] + [3] + \dots + [99] = 90$$

$$[x] = 2 \text{ for all } x \text{ where } 99 < x < 1000$$

Let,

$$n^3 = x$$

Let us assume that $x < 1000$

So,

$$[1] + [2] + [3] + \dots + [n^3] = \frac{3x}{2}$$

$$\Rightarrow 90 + (x - 99) \cdot 2 = \frac{3x}{2}$$

$$\Rightarrow \frac{x}{2} = 108$$

$$\Rightarrow x = 216 = n^3$$

$$\Rightarrow n = 6$$

52. (a)

Given that Ajitesh made a mistake in the coefficient of x . This means that the sum of roots he would have arrived at would be incorrect but the product of roots he would have got would be the correct one as the same is equal to c/a .

Therefore, the product of the roots of the actual

$$\text{equation would have been } 11(-8) = -88 = \frac{c}{a}.$$

Further, Sankritya made a mistake in the constant part of the equation. This means that the product of roots he would have arrived at would be incorrect but the sum of roots he would have got would be the correct one as the same is equal to

$$-\frac{b}{a}.$$

Therefore, the sum of the roots of the actual

$$\text{equation would have been } -11 + 9 = -2 = -\frac{b}{a}.$$

As we have the correct sum and product of the roots of the actual equation, the equation would have been

$$x^2 - (-2)x + (-88) = 0$$

$$x^2 + 2x - 88 = 0$$

Therefore roots of the above equation will be

$$(-1 + \sqrt{89}) \text{ and } -(1 + \sqrt{89})$$

53. (1499)

For every 3 empty bottles, he gets 1 coke bottle free.

So,

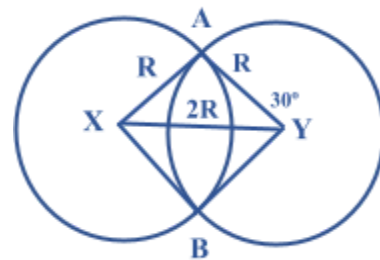
Number of cokes purchased by him at \$1 each is
 $3000 + 1000 + 333 + 111 + 37 + 12 + 4 + 1 + 1$
 $= 4499$

Hence, the required Profit = number of bottles sold
 $\times \$1 - \3000

$$= \$ (4499 \times 1 - 3000)$$

$$= \$1499$$

54. (130)



Let us assume that $XA = R$ where X is the centre of the left circle.

$$\text{So, } YA = R\sqrt{3}, XY = 2R$$

In $\triangle AXY$,

$$XY = 2R, AX = R, AY = R\sqrt{3}$$

$$\text{So, } XY^2 = AX^2 + AY^2$$

$$\text{Thus, } \angle XAY = 90^\circ, \angle AXY = 60^\circ, \angle AYX = 30^\circ$$

$$\text{So, } \angle AXB = 120^\circ, \angle AYB = 60^\circ$$

Hence, Ramesh covered $(360^\circ - 120^\circ) = 240^\circ$ angle and Suresh covered $(360^\circ - 60^\circ) = 300^\circ$ angle in 10s.

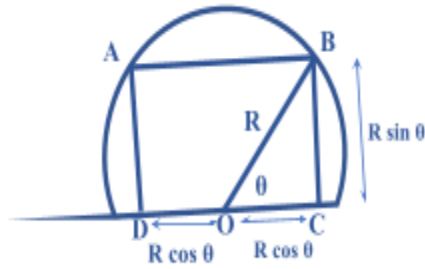
So, Ramesh travels $24^\circ/\text{s}$ and Suresh $30^\circ/\text{s}$.

Ramesh takes 15s to make a full circle and Suresh takes 12s to make a full circle.

Thus, they will meet at B in every 60s.

So, they will meet for the 3rd time at $\{(60 \times 2) + 10\} \text{s} = 130 \text{s}$.

55. (a)

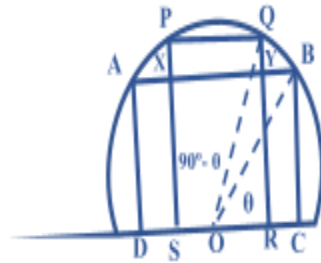


Let's assume that, $\angle BOC = \theta$.

So, the area of ABCD is $2R^2 \sin \theta \cos \theta = R^2 \sin 2\theta$

We can say that, $R^2 \sin 2\theta = R^2 \sin 2(90^\circ - \theta)$

Thus, if we have another rectangle with the angle being $90^\circ - \theta$, then we get



So, XYRS is the common area.

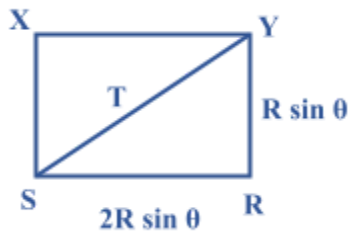
$YR = BC = R \sin \theta$

$PQ = XY = 2R \sin \theta$

$$\square XYRS = 2R^2 \sin^2 \theta = \frac{2}{3} R^2 \sin \theta \cos \theta$$

$$\Rightarrow \tan \theta = \frac{1}{3}$$

$$\Rightarrow \sin \theta = \frac{1}{\sqrt{10}} \left[\text{As, } 0^\circ < \theta < 90^\circ \right]$$



$$\begin{aligned} \text{Circumradius} &= TY = \frac{1}{2} \times SY \\ &= \frac{1}{2} \times (R \sin \theta) \sqrt{5} \\ &= \frac{R}{2\sqrt{2}} \end{aligned}$$

$$\text{Hence, the area of circumcircle is } \frac{\pi R^2}{8} \text{ unit}^2.$$

56.

(5)

Vinit mixes Rs. 20, Rs. 17 and Rs. 18 in the ratio $x : y : z$. y is the geometric mean of x and z . Let and $z = 1$, $y = r$ and $z = r^2$

Let C be the CP of the sanitizer obtained after mixing the 3 elements.

$$\text{Thus, } 20x + 17y + 18z = C(x + y + z) \Rightarrow 20 + 17r + 18r^2 = C(1 + r + r^2)$$

Company marks up the price of the sanitizer by 66.67%

$$\text{Thus, MP} = \frac{5C}{3}$$

Company gives a 20% discount on this and thus,

$$\text{the SP} = \frac{4C}{3}$$

Company makes a profit of Rs 6 while selling 1 kg sanitizer.

$$\Rightarrow \frac{4C}{3} - C = 6, C = 18.$$

$$\text{Thus, } 20 + 17r + 18r^2 = 18 + 18r + 18r^2, r = 2$$

Hence, $x : y : z = 1 : 2 : 4$

Thus, if company mixes Rs 17, Rs 18 and Rs 20 varieties of rice in the ratio $1 : 2 : 4$, then the CP of the mixture will be

$$= \frac{(17 \times 1 + 18 \times 2 + 20 \times 4)}{(1 + 2 + 4)} = 19$$

Thus, the profit to company is $24 - 19 = \text{Rs. } 5$ per kg.

57. (85)

Let us assume that the capacity of the tank is 120 unit.

P can fill at 120 unit/20min = 6 unit/min

Q can fill at a rate of 120 unit/30 min = 4 unit/min

R can fill at a rate of 120 unit/60 min = 2 unit/min

The hole H can drain out water at 120 unit/120 minute = 1 unit/minute rate.

Total amount of water filled in first minute is $(6 + 4 + 2 - 1)$ unit = 11 unit.

A can empty at 120 unit/30 min = 4 unit/min

B can empty at 120 unit/40 min = 3 unit/min

C can empty at 120 unit/120 min = 1 unit/min rate

Total water emptied in a minute is $(4 + 3 + 1 + 1)$ unit = 9 unit.

Hence, total volume filled in 2 minutes

= $(11 \text{ unit} - 9 \text{ unit}) = 2 \text{ unit}$.

Till 60th minute the volume filled is $2 * \frac{60}{2}$ unit
= 60 unit.

After the 60th minute –

The fill rate per 2 minute is $(6 + 4 + 2) - (4 + 3 + 1)$ unit = 4 unit.

48 more unit will be filled in $\left(48 * \frac{2}{4}\right)$ minute
= 24 minute.

The remaining volume will be filled in 1 minute as the pipes P, Q & R will remain open and can fill 12 unit of water.

So, total time needed to fill the tank is $(60 + 24 + 1)$ minutes = 85 minutes.

58. (4047)

$$g(7) = g(5) g(2)$$

$$\Rightarrow 128 = 32 \times g(2)$$

$$\Rightarrow g(2) = 4$$

$$g(5) = g(2) \times g(3)$$

$$\Rightarrow g(3) = 8 = g(2)g(1)$$

$$\Rightarrow g(1) = 2$$

So,

$$g(1) = 2$$

$$g(2) = 2^2$$

$$g(3) = 2^3$$

$$g(4) = 2^4$$

....

$$g(x) = 2^x$$

$$\frac{g(x)}{(1+g(x))} + \frac{g(-x)}{(1+g(-x))} = 1$$

$$= \frac{2^x}{(1+2^x)} + \frac{2^{-x}}{(1+2^{-x})}$$

$$= \frac{(2^x + 1)}{(2^x + 1)}$$

$$= 1$$

Therefore,

$$\frac{g(-2023)}{(1+g(-2023))} + \frac{g(2023)}{(1+g(2023))} = 1$$

$$\frac{g(-2022)}{(1+g(-2022))} + \frac{g(2022)}{(1+g(2022))} = 1$$

$$\frac{g(-1)}{(1+g(-1))} + \frac{g(1)}{(1+g(1))} = 1$$

$$\frac{g(0)}{(1+g(0))} = \frac{1}{2}$$

So,

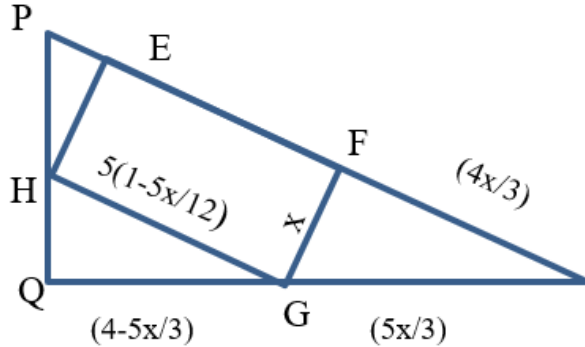
$$2 \left[\frac{g(-2023)}{(1+g(-2023))} + \frac{g(-2021)}{(1+g(-2021))} + \frac{g(-2020)}{(1+g(-2020))} + \dots + \frac{g(2023)}{(1+g(2023))} \right]$$

$$= 2 \left(2023 + \frac{1}{2} \right)$$

$$= 2 \times \frac{4047}{2}$$

= 4047

59. (d)



The circumradius of the right-angle triangle is 2.5 cm. So, the length of the hypotenuses is 5 cm. One of the sides of the triangle is of length 3 cm. So, the other side is 4 cm.

Let,

$$PQ = 3 \text{ cm}$$

$$QR = 4 \text{ cm}$$

$$PR = 5 \text{ cm}$$

$$FG = x \text{ cm}$$

The length of the sides of rectangle is also shown in the diagram.

$$\text{So, the area of the rectangle is } 5x \left(1 - \frac{5x}{12} \right) = A_1$$

So,

$$A_1 = 5x \left(1 - \frac{5x}{12} \right)$$

$$A_1 = 5 \left(x - \frac{5x^2}{12} \right)$$

$$\text{To maximize } A_1 \text{ we need to maximize } \left(x - \frac{5x^2}{12} \right)$$

$$f(x) = \left(x - \frac{5x^2}{12} \right)$$

$$\Rightarrow f(x) = \left(\frac{5}{12} \right) * \left(\frac{12x}{5-x^2} \right)$$

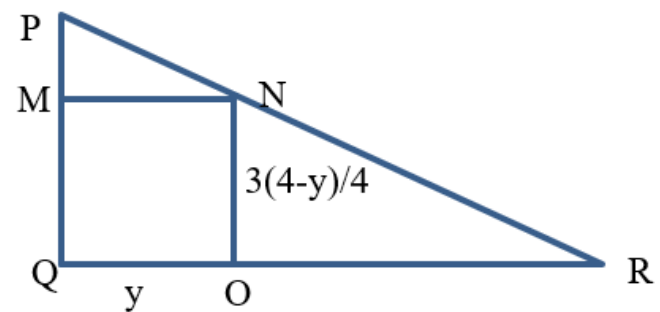
$$f(x) = \left(\frac{5}{12} \right) * \left\{ \frac{36}{25} - \left(x - \frac{6}{5} \right)^2 \right\}$$

So, the maximum value will be achieved if $x = \frac{6}{5}$

$$A_1 = 5 * \left(\frac{6}{5} \right) * \left\{ 1 - \left(\frac{5}{12} \right) * \left(\frac{6}{5} \right) \right\} = 3$$

So,

Now, let assume that $OQ = y$



$$\text{Total area of the rectangle MNOQ is } A_2 = \frac{3y(4-y)}{4}$$

The maximum value will be achieved if $y = 2$

So, maximum value of A_2 is 3 cm^2

The inradius of the triangle PQR is 1 cm. So $A_3 = \pi$

So, 2, 3, 5 are right.

60.

(c)

$$\text{The volume of Type 1 tube} = 2\pi * 7 * \pi = 14\pi^2 \text{ cc}$$

$$\text{The volume of Type 2 tube} = 2\pi * 5 * \pi = 10\pi^2 \text{ cc}$$

$$\text{Total volume of the 7 Type 1 \& 13 Type 2 tubes} = (98\pi^2 + 130\pi^2) = 228\pi^2 \text{ cc}$$

$$\text{Total volume which will be transferred to the Jar} = 228\pi \text{ cc}$$

$$\text{Let the height of the jar the water level will reach} = h \text{ cm}$$

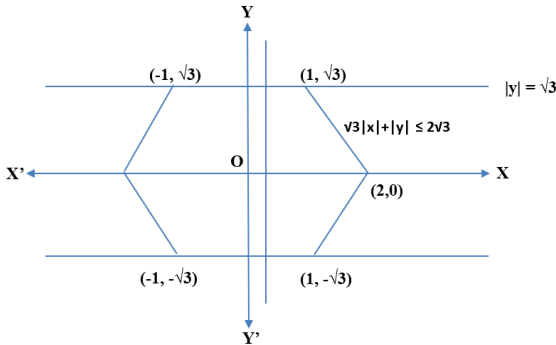
So,

$$\pi \left(\frac{6+3h}{4} \right)^2 \frac{(8+h)}{3} - \pi 6^2 * \frac{8}{3} = 228\pi$$

$$\Rightarrow h = 4$$

Hence, the right answer is 4 cm.

61. (d)



The area bounded by the curves is a regular hexagon with length of sides = 2 cm

The area of the hexagon = $6\sqrt{3} \text{ cm}^2$

Let's assume that $x = \alpha$ divides the hexagon into two regions having area in the ratio of 1 : 2

Initially let's assume that $\alpha > 0$.

So, the area of the region to the left of $x = \alpha$ is $3\sqrt{3} + 2\alpha\sqrt{3} = 4\sqrt{3}$

$$\Rightarrow \alpha = \frac{1}{2}$$

If α is negative then we will also have the regions split in the ratio of 1 : 2. In that case the region having more area will be to the right of $x = \alpha$

So, α can assume both $\frac{1}{2}$ & $-\frac{1}{2}$

So, both option 1 & 2 are right.

If we look at the options, only option (d) contains both 1 & 2 right.

Thus, option d is the right answer.

62. (13)

Given –

$$(x^4 + 1) + (x^8 + 1) + (x^{12} + 1) + \dots + (x^{144} + 1) - 37x^{36}$$

$$= (x^4 + 1) + (x^8 + 1) + (x^{12} + 1) + \dots + (x^{144} + 1) - x^{36 \times 37}$$

$$= (x^4 + 1) + (x^8 + 1) + (x^{12} + 1) + \dots + (x^{144} + 1) - x^{36 \times \frac{(2+72)}{2}}$$

$$= (x^4 + 1) + (x^8 + 1) + (x^{12} + 1) + \dots + (x^{144} + 1) - x^2 + x^4 + x^6 + \dots + x^{72}$$

$$= \left(x^2 + \frac{1}{x^2}\right) + \left(x^4 + \frac{1}{x^4}\right) + \left(x^8 + \frac{1}{x^8}\right) + \dots + \left(x^{72} + \frac{1}{x^{72}}\right)$$

As, x is a real number $\left(x^{2n} + \frac{1}{x^{2n}}\right) \geq 2$ for all value of n where n is a natural number.

So,

$$k = 1 + 1 + \dots (36 \text{ times}) \dots + 1$$

$$\Rightarrow k = 36$$

Also,

$a + 2b + 3c + 4d + 5e \leq 37$; where a, b, c, d, e are distinct natural numbers.

The minimum value of $a + 2b + 3c + 4d + 5e$

$$= (1 \times 5) + (2 \times 4) + (3 \times 3) + (4 \times 2) + (5 \times 1) = 35$$

Now let's find out the possibilities for 36 and 37.

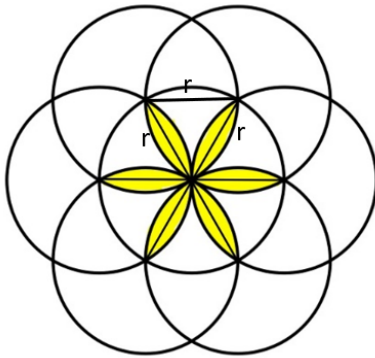
The below table explains all the possibilities-

a	b	c	d	e	Total
5	4	3	2	1	35
4	5	3	2	1	36
5	3	4	2	1	36
5	4	2	3	1	36
5	4	3	1	2	36
6	4	3	2	1	36
7	4	3	2	1	37
4	5	2	3	1	37
4	5	3	1	2	37
5	3	4	1	2	37
6	3	4	2	1	37
6	4	3	1	2	37
6	4	2	3	1	37

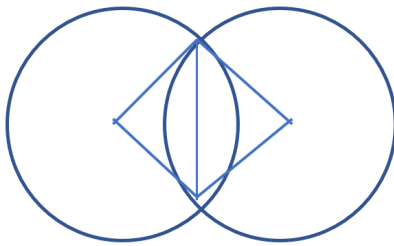
Hence, the total number of permutations are 13.

(Ans)

63. (b)



Let us consider any pair of circles which create the yellow region-



The angle at the center is 60 degrees for both the circles.

The area of the intersecting region

$$= 2 * \pi * \left(\frac{60}{360} \right) - 2 * \sqrt{\frac{3}{4}} = \left(\frac{\pi}{3} - \frac{\sqrt{3}}{2} \right)$$

So, the area of all the highlighted region is

$$6 * \left(\frac{\pi}{3} - \frac{\sqrt{3}}{2} \right)$$

Hence, option "b" is the right answer.

64. (1295)

It is given that,

$$\frac{7.5 \times 10,000}{100} + \frac{4.5 \times 1 \times 4000}{100} + \frac{x \times 1 \times 11,000}{100} = \frac{6}{100} \times 25000$$

$$7.5 \times 10,000 + 4.5 \times 4000 + 11,000x = 6 \times 25,000$$

$$x = 5.18\%$$

Hence, the required interest

$$= \frac{25000 \times 5.18 \times 1}{100} = \text{Rs.} 1295$$

65. (d)

Let's say Sunita and Danish came up with 3 numbers in the dice as 3, 4 & 5 then first they multiply the number and they write all the natural numbers which are less than the $(3 \times 4 \times 5)$ in an ascending order and then deletes the number which are not co-prime to the number $3 \times 4 \times 5$. So, eventually, they will be left with all the numbers which are less than $(3 \times 4 \times 5)$ and co-prime to it which we can find through Euler's theorem.

So, for $3 \times 4 \times 5$, value of N is

$$3 \times 4 \times 5 \left(1 - \frac{1}{2} \right) * \left(1 - \frac{1}{2} \right) * \left(1 - \frac{1}{5} \right)$$

$$= 16$$

From the given options, 42 is not possible as 42 has a prime factor as 7 which can not appear when we are rolling a dice. Thus, option II is not possible.

The highest outcome post multiplying the 3 rolls which do not have any multiple of 2 is $5 \times 5 \times 5 = 125$.

N for 125 is $125 * \left(1 - \frac{1}{5} \right) = 100$. Thus, 100 is possible. So, option III is possible.

The value of N should always be less than 108 as – Any number which is more than 125 (that can come as an outcome) is going to have 2 as one of it's factor, so the value of N corresponding to that

value is going to be less than $\frac{1}{2}$ of the value. As it is not possible to have an outcome of 240 as a product of the three rolls (maximum number is 216), thus 120 is wrong.

As, option II, IV are wrong, the only option supporting these 2 are option d. Hence, option d is the right answer.

66. (80)

Total number of students

$$= 20 + X + 1 + X - 9 = 2X + 12 = 2(X + 6)$$

so, total weight of the class VI, VII and VIII

$$= 2(X + 6) \times 48.75 = 97.5(X + 6)$$

$$\Rightarrow 20 \times 45 + (X + 1) \times 60 + (X - 9) \times 36$$

$$= 97.5(X + 6)$$

$$\Rightarrow 900 + 60X + 60 + 36X - 324 = 97.5X + 585$$

$$\Rightarrow 1.5X = 51$$

$$x = \frac{51}{1.5}$$

$$\Rightarrow x = 34$$

$$\text{Hence, total number of students} = 2(34 + 6) = 80$$



PW Web/App - <https://smart.link/7wwosivoicgd4>

Library- <https://smart.link/sdfez8ejd80if>