Mock Test Series 1.0

Mock Test – 06

VARC

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

On 19 November 1990, Boris Yeltsin gave a speech in Kyiv to announce that, after more than 300 years of rule by the Russian tsars and the Soviet 'totalitarian regime' in Moscow, Ukraine was free at last. Russia, he said, did not want any special role in dictating Ukraine's future, nor did it aim to be at the centre of any future empire. Five months earlier, in June 1990, inspired by independence movements in the Baltics and the Caucasus, Yeltsin had passed a declaration of Russian sovereignty that served as a model for those of several other Soviet republics, including Ukraine. While they stopped short of demanding full separation, such statements asserted that the USSR would have only as much power as its republics were willing to give.

Russian imperial ambitions can appear to be age-old and constant. Even relatively sophisticated media often present a Kremlin drive to dominate its neighbours that seems to have passed from the tsars to Stalin, and from Stalin to Putin. So it is worth remembering that, not long ago, Russia turned away from empire. In fact, in 1990-91, it was Russian secessionism – together with separatist movements in the republics – that brought down the USSR. To defeat the Soviet leader Mikhail Gorbachev's attempt at preserving the union, Yeltsin fused the concerns of Russia's liberal democrats and conservative nationalists into an awkward alliance. Like Donald Trump's Make America Great Again or Boris Johnson's Brexit, Yeltsin insisted that Russians, the Soviet Union's dominant group, were oppressed. He called for separation from burdensome others to bring Russian renewal.

The roots of nationalist discontent lay in Russia's peculiar status within the Soviet Union. After the Bolsheviks took control over much of the tsarist empire's former territory, Lenin declared 'war to the death on Great Russian chauvinism' and proposed to uplift the 'oppressed nations' on its peripheries. To combat imperial inequality, Lenin called for unity, creating a federation of republics divided by nationality. The republics forfeited political sovereignty in exchange for territorial integrity, educational and cultural institutions in their own languages, and the elevation of the local 'titular' nationality into positions of power. Soviet policy, following Lenin, conceived of the republics as homelands for their respective nationalities (with autonomous regions and districts for smaller nationalities nested within them). The exception was the Russian Soviet Federative Socialist Republic, or RSFSR, which remained an administrative territory not associated with any ethnic or historic 'Russia'.

Russia was the only Soviet republic that did not have its own Communist Party, capital, or Academy of Sciences. These omissions contributed to the uneasy overlap of 'Russian' and 'Soviet'.

1. Which one of the following is not a valid inference from the passage?

(a) Russia played a key role in dismantling the Soviet Union by supporting secessionist movements.

(b) Lenin aimed to combat imperial inequality by creating a federation of republics divided by nationality.

(c) The Russian Soviet Federative Socialist Republic (RSFSR) was explicitly associated with a specific ethnic or historic 'Russia.'

(d) Yeltsin's declaration of Russian sovereignty served as a model for other Soviet republics.

2. Which one of the following, if true, would not undermine the effectiveness of Lenin's approach to combat imperial inequality?

(a) Lenin's approach led to a greater emphasis on ethnic divisions, creating tensions among various nationalities within the Soviet Union.

(b) The creation of a federation of republics divided by nationality fostered cooperation and understanding between different ethnic groups.

(c) The policy of elevating the local 'titular' nationality into positions of power caused resentment among non-titular nationalities.

(d) The Russian Soviet Federative Socialist Republic (RSFSR) became a symbol of Russian dominance within the Soviet Union.

3. The author would support none of the following statements about the Soviet Union and its dissolution EXCEPT that:

(a) The Soviet Union's dissolution was primarily driven by external forces.
(b) Yeltsin's call for separation was a key factor in the eventual collapse of the Soviet Union.
(c) The Soviet Union was committed to preserving the unique cultural identities of all its republics.
(d) Lenin's approach to creating a federation of republics was entirely successful in eliminating imperial inequality**.**

4. Had the passage continued, what would the author have logically discussed next?

1. The specific implications of Yeltsin's policies on post-Soviet Russia.
2. A comparison of Russian secessionism with other historical secessionist movements.
3. The role of the Communist Party in shaping Russian identity.
4. The impact of the uneasy overlap between 'Russian' and 'Soviet' on modern Russia's political landscape.

(A) Only 3 and 4
(B) Only 1 and 3
(C) Only 2 and 3
(D) Only 1 and 4

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

Imagine a vast circular chamber, with walls covered in a towering painted map of planet Earth. Picture this hall 'like a theatre, except that the circles and galleries go right round through the space usually occupied by the stage'. Enormous rings of tiered seating circle its outer walls. Imagine that working in these seats are 64,000 'computers' – humans doing calculations – each preparing a different weather forecast for their designated geography. And in the middle of the hall, on a large pulpit at the top of a tall multistorey pillar, stands the 'man in charge', who coordinates the scattered weather calculations from his computers into a global forecast like a 'conductor of an orchestra'.

This 'forecast factory' was the dream of the 20th-century English mathematician and meteorologist Lewis Fry Richardson. Following hundreds of pages of equations, velocities and data in his prosaically titled book Weather Prediction by Numerical Process (1922), he asks the reader to indulge him: 'After so much hard reasoning, may one play with a fantasy?' For Richardson, one of the main limitations on weather forecasting was a lack of computational capacity. But through the fantasy he could ignore practical problems and bring an entire planet into focus. His 'factory' saw once-scattered local observations merging into a coherent planetary system: calculable, predictable, overseen and singular.

Richardson died in 1953, the year IBM released the first mass-produced electronic computer. Though his factory never materialised exactly as he imagined it, his dream of a calculable planet now seems prophetic. By the 1960s, numerical calculation of global weather conditions had become a standardised way of recording changes in the atmosphere. Clouds and numbers seemed to crowd the sky. Since the 1960s, the scope of what Richardson called weather prediction has expanded dramatically: climate models now stretch into the deep past and future, encompassing the entirety of the Earth system rather than just the atmosphere. What is startling about this is not that our technical abilities have exceeded Richardson's wildest dreams but the unexpected repercussions of the modern 'forecast factory'. The calculable, predictable, overseen and singular Earth has revealed not only aeons of global weather, but a new kind of planet – and, with it, a new mode of governance.

The planet, I argue, has appeared as a new kind of political object. I'm not talking about the Sun-orbiting body of the Copernican revolution, or the body that the first astronauts looked back upon in the 1960s: Buckminster Fuller's 'Spaceship Earth', or Carl Sagan's 'lonely speck'. Those are the planets of the past millennium. I'm talking about the 'planet' inside 'planetary crisis': a planet that emerges from the realisation that anthropogenic impacts are not

isolated to particular areas, but integrated parts of a complex web of intersecting processes that unfold over vastly disparate timescales and across different geographies. This is the planet of the Anthropocene, of our 'planetary emergency' as the UN secretary-general António Guterres called it in 2020. The so-called planetary turn marks a new way of thinking about our relationship to the environment. It also signals the emergence of a distinct governable object, which suggests that the prime political object of the 21st century is no longer the state, it's the planet.

5. In the context of the passage, all of the following statements are true EXCEPT:
(a) Richardson's "forecast factory" concept influenced the development of weather prediction by numerical process.
(b) Richardson's idea of a calculable planet has contributed to understanding the interconnectedness of anthropogenic impacts.
(c) The emergence of the Anthropocene has shifted the primary political object from the state to the planet.
(d) The first mass-produced electronic computer was released by IBM in 1953, but Richardson did not live to see it.

6. Which one of the following statements best reflects the main argument of the third paragraph of the passage?
(a) The development of electronic computers surpassed Richardson's expectations.
(b) The modern 'forecast factory' has had unforeseen consequences on our understanding of the planet.
(c) The primary focus of weather prediction remains on atmospheric conditions.
(d) Richardson's dream was entirely fulfilled with the advent of electronic computers.

7. The author lists all of the following as reasons for the emergence of the new kind of planet EXCEPT:
(a) The development of advanced climate models
(b) The realization of anthropogenic impacts on the environment
(c) The influence of the Copernican revolution
(d) The expansion of weather prediction beyond the atmosphere.

8. The central theme of the passage is about the choice between:
(a) The evolution of weather forecasting and the emergence of a new political object
(b) The role of computational capacity in Richardson's forecast factory and the Anthropocene era
(c) The transition from human computers to electronic computers in weather prediction
(d) The challenges of weather prediction and the Copernican revolution.

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

With a pocket-full of blazing stars and assorted other wildflower seeds, I'm ready to spend another hour restoring the several acres of longleaf pine savanna that surrounds my home in north Florida. When we purchased the property four decades back, it was badly degraded pasture; the native longleafs were long gone, fires long excluded; hard farming followed by overgrazing had left little for cows to eat and depleted the land of the former savanna's biological richness. Instead of flowers under widely spaced pine trees, there were patches of bare sand, clumps of dog fennel and head-high stands of ragweed and other ruderals overtopping scraggly pasture grasses. The picture of degradation was completed by errant coils of rusted barbed wire, bottle dumps and a dead refrigerator. There were some native plants but, other than scattered pawpaws, they were mostly undesirables such as cactus and sand spurs. Some thin-barked native trees, mostly sweetgums and laurel oaks, were invading due to exclusion of the low-intensity fires that historically burned through this grassy ecosystem every year or three.

My decision to restore our degraded pastures to its historic state of an open-canopied longleaf pine savanna was by no means immediate. I came to Florida with a love of trees and a preference for forest. As a child, I aspired to a career

as a tree surgeon; as an adult, I ended up a tree ecologist, which involves some surgery, more digging, too much data crunching, and lots of wordsmithing. My professional focus is on improving the fates of tropical forests through sustainable management for timber. This means that my job is all about maintaining forest cover. At home, though, I strive to keep trees from invading and shading savanna.

It pains me to admit it, but initially I planned to restore the degraded pasture to functional pasture. I don't recall cattle-keeping aspirations, but the land was in sad shape and cried out for fixing. New to the South, to me the scraggly pines and oaks growing in coarse sand suggested acidity and nutrient scarcity. I reasoned that a century of hard use had depleted the soil of nutrients, especially nitrogen. Therefore, when offered free slag lime derived from water-softening by our municipal water authority, I jumped at the chance to counter the soil's acidity. Then I planted hairy indigo, an Argentinian nitrogen-fixer, to deal with that deficiency. The lime was delivered the day after I requested it; five piles of two cubic yards each. A big bag of hairy indigo seeds was readily had and easily sown.

To make a sad story short, I soon realised the error of my ways. Floridian sands are perched on limestone, which keeps the pH near neutral – lime was exactly what the soil didn't need. As for restoring soil fertility, native pine savanna flourishes in nutrient-poor soil; hairy indigo's nitrogen contributions favour weedy and exotic species, not the natives I've learned to prefer. Thanks to the lack of rocks, it took me and my long-handled spade only a dozen evenings to dig deep holes next to each of those piles to bury the lime. In contrast, the battle against hairy indigo continues; despite consistent efforts to weed it out, the species persists among the bunchgrasses and blazing stars in my recovering savanna.

9. Which one of the following, if true about the author's restoration efforts, would invalidate the purpose of restoring the degraded pasture to its historic state of an open-canopied longleaf pine savanna in the passage?

1. The author discovers that the longleaf pine savanna ecosystem is no longer viable due to climate change in the region.
2. The author finds out that the longleaf pine savanna has been replaced by a more ecologically diverse and sustainable ecosystem in the region.
3. The author decides to focus on creating an aesthetically pleasing landscape rather than restoring the native longleaf pine savanna.
4. The author receives an award for his dedication to preserving native plant species.

(a) Only 3
(b) Only 1 and 2
(c) Only 3 and 4
(d) Only 2 and 4

10. Which of the following statements can be inferred from the passage:

1. The author initially made incorrect assumptions about the soil's acidity and nutrient scarcity.
2. The author's childhood aspiration to become a tree surgeon directly influenced their decision to restore the longleaf pine savanna.
3. Longleaf pine savannas have always been a major focus of the author's professional life.
4. The battle against hairy indigo has been a challenging and ongoing process for the author.

(a) Only 1 and 3
(b) Only 1 and 4
(c) Only 2 and 3
(d) Only 2 and 4

11. Which one of the following statements, if true, would be the most direct extension of the arguments in the passage?

(a) Encouraging the natural occurrence of low-intensity fires would help maintain the

balance of native species in the longleaf pine savanna.

(b) The presence of thin-barked native trees in the savanna is a positive development for the ecosystem.

(c) The author's experiences in tree ecology have led to a deeper understanding of how to convert degraded pastures into lush forests.

(d) Introducing non-native species to the longleaf pine savanna can ultimately improve its overall biodiversity.

12. The author of this passage is LEAST likely to support the view that:

(a) Introducing non-native species to an ecosystem can have positive effects on its biodiversity.

(b) Traditional farming practices should be preserved in order to maintain a healthy ecosystem.

(c) Low-intensity fires are an important factor in maintaining the balance of native species in the longleaf pine savanna.

(d) The exclusion of certain tree species can lead to the invasion of other unwanted species in the longleaf pine savanna.

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

The opposition between 'nature' and 'culture' is problematic for many reasons, but there's one that we rarely discuss. The 'nature vs culture' dualism leaves out an entire domain that properly belongs to neither: the world of waste. The mountains of waste that we produce every year, the torrents of polluting effluent, the billions of tonnes of greenhouse gases, the new cosmos of microplastics expanding through our oceans – none of this has ever been entered into the ledger under 'culture'. Of all the products of human hands, it's the oeuvre that no one wants to own, discuss or preferably even see. Yet it can't be assimilated into 'nature' either, at least not in the way that pre-industrial waste has been for millennia. This new, 'improved' waste is incompatible with Earth – too chemical, too durable, too noxious and, ultimately, too voluminous.

Waste is precisely what dissolves the distinction between nature and culture. Today, when the very weather is warped by the climate crisis, and plankton thousands of metres deep have intestinal tracts full of microplastics, the idea of a nature that is pristine or untouched is delusional. Nature and waste have fused at both planetary and microbiological scales. Similarly, waste is not merely a byproduct of culture: it is culture. We have produced a culture of waste. To focus our gaze on waste is not an act of morbid negativity; it is an act of cultural realism. If waste is the mesh that entangles nature and culture, it's necessarily the defining material of our time. We live in the Waste Age.

If we look at the material ages of human history, from the Stone Age and the Bronze Age through to the Steam Age and the Information Age, we get the illusory sense that hard things are dematerialising. In fact, the opposite is true. The Steam Age launched a great explosion of material goods that has mushroomed exponentially ever since, while statistics about our current rates of waste numb the mind. What does it mean to say that, by 2050, as much as 12 billion tonnes of plastic will have accumulated in landfills or the natural environment? What does it mean to observe that more than a million plastic bags are consumed every minute globally, and that this amounts to between 500 billion and 5 trillion a year? Such numbers present a seemingly precise quantification yet one that's utterly ungraspable. The average person just translates them into 'a shitload'.

This is where the naming of ages becomes useful. The Anthropocene, or the age of human-driven planetary change, helps to evoke the new geological layer we are forming, a new planetary crust composed of our fossil-fuel residues, bottle tops and cigarette butts. Could we imagine any more literal entanglement of nature and waste? Some prefer a more political definition, the Capitalocene, which points the finger at a specific economic system: capitalism. But to say that we live in a Waste Age is to acknowledge both its geological and economic dimensions. It is to acknowledge that culture produces not just architecture and ingenious devices, but also a million plastic bags a minute. It is to acknowledge that growth is entirely

dependent on the relentless and ruthlessly efficient generation of waste.

Is this an ungenerous and pessimistic take on human activity in the 21st century? On the contrary. Invoking the Waste Age offers the opportunity for a radical shift in late-capitalist civilisation. Only by recognising the scale of the crisis can we reorient society and the economy towards less polluting modes of producing, consuming and living. The problem is that waste has always been a marginal issue, both literally and figuratively. It has been dumped in and on the peripheries, consigned to that mythical place called 'away'. It has always been an 'externality', an unavoidable byproduct of necessary industrialisation. But it is now an internality – internal to every ecosystem and every digestive system from marine micro-organisms to humans. If waste truly were to be a central issue – brought into the heart of every conversation about how things are extracted, designed and disposed of – it would transform society beyond recognition. To invoke the Waste Age is to usher in the hope of a cleaner future.

13. Which one of the following statements best summarises the central point of the passage?

(a) Waste produced by human activities in the Anthropocene is a defining feature of our time and dissolves the distinction between nature and culture.

(b) Waste production is a consequence of the capitalist economic system and should be addressed through political action.

(c) The Waste Age is a time of pessimism and hopelessness, as the scale of waste production is beyond human comprehension.

(d) Waste production is an external issue, consigned to the peripheries of society, and is not a central concern for achieving a cleaner future.

14. Which one of the following statements best describes what the passage is about?

(a) The Waste Age is an age in which waste has become a defining material and cultural reality, necessitating a radical shift in how society and the economy operate.

(b) The opposition between 'nature' and 'culture' is problematic because it leaves out the domain of waste, which is incompatible with both nature and culture, and has now become a defining feature of the current geological and economic era.

(c) Waste is a major environmental issue that has been consistently overlooked as a marginal problem but has now become an internality within every ecosystem, requiring a shift in societal and economic practices.

(d) The Waste Age is a product of a specific economic system that has generated waste as a necessary byproduct of industrialisation, leading to the entanglement of nature and waste, and necessitating a shift towards less polluting modes of producing and consuming.

15. In this passage, the author is making the claim that:

(a) The opposition between nature and culture has been a problem for millennia and needs to be completely dismantled.

(b) The Waste Age is a defining era of human history that has fused nature and culture together in an unprecedented way, and recognizing the scale of the waste crisis is essential to transforming society towards a cleaner future.

(c) The accumulation of waste in the environment is solely the result of industrialization and capitalism, and a complete restructuring of the global economic system is necessary to address the waste crisis.

(d) Waste is an unavoidable externality of human activity that will continue to be dumped on the peripheries of society, and efforts to address the waste crisis are unlikely to have any significant impact on the current economic system.

16. Which one of the following sets of words and phrases serves best as keywords of the passage?

(a) Nature vs Culture, waste, Anthropocene, material ages

(b) Climate crisis, pollution, economic growth, capitalism

(c) Waste Age, plastic bags, marine micro-organisms, cleaner future
(d) Culture, pollution, industrialization, sustainability

17. Carefully read the statements in the questions below and arrange them in a logical order.
1. Copper is a crucial component in the manufacturing of electric vehicles, including batteries, motors, and wiring.
2. The mining and processing of copper come with significant environmental challenges, including land degradation and water pollution.
3. With the increasing adoption of electric vehicles, the demand for copper is expected to increase substantially in the coming years.
4. Therefore, there is a need for sustainable mining practices and innovative recycling technologies to meet the rising demand for copper without causing further harm to the environment.
5. According to research, electric vehicles require up to four times more copper than conventional cars.

(a) 35124 (b) 25134
(c) 41253 (d) 15234

18. Carefully read the statements in the questions below and arrange them in a logical order.
1. Blockchain technology has the potential to revolutionize various industries by providing secure, transparent, and decentralized systems.
2. However, the adoption of blockchain technology in the healthcare industry has been slow due to various challenges, including regulatory issues and concerns about data privacy and security.
3. Blockchain technology can also be used in the finance industry to create secure and efficient payment systems, as well as to reduce the risk of fraud and money laundering.
4. Another industry that can benefit from blockchain technology is the supply chain industry, where it can be used to provide end-to-end transparency and traceability of products.
5. One of the industries that can benefit greatly from blockchain technology is the healthcare industry, where it can be used to securely store and share patient data.

(a) 32154 (b) 51243
(c) 15243 (d) 43514

19. Carefully read the statements in the questions below and arrange them in a logical order.
1. In order to address the concerns about job loss and economic inequality, there is a need for policies that support retraining and reskilling of workers for new roles in the emerging digital economy.
2. However, there are also potential benefits to the adoption of automation and artificial intelligence, including increased productivity, lower costs, and improved safety.
3. The rise of automation and artificial intelligence is leading to the displacement of human workers, resulting in concerns about job loss and economic inequality.
4. Ultimately, the successful integration of automation and artificial intelligence into the economy will require a combination of technological innovation and social policies that promote equitable access and distribution of the benefits of these technologies.
5. Additionally, there is a need for policies that address the unequal distribution of wealth and income, such as progressive taxation and social welfare programs.

(a) 15243 (b) 24531
(c) 35142 (d) 32154

20. Carefully read the statements in the questions below and arrange them in a logical order.
1. The adoption of renewable energy sources can help reduce greenhouse gas emissions and improve air quality, which can have significant environmental and health benefits.
2. The use of renewable energy sources such as solar, wind, and hydropower is increasing globally, driven by concerns about climate

change and the need for sustainable energy solutions.

3. Additionally, the integration of renewable energy sources into the electrical grid requires the modernization of the grid infrastructure to accommodate distributed generation and two-way power flows.
4. However, the adoption of renewable energy sources also poses challenges, including the intermittency of wind and solar power, which can affect the stability of the electrical grid.
5. To address these challenges, there is a need for the development of energy storage technologies, such as batteries and pumped hydro storage, which can store excess energy and release it during times of peak demand.

(a) 12534 (b) 21453
(c) 31254 (d) 51243

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

What role can and should designers play in all this? Design has been a driving forces behind our prodigious waste streams in the past century. As the handmaidens of commerce, designers have been complicit in the throwaway economy: manufacturing planned obsolescence, promoting convenience culture, entombing products in layers of seductive packaging. In short, they've been doing what designers do best – creating desire. Paradoxically, even when designers achieve a sense of permanence, it is illusory; the iPhone seemingly achieved the Platonic ideal of the smartphone, only to be replaced year after year because of software innovations and the need to stimulate new sales. However, the culture of design is changing, and the outlook of young designers today is very different from that of their predecessors. Many have very little interest in producing more stuff, and are much more invested in understanding the extractive processes behind products and their afterlives. Shorn of blissful ignorance and only too alert to the mounting crisis around us, designers are reinventing themselves as material researchers, waste-stream investigators and students of global economic flows.

Which of the following best summarizes the passage?

(a) Designers have been complicit in the throwaway economy and creating desire, but younger designers are changing the culture of design by being more invested in understanding the extractive processes behind products and their afterlives.
(b) Designers are solely responsible for the prodigious waste streams and the throwaway economy of the past century, but young designers today are reinventing themselves as material researchers and waste-stream investigators.
(c) Designers have been manufacturing planned obsolescence and entombing products in seductive packaging, leading to the throwaway economy. However, the culture of design is changing and young designers are only invested in producing more stuff.
(d) The role of designers in the throwaway economy is insignificant, as they are only responsible for creating desire. However, the younger generation of designers is still invested in producing more stuff.

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

Stacking is a familiar concept from the history of technology. When speculators laid the first railroad tracks across the United States in the early 19th century, they selected paths based on probable demand, the supply of capital, labour availability, and the contours of the landscape. If you are short on labour but long on land, it is cheaper to go around the mountain than to dig a tunnel through it. When the next set of network builders strung telegraph cables, it made sense to run them along the railroad tracks: the equipment could be easily transported, and railroads were major users of telegraph signals to coordinate traffic. John Gast's classic painting American Progress (1872), of American appropriation of Native American lands

through settlement, shows the connection clearly. Guess what path the major internet cables follow? There are clear reasons for stacking technological systems: shared expertise, economies of scale, distribution of consumers, etc. It is not, however, a widely appreciated phenomenon in intellectual history. Sometimes, the stacking of fringe theories is pretty straightforward. Believing that Earth is flat and that the Apollo 11 Moon landing in 1969 was faked on a soundstage are conceptually distinct beliefs. Nothing about the latter impels you to believe the former. However, believing that Earth is flat essentially requires that you think that NASA's achievements are part of an elaborate conspiracy: there is no ability to travel to the Moon, nor are the photographs of a globular Earth from space authentic. These fringe theories stack through logical interconnection. Fringe doctrines can also share a political sensibility. The mid- to late-19th-century enthusiasm for spiritualism – communication with ethereal spirits by groups of individuals seated around a séance table in a dimly lit room – tracked with socialism, women's suffrage and vegetarianism. All were heterodox theories concerned with liberating the oppressed.

Which of the following best summarizes the passage?

(a) Stacking technological systems is a widely appreciated phenomenon in intellectual history that can lead to the interconnection of fringe beliefs.

(b) The stacking of fringe theories can be straightforward, but the interconnection of fringe beliefs can lead to the sharing of political sensibilities concerned with liberating the oppressed.

(c) The selection of paths based on probable demand, supply of capital, labour availability, and the contours of the landscape is a concept from the history of technology that led to the stacking of technological systems.

(d) The stacking of technological systems is a familiar concept from the history of technology, but the interconnection of fringe beliefs can only be achieved through the sharing of political sensibilities.

23. Which of the following is the ODD ONE OUT? [TITA]

1. The Renaissance was a period of great cultural and artistic achievements that occurred in Europe from the 14th to the 17th century.
2. The Enlightenment was an intellectual and philosophical movement that dominated the world of ideas in Europe during the 18th century.
3. The Industrial Revolution, which began in the 18th century, transformed the way goods were produced and led to significant changes in social and economic organization.
4. Romanticism was an artistic and literary movement that originated in Europe in the late 18th century, emphasizing individualism, emotion, and the natural world.
5. Modernism is a cultural and artistic movement that emerged in the early 20th century, characterized by experimentation, abstraction, and a rejection of traditional values.

24. Which of the following is the ODD ONE OUT? [TITA]

1. The ancient Greek philosopher Aristotle taught that living a virtuous life was the key to happiness.
2. The Indian philosophy of Buddhism teaches that the path to happiness lies in the elimination of desire and the achievement of enlightenment.
3. The German philosopher Immanuel Kant believed that morality is based on reason and that we should always act in a way that treats others as ends in themselves.
4. The 17th-century French philosopher Rene Descartes is known for his famous statement "I think, therefore I am", which established the concept of mind-body dualism.

5. The Chinese philosopher Confucius emphasized the importance of social harmony and moral behavior in achieving happiness.

LRDI

Directions (25–28): Read the following passage and answer the questions that follow:

The following table shows the sum of runs scored by Virat Kohli in the combination of any 3 test matches out of 5 test matches that he played against England. Every match has two innings, 1st and 2nd:

Combination	Sum of total runs	Sum of runs in 1st Inning
Match 4 + Match 2 + Match 1	490	
Match 4 + Match 3 + Match 5	420	
Match 2 + Match 1 + Match 3	450	234
Match 4 + Match 2 + Match 5	480	
Match 5 + Match 1 + Match 3	410	235

Further it is known that the ratio of his runs in 1st inning to the runs in 2nd inning in 5 matches were 7:3, 13:7, 3:2, 1:1, 2:3 in no particular order. Also it is known that Virat did not hit a century in any of the test matches.

25. In which match did Virat score the highest runs?
(a) Match 4 (b) Match 3
(c) Match 2 (d) Match 5

26. How many runs did Virat score in the second inning of Match 5?

27. What is the ratio of runs scored by Virat in the 1st inning to the second inning in match 4?
(a) 13:7 (b) 3:2
(c) 1:1 (d) None of these

28. What is Virat's sum of 2nd inning scores of Match 2 and Match 3?

Directions (29–33): Read the following passage and answer the questions that follow:

In M's Repose lounge there are three floors the ground floor is number 1, then above that number 2 and so on. And each floor has four halls H1, H2, H3, and H4 from left to right. According to covid guidelines, each of the Halls should allow only 200 guests whereas one Hall should remain vacant on each floor. On Monday Some Halls are booked for different programs which are going to be held in the lounge. 800 guests can enter the lounge. The H3 and H4 halls are not vacant on any floor. The total number of guests on H4 of every floor is 220. The guests who attend Birthday are 120. The Hall of Birthday is just above the Hall of Farewell. The total number of guests who attend Farewell is equal to the total guests who attend Engagement. Reunion is not on the same floor as Farewell and Engagement. The wedding program is to be held in H1, but neither any of the halls just above nor just below it is booked for any function. There are two halls between Farewell and Wedding halls. The engagement hall is between Fresher and Baby shower Halls. The total number of guests who attend Reception is 145. The guests who attend the baby shower are 30, which is half of the guests who attend the Seminar. The hall between the Reception and Freshers hall is vacant, and both Halls are in H2 of some floors. The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25. The total number of guests who attend the Wedding is five more than the guests who attend Reception.

29. Which event has the highest number of guests?
(a) Birthday
(b) Wedding
(c) Seminar
(d) Fresher

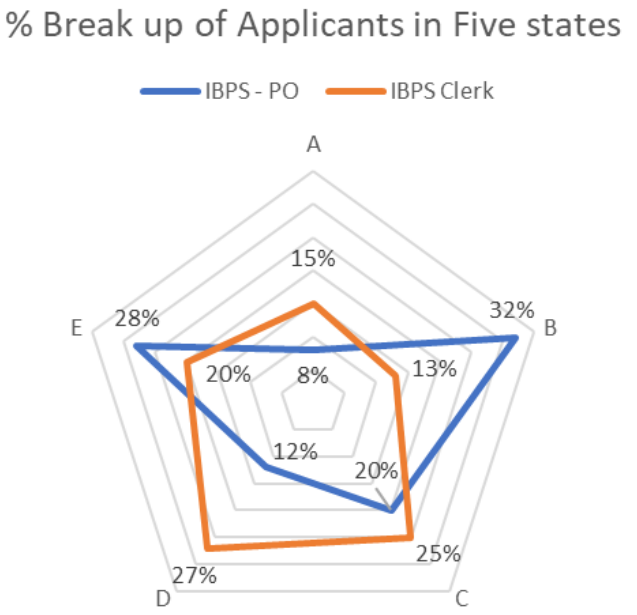
30. Four of the following five are alike in a certain way and hence form a group. Which of the following does not belong to that group?
(a) Wedding
(b) Reception
(c) Birthday
(d) Seminar

31. Which of the following halls is vacant on floor 3?
(a) H1
(b) H2
(c) H3
(d) H4

32. How many total guests are on floor 2?

33. What is the difference between the Birthday and Reception guests?

Directions (34–39): Read the following passage and answer the questions that follow:
Following chart represents the data regarding the number of IBPS PO and IBPS Clerk applicants in five different states A, B, C, D and E in 2016.
Total number of IBPS PO applicants from states A, B, C, D and E together = 4 lakhs
Total number of IBPS Clerk applicants from states A, B, C, D and E together = 6 lakhs.



Male : Female applicants in IBPS PO across the 5 states A through E are 7 : 3, 7 : 9, 4 : 1, 1 : 2, 4 : 3 respectively.
Male : Female applicants in IBPS Clerk across the 5 states A through E are 7 : 5, 11 : 15, 3 : 2, 7 : 11, 3 : 1 respectively.

34. What is the difference between the total male applicants in IBPS PO and the total male applicants in IBPS Clerk?

35. For IBPS PO, what is the value of the ratio of difference between the total number of male applicants and the total number of female applicants from states A and C together to the difference between the total number of male applicants and the total number of female applicants from states D and E together?
(a) 4.3 (b) 2.7
(c) 3.1 (d) None of these

36. Total 2% IBPS clerk applicants are selected out of which 25% and 33% applicants are from state A and E respectively. If 1250 and 1738 female applicants in IBPS clerk are selected from state A and E respectively, then find approximately what percent of selected IBPS clerk applicants from state A and E together are males?

37. Total number of male applicants for IBPS PO from states A, B and C together are approximately what percent more/less than the total number of female applicants for IBPS PO from the same states together?

38. If in 2017, female applicants for IBPS clerk from state B and D are increased by 5% and 10% respectively than the previous year and male applicants for IBPS clerk from state D and B are decreased by 5% and 10% than previous year respectively, then what is the ratio of total applicants for IBPS clerk from state B and total applicants for the same exam from state D?
(a) 37 : 105 (b) 47 : 125
(c) 57 : 125 (d) 303 : 650

39. In 2015, total IBPS PO applicants from all given states together are 20% more than next year, and percentage brake-ups and the ratio of male to female applicants for all given states are the same as next year. Similarly, in 2015, total IBPS clerk applicants from all given states together are 30% less than next year, and percentage break-ups and the ratio of male to female applicants for all given states are the same as next year. What is the

difference between the total number of male applicants for IBPS PO from state C, D and E together in 2015 to the total number of female applicants for IBPS clerk from state A, B and C together in the same year? (TITA)

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

National Institute of Management (NIM) offers five options in the last semester- Sales & Marketing (SM), Financial Management (FM), International Business (IB), Operations (OP), and Human Resource Management (HRM). Students had to share their order of preference for two of the 5 subjects. Five students A, B, C, D & E have filled out their subject preference form. NIM mapped the preference data of the students and allotted subjects based on the below logic-

1. A subject will be allocated to the student who has chosen that subject as preference 1.
2. Every subject should have exactly 1 student and no student can get more than 1 subject as optional.
3. If a subject X is not the first preference of any of the students, then the subject will be allocated to the student who has chosen that subject as second preference
4. In case of a tie, a student with having higher CGPA will get the subject
5. If a student fails to get his first/second preferred subject, then he is allocated randomly to a subject having no enrolment.

Also, it is given that

(a) None of the students had the same ordered subject preferences
(b) All the subjects were present in either 1st or 2nd preference of these 5 students
(c) Subject allocation for B never be SM.
(d) The CGPAs of the students are 7.8, 8, 8.4, 8.9 & 9.1 not in any ordered manner.
(e) CGPA is a constraint for subject allocation, which is filled in order of preference.

Below is the information known about the students' preferences and final allocation -

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

40. What subject has been allocated to B?
(a) SM (b) FM
(c) OP (d) Data inadequate

41. FM is allocated to whom?
(a) A (b) B
(c) D (d) Data inadequate

42. If it is known that A neither got the highest nor second highest CGPA, then what is the CGPA of A?
(a) 8.4
(b) 8
(c) 8.9
(d) Cannot be determined

43. If it is known that FM is the most preferred subject at that time, which allows students for final allocation with the highest order of preference as well as CGPA, then what is the CGPA of A?
(a) 8 (b) 8.4
(c) 8.9 (d) 9.1

44. What is the rank of B as per the increasing order of the CGPA?
(a) 1 (b) 2
(c) 3 (d) Cannot be determined

QUANT

45. How many distinct real solutions the quadratic equation $3x^2 + |x| + [x-1] - x + 1 = 0$ has, if $[\cdot]$ represents the greatest integer function of x? [TITA]

46. An eye-wear store owner offers sunglasses for Rs. 1200 each. However, he has to offer two successive discounts of 12% and 18%. In addition, he recovers from the buyer the sales tax on the net selling price at a rate of 25% of the net price. Calculate the profit % if the cost price of a sunglass is Rs. 500.

(a) 116.48% (b) 118.32%
(c) 122.24% (d) 124.36%

47. In a college, the average monthly stipends of 40 Phd students is Rs. 6200. When 18 Phd students left the college, the average monthly stipends increased by Rs. 900, then what is the average monthly stipends (in Rs.) of 18 phd students who left the college? [TITA]

48. There are three persons A, B, and C employed to complete work in Rs.8567. Work done by A in 4 days is twice the work done by B in 5 days and work done by A in 6 days is equal to the work done by C in 5 days. Find the share of A and C in the total amount (in Rs.).

49. p, q are the irrational roots of the equation $x^3 + 1 = 2x^2$

If $f_n(p,q) = (p^n - q^n)/(p-q)$

Then find the value of $f_1(p,q) + f_2(p,q) + f_3(p,q) + \ldots + f_{2020}(p,q)$ is-

(a) $f_{2021}(p,q)+1$ (b) $f_{2021}(p,q)-1$
(c) $f_{2022}(p,q)+1$ (d) $f_{2022}(p-q)-1$

50. Karan and Jaya are travelling to cover a certain distance of 200 km each by using different vehicles. Karan covers 50% distance by car which is travelling with speed 42 km/hr and remaining distance by bus with speed 50 km/hr. Jaya covers 40% of the distance by bus with speed 48 km/hr and remaining distance by car with speed 45 km/hr. Then, the sum of time taken by Karan and Jaya to travel whole distance:

(a) Between 7.5 to 8 hrs
(b) Between 8 to 8.5 hrs
(c) Between 8.5 to 9 hrs
(d) Between 9 to 9.5 hrs

51. 50 young staffs were asked to collect accurate blood-sample of a certain villagers. Each blood sample was to be verified by 2 blood-analysts namely Dexter and Henna. Dexter usually rejects 30% of the samples that he reviews while Henna accepts only 30% of the samples that he reviews. If a staff gets his sample reviewed from both the analyst, what is the probability of getting a rejection from both?

(a) 0.21 (b) 0.24
(c) 0.5 (d) 0.9

52. Anuj had a certain amount. He invested 30% of it in FD, 15% of it in gold and 20% of it in stock market and kept remaining Rs 700 with him. If he got return at 12% for a year on stock market, what amount (in Rs.) did he get as return?

53. If $n^2 + n = 20$, then find the approximate integer value of the expression

$$\left[\sqrt{3}\right]+\left[\sqrt{5}\right]+\left[\sqrt{7}\right]+\ldots+\left[\sqrt{2n+1}\right]+\left\{\sqrt{3}\right\}+\left\{\sqrt{5}\right\}+\left\{\sqrt{7}\right\}+\ldots+\left\{\sqrt{2n+1}\right\},$$

where $\{x\}$ denotes the fractional part of x and $[x]$ denotes the greatest integer value of x not greater than x. [Take, $\sqrt{3}=1.73, \sqrt{5}=2.24, \sqrt{7}=2.65, \sqrt{8}=2.83$]

54. Let $g(x)g(y) = g(x+y)$

Also, it is given that $g(5) = 32$; $g(7) = 128$

Find $2\left[\frac{g(-2023)}{(1+g(-2023))}+\frac{g(-2021)}{(1+g(-2021))}\right.$

$$+\frac{g(-2020)}{(1+g(-2020))}+\ldots+\frac{g(2023)}{(1+g(2023))}\Bigg]=?$$

55. P started a business with Rs.84000. After 'm' months, Q joined him with Rs-90000. After next 14 months, P left. At the end of 3 years partnership, profit received by P and Q is in the ratio 2: 5 respectively. Find the value of 'm'.

56. If $\left(3-5\sqrt{3}\right)\tan\theta=3\sqrt{3}-5\theta, 0^{\circ}<\theta<90^{\circ}$, then what is the value of (cot θ + sec θ – sin θ)?

(a) $\frac{(4\sqrt{3}+1)}{2\sqrt{3}}$ (b) $\frac{(2\sqrt{3}-1)}{2\sqrt{3}}$

(c) $\frac{(4\sqrt{3}-1)}{2\sqrt{3}}$ (d) $\frac{(2\sqrt{3}+1)}{2\sqrt{3}}$

57. What are the last non – zero digit of $\frac{16!}{7!}-\frac{12!}{4!}$?

(a) 8 (b) 7
(c) 6 (d) 4

58. Consider the quadratic equation $px^2 + qx + r = 0$, where $p \neq 0$, and p, q, and r are integers. The roots of this equation are α and β, and the greatest integer function of the roots are [α] = 3 and [β] = -2. If α + β = 1, then the quadratic equation is:

(a) $x^2 – 3x + 10 = 0$
(b) $x^2 – x + 12 = 0$
(c) $x^2 – x + 6 = 0$
(d) $x^2 – 2x + 15 = 0$

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

R_1 : R1 is the largest possible rectangle inside the triangle having one side on the hypotenuses.

R_2 : R2 is the largest possible rectangle inside the triangle having one side on the smallest side

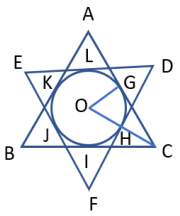
C_1 : The largest possible circle inside the triangle

Let the area of R1, R2 & C1 are A1, A2 & A3 respectively. A is the area of the right-angle triangle. Then which is/are the right statement(s) about A1, A2, A3-

1. A1 < A2 < A3
2. A1 = A2 < A3
3. A1 : A2 : A3 = $1:1:\pi$
4. A1 : A2 : A3 = $1:\sqrt{2}:\pi$
5. A1 : 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.



What's the area of the star outside the circle of radius 2 cm in the above figure if AC = 13 cm, GC = 4 cm and BC = 11 cm? [It is provided that each side of the star is identical.]

(a) 4(10 - 2π) (b) 40 - 2π
(c) 80 - 4π (d) 8(10 - π)

61. If (3, 0) is one of the vertices and 2x - 2y - 3 = 0 is one of the sides of an equilateral triangle, then which of the following statements is false?

(a) area of triangle is $\frac{3\sqrt{3}}{8}$ sq. unit

(b) orthocentre is $\left(\frac{5}{2},\frac{1}{2}\right)$

(c) slope of other two sides of triangle are $(2+\sqrt{3})$ and $(\sqrt{3}-2)$

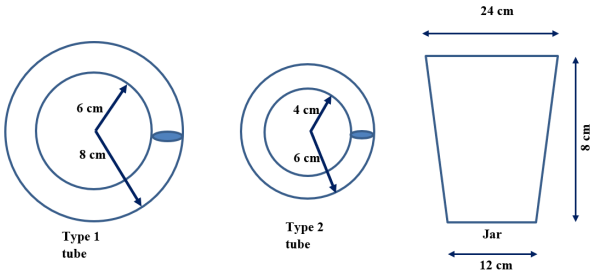
(d) circumcentre is $\left(\frac{1}{2},-\frac{1}{3}\right)$

62. Let's consider the equation $[x]^2 - 3x + 6\{x\} = 0$, where $[x]$ is the greatest integer function and $\{x\}$ is the fractional part function. Then how many values x can assume?

63. A trader sold an article at profit of 25%. Had he bought that article at 60% less price and sold it at Rs 130 less, then he would have gained 50%. What is the value (in Rs) of cost price?

(a) 150 (b) 200
(c) 225 (d) 250

64. 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 $1/\pi$ 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

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

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

(a) 3 : 4 (b) 1 : 1
(c) 2 : 3 (d) 10 : 11

VARC

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

LRDI

25.	(c)	29.	(b)	33.	(25)	37.	(46)	41.	(a)
26.	(49)	30.	(d)	34.	(106100)	38.	(c)	42.	(a)
27.	(b)	31.	(a)	35.	(d)	39.	(73050)	43.	(d)
28.	(126)	32	(280)	36.	(57)	40.	(c)	44.	(b)

QUANT

45.	(2)	50.	(c)	55.	(1)	60.	(d)	65.	(9)
46.	(a)	51.	(a)	56.	(c)	61.	(d)	66.	(c)
47.	(5100)	52	(48)	57.	(a)	62.	(4)		
48.	(7249)	53.	(12)	58.	(c)	63.	(b)		
49.	(d)	54.	(4047)	59.	(d)	64.	(c)		

Hints & Solutions

VARC

1. **(c)**

Option A: This statement can be inferred from the passage. It mentions that "in 1990-91, it was Russian secessionism – together with separatist movements in the republics – that brought down the USSR." Hence, this option is a valid inference from the passage.

Option B: This statement can also be inferred from the passage. It is mentioned that "Lenin declared 'war to the death on Great Russian chauvinism' and proposed to uplift the 'oppressed nations' on its peripheries." Further, "to combat imperial inequality, Lenin called for unity, creating a federation of republics divided by nationality." Thus, this option is a valid inference from the passage.

Option C: This statement is in direct contradiction with the passage. The passage states that "The exception was the Russian Soviet Federative Socialist Republic, or RSFSR, which remained an administrative territory not associated with any ethnic or historic 'Russia'." This means that the RSFSR was not explicitly associated with a specific ethnic or historic 'Russia.' Hence, this option is Alien (A) according to the BANE Theory and is not a valid inference from the passage.

Option D: This statement can be inferred from the passage, as it mentions that "Yeltsin had passed a declaration of Russian sovereignty that served as a model for those of several other Soviet republics, including Ukraine." Thus, this option is a valid inference from the passage.

Using the BANE Theory, we can choose option C as the correct answer since it is Alien to the passage.

2. **(b)**

Option A: This statement, if true, would undermine Lenin's approach as it would suggest that his method for combating imperial inequality led to greater ethnic divisions and tensions. This option is Broad according to the BANE Theory, and can be eliminated.

Option B: This statement, if true, would not undermine Lenin's approach as it would suggest that the creation of a federation of republics divided by nationality fostered cooperation and understanding between different ethnic groups, which was one of his goals. Hence, this option is the correct answer.

Option C: This statement, if true, would undermine Lenin's approach as it would suggest that the policy of elevating the local 'titular' nationality into positions of power caused resentment among non-titular nationalities, which would not help combat imperial inequality. This option is Narrow according to the BANE Theory, and can be eliminated.

Option D: This statement, if true, would undermine Lenin's approach as it would suggest that the RSFSR became a symbol of Russian dominance within the Soviet Union, despite his efforts to combat imperial inequality. This option is Extreme according to the BANE Theory, and can be eliminated.

Using the BANE Theory, we can eliminate options A, C, and D as they are Broad, Narrow,

and Extreme, respectively. Therefore, the correct answer is:

B) The creation of a federation of republics divided by nationality fostered cooperation and understanding between different ethnic groups.

3. (b)

Option A: This statement is not supported by the passage, as it mentions "it was Russian secessionism – together with separatist movements in the republics – that brought down the USSR." Thus, it was internal factors that played a significant role in the dissolution of the Soviet Union. This option is Alien according to the BANE Theory and can be eliminated.

Option B: This statement is supported by the passage, which states that "to defeat the Soviet leader Mikhail Gorbachev's attempt at preserving the union, Yeltsin fused the concerns of Russia's liberal democrats and conservative nationalists into an awkward alliance." Yeltsin's call for separation was a key factor in the eventual collapse of the Soviet Union. Hence, this is the correct answer.

Option C: This statement is not supported by the passage, as it mentions the Russian Soviet Federative Socialist Republic (RSFSR) as an exception to the policy of preserving unique cultural identities, remaining "an administrative territory not associated with any ethnic or historic 'Russia'." Moreover, it describes the "uneasy overlap of 'Russian' and 'Soviet'." This option is Narrow according to the BANE Theory and can be eliminated.

Option D: This statement is not supported by the passage, as it does not claim that Lenin's approach was entirely successful in eliminating imperial inequality. The passage highlights the "roots of nationalist discontent" and the "uneasy overlap of 'Russian' and 'Soviet'." This option is Extreme according to the BANE Theory and can be eliminated.

Using the BANE Theory, we can eliminate options A, C, and D as they are Alien, Narrow, and Extreme, respectively. Therefore, the correct answer is:

B) Yeltsin's call for separation was a key factor in the eventual collapse of the Soviet Union.

4. (d)

Option 1: This option is relevant to the passage since it discusses Yeltsin's actions and their influence on Russian sovereignty. It is a logical extension of the discussion, and according to the BANE Theory, this option is correct.

Option 2: Comparing Russian secessionism to other historical secessionist movements could be an interesting discussion, but it is not directly related to the passage's focus on Russian history and identity. This option is Alien according to the BANE Theory and can be eliminated.

Option 3: Although the passage mentions the Communist Party, it does not focus on the role of the party in shaping Russian identity. This option is Alien according to the BANE Theory and can be eliminated.

Option 4: The last line of the passage refers to the "uneasy overlap of 'Russian' and 'Soviet'," which implies that the author might discuss the impact of this overlap on modern Russia's political landscape. According to the BANE Theory, this option is correct.

Using the BANE Theory, we can narrow down the possible answers to Options 1 and 4, as both are relevant to the passage and logical extensions of the discussion. Options 2 and 3 can be eliminated since they are considered Alien and not directly related to the passage's focus.

5. (d)

A) This statement is true, as Richardson's idea of the "forecast factory" led to the development of numerical weather prediction, which is now a standardized way of recording atmospheric changes.

B) This statement is also true, as the passage explains that the calculable planet concept has led to the realization that human impacts are part of a

complex web of processes, indicating the interconnectedness of these effects.

C) This statement is true, as the passage argues that the emergence of the Anthropocene and the concept of a "planetary emergency" have shifted the focus from the state to the planet as the primary political object.

D) This is the only statement that is false. While it is true that the first mass-produced electronic computer was released by IBM in 1953, Richardson did live to see it, as he died in the same year. The passage states that Richardson died in 1953, but it does not state that he did not live to see the release of the first mass-produced electronic computer. This statement is false because it suggests that Richardson did not live to see the release of the first mass-produced electronic computer, while in reality, he passed away in the same year as its release, making it possible that he was aware of it before his death.

Hence, option D is the correct answer.

6. (b)

A) The development of electronic computers surpassed Richardson's expectations.

This option is too narrow. Although electronic computers exceeded Richardson's expectations, the paragraph focuses more on the repercussions of the modern 'forecast factory' and the expansion of weather prediction.

B) The modern 'forecast factory' has had unforeseen consequences on our understanding of the planet.

This option is correct, as it captures the main argument of the paragraph, which highlights the unexpected repercussions of the modern 'forecast factory' and the emergence of a new kind of planet and governance.

C) The primary focus of weather prediction remains on atmospheric conditions.

This option is alien and incorrect. The paragraph emphasizes the expansion of climate models beyond atmospheric conditions, encompassing the entirety of the Earth system.

D) Richardson's dream was entirely fulfilled with the advent of electronic computers.

This option is extreme and incorrect. The paragraph states that Richardson's factory never materialized exactly as he imagined it, but his dream of a calculable planet seems prophetic.

Hence, the correct answer is option B, as it best reflects the main argument of the third paragraph of the passage.

7. (c)

A) The development of advanced climate models

This option is a reason mentioned in the passage for the emergence of the new kind of planet. It is stated that "climate models now stretch into the deep past and future, encompassing the entirety of the Earth system rather than just the atmosphere."

B) The realization of anthropogenic impacts on the environment

This option is another reason mentioned in the passage for the emergence of the new kind of planet. The author talks about a planet that "emerges from the realization that anthropogenic impacts are not isolated to particular areas, but integrated parts of a complex web of intersecting processes."

C) The influence of the Copernican revolution

This option is correct, as it is not mentioned as a reason for the emergence of the new kind of planet in the passage. The author states that they are not talking about "the Sun-orbiting body of the Copernican revolution" but rather a different kind of planet.

D) The expansion of weather prediction beyond the atmosphere

This option is mentioned in the passage as a reason for the emergence of the new kind of planet. The author explains that since the 1960s, the scope of weather prediction has expanded dramatically, encompassing the entirety of the Earth system rather than just the atmosphere, which contributes to the emergence of the new kind of planet.

Based on the BANE Theory analysis, Option C is the correct answer, as it is the only one that is alien to the reasons mentioned in the passage for the emergence of the new kind of planet.

8. **(a)**

Option A: The evolution of weather forecasting and the emergence of a new political object. This option relates to the passage's discussion of Richardson's forecast factory and how the modern understanding of the planet has changed, resulting in a new political object. It captures the central theme of the passage, making it a strong contender.

Option B: The role of computational capacity in Richardson's forecast factory and the Anthropocene era. While this option touches on some aspects of the passage, such as the importance of computational capacity in Richardson's ideas and the Anthropocene era, it doesn't encompass the full theme, making it a weaker choice.

Option C: The transition from human computers to electronic computers in weather prediction. This option focuses only on one aspect of the passage, the evolution of computation technology, and ignores the broader themes related to the planet and its changing role as a political object. This option can be easily eliminated.

Option D: The challenges of weather prediction and the Copernican revolution. This option introduces the Copernican revolution, which is not directly related to the passage's central theme. It can be eliminated as it does not fully capture the central theme of the passage.

After analyzing the options, we can conclude that Option A, "The evolution of weather forecasting and the emergence of a new political object," best represents the central theme of the passage. It captures the progression of weather forecasting from Richardson's forecast factory to the modern understanding of the planet and the political implications arising from this new perspective.

9. **(b)**

Option 1: This option is close and cannot be easily eliminated. If it is true that the longleaf pine savanna ecosystem is no longer viable due to climate change, restoring the degraded pasture to its historic state might not be feasible or sustainable, which would invalidate the author's purpose.

Option 2: This option is also close and cannot be easily eliminated. If the longleaf pine savanna has been replaced by a more ecologically diverse and sustainable ecosystem, the purpose of restoring the degraded pasture to its historic state might be invalidated, as it may no longer be the best choice for the environment.

Option 3: This option can be eliminated as it is too narrow. The passage suggests that the author's main goal is to restore the degraded pasture to its historic state. Focusing on aesthetics does not necessarily invalidate the purpose of the restoration. While aesthetics may play a role in the author's decision-making, it is not the primary focus, and thus, this option does not address the purpose of restoring the degraded pasture to its historic state.

Option 4: This option can be eliminated as it is alien or strange to the purpose of the passage. Receiving an award for dedication to preserving native plant species does not invalidate the purpose of restoring the degraded pasture to its historic state. In fact, it could be seen as an acknowledgment of the author's efforts, but it does not have any direct impact on the restoration process or its purpose.

In summary, options 1 and 2 are close and cannot be easily eliminated, as both options, if true, would have implications on the viability or necessity of restoring the degraded pasture to its historic state of an open-canopied longleaf pine savanna. Options 3 and 4 can be eliminated based on BANE Theory, as they do not directly address or impact the purpose of the restoration as stated in the passage.

10. **(b)**

Option 1: This option can be inferred from the passage. The author initially assumed that the soil was acidic and nutrient-poor, which led them to add lime and plant hairy indigo. Later, they realized that the soil did not need lime and that the native pine savanna actually thrived in nutrient-poor conditions. Therefore, this statement can be inferred from the passage, making it a valid answer.

Option 2: This option is too narrow and cannot be inferred from the passage. While the author mentions their childhood aspiration to become a tree surgeon and their adult career as a tree ecologist, there is no direct connection between these aspirations and the decision to restore the longleaf pine savanna. The author's love of trees and preference for forest environments influenced their decision, but the childhood aspiration itself did not.

Option 3: This option is alien to the passage. The passage does not focus on the author's professional life, and it is mentioned that the author's professional focus is on improving tropical forests through sustainable management for timber. Thus, longleaf pine savannas are not a major focus of the author's professional life, and this statement cannot be inferred from the passage.

Option 4: This option can be inferred from the passage. The author mentions that the battle against hairy indigo continues, and despite consistent efforts to weed it out, the species persists among the bunchgrasses and blazing stars in the recovering savanna. This implies that it has been a challenging and ongoing process for the author.

Hence, options 1 and 4 are correct.

11. (a)

This question asks us to identify the statement that would most directly extend the arguments made in the passage. Let's analyze each option using the BANE theory:

A) Encouraging the natural occurrence of low-intensity fires would help maintain the balance of native species in the longleaf pine savanna.

This option is not too broad or narrow as it relates to the ecosystem of the longleaf pine savanna and the role of low-intensity fires in maintaining its balance. It is not extreme or strange as it aligns with the author's mention of the exclusion of fires and its effects on the savanna. This option is consistent with the argument made in the passage, as the author notes that the exclusion of fires has led to the invasion of thin-barked native trees and the proliferation of undesirable species.

B) The presence of thin-barked native trees in the savanna is a positive development for the ecosystem.

This option is too narrow as it only focuses on thin-barked native trees, without considering the larger ecosystem of the savanna. It is extreme as it suggests that the presence of any species, regardless of its effects on the ecosystem, is inherently positive.

C) The author's experiences in tree ecology have led to a deeper understanding of how to convert degraded pastures into lush forests.

This option is too broad as it goes beyond the scope of the passage, which only focuses on the restoration of the longleaf pine savanna. It is alien as it introduces the idea of converting pastures into forests, which is not discussed in the passage.

D) Introducing non-native species to the longleaf pine savanna can ultimately improve its overall biodiversity.

This option is extreme as it suggests that introducing non-native species is always positive for the ecosystem. It is also strange as it contradicts the author's experience with hairy indigo, an introduced species that has contributed to the proliferation of weedy and exotic species, rather than the natives the author prefers.

Based on the BANE theory analysis, we can see that option A is the most closely related to the arguments made in the passage. The author discusses the exclusion of low-intensity fires, which has had negative effects on the savanna's balance, and notes that restoring this natural

occurrence would help promote the growth of native species. Therefore, option A is the correct answer.

12. (d)

A) This option can be eliminated as it contradicts the author's stance on non-native species. The author mentions how he made the mistake of introducing hairy indigo, which favoured weedy and exotic species instead of the natives he preferred. The author's emphasis is on restoring the ecosystem to its former natural state, which means that he is not likely to support introducing non-native species that can upset the balance of the ecosystem.

B) This option can be easily eliminated as it is too narrow. The passage does not discuss the preservation of traditional farming practices in order to maintain a healthy ecosystem. In fact, the author highlights how traditional farming practices have led to the degradation of the ecosystem and how his efforts are focused on restoring it.

C) This option can be eliminated as it is too broad. While the author does mention the importance of low-intensity fires in maintaining the balance of native species in the longleaf pine savanna, he does not argue that they are the only factor. Furthermore, the author's efforts are focused on restoring the ecosystem to its former state without the need for fires, as they have been excluded for some time.

D) This option is the correct answer. The author mentions how the exclusion of low-intensity fires has led to the invasion of thin-barked native trees such as sweetgums and laurel oaks in the longleaf pine savanna. However, the author does not argue that the exclusion of certain tree species can lead to the invasion of other unwanted species. The focus of the passage is on restoring the ecosystem to its natural state by removing unwanted species and allowing native species to thrive.

13. (a)

Option A is the best summary of the central point of the passage. The author argues that waste is a defining feature of the Anthropocene and blurs the distinction between nature and culture. The production of waste is not just a byproduct of human culture, it is culture. Waste has always been marginalised and seen as an externality of necessary industrialisation, but it is now internal to every ecosystem and every digestive system, from marine micro-organisms to humans. The author believes that invoking the Waste Age offers an opportunity for a radical shift in late-capitalist civilisation towards less polluting modes of producing, consuming, and living.

Option B is too narrow because it only focuses on the economic dimension of waste production and overlooks the geological dimension.

Option C is too extreme because the author argues that recognising the scale of the waste crisis can lead to reorientation of society and the economy towards less polluting modes of living.

Option D is too narrow because the author argues that waste is no longer an external issue, but an internality internal to every ecosystem and every digestive system, and it should be brought into the heart of every conversation about how things are extracted, designed, and disposed of.

14. (b)

Option A is a very broad statement as it does not cover the various nuances of the passage. The passage talks about how the Waste Age has become a defining cultural and material reality, necessitating a shift in societal and economic practices to address the issue of waste. Thus, option A is too broad.

Option B comes closest to the central point of the passage as it talks about how the opposition between nature and culture is problematic as it leaves out the domain of waste, which has become a defining feature of the current geological and economic era. This option captures the central argument of the passage, and the idea that waste has become incompatible with

both nature and culture. Hence, this option is correct.

Option C is too narrow as it only talks about waste being a major environmental issue that has been overlooked and has now become an internality within every ecosystem. This option does not capture the central argument of the passage that waste has become a defining feature of the current geological and economic era, which necessitates a shift in societal and economic practices. Therefore, this option can be eliminated.

Option D is too extreme as it is not accurate to state that waste is a necessary byproduct of industrialisation. The passage highlights that waste has been consistently overlooked as an externality, but it is now an internality within every ecosystem. This option also does not capture the central argument of the passage that waste has become a defining feature of the current geological and economic era, which necessitates a shift in societal and economic practices. Therefore, this option can also be eliminated.

15. (b)

Option A is too broad and extreme because the passage does not argue that the entire opposition between nature and culture needs to be dismantled. Instead, it focuses on the problematic nature of this dualism in relation to waste.

Option C is too narrow and extreme because it suggests that the waste crisis can only be addressed by completely restructuring the global economic system, which is not something the passage advocates for.

Option D is also too extreme because it claims that efforts to address the waste crisis will have no significant impact, which is not something that the passage argues for.

Option B is the correct answer because it captures the central idea of the passage: that the Waste Age is a defining era of human history that has fused nature and culture together in an unprecedented way, and recognizing the scale of the waste crisis is essential to transforming society towards a cleaner future. The passage argues that waste is a defining material of our time, and that acknowledging the geological and economic dimensions of the Waste Age can lead to a radical shift in late-capitalist civilization.

16. (c)

A) The first option contains keywords that are too broad, as they include general concepts that are discussed in the passage, such as "Nature vs Culture" and "material ages," but do not encompass the main focus of the text, which is waste and its impact on the environment.

B) The second option contains keywords that are too narrow, as they focus on specific aspects of the passage, such as "climate crisis" and "capitalism," but do not encompass the overall message of the text.

C) The third option contains keywords that are most closely related to the main focus of the passage, such as "Waste Age," "plastic bags," "marine micro-organisms," and "cleaner future." These keywords represent the central themes of the text, and are the best choice for this question.

D) The fourth option contains keywords that are too extreme, as they are too focused on negative aspects of the text, such as "pollution" and "industrialization," and do not fully represent the overall message of the passage, which also discusses the potential for positive change through recognizing the issue of waste. Therefore, this option can be easily eliminated.

Therefore, the correct answer is C.

17. (a)

The correct sequence is 35124. Statement-3 introduces the topic of the increasing demand for copper due to the rising adoption of electric vehicles. Statement-5 provides an explanation for the increased demand for copper in electric vehicles, stating that they require up to four times more copper than conventional cars. Statement-1 explains the importance of copper in electric vehicle manufacturing, including batteries, motors, and wiring.

Statement-2 highlights the environmental challenges associated with mining and processing copper, such as land degradation and water pollution. This statement introduces an important issue related to copper mining that needs to be addressed. Finally, statement-4 suggests a solution to this problem, emphasizing the need for sustainable mining practices and innovative recycling technologies.

Overall, this sequence provides a logical flow of information, starting with the topic of the increasing demand for copper in electric vehicles and ending with a call for sustainable solutions to the environmental challenges associated with copper mining. This arrangement provides a clear and consistent understanding of the topic, making it a logically consistent arrangement of statements.

18. (c)

The correct sequence is 15243. Statement 1 provides an introduction to the potential of blockchain technology and how it can revolutionize different industries.

Statement 5 follows and explains how blockchain technology can be used in the healthcare industry to securely store and share patient data. This statement provides a specific example of how blockchain technology can be applied in the healthcare industry.

Statement 2 comes next and provides information on the challenges faced by the healthcare industry in adopting blockchain technology. This statement highlights the regulatory issues and data privacy and security concerns that need to be addressed for the successful adoption of blockchain technology in healthcare.

Statement 4 follows with an explanation of how the supply chain industry can benefit from blockchain technology. This statement emphasizes the value of end-to-end transparency and traceability of products, which can be provided by blockchain technology.

Finally, statement 3 concludes the sequence by explaining how blockchain technology can be used in the finance industry to create secure and efficient payment systems and reduce the risk of fraud and money laundering. This statement highlights another industry that can benefit from blockchain technology.

This sequence provides a logical flow of information, starting with an introduction to the potential of blockchain technology and ending with an explanation of its application in the finance industry. The arrangement provides a clear and consistent understanding of the topic, making it a logically consistent arrangement of statements.

19. (d)

The correct sequence is 32154. Statement 3 introduces the topic of the rise of automation and artificial intelligence and how it can lead to the displacement of human workers, raising concerns about job loss and economic inequality.

Statement 2 provides a counterpoint by explaining the potential benefits of automation and artificial intelligence, including increased productivity, lower costs, and improved safety.

Statement 1 follows up with the need for policies that address the concerns raised in Statement 1, such as supporting the retraining and reskilling of workers for new roles in the digital economy.

Statement 5 suggests another policy solution to address economic inequality by addressing the unequal distribution of wealth and income through progressive taxation and social welfare programs.

Finally, Statement 4 concludes the sequence by emphasizing that the successful integration of automation and artificial intelligence into the economy will require a combination of technological innovation and social policies that promote equitable access and distribution of the benefits of these technologies.

Overall, this sequence provides a logical flow of information, starting with the concerns about job loss and economic inequality and ending with a call for a balanced approach to the adoption of automation and artificial intelligence that benefits

everyone. Therefore, the correct sequence is 32154.

20. (b)

The correct sequence is 21453.

Statement 2 introduces the topic of the increasing use of renewable energy sources globally, driven by concerns about climate change and the need for sustainable energy solutions.

Statement 1 provides an explanation of the benefits of adopting renewable energy sources, such as reducing greenhouse gas emissions and improving air quality.

Statement 4 follows up with the need for modernizing the grid infrastructure to accommodate distributed generation and two-way power flows for integrating renewable energy sources into the electrical grid.

Statement 5 highlights the challenges faced in the adoption of renewable energy sources, such as the intermittency of wind and solar power that can affect the stability of the electrical grid.

Finally, Statement 3 suggests a solution to the challenges faced in the adoption of renewable energy sources by emphasizing the need for the development of energy storage technologies, such as batteries and pumped hydro storage, which can store excess energy and release it during times of peak demand.

Overall, this sequence provides a logical flow of information, starting with the adoption of renewable energy sources, followed by the benefits, challenges, and solutions related to their adoption. Therefore, the correct sequence is 21453.

21. (a)

Option A is the correct answer as it accurately summarizes the passage. The passage describes how designers have played a significant role in the prodigious waste streams of the past century by being complicit in the throwaway economy, manufacturing planned obsolescence, and promoting convenience culture. However, the culture of design is changing, and young designers today are reinventing themselves as material researchers and waste-stream investigators, showing a different outlook from their predecessors. The passage highlights that young designers have little interest in producing more stuff and are more invested in understanding the extractive processes behind products and their afterlives. Thus, option A captures the main idea of the passage without being too broad, alien, narrow, or extreme.

Option B is too narrow, as it implies that designers are solely responsible for the prodigious waste streams and the throwaway economy, ignoring other factors that have contributed to these issues. Option C is too extreme, as it suggests that young designers are only interested in producing more stuff, which contradicts the passage.

Option D is too alien, as it implies that the role of designers in the throwaway economy is insignificant, which is not mentioned in the passage. Therefore, options B, C, and D can be eliminated.

22. (b)

Option B is the correct answer as it accurately summarizes the passage. The passage describes how the stacking of fringe theories can be straightforward, but the interconnection of fringe beliefs can lead to the sharing of political sensibilities concerned with liberating the oppressed. For example, mid- to late-19th-century enthusiasm for spiritualism was associated with socialism, women's suffrage, and vegetarianism, all of which were heterodox theories concerned with liberating the oppressed. The passage explains that stacking technological systems is a familiar concept from the history of technology, but it is not a widely appreciated phenomenon in intellectual history. Therefore, option B captures the main idea of the passage without being too broad, alien, narrow, or extreme.

Option A is too broad, as it implies that stacking technological systems is a widely appreciated

phenomenon in intellectual history, which is not mentioned in the passage. Option C is too narrow, as it focuses only on the concept of selecting paths based on probable demand, supply of capital, labour availability, and the contours of the landscape from the history of technology. Option D is too extreme, as it suggests that the interconnection of fringe beliefs can only be achieved through the sharing of political sensibilities, which is not supported by the passage. Therefore, options A, C, and D can be eliminated.

23. **(3)**

Statement 3 is the odd one out because while the other four statements are discussing cultural and artistic movements in Europe and their significance, Statement 3 is talking about a technological and economic transformation that occurred during the same period. Statement 1 is talking about the Renaissance, a cultural and artistic movement, Statement 2 is discussing the Enlightenment, an intellectual and philosophical movement, Statement 4 is discussing Romanticism, an artistic and literary movement, and Statement 5 is discussing Modernism, a cultural and artistic movement. Therefore, Statement 3 is the odd one out.

24. **(4)**

Statement 4 is the odd one out because it is the only statement that does not talk about the achievement of happiness as a central concept in philosophy. Statement 1 talks about Aristotle's philosophy that a virtuous life leads to happiness, Statement 2 talks about the Buddhist philosophy that the elimination of desire and the achievement of enlightenment leads to happiness, Statement 3 talks about Kant's philosophy that morality based on reason leads to happiness, and Statement 5 talks about Confucius' philosophy that social harmony and moral behavior lead to happiness. On the other hand, Statement 4 is discussing the concept of mind-body dualism, which is not directly related to the attainment of happiness. Therefore, Statement 4 is the odd one out.

LRDI

25. **(c)**

Let's assume
Match 1 = M1
Match 2 = M2
Match 3 = M3
Match 4 = M4
Match 5 = M5
M4 + M2 + M1 = 490 —--(eq 1)
M4 + M3 + M5 = 420 —--(eq 2)
M2 + M1 + M3 = 450 —--(eq 3)
M4 + M2 + M5 = 480 —--(eq 4)
M5 + M1 + M3 = 410 —--(eq 5)
Now, Adding all these equations together
3(M1 + M2 + M3 + M4 + M5) = 2250

$$M1 + M2 + M3 + M4 + M5 = \frac{2250}{3} = 750 \text{ (eq 6)}$$

Hence the sum of Virat's score in all five matches is 750.

We know that M4 + M2 + M1 = 490
Now put value of M4 + M2 + M1 in (eq 6)
So M3 + M5 = 260 — (eq 7)
Putting value of (eq 7) in (eq 2) and 5 we get,
M4 = 160
Similarly we can find other Values as well.
M1 = 150
M2 = 180
M3 = 120
M4 = 160
M5 = 140

It is given that the sum of runs scored in M2+M1+M3 in 1st inning is 234 and M5+M1+M3 is 235, Which means the difference between the runs scored by M2 and M5 in the 1st inning is 235-234 = 1. Now if we check the ratios, with some calculated trials we can see that if the score of Virat in Match 2 is in the ratio 1:1

for the 1st and 2nd Inning and in Match 5, it is in the ratio of 13:7 then the difference of his 1st inning score of match 2 and match 5 will be 1.

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Ratio
M1			
M2	90	90	1:1
M3			
M4			
M5	91	49	13:7

Now, Ratio of 1st inning to the second inning for Match1 and Match 3 will be either 2:3, 3:2 or 7:3.
And also sum of first inning of Match1 and Match 3 is 234-90 = 144
In the given ratios, 144 can be achieved only by 60 + 84.
Again by using some calculated trail it can be found that for match 3, ratio of 1st inning to the second inning will be 7:3 and scores will be 84 : 36. And ratio of 1st inning to the second inning for Match 1 will be in the ratio 2:3 and scores will be 60:90. Now the sum of the score of the 1st inning of match 3 and match 1 is 84+60 = 144 which satisfies the requirement.
So the only ratio that is left for Match 4 is 3:2.
Now the final table look like this:

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Total Runs	Ratio
M1	60	90	150	2:3
M2	90	90	180	1:1
M3	84	36	120	7:3
M4	96	64	160	3:2
M5	91	49	140	13:7

Virat scored highest runs in match 2.

26. (49)

Let's assume
Match 1 = M1
Match 2 = M2
Match 3 = M3
Match 4 = M4
Match 5 = M5

M4 + M2 + M1 = 490 ——-(eq 1)
M4 + M3 + M5 = 420 ——-(eq 2)
M2 + M1 + M3 = 450 ——-(eq 3)
M4 + M2 + M5 = 480 ——-(eq 4)
M5 + M1 + M3 = 410 ——-(eq 5)

Now, Adding all these equations together
3(M1 + M2 + M3 + M4 + M5) = 2250

$$M1 + M2 + M3 + M4 + M5 = \frac{2250}{3} = 750 \text{ (eq 6)}$$

Hence the sum of Virat's score in all five matches is 750.

We know that M4 + M2 + M1 = 490
Now put value of M4 + M2 + M1 in (eq 6)
So M3 + M5 = 260 — (eq 7)
Putting value of (eq 7) in (eq 2) and 5 we get,
M4 = 160
Similarly we can find other Values as well.
M1 = 150
M2 = 180
M3 = 120
M4 = 160
M5 = 140

It is given that the sum of runs scored in M2+M1+M3 in 1st inning is 234 and M5+M1+M3 is 235, Which means the difference between the runs scored by M2 and M5 in the 1st inning is 235-234 = 1. Now if we check the ratios, with some calculated trials we can see that if the score of Virat in Match 2 is in the ratio 1:1 for the 1st and 2nd Inning and in Match 5, it is in the ratio of 13:7 then the difference of his 1st inning score of match 2 and match 5 will be 1.

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Ratio

M1			
M2	90	90	1:1
M3			
M4			
M5	91	49	13:7

Now, Ratio of 1st inning to the second inning for Match1 and Match 3 will be either 2:3, 3:2 or 7:3. And also sum of first inning of Match1 and Match 3 is 234-90 = 144
In the given ratios, 144 can be achieved only by 60 + 84.
Again by using some calculated trail it can be found that for match 3, ratio of 1st inning to the second inning will be 7:3 and scores will be 84 : 36. And ratio of 1st inning to the second inning for Match 1 will be in the ratio 2:3 and scores will be 60:90. Now the sum of the score of the 1st inning of match 3 and match 1 is 84+60 = 144 which satisfies the requirement.
So the only ratio that is left for Match 4 is 3:2.
Now the final table look like this:

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Total Runs	Ratio
M1	60	90	150	2:3
M2	90	90	180	1:1
M3	84	36	120	7:3
M4	96	64	160	3:2
M5	91	49	140	13:7

Virat scored 49 runs in the second inning of match 5.

27. (b)

Let's assume
Match 1 = M1
Match 2 = M2
Match 3 = M3
Match 4 = M4
Match 5 = M5

M4 + M2 + M1 = 490 ——-(eq 1)
M4 + M3 + M5 = 420 ——-(eq 2)
M2 + M1 + M3 = 450 ——-(eq 3)
M4 + M2 + M5 = 480 ——-(eq 4)
M5 + M1 + M3 = 410 ——-(eq 5)

Now, Adding all these equations together
3(M1 + M2 + M3 + M4 + M5) = 2250

$$M1 + M2 + M3 + M4 + M5 = \frac{2250}{3} = 750$$ (eq 6)

Hence the sum of Virat's score in all five matches is 750.

We know that M4 + M2 + M1 = 490
Now put value of M4 + M2 + M1 in (eq 6)
So M3 + M5 = 260 — (eq 7)
Putting value of (eq 7) in (eq 2) and 5 we get,
M4 = 160
Similarly we can find other Values as well.
M1 = 150
M2 = 180
M3 = 120
M4 = 160
M5 = 140

It is given that the sum of runs scored in M2+M1+M3 in 1st inning is 234 and M5+M1+M3 is 235, Which means the difference between the runs scored by M2 and M5 in the 1st inning is 235-234 = 1. Now if we check the ratios, with some calculated trials we can see that if the score of Virat in Match 2 is in the ratio 1:1 for the 1st and 2nd Inning and in Match 5, it is in the ratio of 13:7 then the difference of his 1st inning score of match 2 and match 5 will be 1.

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Ratio
M1			
M2	90	90	1:1
M3			
M4			

M5	91	49	13:7

Now, Ratio of 1st inning to the second inning for Match1 and Match 3 will be either 2:3, 3:2 or 7:3. And also sum of first inning of Match1 and Match 3 is 234-90 = 144
In the given ratios, 144 can be achieved only by 60 + 84.
Again by using some calculated trail it can be found that for match 3, ratio of 1st inning to the second inning will be 7:3 and scores will be 84 : 36. And ratio of 1st inning to the second inning for Match 1 will be in the ratio 2:3 and scores will be 60:90. Now the sum of the score of the 1st inning of match 3 and match 1 is 84+60 = 144 which satisfies the requirement.
So the only ratio that is left for Match 4 is 3:2.
Now the final table look like this:

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Total Runs	Ratio
M1	60	90	150	2:3
M2	90	90	180	1:1
M3	84	36	120	7:3
M4	96	64	160	3:2
M5	91	49	140	13:7

Virat's 4th Match score is in the ratio 3:2.

28. (126)

Let's assume
Match 1 = M1
Match 2 = M2
Match 3 = M3
Match 4 = M4
Match 5 = M5

M4 + M2 + M1 = 490 ——-(eq 1)
M4 + M3 + M5 = 420 ——-(eq 2)
M2 + M1 + M3 = 450 ——-(eq 3)
M4 + M2 + M5 = 480 ——-(eq 4)
M5 + M1 + M3 = 410 ——-(eq 5)

Now, Adding all these equations together

3(M1 + M2 + M3 + M4 + M5) = 2250

$$M1 + M2 + M3 + M4 + M5 = \frac{2250}{3} = 750$$ (eq 6)

Hence the sum of Virat's score in all five matches is 750.

We know that M4 + M2 + M1 = 490
Now put value of M4 + M2 + M1 in (eq 6)
So M3 + M5 = 260 — (eq 7)
Putting value of (eq 7) in (eq 2) and 5 we get,
M4 = 160
Similarly we can find other Values as well.
M1 = 150
M2 = 180
M3 = 120
M4 = 160
M5 = 140

It is given that the sum of runs scored in M2+M1+M3 in 1st inning is 234 and M5+M1+M3 is 235, Which means the difference between the runs scored by M2 and M5 in the 1st inning is 235-234 = 1. Now if we check the ratios, with some calculated trials we can see that if the score of Virat in Match 2 is in the ratio 1:1 for the 1st and 2nd Inning and in Match 5, it is in the ratio of 13:7 then the difference of his 1st inning score of match 2 and match 5 will be 1.

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Ratio
M1			
M2	90	90	1:1
M3			
M4			
M5	91	49	13:7

Now, Ratio of 1st inning to the second inning for Match1 and Match 3 will be either 2:3, 3:2 or 7:3. And also sum of first inning of Match1 and Match 3 is 234-90 = 144

In the given ratios, 144 can be achieved only by 60 + 84.

Again by using some calculated trail it can be found that for match 3, ratio of 1st inning to the second inning will be 7:3 and scores will be 84 : 36. And ratio of 1st inning to the second inning for Match 1 will be in the ratio 2:3 and scores will be 60:90. Now the sum of the score of the 1st inning of match 3 and match 1 is 84+60 = 144 which satisfies the requirement.

So the only ratio that is left for Match 4 is 3:2.

Now the final table look like this:

Matches	Runs scored in 1st Inning	Runs scored in 2nd Inning	Total Runs	Ratio
M1	60	90	150	2:3
M2	90	90	180	1:1
M3	84	36	120	7:3
M4	96	64	160	3:2
M5	91	49	140	13:7

The sum of Virat's second inning score of Match 2 and Match 3 = 90 + 36 = 126..

29. (b)

According to the given conditions,

Floor3				
Floor2				
Floor1				
	H1	H2	H3	H4

The wedding guests are in H1 and neither any of the halls just above nor just below is booked.

Case 1:

F3	Wedding			
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			
	H1	H2	H3	H4

There are two halls between Farewell and Wedding hall.

Case 1:

F3	Wedding			Farewell
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			Farewell
	H1	H2	H3	H4

The guests who attend Birthday are 120 which are just above the hall of Farewell. Thus case 1 is cancelled out.

F3	----------			Birthday (120)
F2	Wedding			Farewell

F1	----------			
	H1	H2	H3	H4

OR

F3	----------			
F2	----------			Birthday (120)
F1	Wedding			Farewell
	H1	H2	H3	H4

The hall between the Reception and Freshers hall is unbooked and both halls are in H2.

F3	----------	Reception/ Freshers		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Reception/ Freshers		
	H1	H2	H3	H4

OR

F3	----------	Reception/ Freshers		
F2	----------	----------		Birthday (120)
F1	Wedding	Reception/ Freshers		Farewell
	H1	H2	H3	H4

The Engagement hall is between Freshers and Baby shower Hall. Thus

F3	----------	Reception		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Freshers	Engagement	Baby shower
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement	Baby shower
F2	----------	----------		Birthday (120)
F1	Wedding	Reception		Farewell
	H1	H2	H3	H4

The guests who attend the Baby shower are 30 which is half of the guests who attend the Seminar.

Thus, the total number of guests who attend Seminar = 60

The total number of guests in H4 is 220.

So, the guest who attend Farewell = 220-(120+30) = 70

The total number of guests who attend Farewell is equal to the total guests who attend Engagement=70

The total number of guests who attend Reception is 145.

The total number of guests who attend the Wedding is 5 more than the guests who attend Reception

Therefore, Wedding guests =145+5= 150

F3	----------	Reception 145		Birthday (120)
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------		Birthday 120
F1	Wedding 150	Reception 145		Farewell 70
	H1	H2	H3	H4

Reunion is not on the same floor as Farewell and Engagement.

F3	----------	Reception 145		Birthday 120
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------	Reunion	Birthday 120
F1	Wedding 150	Reception 145	Seminar	Farewell 70
	H1	H2	H3	H4

Now the case in which Seminar is in hall 3 of floor 1 is eliminated because by doing so no hall is empty on F1 which violates the condition mentioned as **"one Hall should remain vacant on each floor".**

Total number of guests who attend Seminar = 60

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

Total guests = 150 + 145 + 60 + 70 + 70 + 120 + 30 = 645

The total remaining guests are= 800 - 645 = 155

The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25

Prime number after 25 = 29,31, 37…

Prime number	multiples	total
29 (remaining= 155-29=126)	29×2=58 29×3=87	not possible
31 (remaining= 155-31=124)	31×4=124	31+124=155 (possible)

Thus, Guests who attend Freshers =124
And the guests who attend Reunion =31

F3	----------	Reception 145	Reunion 31	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers 124	Engagement 70	Baby shower 30

As we can see in weddings we have the highest number of guests.

30. (d)

According to the given conditions,

Floor3				
Floor2				
Floor1				
	H1	H2	H3	H4

The wedding guests are in H1 and neither any of the halls just above nor just below is booked.

Case 1:

F3	Wedding			
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			
	H1	H2	H3	H4

There are two halls between Farewell and Wedding hall.

Case 1:

F3	Wedding			Farewell
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			Farewell
	H1	H2	H3	H4

The guests who attend Birthday are 120 which are just above the hall of Farewell. Thus case 1 is cancelled out.

F3	----------			Birthday (120)
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

OR

F3	----------			
F2	----------			Birthday (120)
F1	Wedding			Farewell
	H1	H2	H3	H4

The hall between the Reception and Freshers hall is unbooked and both halls are in H2.

F3	----------	Reception/ Freshers		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Reception/ Freshers		
	H1	H2	H3	H4

OR

F3	----------	Reception/ Freshers		
F2	----------	----------		Birthday (120)
F1	Wedding	Reception/ Freshers		Farewell
	H1	H2	H3	H4

The Engagement hall is between Freshers and Baby shower Hall. Thus

F3	----------	Reception		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Freshers	Engagement	Baby shower
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement	Baby shower
F2	----------	----------		Birthday (120)
F1	Wedding	Reception		Farewell
	H1	H2	H3	H4

The guests who attend the Baby shower are 30 which is half of the guests who attend the Seminar.

Thus, the total number of guests who attend Seminar = 60

The total number of guests in H4 is 220.

So, the guest who attend Farewell = 220-(120+30) = 70

The total number of guests who attend Farewell is equal to the total guests who attend Engagement=70

The total number of guests who attend Reception is 145.

The total number of guests who attend the Wedding is 5 more than the guests who attend Reception
Therefore, Wedding guests =145+5= 150

F3	----------	Reception 145		Birthday (120)
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------		Birthday 120
F1	Wedding 150	Reception 145		Farewell 70
	H1	H2	H3	H4

Reunion is not on the same floor as Farewell and Engagement.

F3	----------	Reception 145		Birthday 120
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------	Reunion	Birthday 120
F1	Wedding 150	Reception 145	Seminar	Farewell 70
	H1	H2	H3	H4

Now the case in which Seminar is in hall 3 of floor 1 is eliminated because by doing so no hall is empty on F1 which violates the condition mentioned as **"one Hall should remain vacant on each floor".**

Total number of guests who attend Seminar = 60

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

Total guests = 150 + 145 + 60 + 70 + 70 + 120 + 30 = 645

The total remaining guests are= 800 - 645 = 155
The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25
Prime number after 25 = 29,31, 37…

Prime number	multiples	total
29 (remaining= 155-29=126)	29×2=58 29×3=87	not possible
31 (remaining= 155-31=124)	31×4=124	31+124=155 (possible)

Thus, Guests who attend Freshers =124
And the guests who attend Reunion =31

The final arrangement is:

F3	----------	Reception 145	Reunion 31	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers 124	Engagement 70	Baby shower 30

As we can see that all have more than 100 guests but seminars have less than 100 guests.

31. (a)

According to the given conditions,

Floor3				
Floor2				
Floor1				
	H1	H2	H3	H4

The wedding guests are in H1 and neither any of the halls just above nor just below is booked.

Case 1:

F3	Wedding			
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			
	H1	H2	H3	H4

There are two halls between Farewell and Wedding hall.

Case 1:

F3	Wedding			Farewell
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			Farewell
	H1	H2	H3	H4

The guests who attend Birthday are 120 which are just above the hall of Farewell. Thus case 1 is cancelled out.

F3	----------			Birthday (120)
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

OR

F3	----------			
F2	----------			Birthday (120)
F1	Wedding			Farewell
	H1	H2	H3	H4

The hall between the Reception and Freshers hall is unbooked and both halls are in H2.

F3	----------	Reception/ Freshers		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Reception/ Freshers		
	H1	H2	H3	H4

OR

F3	----------	Reception/ Freshers		
F2	----------	----------		Birthday (120)
F1	Wedding	Reception/ Freshers		Farewell
	H1	H2	H3	H4

The Engagement hall is between Freshers and Baby shower Hall. Thus

F3	----------	Reception		Birthday (120)

F2	Wedding	----------		Farewell
F1	----------	Freshers	Engagement	Baby shower
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement	Baby shower
F2	----------	----------		Birthday (120)
F1	Wedding	Reception		Farewell
	H1	H2	H3	H4

The guests who attend the Baby shower are 30 which is half of the guests who attend the Seminar.

Thus, the total number of guests who attend Seminar = 60

The total number of guests in H4 is 220.

So, the guest who attend Farewell = 220-(120+30) = 70

The total number of guests who attend Farewell is equal to the total guests who attend Engagement=70

The total number of guests who attend Reception is 145.

The total number of guests who attend the Wedding is 5 more than the guests who attend Reception

Therefore, Wedding guests =145+5= 150

F3	----------	Reception 145		Birthday (120)
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------		Birthday 120
F1	Wedding 150	Reception 145		Farewell 70
	H1	H2	H3	H4

Reunion is not on the same floor as Farewell and Engagement.

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------	Reunion	Birthday 120
F1	Wedding 150	Reception 145	Seminar	Farewell 70
	H1	H2	H3	H4

Now the case in which Seminar is in hall 3 of floor 1 is eliminated because by doing so no hall is empty on F1 which violates the condition mentioned as **"one Hall should remain vacant on each floor".**

Total number of guests who attend Seminar = 60

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

Total guests = 150 + 145 + 60 + 70 + 70 + 120 + 30 = 645

The total remaining guests are= 800 - 645 = 155

The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25

Prime number after 25 = 29,31, 37…

Prime number	multiples	total
29 (remaining= 155-29=126)	29×2=58 29×3=87	not possible
31 (remaining= 155-31=124)	31×4=124	31+124=155 (possible)

Thus, Guests who attend Freshers =124

And the guests who attend Reunion =31

The final arrangement is:

F3	----------	Reception 145	Reunion 31	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers 124	Engagement 70	Baby shower 30

32. (280)

According to the given conditions,

Floor3				
Floor2				
Floor1				
	H1	H2	H3	H4

The wedding guests are in H1 and neither any of the halls just above nor just below is booked.

Case 1:

F3	Wedding			
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			
	H1	H2	H3	H4

There are two halls between Farewell and Wedding hall.

Case 1:

F3	Wedding			Farewell
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			Farewell
	H1	H2	H3	H4

The guests who attend Birthday are 120 which are just above the hall of Farewell. Thus case 1 is cancelled out.

F3	----------			Birthday (120)
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

OR

F3	----------			

F2	----------			Birthday (120)
F1	Wedding			Farewell
	H1	H2	H3	H4

The hall between the Reception and Freshers hall is unbooked and both halls are in H2.

F3	----------	Reception/ Freshers		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Reception/ Freshers		
	H1	H2	H3	H4

OR

F3	----------	Reception/ Freshers		
F2	----------	----------		Birthday (120)
F1	Wedding	Reception/ Freshers		Farewell
	H1	H2	H3	H4

The Engagement hall is between Freshers and Baby shower Hall. Thus

F3	----------	Reception		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Freshers	Engagement	Baby shower
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement	Baby shower
F2	----------	----------		Birthday (120)
F1	Wedding	Reception		Farewell
	H1	H2	H3	H4

The guests who attend the Baby shower are 30 which is half of the guests who attend the Seminar.

Thus, the total number of guests who attend Seminar = 60

The total number of guests in H4 is 220.

So, the guest who attend Farewell = 220-(120+30) = 70

The total number of guests who attend Farewell is equal to the total guests who attend Engagement=70

The total number of guests who attend Reception is 145.

The total number of guests who attend the Wedding is 5 more than the guests who attend Reception

Therefore, Wedding guests =145+5= 150

F3	----------	Reception 145		Birthday (120)
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------		Birthday 120
F1	Wedding 150	Reception 145		Farewell 70
	H1	H2	H3	H4

Reunion is not on the same floor as Farewell and Engagement.

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30

F2	----------	----------	Reunion	Birthday 120
F1	Wedding 150	Reception 145	Seminar	Farewell 70
	H1	H2	H3	H4

Now the case in which Seminar is in hall 3 of floor 1 is eliminated because by doing so no hall is empty on F1 which violates the condition mentioned as **"one Hall should remain vacant on each floor".**

Total number of guests who attend Seminar = 60

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

Total guests = 150 + 145 + 60 + 70 + 70 + 120 + 30 = 645

The total remaining guests are= 800 - 645 = 155

The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25

Prime number after 25 = 29,31, 37…

Prime number	multiples	total
29 (remaining= 155-29=126)	29×2=58 29×3=87	not possible
31 (remaining= 155-31=124)	31×4=124	31+124=155 (possible)

Thus, Guests who attend Freshers =124

And the guests who attend Reunion =31

The final arrangement is:

F3	----------	Reception 145	Reunion 31	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers 124	Engagement 70	Baby shower 30

Floor 2 events – Wedding =150, Seminar=60 Farewell = 70

Total guests = 150 + 60 + 70 = 280.

33. (25)

According to the given conditions,

Floor3				
Floor2				
Floor1				
	H1	H2	H3	H4

The wedding guests are in H1 and neither any of the halls just above nor just below is booked.

Case 1:

F3	Wedding			
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			
	H1	H2	H3	H4

There are two halls between Farewell and Wedding hall.

Case 1:

F3	Wedding			Farewell
F2	----------			
F1	----------			
	H1	H2	H3	H4

Case 2:

F3	----------			
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

Case 3:

F3	----------			
F2	----------			
F1	Wedding			Farewell
	H1	H2	H3	H4

The guests who attend Birthday are 120 which are just above the hall of Farewell. Thus case 1 is cancelled out.

F3	----------			Birthday (120)
F2	Wedding			Farewell
F1	----------			
	H1	H2	H3	H4

OR

F3	----------			
F2	----------			Birthday (120)
F1	Wedding			Farewell
	H1	H2	H3	H4

The hall between the Reception and Freshers hall is unbooked and both halls are in H2.

F3	----------	Reception/ Freshers		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Reception/ Freshers		
	H1	H2	H3	H4

OR

F3	----------	Reception/ Freshers		
F2	----------	----------		Birthday (120)
F1	Wedding	Reception/ Freshers		Farewell
	H1	H2	H3	H4

The Engagement hall is between Freshers and Baby shower Hall. Thus

F3	----------	Reception		Birthday (120)
F2	Wedding	----------		Farewell
F1	----------	Freshers	Engagement	Baby shower
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement	Baby shower
F2	----------	----------		Birthday (120)
F1	Wedding	Reception		Farewell
	H1	H2	H3	H4

The guests who attend the Baby shower are 30 which is half of the guests who attend the Seminar.

Thus, the total number of guests who attend Seminar = 60

The total number of guests in H4 is 220.

So, the guest who attend Farewell = 220-(120+30) = 70

The total number of guests who attend Farewell is equal to the total guests who attend Engagement=70

The total number of guests who attend Reception is 145.

The total number of guests who attend the Wedding is 5 more than the guests who attend Reception

Therefore, Wedding guests =145+5= 150

F3	----------	Reception 145		Birthday (120)
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------		Birthday 120
F1	Wedding 150	Reception 145		Farewell 70
	H1	H2	H3	H4

Reunion is not on the same floor as Farewell and Engagement.

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------		Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

OR

F3	----------	Freshers	Engagement 70	Baby shower 30
F2	----------	----------	Reunion	Birthday 120
F1	Wedding 150	Reception 145	Seminar	Farewell 70
	H1	H2	H3	H4

Now the case in which Seminar is in hall 3 of floor 1 is eliminated because by doing so no hall is empty on F1 which violates the condition mentioned as **"one Hall should remain vacant on each floor".**

Total number of guests who attend Seminar = 60

F3	----------	Reception 145	Reunion	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers	Engagement 70	Baby shower 30
	H1	H2	H3	H4

Total guests = 150 + 145 + 60 + 70 + 70 + 120 + 30 = 645

The total remaining guests are= 800 - 645 = 155

The total number of guests who attend Fresher is multiple of the total guests who attend Reunion, which is a prime number greater than 25

Prime number after 25 = 29,31, 37…

Prime number	multiples	total
29 (remaining= 155-29=126)	29×2=58 29×3=87	not possible
31 (remaining= 155-31=124)	31×4=124	31+124=155 (possible)

Thus, Guests who attend Freshers =124

And the guests who attend Reunion =31

The final arrangement is:

F3	----------	Reception 145	Reunion 31	Birthday 120
F2	Wedding 150	----------	Seminar 60	Farewell 70
F1	----------	Freshers 124	Engagement 70	Baby shower 30

Birthday=120 Reception=145

145-120= 25.

34. (106100)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

The total male applicants in IBPS PO = (22,400 + 56,000 + 64,000 + 16,000 + 64,000) = 2,22,400

The total male applicants in IBPS Clerk = (52,500 + 33,000 + 90,000 + 63,000 + 90,000) = 3,28,500

Hence, the required difference = 3,28,500 – 2,22,400 = 106100.

35. (d)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

For IBPS PO:

Total number of male applicants from states A and C together = 22400 + 64000 = 86400

Total number of female applicants from states A and C together = 9600 + 16000 = 25600

Difference between total number of male applicants and total number of female applicants from states A and C together

= 86400 - 25600 = 60800

Total number of male applicants from states D and E together = 16000 + 64000 = 80000

Total number of female applicants from states D and E together = 32000 + 48000 = 80000

Difference between total number of male applicants and total number of female applicants from states D and E together = 80000 - 80000 = 0.

Ratio = 60800/0 = Not defined.

36. (57)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

In IBPS clerk:

Total number of applicants selected = 2% of 6 lakhs = 12000

Total number of applicants selected from state A and E = 25% of 12000 + 33% of 12000

= 6960

Total number of female applicants selected from state A and E = 1250 + 1738 = 2988

Therefore, total number of male applicants selected from state A and E= 6960 - 2988 = 3972

Percentage $= \left(\frac{3972}{6960}\right) \times 100$

= 57% (approx.)

37. (46)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

Total number of male applicants for IBPS PO from states A, B and C together

= 22400 + 56000 + 64000

= 142400

Total number of female applicants for IBPS PO from states A, B and C together
= 9600 + 72000 + 16000 = 97600
Difference = 142400 - 97600 = 44800

Percentage $= \left(\frac{44800}{97600}\right) \times 100$

= 46% (approx.)

38. (c)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

In 2017:
For IBPS clerk:
Total number of female applicants from state B = 105% of 45000 = 47250
Total number of male applicants from state B = 90% of 33000 = 29700
Total applicants from state B = 47250 + 29700 = 76950
Total number of female applicants from state D = 110% of 99000 = 108900
Total number of male applicants from state D = 95% of 63000 = 59850
Total applicants from state D = 108900 + 59850 = 168750
Ratio = 76950: 168750 = 57: 125.

39. (73050)

State	IBPS PO			IBPS Clerk		
	Total Applicants	Male	Female	Total Applicants	Male	Female
A	8% of 4 lakhs = 32000	32,000 × 7/10 = 22,400	32000 – 22400 = 9600	15% of 6 lakhs = 90,000	90,000 × 7/12 = 52,500	90,000 – 52,500 = 37500
B	32% of 4 lakhs = 128000	128000 × 7/16 = 56000	128000 – 56000 = 72000	13% of 6 lakhs = 78,000	78,000 × 11/26 = 33,000	78000 – 33000 = 45000
C	20% of 4 lakhs = 80,000	80,000 × 4/5 = 64000	80000 – 64000 = 16000	25% of 6 lakhs = 1,50,000	1,50,000 × 3/5 = 90,000	1,50,000 – 90000 =60,000
D	12% of 4 lakhs = 48,000	48000 × 1/3 = 16000	48000 – 16000 = 32000	27% of 6 lakhs = 1,62,000	1,62,000 × 7/18 = 63000	1,62,000 – 63,000 = 99,000
E	28% of 4 lakhs = 1,12,000	112000 × 4/7 = 64000	112000 – 64000 = 48000	20% of 6 lakhs = 1,20,000	1,20,000 × 3/4 = 90,000	1,20,000 – 90,000 = 30,000

In 2015:
For IBPS PO:
Total number of male applicants from state C, D and E together
= 120% of (64000 + 16000 + 64000)
= 172800
For IBPS clerk:
Total number of female applicants from state A, B and C together
= 70% of (37500 + 45000 + 60000)
= 99750
Difference = 172800 - 99750 = 73050.

40. (c)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

From the given table, you can find C's preferences and allocation are not the same.
So, it can be inferred that,
(i) There must be at least 1 profile with FM as Preference-1.
(ii) There must be at least 1 profile with OP as Preference-2.
So, C's CGPA was less than those who have the same preference as C.
Thus, FM can be preference-1 for either A or E or both A and E.
Assuming FM is a Preference-1 for E, the preference order will be the same for C and E. Hence, Preference-1 for E is not FM, which is either IB or HRM.
Thereafter, the CGPA of A will be compared with C after getting the sub-allocation for A.
So, you will get the preference-1 and preference-2 allocation as in Table-1: -

Students	**Preference 1**	**Preference 2**	**CGPA**	**Sub Allocated**
A	FM	HRM		
B	SM	OP/IB/FM		
C	FM	OP		**HRM**
D	SM	HRM		
E	IB/HRM	OP		**IB**

As per condition (i), the subject allocated for A will be FM.
Thus, CGPA (A)> CGPA (C)
From the above table, it is seen that the Subject allocated to E is IB, So IB is definitely preference-1 for E, not HRM.
Thus, CGPA (E)> CGPA (C)
Similarly, the Subject allocation for either B or D will be either SM or OP,
From condition (c), It is clear that the Sub allocated for D is SM. So, the Sub allocated for B is OP.
Hence the below table provides the information as:-

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP/IB		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Since OP is the final allocation for B, Now IB can be placed as,
(i) not B's second preference, referred to Table-(a)
(ii) B's second preference, referred to Table-(b)
Thus, CGPA (D)> CGPA (B)

Table (a):

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

From Table-(a), we can infer that HRM was not allocated as the final subject as both A & D got their first preferences respectively.
B's second preference should be OP as this should create a tie situation with C & B is getting OPat last.
Hence, CGPA (B)> CGPA (C).
This table-(a) is coherent with all the conditions in the passage. So, this is a possible outcome.
Table-(b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	IB		
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Here in Table-(b), we observe, If C gets OP without competition, then B will get HRM as a result of random allocation. But this contradicts the conditions mentioned in the question.
So, Table-(a) is true, and Table-(b) is false.
Based on the results of Table-(a) we can conclude in terms of CGPA score: -
Since, A, D, and E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order.
Thus, D>B>C; A>C; E>C.
Thus, C has the lowest CGPA among all.

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**	9.1/ 8.9/ 8.4	FM
B	**SM**	IB	8	OP
C	**FM**	**OP**	7.8	**HRM**
D	**SM**	**HRM**	9.1/ 8.9/ 8.4	SM
E	IB	**OP**	9.1/ 8.9/ 8.4	**IB**

The subject has been allocated to B is OP.
Ans- C

41. (a)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

From the given table, you can find C's preferences and allocation are not the same.
So, it can be inferred that,
(i) There must be at least 1 profile with FM as Preference-1.
(ii) There must be at least 1 profile with OP as Preference-2.
So, C's CGPA was less than those who have the same preference as C.
Thus, FM can be preference-1 for either A or E or both A and E.
Assuming FM is a Preference-1 for E, the preference order will be the same for C and E.

Hence, Preference-1 for E is not FM , which is either IB or HRM.
Thereafter, the CGPA of A will be compared with C after getting the sub-allocation for A.
So, you will get the preference-1 and preference-2 allocation as in Table-1: -

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	HRM		
B	SM	OP/IB/FM		
C	FM	OP		**HRM**
D	SM	HRM		
E	IB/HRM	OP		**IB**

As per condition (i), the subject allocated for A will be FM.
Thus, CGPA (A)> CGPA (C)
From the above table, it is seen that the Subject allocated to E is IB, So IB is definitely preference-1 for E, not HRM.
Thus, CGPA (E)> CGPA (C)
Similarly, the Subject allocation for either B or D will be either SM or OP,
From condition (c), It is clear that the Sub allocated for D is SM. So, the Sub allocated for B is OP.
Hence the below table provides the information as:-

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP/IB		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Since OP is the final allocation for B, Now IB can be placed as,
(i) not B's second preference, referred to Table-(a)
(ii) B's second preference, referred to Table-(b)
Thus, CGPA (D)> CGPA (B)

Table (a):

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

From Table-(a), we can infer that HRM was not allocated as the final subject as both A & D got their first preferences respectively.
B's second preference should be OP as this should create a tie situation with C & B is getting OPat last.
Hence, CGPA (B)> CGPA (C).
This table-(a) is coherent with all the conditions in the passage. So, this is a possible outcome.
Table-(b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	IB		
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Here in Table-(b), we observe, If C gets OP without competition, then B will get HRM as a result of random allocation. But this contradicts the conditions mentioned in the question.
So, Table-(a) is true, and Table-(b) is false.
Based on the results of Table-(a) we can conclude in terms of CGPA score: -
Since, A, D, and E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order.
Thus, D>B>C; A>C; E>C.
Thus, C has the lowest CGPA among all.

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**	9.1/ 8.9/ 8.4	FM
B	**SM**	IB	8	OP
C	**FM**	**OP**	7.8	**HRM**
D	**SM**	**HRM**	9.1/ 8.9/ 8.4	SM
E	IB	**OP**	9.1/ 8.9/ 8.4	**IB**

FM is allocated to A.
Ans- A

42. **(a)**

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

From the given table, you can find C's preferences and allocation are not the same.
So, it can be inferred that,

(i) There must be at least 1 profile with FM as Preference-1.
(ii) There must be at least 1 profile with OP as Preference-2.

So, C's CGPA was less than those who have the same preference as C.

Thus, FM can be preference-1 for either A or E or both A and E.

Assuming FM is a Preference-1 for E, the preference order will be the same for C and E. Hence, Preference-1 for E is not FM , which is either IB or HRM.

Thereafter, the CGPA of A will be compared with C after getting the sub-allocation for A.

So, you will get the preference-1 and preference-2 allocation as in Table-1: -

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	HRM		
B	SM	OP/IB/FM		
C	FM	OP		**HRM**
D	SM	HRM		
E	IB/HRM	OP		**IB**

As per condition (i), the subject allocated for A will be FM.

Thus, CGPA (A)> CGPA (C)

From the above table, it is seen that the Subject allocated to E is IB, So IB is definitely preference-1 for E, not HRM.

Thus, CGPA (E)> CGPA (C)

Similarly, the Subject allocation for either B or D will be either SM or OP,

From condition (c), It is clear that the Sub allocated for D is SM. So, the Sub allocated for B is OP.

Hence the below table provides the information as:-

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP/IB		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Since OP is the final allocation for B, Now IB can be placed as,

(i) not B's second preference, referred to Table-(a)

(ii) B's second preference, referred to Table-(b)

Thus, CGPA (D)> CGPA (B)

Table (a):

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

From Table-(a), we can infer that HRM was not allocated as the final subject as both A & D got their first preferences respectively.

B's second preference should be OP as this should create a tie situation with C & B is getting OPat last.

Hence, CGPA (B)> CGPA (C).

This table-(a) is coherent with all the conditions in the passage. So, this is a possible outcome.

Table-(b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	IB		
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Here in Table-(b), we observe, If C gets OP without competition, then B will get HRM as a result of random allocation. But this contradicts the conditions mentioned in the question.

So, Table-(a) is true, and Table-(b) is false.

Based on the results of Table-(a) we can conclude in terms of CGPA score: -

Since, A, D, and E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order.

Thus, D>B>C; A>C; E>C.

Thus, C has the lowest CGPA among all.

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**	9.1/ 8.9/ 8.4	FM
B	**SM**	IB	8	OP
C	**FM**	**OP**	7.8	**HRM**
D	**SM**	**HRM**	9.1/ 8.9/ 8.4	SM
E	IB	**OP**	9.1/ 8.9/ 8.4	**IB**

Since, A, D, & E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order. Since A is not in the top two, it will definitely be in the third

position in Descending order of CGPA. So CGPA of A will be 8.4. Ans- A

43. (d)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

From the given table, you can find C's preferences and allocation are not the same.
So, it can be inferred that,

(iii) There must be at least 1 profile with FM as Preference-1.

(iv) There must be at least 1 profile with OP as Preference-2.

So, C's CGPA was less than those who have the same preference as C.
Thus, FM can be preference-1 for either A or E or both A and E.
Assuming FM is a Preference-1 for E, the preference order will be the same for C and E. Hence, Preference-1 for E is not FM , which is either IB or HRM.
Thereafter, the CGPA of A will be compared with C after getting the sub-allocation for A.
So, you will get the preference-1 and preference-2 allocation as in Table-1: -

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	HRM		
B	SM	OP/IB/FM		
C	FM	OP		**HRM**
D	SM	HRM		
E	IB/HRM	OP		**IB**

As per condition (i), the subject allocated for A will be FM.
Thus, CGPA (A)> CGPA (C)
From the above table, it is seen that the Subject allocated to E is IB, So IB is definitely preference-1 for E, not HRM.
Thus, CGPA (E)> CGPA (C)
Similarly, the Subject allocation for either B or D will be either SM or OP,
From condition (c), It is clear that the Sub allocated for D is SM. So, the Sub allocated for B is OP.
Hence the below table provides the information as:-

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP/IB		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Since OP is the final allocation for B, Now IB can be placed as,
(i) not B's second preference, referred to Table-(a)
(ii) B's second preference, referred to Table-(b)
Thus, CGPA (D)> CGPA (B)

Table (a):

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

From Table-(a), we can infer that HRM was not allocated as the final subject as both A & D got their first preferences respectively.
B's second preference should be OP as this should create a tie situation with C & B is getting OPat last.
Hence, CGPA (B)> CGPA (C).
This table-(a) is coherent with all the conditions in the passage. So, this is a possible outcome.
Table-(b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	IB		
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Here in Table-(b), we observe, If C gets OP without competition, then B will get HRM as a result of random allocation. But this contradicts the conditions mentioned in the question.
So, Table-(a) is true, and Table-(b) is false.

Based on the results of Table-(a) we can conclude in terms of CGPA score: -

Since, A, D, and E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order.

Thus, D>B>C; A>C; E>C.

Thus, C has the lowest CGPA among all.

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**	9.1/ 8.9/ 8.4	FM
B	**SM**	IB	8	OP
C	**FM**	**OP**	7.8	**HRM**
D	**SM**	**HRM**	9.1/ 8.9/ 8.4	SM
E	IB	**OP**	9.1/ 8.9/ 8.4	**IB**

As given, FM is the most preferred subject at that time, which allows students for final allocation with the highest order of preference as well as CGPA, then the preference-1 filled as a first preference with highest of CGPA have the final allocation as FM. So A has the highest CGPA of 9.1.

Ans- D

44. (b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A		HRM		
B	SM			
C	FM	OP		HRM
D	SM	HRM		
E		OP		IB

From the given table, you can find C's preferences and allocation are not the same.

So, it can be inferred that,

(v) There must be at least 1 profile with FM as Preference-1.

(vi) There must be at least 1 profile with OP as Preference-2.

So, C's CGPA was less than those who have the same preference as C.

Thus, FM can be preference-1 for either A or E or both A and E.

Assuming FM is a Preference-1 for E, the preference order will be the same for C and E. Hence, Preference-1 for E is not FM , which is either IB or HRM.

Thereafter, the CGPA of A will be compared with C after getting the sub-allocation for A.

So, you will get the preference-1 and preference-2 allocation as in Table-1: -

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	HRM		
B	SM	OP/IB/FM		
C	FM	OP		**HRM**
D	SM	HRM		
E	IB/HRM	OP		**IB**

As per condition (i), the subject allocated for A will be FM.

Thus, CGPA (A)> CGPA (C)

From the above table, it is seen that the Subject allocated to E is IB, So IB is definitely preference-1 for E, not HRM.

Thus, CGPA (E)> CGPA (C)

Similarly, the Subject allocation for either B or D will be either SM or OP,

From condition (c), It is clear that the Sub allocated for D is SM. So, the Sub allocated for B is OP.

Hence the below table provides the information as:-

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP/IB		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Since OP is the final allocation for B, Now IB can be placed as,

(i) not B's second preference, referred to Table-(a)

(ii) B's second preference, referred to Table-(b)

Thus, CGPA (D)> CGPA (B)

Table (a):

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	OP		OP
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

From Table-(a), we can infer that HRM was not allocated as the final subject as both A & D got their first preferences respectively.

B's second preference should be OP as this should create a tie situation with C & B is getting OPat last.
Hence, CGPA (B)> CGPA (C).
This table-(a) is coherent with all the conditions in the passage. So, this is a possible outcome.
Table-(b)

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**		FM
B	**SM**	IB		
C	**FM**	**OP**		**HRM**
D	**SM**	**HRM**		SM
E	IB	**OP**		**IB**

Here in Table-(b), we observe, If C gets OP without competition, then B will get HRM as a result of random allocation. But this contradicts the conditions mentioned in the question.
So, Table-(a) is true, and Table-(b) is false.
Based on the results of Table-(a) we can conclude in terms of CGPA score: -
Since, A, D, and E got the subject allocation from their first preference, they are having the top-3 CGPA i.e., 9.1, 8.9, 8.4 in any order.
Thus, D>B>C; A>C; E>C.
Thus, C has the lowest CGPA among all.

Students	Preference 1	Preference 2	CGPA	Sub Allocated
A	FM	**HRM**	9.1/ 8.9/ 8.4	FM
B	**SM**	IB	8	OP
C	**FM**	**OP**	7.8	**HRM**
D	**SM**	**HRM**	9.1/ 8.9/ 8.4	SM
E	IB	**OP**	9.1/ 8.9/ 8.4	**IB**

The rank of B as per the increasing order of the CGPA is two.
7.8 < 8 < 8.4 < 8.9 < 9.1
C B A/D/E A/D/E A/D/E
Ans- B

QUANT

45. **(2)**

Let's assume $x \geq 0$.
So, $3x^2 + [x-1] + 1 = 0$
When $x \geq 0$, there can be two possibilities:
Case 1: $1 > x > 0$
Then, $3x^2 + [x-1] + 1 = 0$
$\Rightarrow 3x^2 - 1 + 1 = 0$
$\Rightarrow 3x^2 = 0$
$\Rightarrow x = 0, 0$
Case 2: $x \geq 1$
$3x^2 + [x-1] + 1 = 0$
$3x^2 > 0$ as $x \geq 1$
$[x-1] \geq 0$ as $x \geq 1$
$\Rightarrow 1 > 0$
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: $-1 \leq x < 0$
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: $x < -1$
Then, $3x^2 - 2x + 1 = -[x-1]$
$\Rightarrow 3x^2 - 2x + 1 = -[x] + 1$
$\Rightarrow 3x^2 - 2x = -[x]$
For, $x < -1$
$3x^2 > 0$
$-2x > 0$
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.

46. **(a)**

According to the Question,

$$SP = 1200 \times \frac{(100-12)}{100} \times \frac{(100-18)}{100}$$

SP = Rs. 865.92
But the dealer recovers 25% of Rs. 865.92 from the customer, i.e., 216.48.
So, SP = 865.92 + 216.48 = Rs. 1082.4

Also, CP = 500

Profit% = $\frac{(1082.4-500)}{500} \times 100 = 116.48\%$

47. (5100)

The total monthly stipends = 40 × 6200 = Rs. 248000

When 18 phd students left the college, then total monthly stipends of

22 phd students = 22 × (6200 + 900) = Rs. 156200

So, total monthly stipends of 18 phd students

= 248000 - 156200 = Rs. 91800

Hence, average monthly stipends of 18 phd students = Rs. $\frac{91800}{18}$

= Rs. 5100

48. (7249)

Let efficiency of A, B, and C is A units per day, B units per day, and C. units per day respectively.

ATQ,

4A = 2 × 5B

$\frac{A}{B}=\frac{5}{2}$

And

6A = 5C

$\frac{A}{C}=\frac{5}{6}$

Now, equating the ratios,

A: B: C = 5: 2: 6 [sum of ratio = 13]

Given,

13 units = Rs. 8567

1 unit = Rs. 659

11 units = 659 × 11 = Rs 7249

49. (d)

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

⇨ $(x-1)(x^2-x-1) = 0$

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

p + q = 1

pq = -1

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

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

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

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

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

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

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

So, option d is the right choice.

50. (c)

For Karan:

Distance = 200 km

Time taken = $\left(\frac{100}{42}\right)+\left(\frac{100}{50}\right)$

= 4.38 hours

For Jaya:

Distance = 200 km

Time taken = 40% of $\left(\frac{200}{48}\right)$ + 60% of $\left(\frac{200}{45}\right)$

= 4.34 hrs

Required sum = 4.38 + 4.34 = 8.72 hours.

51. (a)

In this question, the number of staffs i.e., 50 is a redundant data and thus needs to be ignored. The probability of a sample getting rejected by Dexter is 0.3 and that of by Henna is 0.7.

Hence, the probability of a sample being rejected by both Dexter and Henna is 0.3 × 0.7 = 0.21

52. (48)

The amount that Anuj kept himself = [100 - (30+15+20)]%
= (100 – 65)%
= 35%

Total amount = $\frac{(700\times100)}{35}$ = Rs 2000

Amount invested in stock market = 20% of 2000
= Rs 400
Amount Anuj gets as a return = 400 × 12%
= 12 × 4
= Rs 48

53. **(12)**

Since, $n^2 + n = 20$
=> $n^2 + n – 20 = 0$
=> $n^2 + 5n – 4n – 20 = 0$
=> $n(n+ 5) – 4(n + 5) = 0$
=> $(n – 4)(n + 5) = 0$
=> $n = 4, - 5$

But, at n = $-5, \sqrt{2n+1}$ does not exist.

So, n = 4.

Therefore, our given expression becomes

$$\left[\sqrt{3}\right]+\left[\sqrt{5}\right]+\left[\sqrt{7}\right]+...+\left[\sqrt{2(4)+1}\right]+\left\{\sqrt{3}\right\}$$

$$+\left\{\sqrt{5}\right\}+\left\{\sqrt{7}\right\}+...+\left\{\sqrt{2(4)+1}\right\},$$

$$=\left[\sqrt{3}\right]+\left[\sqrt{5}\right]+\left[\sqrt{7}\right]+\left[\sqrt{8}\right]+\left[\sqrt{9}\right]+\left\{\sqrt{3}\right\}$$

$$+\left\{\sqrt{5}\right\}+\left\{\sqrt{7}\right\}+\left\{\sqrt{8}\right\}+\left\{\sqrt{9}\right\}$$

$$=\left[\sqrt{3}\right]+\left\{\sqrt{3}\right\}+\left[\sqrt{5}\right]+\left\{\sqrt{5}\right\}+\left[\sqrt{7}\right]+\left\{\sqrt{7}\right\}$$

$$+\left[\sqrt{8}\right]+\left\{\sqrt{8}\right\}+[3]+\{3\}$$

$= \sqrt{3}+\sqrt{5}+\sqrt{7}+\sqrt{8}+3+0$ [Since, [x] +{x} = x and if x ∈ Z, [x] = x, {x} = 0]
≈ 1.73 + 2.24 + 2.65 + 2.83 + 3
= 12.45
= 12 (approx.)

54. **(4047)**

g(7) = g(5) g(2)
=> 128 = 32 × g(2)
=> g(2) = 4
g(5) = g(2) × g(3)
=> g(3) = 8 = g(2)g(1)
=> g(1) = 2
So,
g(1) = 2
g(2) = 2^2
g(3) = 2^3
g(4) = 2^4
....
g(x) = 2^x

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

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

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

= 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,

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

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

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

$$=4047$$

55. **(1)**

Partnership period = 3 years = 36 months

Profit ratio, P. Q = (84000 × (m + 14)): (90000 × (36 - m)]: [14(m+14) : 15(36 - m)]

Also, profit ratio, P: Q = 2: 5

Then, 2: 5 = [14(m + 14)]: [15(36 - m)]

3(36 - m) = 7(m + 14)

108 - 3m = 7m + 98

10m = 10

=> m = 1

56. **(c)**

$$\left(\theta-3\sqrt{3}\right)\tan 5\theta = \sqrt{-}$$

$$\Rightarrow 5\tan^2 3 \quad 5\left(3-\tan\sqrt{\theta}\right) \quad 3 \quad 3= \sqrt{}$$

$$\Rightarrow \left(\tan \quad 3-\sqrt{5}\right)\tan\theta \quad 3)+ \quad 0=$$

$$\Rightarrow \tan \quad 3,\sqrt{r} \qquad -\frac{3}{5}$$

$$\Rightarrow \tan \quad 3\sqrt{}$$

$$\Rightarrow \theta = 60^{o}$$

$$\text{So, } (\cot\theta - \sin\theta)$$

$$= (\cot 60^{o} + \sec 60^{o} - \sin 60^{o})$$

$$=\frac{1}{\sqrt{3}}+2-\frac{\sqrt{3}}{2}$$

$$=\frac{(4\sqrt{3}-1)}{2\sqrt{3}}$$

57. **(a)**

$\frac{16!}{7!}-\frac{12!}{4!}$ = (16 × 15 × 14 …× 9 × 8) - (12 × 11 × 10 ×..× 5)

16 × 15 × 14×…..× 9 × 8 and 12 × 11 × 10 ×……..×5 has two zero in last because each has two 5's.

(8 × 3 × 14 × 13 × 12 ×11 ×9 × 8) - (6 × 11 × 9 × 8 × 7 × 6)

Unit digit = Unit digit of (2 – 4) = Unit digit of (12-4) = 8

58. **(c)**

Given:

The roots of the quadratic equation are α and β.

The greatest integer function of α and β are [α] = 3 and [β] = -2, respectively.

The sum of the roots, α + β = 1.

From the properties of quadratic equations, we know that:

$$\alpha + \beta = \frac{-q}{p} \quad \text{and} \quad \alpha\beta = \frac{r}{p}$$

As α + β = 1, we can substitute the given value:

$$\alpha + \beta = \frac{-q}{p}$$

$$1 = \frac{-q}{p} \quad ...(1)$$

Since [α] = 3, we can infer that α lies between 3 and 4, i.e., $3 \le \alpha < 4$. Similarly, since [β] = -2, we can infer that β lies between -2 and -1, i.e., $-2 \le \beta < -1$.

However, we know that α + β = 1. So, we can't conclude that α = 3 and β = -2, as this would

result in $\alpha + \beta = 1$. Instead, we can rewrite α and β as:

$\alpha = 3 + a$

$\beta = -2 + b$

where $0 \le a < 1$ and $0 \le b < 1$. Since $\alpha + \beta = 1$:

$(3 + a) + (-2 + b) = 1$

$a + b = 0$

Since a and b are both non-negative and less than 1, the only possible solution is $a = b = 0$. Therefore, $\alpha = 3$ and $\beta = -2$.

Now, let's use the other property of quadratic equations:

$$\alpha\beta = \frac{r}{p}$$

Substitute the values of α and β:

$$(3)(-2) = \frac{r}{p}$$

$$-6 = \frac{r}{p} \quad ...(2)$$

We have two equations, (1) and (2), with two unknowns, p and q. Let's solve these equations simultaneously:

From equation (1):

$$1 = \frac{-q}{p}$$

$q = -p$

Now, substitute the value of q in equation (2):

$$-6 = \frac{r}{(-p)}$$

$r = 6p$

Now we have the values of q and r in terms of p:

$q = -p$

$r = 6p$

Substitute these values into the quadratic equation:

$px^2 + qx + r = 0$

$px^2 - px + 6p = 0$

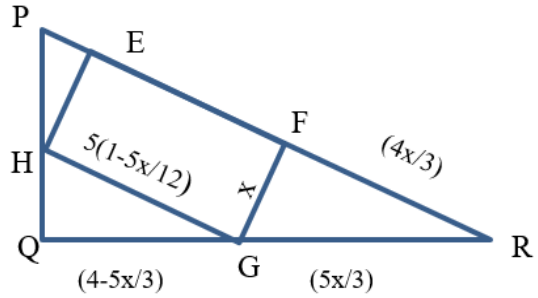
The equation $px^2 - px + 6p = 0$ is true for $\alpha = 3$ and $\beta = -2$. However, we need to find integer values for p, q, and r. Notice that the equation has a common factor, p:

$p(x^2 - x + 6) = 0$

Since we are looking for integer solutions and $p \neq 0$, so

$x^2 - x + 6 = 0$

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 cm

QR = 4 cm

PR= 5 cm

FG = x cm

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

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

So,

$$A1= 5x\left(\frac{1-5x}{12}\right)$$

$$\Rightarrow A^1 = 5\left(\frac{x-5x^2}{12}\right)$$

To maximize A_1 we need to maximize

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

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

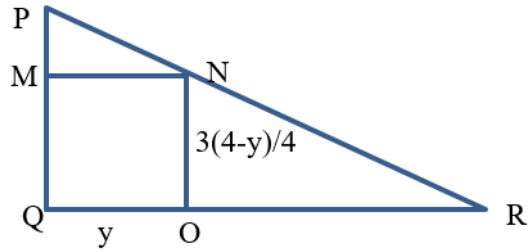
$$\Rightarrow \quad f(x) = \left(\frac{5}{12}\right)\left(\frac{12x}{5-x^2}\right)$$

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

So, the maximum value will be achieved if $x=6/5$

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

Now, let assume that OQ = y



Total area of the rectangle MNOQ is A^2

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

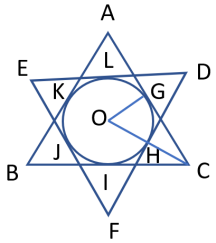
The maximum value will be achieved if y = 2

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. (d)



From the figure, it is clear that O is the incentre of both the triangles ABC and DEF.

Therefore, the area of each triangle A = inradius(r) × Semi-perimeter of each triangle (S)

$A = 4 \times S$ … (i)

Now,

From the figure,

AG = AK, BK = BI, and IC = GC.

Given,

AC = 13 cm, and GC = 4 cm

So, AG = AK = 13 – 4 = 9 cm

Again, BC = 11 cm

IC = GC = 4 cm.

Therefore, BI = BK = 11 – 4 = 7 cm.

Perimeter of ΔABC = AB + BC + CA

= BK + AK + 11 + AG + GC

= 7 + 9 + 11 + 9 + 4

= 40 cm

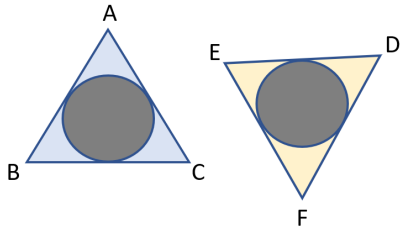
Since the sides of the star are identical, so the perimeter of ΔABC = the perimeter of ΔDEF.

Now, the area of each triangle

$$A = 2 \times \frac{40}{2} = 40 \text{ cm}^2$$

Now, the area of the circle = $\pi(2)^2 = 4\pi$ cm^2

Hence, the area of the star outside the circle = The total area of the star – The area of the circle

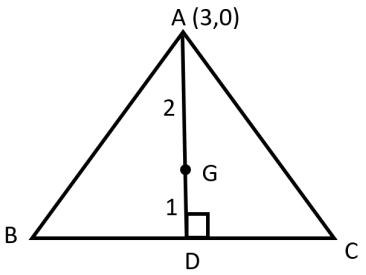


= 2 × area of each triangle – 2 × area of the circle

= 2 × (40 - 4π)

= 8(10 - π) cm^2

61. (d)



Let the equation of BC is 2x-2y-3=0.
Slope of line 2x-2y-3=0 is tan θ =1

AD = $\left|\frac{(2\times 3-3)}{(2\sqrt{2})}\right| = \frac{3}{(2\sqrt{2})} = \frac{\sqrt{3}a}{2}$

Therefore, a = $\sqrt{\frac{6}{2}}$

Area = $\sqrt{\frac{3}{4}} \times \frac{6}{4} = \frac{3\sqrt{3}}{8}$ sq. units

Equation of AD is x +y = 3

D = $\left(\frac{9}{4},\frac{3}{4}\right)$

Thus, G = $\left(\frac{5}{2},\frac{1}{2}\right)$ =orthocentre = circumcentre

Slope of the other lines are tan

$\theta \pm 60) = (1 \pm \sqrt{3}) / (1 \mp \sqrt{3})$

$= \frac{\left(1+\sqrt{3}\right)}{1\left(1-\sqrt{3}\right)}, \frac{\left(1-\sqrt{3}\right)}{\left(1+\sqrt{3}\right)}$

$= -(2+\sqrt{3}), (\sqrt{3}-2)$

Hence, 1, 2, and 3 are true. Only 4 is false.

62. (4)

The given equation is $[x]^2 - 3x + 6\{x\} = 0$

$\Rightarrow \quad [x]^2 + 6\{x\} = 3x \quad \ldots. (i)$

Now, we know that, $\{x\} = x - [x]$

$\Rightarrow \quad x = [x] + \{x\} \quad \ldots. (ii)$

So, from (i) and (ii), we get

$[x]^2 + 6\{x\} = 3[x] + 3\{x\}$

$\Rightarrow 6\{x\} - 3\{x\} = 3[x] - [x]^2$

$\Rightarrow \quad \{x\} = \frac{3[x]-[x]^2}{3}$

Now, by the definition of {x},

$0 \le \{x\} < 1$

$\Rightarrow 0 \le \frac{3[x]-[x]^2}{3} < 1$

From here, we can conclude that, [x] can be 0, 1, 2 and 3.

So, when [x] = 0, then {x} = 0, i.e., x = 0,

when [x] = 1, then $\{x\} = \frac{2}{3}$, i.e., $x = \frac{5}{3}$

when [x] = 2, then $\{x\} = \frac{2}{3}$, i.e., $x = \frac{8}{3}$

and when [x] = 3, then {x} = 0, i.e., x = 3

Therefore, x can have 4 real values.

63. (b)

Suppose cost price Rs = 100

Then, selling price = 125 (because 25% profit given)

In second case,

Cost price Rs 40

Selling price Rs = $40 \times \frac{3}{2} = 60$ (50% profit)

Difference in selling price = Rs 125 - 60 = Rs. 65

But difference in selling price = Rs 130 (given)

Then, if the difference is 65, then the cost price = 130

Therefore, if the difference is 1, then the cost price = $\frac{130}{65} = 2$

If the difference is 100, then the cost price = 200

Hence, Cost price = Rs 200

64. (c)

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

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

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

Total volume which will be transferred to the Jar = 228π cc

Let the height of the jar the water level will reach = h cm

So,

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

$\Rightarrow$ h = 4

Hence, the right answer is 4 cm.

65. **(9)**

Let the side of the square be 'a' cm

Perimeter of square = 4a cm

Diagonal of square = $a\sqrt{2}$cm

Now,

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

$\Rightarrow 18a = 22a - 12$

$\Rightarrow 4a = 12$

$\Rightarrow a = 3$

$\therefore$ The side of the square is 3 cm.

i.e., S = 3. (Given)

Now, $1+\frac{2}{S}+\frac{3}{S^2}+\frac{4}{S^3}+...$

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

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

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

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

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

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

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

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

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

$$=\frac{9}{4}$$

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

66. **(c)**

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

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

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

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

So,

For A, as he is moving towards C, he met the sound after 9 s.

So,

9a+9*330 = 3300

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

Similarly for By,

12*330-12b = 3300

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

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

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

Library- https://smart.link/sdfez8ejd80if