AIMCAT 2017

VARC

…Just as Francis Fukuyama claimed in 1989 that history had ended – meaning not that nothing more would ever happen, only that all 'viable systematic alternatives to Western liberalism' had been exhausted – so too some philosophers claim that art as a practice will continue, but it has no more ways of progressing. Two of the more prominent philosophers to have made this sort of argument were G W F Hegel in the early 19th century, and Arthur Danto in the late 20th century…

…What do philosophers mean when they say art has or will come to an end? …Danto drew attention to two different kinds of endings. We might claim that a narrative has ended; or we might say that a chronicle has ended. This is an important distinction. A narrative has a kind of structure – for example…a story about how I solved a certain problem; and once the problem was solved, the story ends. A chronicle, by contrast, is just a series of events, with no structure – the events simply follow one after the other. …A chronicle ends only with the disappearance of the thing we are describing.

For Hegel, and Danto, art's narrative had ended; it had progressed as far as it could in solving the task it had set itself. But art's chronicle would never end: there would be new artworks for just as long as there were human beings to create them. Art's end, in this sense, was a good thing. Art was released from labouring away at a task (given by the narrative); it was now free to be anything…

For art to end, then, is for art to be released. Art no longer had to grind away at solving a task. But this still leaves the unanswered question: what does it mean for art to have a task? Hegel's answer

to this question is complex. Its central motor is the claim that human life, including human culture, is underwritten by a collective principle of self-consciousness, known as Geist, a notoriously tricky German term, most often rendered as 'mind' or 'spirit'. It is Geist's task …to refine and complete its awareness of its own freedom, and its awareness of itself. The more this process of refinement progressed, the more abstract and conceptual it became. In the historical period that Hegel roughly identified with Ancient Greece, this self-awareness could find perfect embodiment in 'classical art' ... However, as this self-awareness became more complex and abstract, it developed beyond art's capacities for expression. Consequently, art could no longer push forward the development of Geist. This task fell to the more discursive and conceptually complex spheres of religion and philosophy … Art, as a means of eliciting progress in the task of articulating Geist and its self-consciousness, became superseded, and no longer of use in this task.

…But the idea that art is perhaps best understood as a practice exhibiting a narrative survives as a genuinely interesting idea…Danto's claim was that art's first task – the first narrative it worked through – was the perfection of verisimilitude; of producing images that presented an exact likeness of their objects…[However] the camera obscura was later a key technological advancement, in allowing rudimentary reference photographs to be taken …The camera obscura, of course, soon became the photographic camera, which could record virtually perfect likenesses of objects. Art's innermost goal – its narrative of perfecting representations of objects – had been usurped. It now fell to art, in Danto's view, to focus on a new question: 'What is art?'

Q1.   All of the following subscribe to Danto's definition of a narrative EXCEPT:

 a) **a movie about how a group of superheroes succeed in bringing back their dead friends killed by an eccentric rationalist.**

 b) **the account of a serial killer who transforms into a vigilante and starts eliminating criminals escaping the law.**

 c) the remarkable tale of how an investment banker escapes from one of the toughest prisons in the country after planning the escape for years.

 d) the story of how a brilliant woman helps two reckless and rather unimaginative guys defeat a homophobic and xenophobic psychopath.

Q2.   Hegel's answer to what it means for art to have a task is that:

a) **art motors self-consciousness in human life.**

b) **art expresses Geist.**   ✔ **Your answer is correct**

c) art perfects verisimilitude.

d) art prepares humans for religion.

Number of words and Explanatory notes for RC:

Number of words: 584

Consider Danto's definitions of a narrative and a chronicle: '*Danto drew attention to two different kinds of endings. We might claim that a narrative has ended; or we might say that a chronicle has ended. This is an important distinction. A narrative has a kind of structure – for example…a story about how I solved a certain problem; and once the problem was solved, the story ends. A chronicle, by contrast, is just a series of events, with no structure – the events simply follow one after the other. …A chronicle ends only with the disappearance of the thing we are describing.*'
Option A: A narrative is about how a particular problem was solved, and then it ends. This example talks about one problem (bringing back the dead friends) and how it was accomplished (as understood from the word 'succeed'). Hence, this is a narrative. Option A is not the answer.
Option B: As the term suggests, it is the account of someone who performs certain tasks, one after the other, a series of tasks, with no notable end in sight. This is an example of a chronicle, and not a narrative. Hence, Option B is the answer.
Option C: This example is about one problem that was solved (escaping prison). Hence, it is a narrative and not a chronicle. Option C is not the answer.
Option D: This is an example of a task that was completed, a problem that was solved (defeating the psychopath). Hence, it is a narrative and not a chronicle. Option D is not the answer.   Choice (B)

c) art perfects verisimilitude.

d) art prepares humans for religion.

Number of words and Explanatory notes for RC:

Number of words: 584

Consider the sentences: 'what does it mean for **art to have a task**? Hegel's answer to this question is complex. Its central motor is the claim that human life, including human culture, is underwritten by a collective principle of self-consciousness, known as Geist, a notoriously tricky German term, most often rendered as 'mind' or 'spirit'. **It is Geist's task … to refine and complete its awareness of its own freedom, and its awareness of itself**. The more this process of refinement progressed, the more abstract and conceptual it became. In the historical period that Hegel roughly identified with Ancient Greece, **this self-awareness could find perfect embodiment in 'classical art'** …' Here in the expression 'its central motor', the 'its' stands for Hegel's answer. Hegel's answer is motored (is based on) by the claim that human life is underwritten by a collective principle. This principle is Geist. Geist's task is to refine its own self-awareness. Later, the author goes on to say: 'Consequently, **art could no longer push forwards the development of Geist**.' So, the task of art is to push the development of Geist.

Option A: The motor of Hegel's answer is that human life is underwritten by a collective principle of self-consciousness. Art doesn't motor (or drive) self-consciousness into human life. Human life is driven by a collective refinement of self-consciousness and this journey is expressed through art (art articulates Geist). Hence, Option A is not the answer.

Option B: From 'Art, **as a means of eliciting progress in the task of articulating Geist and its self-consciousness**, became superseded, and no longer of use in this task', we can understand that the task Hegel thought art should perform before it became a task for religion and philosophy is that of *articulating Geist* – or helping advance the process of refining its own self-awareness. Hence, Option B is the answer.

Option C: It was Danto's claim and not that of Hegel that the purpose of art is verisimilitude. Hence, Option C is not the answer.

Option D: Religion is not part of the discussion. Also, religion took over the task of art, when the task became too conceptual. Hence, this option is not the answer.

Choice (B)

Q3. The author explains that 'Art's innermost goal… had been usurped' because:

a) **the photographic camera evolved to perform art's task.**

b) **art couldn't perfect likenesses of objects the way a camera did.**

c) art was assigned the task of refining Geist.

d) an answer to the question of what art is, wasn't found.

Number of words and Explanatory notes for RC:

Number of words: 584

Consider the sentences: '*The camera obscura, of course, soon became the photographic camera, <u>**which could record virtually perfect likenesses of objects**</u>. <u>**Art's innermost goal**</u> – its narrative of perfecting representations of objects – <u>**had been usurped**</u>.*'

Option A: Art's innermost goal, as mentioned above, was the perfection of verisimilitude. The camera evolved to take up the task of recording the perfect likeness of objects, and hence, snatched (usurped) the task that art was supposed to perform. Hence, Option A is the answer.

Option B: Art's goal was usurped. The competition between art and a camera wasn't discussed. Since, the camera started doing what was expected of art, art had no function. However, the author doesn't really compare the quality with which art or the camera performed the task. Hence, Option B is not the answer.

Option C: This was according to Hegel. Art's task being that of producing the likeness of objects was Danto's opinion. Hence, Option C is not the answer.

Option D: Art's function had been usurped by the camera, and hence, the statement, that the answer to the question of 'what art is' hasn't been found, (irrespective of whether it is true or false) is not related in any way to the context. Hence, Option D is not the answer.   Choice (A)

Q4.   Art was superseded in the task of articulating Geist because:

a) **Hegel's idea of art clashed with Danto's claim of what art's purpose was.**

b) **self-awareness became too abstract for art to convey it.**

c) self-awareness found its perfect embodiment in 'classical art'.

d) religion and philosophy evolved in their abilities to express self-awareness.

Number of words and Explanatory notes for RC:

Number of words: 584

Consider the sentences: '*However, as this __self-awareness became more complex and abstract__, it developed beyond art's capacities for expression. Consequently, __art could no longer push forwards the development of Geist__. This task fell to the more discursive and conceptually __complex spheres of religion and philosophy__ ... Art, as a means of eliciting progress in the task of articulating Geist and its self-consciousness, became superseded, and no longer of use in this task.*'
Option A: Art's task being that of articulating Geist was Hegel's claim and hence, there is no clash with that of Danto. Hence, this is not the reason why art became superseded by religion and philosophy. Option A is not the answer.
Option B: Self-abstract became too complex and art was not sufficient to be able to express it. Therefore, it got superseded by the complex spheres of philosophy and religion. Hence, Option B is the answer.
Option C: This is contradictory since it tells us why art's primary task was thought to be in expressing Geist, whose function it was to refine its own awareness of itself and its freedom. So, if art was the embodiment of Geist, it wouldn't have been superseded. This option can be eliminated on tone, since we are looking for something that is not positive. Hence, Option C is not the answer.
Option D: It is not religion and philosophy which evolved to be able to express self-awareness. It is self-awareness which became too complex for art and hence, the complex spheres of philosophy and religion became more apt for it. Hence, Option D is not the answer.   Choice (B)

Q5.   According to the author, art's end was a good thing – as explained in the third para – because:

a) **art as a narrative is not as effective as art as a chronicle.**

b) **art is not joyful when it is labouring away at a task.**

c) art could be free to take any form.

d) because it would allow new artworks to be created for just as long as there were human beings to create them.

Consider the sentences: '*Art's end, in this sense, was a good thing. Art was released from labouring away at a task (given by the narrative); **it was now free to be anything**...*' According to the author, art's end meant the end of art as a narrative, the end of art having a task. This allowed art to be free.

Option A: The effectiveness of art as a narrative versus art as a chronicle has not been compared in the above lines. The discussion was more about the end of art as a narrative, and not that of art as a chronicle. Option A is not the answer.

Option B: Joy is an alien term not present in the discussion. Art was allowed to be free – this doesn't necessarily translate to art being joyful or not. And for whom? Hence, Option B is not the answer.

Option C: According to the author, art's end as a narrative is a good thing because the author believes this will allow art to be free, released, instead of grinding away at one task. Hence, Option C is the answer.

Option D: The author mentions art networks to talk about how art as a chronicle will live on forever. However, that doesn't explain why the end of art as a narrative, is a good thing. Hence, Option D is not the answer.   Choice (C)

...The argument … [that rising inequality in the Anglo-American world must eventually threaten the foundations of democracy] channels a time-worn view, held by thinkers from Karl Marx to Friedrich Hayek, that democracy and capitalism may prove incompatible.

…[T]he past century or so tells a different story. ...Since the dawn of industrialisation, no advanced capitalist democracy has fallen out of the ranks of high-income countries or regressed permanently into authoritarianism. This is not a coincidence, say Torben Iversen of Harvard University and David Soskice of the London School of Economics, in their recent book, "Democracy and Prosperity". Rather, they write, in advanced economies, democracy and capitalism tend to reinforce each other…

Economists and political theorists have imagined all sorts of ways capitalist democracies might fail. The oldest is the worry that grasping masses will vote to expropriate the wealth of entrepreneurs and landowners — and without secure property rights there can be no capitalism. Hayek thought that the governments of the early 20th century, in responding to the concerns of the masses, had over-centralised economic decision-making, a road that led eventually to totalitarianism. …Joseph Schumpeter feared that as firms grew more powerful, they might push a country towards

corporatism and clientelism, winning monopoly rights that would generate profits they could share with politicians. Mr Piketty and others say that inequality naturally rises in capitalist countries, and that political power becomes concentrated alongside economic power in an unstable way. Other economists, like Dani Rodrik, have argued that full participation in the global economy forces a country to give up a degree of either national sovereignty or democracy. Lowering barriers to trade means harmonising trade and regulatory policies with other countries, for instance, which reduces each government's ability to accommodate domestic preferences.

But if capitalism and democracy are such uneasy bedfellows, what explains their long co-existence in the rich world? Mr Iversen and Mr Soskice see capitalism and democracy as potentially mutually supporting, with three stabilising pillars. One is a strong government, which constrains the power of large firms and labour unions, and ensures competitive markets. Weaker countries find it harder to resist the short-term expediency of securing power by protecting monopolies. The second is a sizeable middle class, forming a political bloc that shares in the prosperity created by a capitalist economy. A bargain is struck in which the state provides mass higher education on generous terms, while encouraging the development of frontier industries that demand skilled workers. Middle-class households thus reckon that economic growth is likely to benefit them and their children. Rising inequality is not a threat to capitalist democracies …because middle-class voters care little about the poor and do not support broader redistribution that could raise their tax bills.

Providing the education, infrastructure and social safety net that support a prosperous middle class requires substantial tax revenue. For the system to hold, a third pillar is needed: large firms that are not very mobile. ...Though multinationals are adept at shifting production and profits around the world, in a knowledge economy, leading firms cannot break their connections to networks of skilled individuals like those in London, New York or Silicon Valley. Their complex business plans and frontier technologies require the know-how developed and dispersed through these local networks. That increases the power of the state relative to firms, and allows it to tax and spend...

All of this leaves plenty to be concerned about, however. It hinges on the middle classes feeling confident about the economy...

Q6. A substantial tax revenue is important for a government to run a capitalist democracy:

a) **to limit the power of labour unions and larger firms that could turn into monopolies.**

b) **to ensure broader redistribution of wealth through various welfare schemes.**

c) to provide the middle class the wherewithal to benefit from the economic growth of the country.

 d) to keep the masses from revolting against landowners, whose confidence is important for capitalism.

Number of words and Explanatory notes for RC:

Number of words: 581

Consider the sentences: '*Providing the __education, infrastructure and social safety net that support a prosperous middle class__ requires substantial tax revenue.*'
Option A: While this is one of the objectives of a powerful government, the connection between these objectives and tax revenue has not been made in the lines '*One is a strong government, which constrains the power of large firms and labour unions, and ensures competitive markets. Weaker countries find it harder to resist the short-term expediency of securing power by protecting monopolies.*' Hence, Option A is not the answer.
Option B: The broader redistribution of wealth maybe one of the objectives of the government, but this option doesn't explain the explicit focus on middle class which a strong government needs to maintain. Also, consider the sentence: '*middle-class voters care little about the poor and __do not support broader redistribution__ that could raise their tax bills*'. Hence, Option B is not the answer.
Option C: The underlined portions clearly show that the major objective of strong governments is to provide the middle class a chance to evolve and share the prosperity of the country. This is done through providing the middle class with education, social safety and infrastructure (wherewithal – the ability/facilities) needed for them to evolve. Hence, Option C is the answer.
Option D: This point was mentioned with respect to one of the potential issues with capitalism and democracy existing together and doesn't explain why the governments need tax revenues. Hence, Option D is not the answer.   Choice (C)

Q7.   Which of the following, if true, invalidates the concern raised by the author about the theory advocated by Mr. Soskice and Mr. Iversen?

 a) **The middle classes do not have a sound understanding of the fundamental principles of economics.**

b) **The middle class constitutes less than a quarter of the state's population.**

c) The state doesn't have the wherewithal to provide education, infrastructure and the social safety net to support a prosperous middle class.

d) The middle classes will always feel optimistic about a capitalist economy run by a strong government.

Number of words and Explanatory notes for RC:

Number of words: 581

The author's concern can be understood from the last couple of lines in the passage. The author says that the theory of three pillars (proposed by Mr. Soskicke and Mr. Iversen) has one concern: '…*That increases the power of the state relative to firms, and allows it to tax and spend… It leaves **plenty to be concerned** about, however. **It hinges on the middle classes feeling confident about the economy**…*' It is important to understand that the question comes with a caveat – 'if the statement is true'. So, we will have to examine the options based on that caveat and check if the statements (if true) will invalidate (negate) the author's concern.

Option A: The middle class' confidence in a country's economy may or may not really be influenced by their sound understanding of the principles of economics. The author's concern will still hold valid. Hence, Option A is not the answer.

Option B: The lines – '*The second is **a sizeable middle class**, forming a political bloc that shares in the prosperity created by a capitalist economy. A bargain is struck in which the state provides mass higher education on generous terms, while encouraging the development of frontier industries that demand skilled workers*' – about the importance of middle class do not really mention the percentage made up by the middle class. So, 'sizeable' could mean anything – quarter, three quarters, half, etc. Irrespective of what that number is, we cannot judge whether that'll affect the author's concern. Hence, Option B is not the answer.

Option C: If this is true, it is likely to infuriate the middle class as understood from the passage – thus strengthening the author's argument, rather than invalidating it. Hence, Option C is not the answer.

Option D: The author's main concern is that the entire logic of Soskice and Iversen is hinged on the fact that at the end of the day, the middle class could panic, and in that scenario, the whole system goes topsy-turvy. So, if the middle class is always optimistic about a capitalist democracy run by a strong government, the scenario of middle -class unhappiness and panic doesn't arise. Hence, Option D is the answer.

Choice (D)

Q8. All of the following are ways in which capitalist democracies might fail EXCEPT:

a) **Powerful companies might influence policymakers and grasp more power.**

b) **Inequality bred by capitalism leads to political instability.**

c) The masses wielding voting powers make property-owners insecure.

d) A capitalist democracy in addressing the concerns of the masses risks becoming autocratic.

Number of words and Explanatory notes for RC:

Number of words: 581

Option A: Consider the sentences: '*Joseph Schumpeter feared that as firms grew more powerful, they might push a country towards corporatism and clientelism, **winning monopoly rights that would generate profits they could share with politicians**.*' From this, it can be inferred that the author fears that powerful companies and politicians (and therefore, policymakers in a democracy) could be hand in glove to enhance their own profits. Hence, Option A is not the answer.

Option B: Consider the sentences: '*Mr Piketty and others say that inequality naturally rises in capitalist countries, and that **political power becomes concentrated alongside economic power** in an unstable way.*' From this, it can be inferred that inequality is a consequence of a capitalist democracy. Also, the author believes that power accumulates alongside economic power in an unstable way. So, we can infer that inequality increases the chances of political instability. Hence, Option B is true and not the answer.

Option C: Consider the sentences: '*The oldest is the worry that **grasping masses will vote to expropriate the wealth of entrepreneurs and landowners** — and without secure property rights there can be no capitalism.*' The masses that wield voting rights do not make property owners insecure. The insecurity is because of the absence of good property rights. Without those secure property rights, there is always the fear that the **masses will vote** to **expropriate properties** of entrepreneurs and landowners. Hence, Option C hints at a Slippery Slope Fallacy (generalising a distant problem as the cause of cancelling out something in the present – an absurd extrapolation). Option C is the answer.

Option D: This can be understood from the statement, '*Hayek thought that the governments of the early 20th century, in responding to the concerns of the masses, had over-centralised economic decision-making, a **road that led eventually to totalitarianism**.*'. In other words, it can be inferred that because of the centralisation of the economic decision-making (to cater to the masses), the road is paved for totalitarian (or autocratic/authoritarian) governments to grab power. Hence, Option D is not the answer.   Choice (C)

Q9.   The concern raised by economists such as Dani Rodrik about the functioning of capitalist democracies is weakened by which of the following?

a) **Participation in the global economy, in the long run, accommodates domestic preferences.**

b) **Governments which ignore domestic preferences get voted out irrespective of the country's economic health.**

c) Trade barriers raised to keep the local populace happy affect a country's economic growth adversely.

d) Accommodating domestic preferences doesn't help a country's growth in the long run.

Number of words and Explanatory notes for RC:

Number of words: 581

Consider the sentences: 'Other economists, like Dani Rodrik, have argued that full participation in the global economy forces a country to give up a degree of either national sovereignty or democracy. **Lowering barriers to trade** means harmonising trade and regulatory policies with other countries, for instance, which **reduces each government's ability to accommodate domestic preferences**.' Dani Rodrik's concern is that governments cannot harmonise trade (thereby participating in the global economy) without compromising on local/domestic preferences to a certain extent (weakening the idea of democracy).

Option A: This option demonstrates that Dani Rodrik's concern is misplaced since harmonising trade eventually benefits local entities as well/accommodates the domestic preferences. That way the fundamentals of a capitalist democracy have not been undermined. Option A is the answer.

Option B: This doesn't go against the grain of Dani Rodrik, since this statement proves the strength of a democracy and the adverse impact of globalising economy at the expense of the local preferences. Hence, Option B is not the answer.

Option C: This shows that it is not possible to achieve both – harmonise trade with other countries and yet, pay attention to local preferences. This statement strengthens the argument of economists such as Dani Rodrik. Hence, Option C is not the answer.

Option D: This statement talks about why governments may want to globalise the economy, sometimes at the expense of local preferences. But, this statement doesn't weaken Dani Rodrik's argument, rather it strengthens it by asserting that local preferences have to be set aside to harmonise trade. Hence, Option D is not the answer.   Choice (A)

Q10.   Large firms that are not nimble are important for the stability of a capitalist democracy because:

a) **they make the markets competitive.**

b) **they create jobs that share the state's prosperity with the citizens.**

c) they push a country towards corporatism and clientelism

d) they guarantee taxes that allow the government to spend on education and infrastructure.

Number of words and Explanatory notes for RC:

Number of words: 581

This has been explained in detail in the following lines: '*Providing the education, infrastructure and social safety net that support a prosperous middle class requires substantial tax revenue.* **For the system to hold**, a third pillar is needed: **large firms that are not very mobile**. ... *That* **increases the power of the state relative to firms, and allows it to tax and spend**...' The rationale here is that large firms, if not mobile, will give governments more power to tax them. That tax will provide the revenue needed by the government to spend on education and infrastructure.

Option A: Competition isn't really a parameter that has been discussed here, and it won't explain why the immobility of the larger firms is important. Hence, Option A is not the answer.

Option B: While creation of jobs by firms keeps the middle class happy, this option doesn't explain why it is important for large firms to not be too mobile or nimble. We cannot establish from the information in the passage that if companies are mobile, jobs will move out too. Hence, Option B is not the answer.

Option C: This option can be eliminated on tone. The author mentions corporatism and clientelism negatively in '*firms grew more powerful, they might push a country towards corporatism and clientelism*'. That wouldn't obviously be the reason why governments benefit from large immobile firms. Hence, Option C is easy to eliminate.

Option D: The underlined portions mentioned above show that governments need large immobile governments that are more dependent on the skill network the government has built by providing education and infrastructure. Their immobility allows the government the freedom to tax them – revenues which can be spent further on improving the country – to help the middle-class bloc. Hence, Option D is the answer.

Choice (D)

The much-celebrated successes of the green revolution created a sense among the Indian elite that the threat of an uncertain monsoon had receded. In an essay on the monsoon in Indian literature, the writer and newspaper editor Khushwant Singh in 1987 cited a range of epics and poetry to show how deeply the monsoon had shaped Indian cultural sensibilities over hundreds of years. Singh concluded that, in recent decades, 'India has taken enormous strides toward freeing herself from dependence on the vagaries of the monsoons...There is no longer the same agony waiting through long summer months of searing heat to catch a glimpse of the first clouds,' he wrote…

At just this moment in the 1980s, climate scientists began to worry about the behaviour of the monsoon. Late-20th-century breakthroughs in tropical meteorology shed new light on the internal variability in the monsoon on multiple timescales, from the quasiperiodic impact of the El Niño Southern Oscillation to the intra-seasonal variations attributed to the Madden-Julian Oscillation. With mounting evidence of anthropogenic climate change, meteorologists turned to the question of how planetary warming would affect the monsoon.

The monsoon responds to changing land and sea-surface temperatures. But it is also affected by transformations on a regional scale. Aerosol emissions are a major culprit – particulate matter from vehicle emissions, crop burning, and domestic cooking fires. The skies over India have the highest concentration of aerosols in the world, especially during the winter months when there is no rain to wash the skies clean. They appear as a giant stain on satellite images, spreading across the Indian Ocean. Scientists have dubbed it the 'brown cloud'...Recent research has suggested that, by affecting the thermal contrast that drives the monsoon season, aerosol emissions have also contributed to a decline in monsoon rainfall...

Consider the dilemmas this raises. The 'brown cloud' is a function of energy poverty in South Asia rather than excess. It is, at least in part, the result of the incomplete combustion of the cheapest, most polluting fuels – the only fuels accessible to the 240 million people in India who live without access to electricity. To reduce aerosol emissions would demand the more equitable distribution of electricity. And unless this can be generated from renewable sources, we must accept that it would in turn increase India's greenhouse gas emissions, mitigating the regional drivers of climate change while contributing to planetary warming. There are no easy solutions.

Over the past 150 years, forest cover over most parts of Asia has declined dramatically. This, too, affects the monsoon. The ecologists of the 19th century, known as 'desiccationists', who equated deforestation with drought, might have misunderstood the mechanisms at work. But it now seems that they were not wrong to believe that changes in the land could affect the rains. The intensification of agricultural production in India, and the use of more water for irrigation, have affected the moisture of the soil, its capacity to absorb or reflect heat. Crops reflect more solar radiation than forests, which tend to absorb it.

We are left with a bitter irony. Through a cascade of unintended consequences, so many of the measures taken to secure India against the vagaries of the monsoon – intensive irrigation, the planting of new crops – have destabilised the monsoon itself…

Q11.   The irony being referred to in the last para of the passage is that:

a) **the unpredictability of monsoons has several unintended consequences.**

b) **addressing the adverse effect of unpredictable monsoons has initiated a vicious cycle.**

c) no measures have been taken to secure India despite the vagaries of the monsoon.

d) **measures intended to make the monsoons more consistent have impacted it adversely.**

Number of words and Explanatory notes for RC:

Number of words: 543

Consider the sentences: '*We are left with a bitter irony. Through a cascade of unintended consequences, **so many of the measures taken to secure India against the vagaries of the monsoon** – intensive irrigation, the planting of new crops – **have destabilised the monsoon itself**…*'
Option A: There is nothing ironical about monsoons having unintended consequences. Irony would be when the unintended consequences are a result of something that was done to avoid those consequences. Hence, Option A is not the answer.
Option B: The irony is that the measures taken to deal with the negative consequences of variable monsoons (securing India from problems caused by variable monsoons, whatever they are) have led to other consequences, which in turn have affected the monsoons (changing the nature of soil/the sunlight the soil radiates, etc.) – a vicious cycle. Hence, Option B is the answer.
Option C: There have been measures taken to secure India, but those measures have had an adverse impact. So, this option is not factually correct. Option C is not the answer.
Option D: The passage doesn't talk about making monsoons more consistent. In fact, we cannot be sure from the passage if such a thing is even possible. Hence, Option D is not the right answer.   Choice (B)

Q12.   Which of the following, if true, most undermines the reason for the author to believe that there are no easy solutions to 'the brown cloud' problem?

a) **It cannot be solved unless people in South Asia can afford alternative fuels.**

b) **Electricity is not a climate-friendly alternative to the fuels that cause the brown cloud problem.**

c) Greenhouse gas emissions are part of a serious problem which cannot be addressed by simply banning a few fuels.

d) **Even electricity generated completely by non-renewable sources is tangibly less harmful for the climate as aerosol emissions.**

Number of words and Explanatory notes for RC:

Number of words: 543

Consider the sentences: '*To reduce aerosol emissions would demand the **more equitable distribution of electricity**. And **unless this can be generated from renewable sources, we must accept that it would in turn increase India's greenhouse gas emissions**, mitigating the regional drivers of climate change while contributing to planetary warming. There are no easy solutions.*' It is important to understand two parts in these sentences. The author feels that providing equal distribution of electricity will solve the problem of aerosol emissions. However, according to the author that electricity should be produced in a clean way (renewable sources). If not, we are just translating one problem into another – mitigating the regional drivers of climate change (aerosol emissions) while contributing to planetary warming (because of usage of non-renewable sources).
In short, the author's reason to say there are no easy solutions is because the primary solution – providing electricity to all – itself causes other issues (if the electricity is generated from non-renewable sources).
Option A: Even if they can afford alternative fuels, it doesn't undermine/relate to the reason the author says there are no easy solutions. Hence, Option A is not the answer.
Option B: This doesn't undermine the author's reason for saying there are no easy solutions. If anything, it extrapolates it. While the author talks about good and bad sources of electricity, this option calls all sources bad, thereby creating the problem of replacing one cause of worry (aerosol) with another (electricity). Option B is not the answer.
Option C: This option indirectly strengthens the author's reasons for saying that we cannot simply replace one problem with another. By pointing out that greenhouse gas emissions cannot be gotten rid of by simply getting rid of aerosols, the option merely indicates that we need to be careful about the sources of our energy. Hence, Option C is not the answer.
Option D: This option indicates that the author is wrong in believing unclean energy doesn't solve the aerosol problem (as it contributes to global warming in its own way). This option proves that even if we use unclean electricity, it still mitigates the regional drivers (Aerosol emissions) without an equivalent cost on the environment (because of the electricity being produced from unclean sources). Hence, this undermines the author's reasons for suggesting the avoidance of unclean electricity. Option D is the answer.   Choice (D)

Q13. The author mentions 'the desiccationists' to drive home the point that:

a) **deforestation has been responsible for change in monsoon patterns.**

b) **droughts are a consequence of dramatic declines in forest cover.**

c) **intensive irrigation and planting new crops have had an impact on the rains.**

d) **crops reflect more solar radiation than forests, which tend to absorb it.**

Number of words and Explanatory notes for RC:

Number of words: 543

The answer can be understood from the following lines: '*The ecologists of the 19th century, known as 'desiccationists', who equated deforestation with drought, might have misunderstood the mechanisms at work. <u>But it now seems that they were not wrong to believe that changes in the land could affect the rains</u>.*'
Option A: The author didn't want to focus on deforestation directly. If that was the intention, it wouldn't be mentioned that they misunderstood the mechanisms at work. The author wanted to focus on the bigger reason, that the dessicationists were right, which was in establishing a connection between rains and changes in the land. Hence, Option A is not the answer.
Option B: The author hasn't discussed droughts (absence of rain) or their possible causes. The focus of the passage is not the dramatic decline in forest cover. Hence, Option B is not the answer.
Option C: The author spoke about dessicationists to drive home the argument that they were right about changes in the land affecting the rains. The author goes on to argue that these changes include intensive irrigation and planting new crops. This could be understood from the subsequent lines: '*The <u>intensification of agricultural production in India, and the use of more water for irrigation</u>, have affected the moisture of the soil, its capacity to absorb or reflect heat. Crops reflect more solar radiation than forests, which tend to absorb it.*' Similarly, the crop-connect can be found from the lines: *measures taken to secure India against the vagaries of the monsoon – <u>intensive irrigation, the planting of new crops</u> – have destabilised the monsoon itself.* Hence, Option C is the answer.
Option D: The author's main argument was that crops do affect the rainfall. How they do really doesn't need the example of the dessicationists, or that discussion thread about which part they got right and which part they got wrong. Hence, Option D is not the answer.   Choice (C)

Q14.   Variations in monsoon rainfall cannot be connected to which of the following?

a) **El Niño Southern Oscillation**

b) **Inequitable distribution of electricity in South Asia.**

c) **Thermal contrast, which drives monsoons, fashioned by the changing nature of soil**

d) **Poverty in South Asia**

Number of words and Explanatory notes for RC:

Number of words: 543

Option A: That the El Nino Southern Oscillation causes variations in the monsoon rainfall can be understood from the sentences: '*Late-20th-century breakthroughs in tropical meteorology shed new light on the internal variability in the monsoon on multiple timescales, from the quasiperiodic impact of the El Niño Southern Oscillation to the intra-seasonal variations attributed to the Madden-Julian Oscillation.*' Hence, Option A is not the answer.

Option B: Energy poverty in South Asia leads to aerosol emissions which causes thermal contrasts that may be connected to monsoon variations. Hence, the inequitable distribution of electricity in South Asia can be connected to the variability of the monsoons. This is confirmed by: '*It is, at least in part, the result of the incomplete combustion of the cheapest, most polluting fuels – the only fuels accessible to the 240 million people in India who live without access to electricity*'. Hence, Option B is not the answer.

Option C: The soil nature affects the heat radiated which leads to thermal contrasts which, from the passage, are understood to be affecting monsoons ('*...affected the moisture of the soil, its capacity to absorb or reflect heat. Crops reflect more solar radiation than forests, which tend to absorb it*'). Hence, Option C is not the answer.

Option D: It is energy poverty and not poverty that has been discussed in the passage. These 240 million people do not have access to electricity and the reason is not connected to their poverty. Therefore, Option D is the answer.   Choice (D)

Q15.   The author is most likely to approve of which of the following to allay the concerns raised in the passage?

a) **Rolling back some of the measures implemented under green revolution**

b) **Ensuring an optimum balance of shares of land available for agriculture and forest cover**

c) **Substituting polluting fuels with cheap electricity**

d) **Planting new crops that are not reliant on water-intensive irrigation**

Number of words and Explanatory notes for RC:

Number of words: 543

From the first para and the last, it can be understood that the author's central concern is around the measures that have been taken to secure India from the vagaries of the monsoon (measures such as intensive agriculture, planting new crops, etc.) and how those measures have had unintended consequences.

Option A: The author has connected the success of the green revolution (*India has taken enormous strides toward freeing herself from dependence on the vagaries of the monsoons*) to the adverse impact on monsoons (*Through a cascade of unintended consequences, so many of the measures taken to secure India against the vagaries of the monsoon – intensive irrigation, the planting of new crops – have destabilised the monsoon itself*). However, we cannot really believe the author would recommend rolling back the measures for two reasons: In the passage, the author hasn't recommended alternative measures to bring about the green revolution (e.g. what could be done instead of excessive usage of water for irrigation). Secondly, the benefits of the green revolution vis-à-vis the harm of affecting the monsoon is a complicated comparison that the author doesn't delve into. Hence, Option A is not the answer.

Option B: Given that the author feels crops reflect more solar radiation than forests which absorb it (and that is somehow adversely impacting the thermal contrasts and leading to variable monsoons), this option is something the author will approve of. In any way, the author does point to increased planting of crops as a reason for the variability of monsoons. So the reclaiming of some lands for forests is an idea the author will likely approve of. Option B is the correct answer.

Option C: This is not the best possible alternative, given that the author is sceptical about where the electricity comes from. The author feels it is pointless to indulge in using electricity that comes from non-renewable sources of energy. Hence, this is not the most likely option the author will approve of.

Option D: While the new crops are not water-intensive, we cannot be sure if they are substitutes for existing crops (in which case it won't be of help for the existing problem of monsoon variability) or replacements. While Option D is something that the author won't disapprove of, option B is a more comprehensive plan of action for addressing the author's concerns. Hence, Option D is not the most obvious path the author will approve of.   Choice (B)

In the mid-1990s, Joseph Overton, a researcher at the US think tank, the Mackinac Center for Public Policy, proposed the idea of a 'window' of socially acceptable policies within any given domain. This came to be known as the Overton window of political possibilities. The job of think tanks, Overton proposed, was not directly to advocate particular policies, but to shift the window of possibilities so that previously unthinkable policy ideas – those shocking to the sensibilities of the time – become mainstream and part of the debate.

Overton's insight was that there is little point advocating policies that are publicly unacceptable, since no politician will support them. Efforts are better spent, he argued, in shifting the debate so that such policies seem less radical and become more likely to receive support from sympathetic politicians. …

Overton was concerned with the activities of think tanks, but philosophers and practical ethicists might gain something from considering the Overton window. By its nature, practical ethics typically addresses controversial, politically sensitive topics. It is the job of philosophers to engage in 'conceptual hygiene' or, as the late British philosopher Mary Midgley described it, 'philosophical plumbing': clarifying and streamlining, diagnosing unjustified assertions and pointing out circularities.

…[T]he freedom to test the limits of argumentation and intuition is vital to philosophical practice. There are sufficient and familiar examples of historical orthodoxies that have been overturned – women's right to vote; the abolition of slavery; the decriminalisation of same-sex relationships – to establish that strength and pervasiveness of a belief indicate neither truth nor immutability.

....Genuine attempts to resolve difficult ethical dilemmas must recognise that understanding develops by getting things wrong and having this pointed out. Most science fails to predict how the world works with perfect accuracy. But as a collective enterprise, it can identify errors and gradually approximate 'truth'. Ethical truths are less easy to come by, and a different methodology is required …But part of this model requires allowing plenty of room to get things wrong.

It is unfortunate but true that bad ideas are sometimes undermined by bad reasoning. Sometimes those who espouse offensive and largely false views can say true things. Consider the 'born this way' argument, which endorses the flawed assumption that a genetic basis for homosexuality indicates the permissibility of same-sex relationships. While this might win over some individuals, it could cause problems down the line if it turns out that homosexuality isn't genetically determined. Debates relating to the 'culture wars' on college campuses have attracted many ad hominem criticisms that set out to discredit the authors' position by pointing to the fact that they fit a certain demographic (white, middle-class, male) or share some view with a villainous figure, and thus are not fit to contribute. The point of philosophy is to identify such illegitimate moves, and to keep the argument on topic; sometimes, this requires coming to the defence of bad ideas or villainous characters…

Widening the Overton window can yield opportunities for ideas that many find offensive, and straightforwardly mistaken, as well as for ideas that are well-defended and reasonable. It is understandable that those with deep personal involvement in these debates often want to narrow the window and push it in the direction of those views they find unthreatening. But philosophers have a professional duty, as conceptual plumbers, to keep the whole system in good working order…

Q16. The author mentions examples of historical orthodoxies to elucidate that:

a) **philosophers must work outside the limits of argumentation and intuition.**

b) **one can resolve ethical dilemmas only with the understanding developed by being wrong.**

c) **historical wrongs can be corrected only through perseverance.**

d) **a prevailing and ubiquitous attitude need not necessarily be right or incontrovertible.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: '...[T]he freedom to test the limits of argumentation and intuition is vital to philosophical practice. There are **sufficient and familiar examples of historical orthodoxies that have been overturned** – women's right to vote; the abolition of slavery; the decriminalisation of same-sex relationships – **to establish that strength and pervasiveness of a belief indicate neither truth nor immutability**...'

Option A: While this option is close, the author didn't mention that philosophers must go outside the limits. The author wants the philosophers to push the limits so a greater number of debates (hitherto unthinkable) can be taken up. Option A is close but not the answer.

Option B: The historical orthodoxies point to well-accepted beliefs. The discussion here is not so much about ethical dilemmas. Hence, Option B is easy to eliminate.

Option C: The focus is not so much on correcting historical wrongs as it is about a change or shift in attitude. The author provided the examples not to talk about historical wrongs or individual examples. Rather, it is to show that what was once considered extremely correct may not be really that correct. Option C is not the answer.

Option D: A prevailing and ubiquitous attitude (a pervasive belief, largely accepted everywhere) could be wrong. The underscored portions indicate that the author used these examples to prove that the overturning of historical orthodoxies proves that a belief being pervasive doesn't necessarily show that it is unchangeable (immutable – incontrovertible) or true. Hence, Option D is the answer.   Choice (D)

Q17. According to the author, 'conceptual hygiene' and 'philosophical plumbing' help in all of the following EXCEPT in:

a) **bringing into the purview of ethical discussions a much wider spectrum of ideas.**

b) **repressing incendiary or socially radical topics to gain sympathy from politicians.**

c) **weeding out fallacious assumptions and reasoning used in ethical arguments.**

d) **endorsing unpopular but not unreasonable opinions voiced by those vulnerable to *ad hominem* attacks.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: '*By its nature, practical ethics typically addresses controversial, politically sensitive topics. It is the job of philosophers to engage in 'conceptual hygiene' or, as the late British philosopher Mary Midgley described it, 'philosophical plumbing':* **clarifying and streamlining, diagnosing unjustified assertions and pointing out circularities**.'

Also consider: '*It is understandable that those with deep personal involvement in these debates often want to narrow the window and push it in the direction of those views they find unthreatening. But philosophers have a professional duty, as conceptual plumbers,* **to keep the whole system in good working order**...'

Option A: Since, it is understandable that some people would want to make the window of debates narrow, it is the job of the philosophers to ensure that the debates are wider, to push the limits of argumentation. Hence, Option A is not the answer.

Option B: Consider the sentences: '*Efforts are better spent, he argued, in shifting the debate so that such policies seem less radical and become more likely to receive support from sympathetic politicians. ...*' This option doesn't accurately represent the above lines correctly. The lines above explain that philosophers should spend efforts to shift the debate so that radical topics **seem less radical** and can get the attention from **sympathetic** politicians. Sympathetic here doesn't mean the politicians will show real sympathy. It means paying their support to the debate. Hence, Option B is the answer.

Option C: From '***diagnosing unjustified assertions and pointing out circularities***' it can be understood that the job of the philosophers and ethicists is to ensure debates are logical and clean, and that ethical arguments are free of fallacies and circularities (circular reasoning is a fallacy where an argument is offered as a proof for itself or two mutually dependent arguments are used to prove each other). Option C is therefore, not the answer.

Option D: The author indicates in the following lines – '*The point of philosophy is to identify such illegitimate moves, and to keep the argument on topic; sometimes,* **this requires coming to the defence of bad ideas or villainous characters**...' that it is important sometimes to come to the aid of the right argument made by an unpopular person (*ad hominem* fallacy is where one argues against the nature/credibility of the person making the argument rather than focusing on the argument itself). Hence, Option D is not the answer.   Choice (B)

Q18.   It is important to allow 'plenty of room' for ethical discussions because:

a) **no science can make predictions about the world accurately.**

b) **rectification helps deepen insights needed to settle ethical dilemmas.**

c) **ethical truths cannot be approximated as easily as scientific truths.**

d) **narrowing of the Overton window strengthens a myopic point of view.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: '*Most science fails to predict how the world works with perfect accuracy. But as a collective enterprise, it can identify errors and gradually approximate 'truth'. **Ethical truths are less easy to come by**, and a different methodology is required ... **But part of this model requires allowing plenty of room to get things wrong**.*'

Option A: The author offered a comparison of scientific discoveries and ethical discussions (where it is hard to arrive at the right answer, the truth, despite collective identification of errors and approximation as in science). So, 'plenty of room' is not to connect ethics and science. Hence, Option A is not the answer.

Option B: Consider the sentences: '*Genuine attempts to resolve difficult ethical dilemmas **must recognise that** understanding develops by **getting things wrong and having this pointed out**.*' The author suggests that ethical discussions need understanding which develops by getting things wrong and then being corrected. So, it can be said that rectifying mistakes leads to better understanding or insights which can help in resolving ethical dilemmas. Option B is the answer.

Option C: The 'plenty of room' needed for ethical discussions is not justified just because science is easy and ethics isn't. What the author is trying to convey is that scientific truths are arrived at by accepting mistakes, correcting them, and improving the theories. Ethics is tougher, the truths harder to arrive. Hence, there should be room, to allow one to be wrong and discuss and argue about a wide array of topics. Option C is not the answer because the statement is not a science vs ethics comparison.

Option D: This option confuses two different parameters. Widening or narrowing of topics is a different discussion. Giving space to people to be wrong about their ideas and then correct them through debates is another. Option D is not the answer.

Choice (B)

Q19.   The author's main contention about the 'born this way' argument is that:

a) **it enhances the permissibility of same-sex relationships.**

b) **it wins over some individuals by connecting the homosexuality debate with genes.**

c) **its fallibility could weaken the argument of those in favour of same-sex relationships.**

d) it endorses a bad idea with largely false views.

Consider the sentences: '*Sometimes those who espouse offensive and largely false views can say true things*. Consider the 'born this way' argument, which endorses the *flawed assumption* that a genetic basis for homosexuality indicates the permissibility of same-sex relationships. While this might win over some individuals, *it could cause problems down the line if it turns out that homosexuality isn't genetically determined*.' What the author is trying to say here is that good reasoning involves picking the right arguments. For example, to support homosexuality one could argue that it depends on genes. According to the author that makes the homosexuality argument weaker because if it is proven that homosexuality doesn't depend on genes, the whole homosexuality debate is squashed (the author instead subtly and indirectly hints that homosexuality is not about genes. Maybe just about choice.)

Option A: The author is in favour of homosexuality and is hence arguing against bad reasoning. So, the author's contention (disagreement) about the 'born the way' debate isn't definitely because it enhances permissibility. This option can be eliminated on tone.

Option B: The author isn't complaining that this argument wins over some people/sympathisers for homosexuality. The author's contention is that while this argument may win over a few, in the long run it is not a good logic to provide while arguing in favour of homosexuality. Option B is not the answer.

Option C: This is the author's main contention – that the 'born this way' argument is weak and relies on genes being responsible for homosexuality. If it is proven otherwise, does that mean homosexuality is wrong? Certainly not. The author is predominantly using this example to show how philosophers and ethicists have a scope to clean up debates to make sure the right reasoning is used (irrespective of who is making a point). Option C is the answer.

Option D: The 'born this way' argument endorses the cause of homosexuality. The author isn't against homosexuality, and does not call it a bad idea at any stage. Hence, Option D is not the answer.   Choice (C)

Q20.   The depth of the author's main argument in the passage will be enhanced by a study that:

 a) **demonstrates that most of the epoch-defining breakthrough ideas were originally considered offensive or impractical.**

 b) **shows that students of philosophy have more empathy and a better understanding of ethical issues.**

c) **highlights that the more personally invested a person is in a debate, the less likely he or she is to concede ground to an alternative view.**

 d) **proves that practical ethicists haven't been given much scope to air their support for logically sound unpopular opinions.**

Number of words and Explanatory notes for RC:

Number of words: 560

The author's main argument in this passage boils down to philosophers and ethicists expanding the spectrum of ideas discussed, bringing more unacceptable discussions into general debate and then making them acceptable, while keeping the discussion sane and rational.

Option A: Such a study will strengthen the author's argument by demonstrating why the author believes that the primary job of philosophers and ethicists is to bring more topics under the purview of debate – topics that are hitherto considered radical or unacceptable. So, if a majority of breakthrough ideas were originally considered impractical, it proves that we need to broaden the spectrum of our discussions. Hence, Option A is the answer.

Option B: The idea is not to sell philosophy or ethics. It is not a debate around which subject is better or students of which subjects are more ethical or are better debaters. So, proving that philosophy students are more understanding of ethics doesn't really deepen the author's argument about what the priority of philosophers should be. Hence, Option B is not the answer.

Option C: The author already uses this point to argue why philosophers need to do the plumbing job – to ensure they counter the efforts of the myopic ones who try to fit the debate to their narrow perspectives. So, this study will not add any more value. Hence, Option C is not the answer.

Option D: Such a study would show that the ethicists and philosophers aren't being heard. This study will suggest that such people should be heard and be given a greater opportunity to speak up on opinions that are unpopular. This study doesn't do anything though, to further the author's point of view which has more to do with the degree to which we discuss unpopular themes, and the spectrum of such themes which are even debated in the first place. Hence, Option D is not the answer.

Choice (A)

The widespread use of antibiotics encourages the pathogens they are directed against to become inured to their effects. That is well known. Some pathogens develop the ability to inactivate the antibiotic before it can do harm. Others can rapidly pump the antibiotic out of bacterial cells. Still others can change the place in the cell that antibiotics target so that the drugs are ineffective.

But antibiotics cause damage to non-target species as well, so these, too, tend to evolve immunity. Since most antibiotics are administered by mouth, the many bacteria that live peacefully in the human gut are particularly susceptible to such evolutionary pressures.

The medical consequences of this are ill-understood, because most gut bacteria are anaerobes [flourishing only in the absence of oxygen] and hence difficult to culture. But Lisa Maier of the European Molecular Biology Laboratory, in Heidelberg, and her colleagues have grown 40 strains in anaerobic conditions. They then exposed those cultures to hundreds of drugs for a range of ailments. Their study, published in Nature, reveals a way gut bacteria become resistant to antibiotics: exposure to drugs that were designed to act on human cells rather than microbial ones.

Of the drugs in the study, 156 were antibacterials (144 antibiotics and 12 antiseptics). But a further 835, such as painkillers and blood-pressure pills, were not intended to harm bacteria. Yet almost a quarter (203) did. These accidental bactericides included proton-pump inhibitors such as omeprazole (used to treat acid reflux), calcium-channel blockers (to lower blood pressure), antihistamines, painkillers and antipsychotics. In the case of antipsychotics, these chemically diverse drugs affect many of the same strains of gut bacteria.

The researchers noticed too that the strains of bacteria most resistant to the effects of drugs not aimed at them were also those most resistant to antibiotics. ....To check if that was indeed the case, Dr Maier and her colleagues first looked at a particular strain of a common gut bacterium, *Escherichia coli*, which they knew carried an antibiotic-resistance gene called *tolC*. Bacteria that possess *tolC* can make a protein that works as an antibiotic-expulsion pump. The researchers found that *E. Coli* carrying *tolC* were resistant to the effects of both antibiotic and non-antibiotic drugs, and that *E. Coli* engineered to lack it became susceptible to both.

The team then conducted a foray through the genome of *E. coli*, intended to look at the protective effects of every gene the bug possesses. They bought a library of 4,000 *E. Coli* strains, each of which was engineered to overproduce the protein encoded in one particular gene, different for each strain. They studied the effects of seven non-antibiotic drugs on each of these strains.

They found many cases where proteins (and thus genes) which protected bacteria from these seven drugs were ones already known to make them resistant to antibiotics. In sum, their work suggests that bacteria often use similar mechanisms to evade all classes of drugs. These protective mechanisms can be spread by the bacterial habit of trading DNA not only with conspecifics but also

with other members of the bacterial domain. The more these resistant organisms spread, the more they add to the pool of resistance genes in all bacteria, raising the odds that these genes will jump to more disease-causing microbes by horizontal gene transfer. That is worrisome. Drug-resistant infections could, by some estimates,

Q21.   It can be inferred from the passage that the findings of the experiments conducted by Dr Lisa Maier served to chiefly

a) **dispel the notion that gut bacteria, being anaerobes, are difficult to culture.**

b) **highlight that every type of bacteria has become less responsive to the antibiotic treatment designed to combat it.**

c) **indicate that non-antibiotic drugs promote antibiotic resistance in gut microbes.**

d) **prove that one bacterium acquired antibiotic resistance by acquiring the associated gene from another via horizontal gene transfer.**

Number of words and Explanatory notes for RC:

Number of words: 570

Option A: _**The medical consequences of this are ill-understood, because most gut bacteria are anaerobes [flourishing only in the absence of oxygen] and hence difficult to culture. But Lisa Maier [EMBL, Heidelberg], and her colleagues have grown 40 strains in anaerobic conditions.**_ Option A mentions an experimental limitation that has been overcome. But this is not related to the finding of the experiments conducted by Dr Lisa Maier. Hence option A is not the answer.

Option B: The widespread use of antibiotics encourages the pathogens they are directed against to become inured (habituated) to their effects. That is (already) well known. So, the fact that every type of bacteria has become less responsive to the antibiotic treatment designed to combat it is already well known. Option B was neither the objective nor is the finding of the experiments of Dr Lisa Maier and her colleagues at EMBL. Option B is incorrect.

Option C: Their study, published in Nature, reveals a way gut bacteria become resistant to antibiotics: **exposure to drugs that were designed to act on human cells (i.e. non-antibiotics) rather than microbial ones**. ...The researchers noticed too that the strains of bacteria most resistant to the effects of drugs not aimed at them were also those most resistant to antibiotics....They studied the effects of <u>seven non-antibiotic drugs</u> on each of these (engineered _E. coli_) strains. They found many cases where proteins (and thus genes) which **protected bacteria from these seven drugs** were ones already known to make them **resistant to antibiotics**. Hence we can infer that Dr Lisa Maier's experiments help to conclude that <u>non-antibiotic drugs</u> promote antibiotic resistance in gut microbes. Option C is also the central idea of the passage and is the answer to the question.

Option D: Option D is a misdirection. It merely mentions a mechanism by which microorganisms acquire resistance to antibiotics. _**The more these resistant organisms spread, the more they add to the pool of resistance genes in all bacteria, raising the odds that these genes will jump to more disease-causing microbes by horizontal gene transfer... The widespread use of antibiotics encourages the pathogens they are directed against to become inured to their effects. That is already well known.**_ Option D ignores the effects of non-antibiotic drugs in promoting antibiotic resistance in microbes. Option D is not complete as an answer to the question.

Choice (C)

Q22. Which of the following correctly represents examples of "accidental bactericides" mentioned in the passage?

a) **calcium-channel blockers, painkillers, omeprazole, antiseptics, antipsychotics**

b) **antihistamines, calcium-channel blockers, antipsychotics, proton-pump inhibitors, painkillers**

c) **blood-pressure pills, omeprazole, antipsychotics, antimicrobial agents, antihistamines**

d) **painkillers, antibiotic-expulsion pump proteins, antihistamines, proton-pump inhibitors, calcium-channel blockers**

Number of words and Explanatory notes for RC:

Number of words: 570

Consider the sentences of the fourth para: _Of the drugs in the study, 156 were antibacterials (144 antibiotics and 12 antiseptics)._ {Antibiotics and Antiseptics are designed to act on microbial cells.} **But** a further 835, such as painkillers and blood-pressure pills, were not intended to harm bacteria. Yet almost a quarter (203) did. These accidental bactericides included proton-pump inhibitors such as:
(A) Omeprazole (used to treat acid reflux),
(B) Calcium-channel blockers (to lower blood pressure),
(C) Antihistamines,
(D) Painkillers and
(E) Antipsychotics
Option A: Option A includes several accidental bactericides (those not intended to harm bacteria) as mentioned above. But it includes 'antiseptics' which are bactericides and not accidental bactericides. So option A cannot be the answer.
Option B: Option B correctly mentions the list of accidental bactericides mentioned in the passage and is the answer.
Option C: Option C mentions several accidental bactericides as given above. But antimicrobial agents are designed to kill microbes, including bacteria. 'Antimicrobial agents' are not accidental bactericides. Option C can be ruled out.
Option D: Option D mentions 'antibiotic-expulsion pump proteins'. Now an example of a gene (viz _tolC_) which makes this protein has been mentioned in the fourth para (discussion of a parallel experiment). This has not been specifically mentioned as an example of an accidental bactericide and therefore option D can be eliminated. In fact, such a protein (antibiotic-expulsion pump protein) would enhance the resistance of a bacterium to antibiotics. It cannot be called a bactericide, inter alia an accidental bactericide.   Choice (B)

Q23. Which of the following, if true, best exemplifies "These protective mechanisms can be spread by the bacterial habit of trading DNA ...... bacterial domain" mentioned in the penultimate para?

a) **To resist antibiotic and non-antibiotic drugs, gut bacteria use similar mechanisms such as expulsion of drugs via efflux pumps, or inactivation of proteins.**

b) **The effects of antipsychotics and painkillers on the brain could, in part, be a result of their primary influence on gut flora.**

c) **Antibiotics remove drug-sensitive competitors, leaving resistant bacteria behind to reproduce as a result of natural selection.**

d) **The gut bacteria of patients consuming painkillers or proton-pump inhibitors evolve a resistance which is passed onto other pathogens attacking the body.**

Number of words and Explanatory notes for RC:

Number of words: 570

The more these resistant organisms spread, the more they add to the pool of resistance genes in all bacteria, raising the odds that these genes will jump to more disease-causing microbes by horizontal gene transfer.

Option A: In the light of the passage, we can understand that expulsion via efflux pumps, or the inactivation of proteins, are mechanisms by which microbes can demonstrate antibiotic resistance. However, this choice is not an implication of "mechanisms which can be **spread** by the bacterial habit of trading DNA not only with conspecifics but also with other members of the bacterial domain". It does not hint at how bacteria spread antibiotic (or non-antibiotic) resistance to other bacterial species. Option A is not the answer.

Option B: In the case of antipsychotics, these chemically diverse drugs affect many of the same strains of gut bacteria. That suggests their effects on the brain could be a result of their influence on gut flora. But option B is not related to the quoted sentence given in the question.

Option C: Option C mentions natural selection and the removal of drug-sensitive populations of microbes leaving behind drug-resistant populations that propagate. It does not hint at resistant genes jumping to more disease-causing microbes by horizontal gene transfer and thereby does not point to the spreading or the trading of genes. Option C is incorrect.

Option D: The fourth para of the passage talks about how accidental bactericides (including painkillers or proton-pump inhibitors), not intended to harm bacteria, actually do end up harming bacteria. Over time, these bacteria evolve resistance against these bactericides. ....Through the study of the effect of non-antibiotic drugs on the E. coli engineered strains (discussed in the passage), we understand the result: ___Proteins (and thus genes) which protected bacteria from these seven drugs were ones already known to make them resistant to antibiotics___. i.e. Non-antibiotic drugs promote antibiotic resistance in gut microbes. Furthering this idea, the antibiotic resistance (protective mechanism) if passed on to other pathogens infecting the body (as mentioned in option D) is parallel to "bacterial habit of trading DNA not only with conspecifics but also with other members of the bacterial domain" mentioned in the quoted sentence. Option D is the correct answer.   Choice (D)

Q24. Which of the following additional studies can serve to alleviate that which the author calls "worrisome" in the last para of the passage?

a) **Studies showing that the gut bacteria seldom came into contact with the disease-causing bacteria.**

b) **Studies focussing on assessing the impact of the gut bacteria of patients consuming accidental bactericides on pathogens that subsequently infected the body.**

c) **Epidemiological studies linking antibiotic consumption and the dissemination of resistant bacterial strains.**

d) **Subtherapeutic studies linking high antibiotic concentrations in the gut to antibiotic resistance via horizontal gene transfer, mutagenesis and changes in gene expression.**

Number of words and Explanatory notes for RC:

Number of words: 570

Option A: _Bacteria often use similar mechanisms to evade all classes of drug. These protective mechanisms can be spread by the bacterial habit of trading DNA not only with conspecifics but also with other members of the bacterial domain. The more these resistant organisms spread, the more they add to the pool of resistance genes in all bacteria, raising the odds that these genes will jump to more disease-causing microbes by horizontal gene transfer. That is worrisome. Drug-resistant infections could, by some estimates, become responsible for 10m deaths a year by 2050, up from 700,000 today._ Now, if a study showed that the gut bacteria seldom came into contact with disease-causing bacteria, then the resistance genes would not jump to other disease-causing microbes by horizontal gene transfer. Option A would bring some good news in the fight against antimicrobial resistance and would alleviate the "worrisomeness" mentioned in the last para of the passage. Hence option A is the correct answer.

Option B: Option B mentions a study that has already been carried out. _The researchers noticed too that the strains of bacteria most resistant to the effects of drugs not aimed at them were also those most resistant to antibiotics. ....To check if that was indeed the case, Dr Maier and her colleagues first_ .....These protective mechanisms can be spread by the bacterial habit of trading DNA not only with conspecifics but also with other members of the bacterial domain. Option B will not reduce the worry or concern expressed by the author in the last para of the passage.

Option C: The widespread use of antibiotics encourages the pathogens they are directed against to become inured to their effects. That is well known. Option C refers to information that is already available. An additional study of this nature would not suffice in gaining new insights nor dealing with the "worrisomeness" mentioned in the last para of the passage. Hence option C is not the correct answer.

Option D: Option D again mentions factors leading to antibiotic resistance in microbes. Option D will not alleviate the "worrisomeness" mentioned in the last para of the passage. Hence option D is eliminated.   Choice (A)

Q25. DIRECTIONS *for question 25*: Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. Four of them can be put together to form a meaningful and coherent short paragraph and one sentence is the odd one out. Decide on the proper logical order for the sentences and key in the sequence of <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. From the eighth century BC, the Greeks were organised into various independent city-states, known as *poleis*, which spanned the entire Mediterranean region and the Black Sea.
2. While Athens has been inhabited for thousands of years, it became the capital of Greece after the country gained independence from the Ottoman Empire in the Greek War of Independence.
3. They celebrate Independence Day on March 24 with the annual students' parade and continue the following day with a grand parade that features marching bands and military vehicles.
4. Athens is one of the oldest cities in the world and considered the birthplace of democracy, Western philosophy, and the Olympic Games, among other foundational achievements.
5. Back then, the city was home to about 4,000 people but today, more than 600,000 people live in Athens, with nearly 4 million in the metro area.

Sentence 1: Sentence makes no mention of Athens. It talks about the Greeks being organised into various independent city-states.
Sentence 2: Sentence 2 tells us when Athens became the capital of Greece.
Sentence 3: Sentence 3 talks about the Independence Day celebrations in Athens. It has a reference to the pronoun 'They'.
Sentence 4: Sentence 4 is introductory in tone (Athens is one of the oldest cities). It mentions the event "Greek Independence Day". And it portrays Athens as the birthplace of many foundational achievements including democracy.
Sentence 5: Sentence 5 has a clue 'back then'. "The city" in sentence 1 refers to Athens. Sentence 1 compares the number of people in Athens in the past with that of current times.

So, sentence 4 is a general sentence to begin the paragraph. It initiates the discussion about Athens. "Athens is one of the oldest cities in the world and considered the birthplace...." Sentence 4 is followed by sentence 2 which talks about how Greece gained independence from the Ottoman Empire in the Greek War of Independence, after which Athens became the capital of Greece. "Athens, one of the oldest cities in the world" in sentence 4 links with "Athens has been inhabited for thousands of years" in sentence 2. "the Greek War of Independence" in sentence 2 points to "Independence Day" in sentence 4.

Sentences 2 and 5 form a logical block. "**Back then**, the city was home to about 4,000 people" in sentence 5 links with "Athens became the capital of Greece **after** the country gained independence" in sentence 2. So, 5 follows 2. Sentence 3 is the conclusion sentence of the para. "Independence Day celebrations in the city start on March 24" in sentence 3 mirrors the introduction sentence "For Greek Independence Day, we've got a sprawling view of Athens" in sentence 4. So, 4253. Sentence 1 which has no reference to Athens is the odd sentence out. It introduces 'poleis' or 'independent Greek city states' to us. This point can be a part of another para.

Ans: (4253)

For most of human history we haven't needed to think long-term. It wasn't very useful when we were avoiding attacks from sabre-toothed tigers, desperately foraging for breakfast on the forest floor and surviving extreme weather conditions. As futurist Jamais Casio puts it, "In a world of constant, imminent existential threats, the ability to recognise subtle, long-term processes and multi-generational changes wasn't a particularly important adaptive advantage." Yet today, the nature of risk has changed. We no longer live in a world of clear, local cause and effect, and the greatest threats to civilisation are happening on the timescale of decades or centuries.

a) **A world of perpetual and impending existential threats has given way to one where threats require us to think long-term.**

b) While individual preservation was the priority for the greater part of human history, we must adapt to threats to the whole civilisation.

c) Humans have adapted to deal with immediate threats, but haven't learnt to deal with subtle, multi-generational threats.

d) The threats have changed in nature from those that threatened life to those that threaten the civilisation.

Consider the sentences: 'For most of human history we haven't needed to think long-term. It wasn't very useful when we were avoiding attacks from sabre-toothed tigers, desperately foraging for breakfast on the forest floor and surviving extreme weather conditions. As futurist Jamais Casio puts it, "In **a world of constant, imminent existential threats**, the ability to recognise subtle, long-term processes and multi-generational changes wasn't a particularly important adaptive advantage." Yet today, the nature of risk has changed. We no longer live in a world of clear, local cause and effect, and the **greatest threats to civilisation are happening on the timescale of decades or centuries**.

Option A: This option differentiates between historical threats, which were impending and imminent compared to threats of the present, which shape up over generations and are not immediate, and hence, need long-term thought. Hence, Option A is the answer.

Option B: The distinction drawn in the para is not between individuals fighting it alone to survive and civilisations fighting it together. The para is trying to distinguish between threats that plagued humans back in the past and the nature of threats than can be seen now. Hence, Option B is not the answer.

Option C: The para doesn't intend to focus on the ability or inability of humans. Rather, it highlights the change in the present world compared to the one in the past. Hence, Option C is not the answer.

Option D: The difference in threats is not drawn based on who is threatened. The difference that has been drawn is on the basis of time. In the past, there were imminent threats which needed to be handled urgently. Now, the threats take shape over centuries. Hence, Option D is not the answer.   Choice (A)

Q27.   DIRECTIONS *for question 27*: Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. Four of them can be put together to form a meaningful and coherent short paragraph and one sentence is the odd one out. Decide on the proper logical order for the sentences and key in the sequence of <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. And instead of looking to be right all the time, we should be looking for how we're wrong all the time because being wrong opens us up to the possibility of change.
2. Instead of striving for certainty, we should be in constant search of doubt: doubt about our own beliefs and principles.
3. That's why accepting the inevitable imperfections of our values is necessary for any growth to take place.

4. Growth is an endlessly iterative process: when we learn something new, we don't go from "wrong" to "right" but we go from wrong to slightly less wrong.
5. Certainty is the enemy of growth: nothing is for certain until it has already happened and even then, it's still debatable.

Sentence 1: Sentence 1 has the clue "And Instead of".
Sentence 2: Sentence 2 has a contrast marker "Instead of". It also tells us that we should be in search for doubt (and not certainty).
Sentence 3: Sentence 3 has the clue 'That's why'. This refers to a downstream statement following another sentence which gives us the reason.
Sentence 4: Sentence 4 focuses on 'growth'. The description 'iterative process' is explained in "we don't go from "wrong" to "right" but we go from wrong to slightly less wrong.
Sentence 5: Sentence 5 tells us that certainty is the enemy of growth.
In this question, we need to understand the central focus of the para. Is it a discussion about certainty or is it a discussion about growth? There are four sentences which are directly or indirectly speaking about certainty viz sentences 1, 2, 3 and 5. Sentence 4 focuses purely on growth and is the odd sentence out.
Sentence 5 is the topic sentence of the para. It tells us that certainty is the enemy of growth and emphasises that nothing is for certain until it has already happened. Sentences 5 and 3 form a cause-effect sequence. "nothing is for certain until it has already happened and even then, it's still debatable" in sentence 5 is the reason or cause for the action step "accepting the inevitable imperfections of our values is necessary for growth" in sentence 3. Another way of looking at these two sentences is: "Certainty" in 5 contrasts "inevitable imperfections of our values" in sentence 3. Also "enemy of growth" in 5 contrasts "necessary for any growth to take place" in 3.
We now need to see whether and how "inevitable imperfections of our values" has been expanded in the remaining sentences. We can understand that "constant search of doubt" in sentence 2 and "looking for how we're wrong all the time" in sentence 1 point to "inevitable imperfections of our values" given in sentence 3. "we should be in constant search of doubt: doubt about our own beliefs and principles" in sentence 2 also supports "certainty is the enemy of growth" given in sentence 5. So, sentence 2 (Instead of striving for certainty....) and sentence 1 (And instead of looking to be right all the time....), in that order, follow sentence 3. Hence, 5321.
Sentence 4 can be placed in another para, much later in the flow.   Ans: (5321)

Q28. DIRECTIONS *for question 28*: The paragraph given below is followed by four summaries. Choose the option that best represents the author's primary position in the paragraph.

Perhaps the most dangerous impact of neoliberalism is not the economic crises it has caused, but the political crisis. As the domain of the state is reduced, our ability to change the course of our lives through voting also contracts. Instead, neoliberal theory asserts, people can exercise choice through spending. But some have more to spend than others: in the great consumer or shareholder democracy, votes are not equally distributed. The result is a disempowerment of the poor and

middle. As parties of the right and former left adopt similar neoliberal policies, disempowerment turns to disenfranchisement. Large numbers of people have been shed from politics.

 a) **Neoliberalism lies at the root of disillusionment of some sections of society due to their inability to match the spending power of other sections.**

b) **Neoliberalism interferes with the political system by making some voters more important than the others.**

 c) **Neoliberalism has managed to place greater spending power in the hands of some sections of society, thus undermining the value of a democratic system.**

 d) **Neoliberalism has marginalised people with lower spending power in the democratic system, by undermining their ability to make a meaningful choice through voting.**

The para has three parts.

*Perhaps the most dangerous impact of neoliberalism is not the economic crises it has caused, but the political crisis. As the domain of the state is reduced, **our ability to change the course of our lives through voting also contracts**. Instead, neoliberal theory asserts, **people can exercise choice through spending**. But some have more to spend than others: in the great consumer or shareholder democracy, votes are not equally distributed. The result is a disempowerment of the poor and middle. As parties of the right and former left adopt similar neoliberal policies, **disempowerment turns to disenfranchisement**. Large numbers of people have been shed from politics.*

(A) Our ability to change the course of our lives through voting contracts.
(B) People can exercise choice through spending.
(C) Disempowerment of the poor and middle leads to disenfranchisement.

Option A: It is not disillusionment, but disenfranchisement that the author is talking about. The poor and middle are not disillusioned (in which case, they believe their vote has no power). Rather, they are disenfranchised – **shed from politics** – their vote just doesn't have the power. Hence, Option A is not the answer.

Option B: While neoliberalism does interfere with the political system, this option doesn't represent the author's position, in that it doesn't depict the true essence – that it not only interferes but has disenfranchised a section. So, it is not just that some voters are more important than others. It also needs to be understood that in this system, some voters have no choice, so to speak, at all. Hence, Option B is not the answer.

Option C: Neoliberalism doesn't give greater spending power to some. Rather, it gives those with greater spending power, the dominance, by disenfranchising those who don't have the spending power. Hence, Option C is not the answer.

Option D: This option addresses the author's true intent, to communicate how neoliberalism has undermined / compromised the ability of some sections of society (poor and the middle) to exercise a meaningful choice that matters through voting, and thus cut them off from the political system (marginalised them from the democratic system).

Choice (D)

Q29. DIRECTIONS *for question 29*: The question consists of a paragraph with three blanks. For each blank choose one numbered word/ phrase from the corresponding column of choices that will best complete the text. Key in the appropriate numbers of the words/ phrases for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words/ phrases labelled (1), (5) and (9) can complete the text correctly, then enter 159 as your answer in the input box. (Note: Only one word/ phrase in each column can fill the respective blank correctly.)

The Spanish Civil War provides insight into the changing nature of warfare. Civilians were systematically targeted by aerial bombing and the catastrophic results of such attacks were _____(i)_____ in audiovisual media. These changes in the methods of conducting and communicating the effects of war are reflected in the extensive body of poetry written by several foreign authors that allows for the examination of the range of aesthetic paradigms employed to represent the Spanish war in different languages. Such an approach permits the analysis of two

tendencies in the representation of air raids: as an aggressive tactic to instill terror, and as a horrific vision of the resulting human _____(ii)_____. In both, the civilian victim is represented by the figure of a child: a universal symbol whose death can constitute a sublime image, which is at times as effective as propaganda to legitimate the struggle. The theme of Guernica illustrates the way the images of human destruction function as a/ an _____(iii)_____ of a cruelly novel war that foreshadowed disasters beyond Spanish borders.

Blank (i)	Blank (ii)	Blank (iii)
(1) repurposed	(4) carnage	(7) atrocity
(2) publicized	(5) opprobrium	(8) harbinger
(3) blighted	(6) cortege	(9) allegory

The para begins by telling us that the Spanish Civil War provides insight into the changing nature of warfare. The first blank needs a verb which would refer to "disseminated", "made public", "represented" etc. Note the clue mentioned in the line after the first blank: communicating the effects of war. So the first blank can be best completed by 'publicized' which means to communicate, broadcast, transmit, report. "repurposed" means "adapt for use in a different purpose" and it cannot complete the blank. "blighted" is a negative word and it means "have a severely detrimental effect on". So the correct answer for the first blank is (2) publicized.
The second blank needs to be filled with a negative word. "the images of human destruction" and "foreshadowed disasters" given in the last sentence of the para provide clues and these runs parallel to "horrific vision of the resulting human _____". The effects of war are catastrophic and disastrous. Of the three words given for the second blank, "carnage" is the best word. It means "massacre", "bloodbath", "annihilation". The other words viz opprobrium and cortege are too mild (and incorrect) to describe the effects of war. "Opprobrium" means criticism, censure, vituperation, abuse, public shame and disgrace. "cortege" means "a solemn procession, especially for a funeral" or "a person's entourage or retinue". "cortege" is incorrect in usage here and it has not even been mentioned in the plural form "corteges". So this word can safely be eliminated. The correct answer for the second blank is (4) carnage.
Refer to some clues in the latter half of the passage: "represented", universal symbol", "sublime image", "the theme of Guernica illustrates the way the images of human destruction function" etc. The images of human destruction cannot function as an atrocity. So (7) is eliminated. "Harbinger" means a person or thing that shows that something is going to happen soon, especially something bad. (8) is not the answer. "Allegory" means "analogy", "metaphor", "symbol" , "emblem", "story" and is the correct answer for the third blank. (9) is the correct answer.
The correct answer is 249.   Ans: (249)

Q30.   DIRECTIONS *for question 30*: Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. Four of them can be put together to form a meaningful and coherent short paragraph and one sentence is the odd one out. Decide on the proper logical order for the sentences and key in the sequence of <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. They are able, really, to handle an unfathomably complex world better than a human can.
2. Algorithms are capable of accomplishing tasks and tackling problems that they've never been able to do before.
3. Each was a complex tangle of instructions and processes, and some were themselves made from sub-algorithmic building blocks.
4. The complexity, dynamism, the sheer not-understandability of the algorithm means that there is a middle part – between input and output – where it is possible that no one knows exactly what they're doing.
5. But exactly because they can, the way they work has become unfathomable too.

Sentence 1 is dependent, talking about a comparison between 'they' (probably algorithms) and humans.
Sentence 2 is independent and establishes a context for the algorithm.
Sentence 3 talks about what an algorithm comprises – a complex tangle of instructions.
Sentence 4 talks about the complexity of the algorithm. 'The' indicates previous reference.
Sentence 5 starts with a negative connector 'but' followed by 'because they can'. So, this sentence follows a sentence which talks about some task that these are capable of doing. The pronoun 'they' refers to algorithms as the only plural noun subject in the para doing anything at all.
15 are a logical pair. One talks about how they can handle an unfathomably complex world and the other talks about why the way they work is unfathomable too.
Of the remaining three sentences, 4 fits the best, because it explains 5 – how their work has become unfathomable – no one knows what they are doing.
Of the remaining two sentences – 2 is needed more, because 'algorithms' in 2 precedes 'they' in 1. Hence, 3 is the odd one-out. Both 1 and 5 have 'they', but 5 follows 1 as explained about. 15 follow 2 since 2 defines 'algorithms'. So, 215 is a block. 4 is downstream to 215. So, 2154.   Ans: (2154)

Q31. DIRECTIONS *for question 31*: The question consists of a paragraph with three blanks. For each blank choose one numbered word/ phrase from the corresponding column of choices that will best complete the text. Key in the appropriate numbers of the words/ phrases for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words/ phrases labelled (1), (5) and (9) can complete the text correctly, then enter 159 as your answer in the input box. (Note: Only one word/ phrase in each column can fill the respective blank correctly.)

A silent film is a film with no synchronized recorded sound (and in particular, no audible dialogue). In silent films for entertainment, the plot may be conveyed by the use of title cards, written indications of the plot and key dialogue lines. The idea of combining motion pictures with recorded sound is

_____(i)_____ film itself, but because of the technical challenges involved, the introduction of synchronized dialogue became practical only in the late 1920s with the perfection of the Audion amplifier tube and the Vitaphone system. The term "silent film" is _____(ii)_____, as these films were almost always accompanied by live sounds. During the silent-film era that existed from the mid-1890s to the late 1920s, a pianist, theater organist or a small orchestra would often play music (to accompany the films) either from sheet music or improvisation. Sometimes a person would narrate the _____(iii)_____cards for the audience. Though at the time the technology to synchronize sound with the video didn't exist, music was seen as an essential part of the viewing experience.

Blank (i)	Blank (ii)	Blank (iii)
(1) as illusory as	(4) a retronym	(7) intertitle
(2) not so exigent as	(5) a misnomer	(8) rendition
(3) nearly as old as	(6) apposite	(9) felicific

The para highlights the early history of the silent-film. The idea of combining motion pictures with recorded sound is _____ film itself. Note the clue available in the sentence after the first blank. The introduction of synchronized dialogue **became practical only in the late 1920s.** This means that the idea was as old as film, but due to some limitations, "synchronized dialogue" saw the light of day only in the 1920s. "illusory" means based on illusion, not real. "exigent" means pressing and demanding. The comparisons "as illusory as" and "not so exigent as" are inapt in the given context.

Since the silent-films were almost always accompanied by live sounds (a pianist, theater organist or a small orchestra playing music), the term "silent-film" was a misnomer i.e. a wrong or inaccurate name or designation or use of a term. "Retronym" is a term (such as analog watch, film camera, or snail mail) that is newly created and adopted to distinguish the original or older version, form, or example of something (such as a product) from other, more recent versions, forms, or examples. The specific context does not give us a reason to differentiate "silent-film" from "film" but it gives us a reason (these films were almost always accompanied by live sounds) to explain that the term was a misnomer. So, (5) is a more accurate answer than (4). The term "apposite" means apt in the circumstances or in relation to something but the specific context demands an exact opposite usage of this word.

In the first part of the para, we are told that in silent films, the plot may be conveyed by the use of title cards, written indications of the plot and key dialogue lines. Blank 3 needs an adjective for 'cards'. In silent films for entertainment, the plot may be conveyed by the use of title cards, written indications of the plot and key dialogue lines. Intertitle means a word or group of words (such as dialogue in a silent movie or information about a setting) that appear on-screen during a movie but are not part of a scene. Intertitle is a title card – a piece of filmed, printed text edited into the midst of (i.e.inter-) the photographed action at various points. And this word 'Intertitle' is the correct answer for the last blank. "Felicific" means relating to or promoting increased happiness. This word is inappropriate in describing cards. "Rendition" means a performance or interpretation, especially of a dramatic role or piece of music. The correct answer for the last blank is 7.

The correct answer is 357.   Ans: (357)

Q32. DIRECTIONS *for question 32*: Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. Four of them can be put together to form a meaningful and coherent short paragraph and one sentence is the odd one out. Decide on the proper logical order for the sentences and key in the sequence of <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. It is this philosophical depth that has led many readers to speak of the novel as having changed their lives.
2. Grossman completed *Life and Fate* almost fifteen years after he first started work on *Stalingrad*.
3. Much of this material found its way into Stalingrad and it endows the novel with great vitality and a certain democratic quality.
4. Stalingrad, in contrast, is less philosophical but more immediate; it presents us with a richer, more varied human story.

5. *Life and Fate* is, among other things, a considered statement of his moral and political philosophy — a meditation on the nature of totalitarianism, the danger presented by even the most seemingly benign of ideologies, and the moral responsibility of each individual for his own actions.

Sentence 1 talks about 'this' philosophical depth which has led readers to credit 'the novel' of changing their life.
Sentence 2 introduces us to two titles completed by Grossman.
Sentence 3 talks about 'this material', some content, which gives vitality to the novel, Stalingrad.
Sentence 4 talks about Stalingrad, as being different from something else, in that it is less philosophical. Obviously, the comparison has to be with the other novel mentioned in the para – *Life and Fate*.
Sentence 5 talks about Life and Fate.
5 and 4 make up for one logical block, and we know that 4 follows 5 because 4 has the connector 'in contrast' which means it is being differentiated from something mentioned earlier.
'This philosophical depth' connects 1 to 5 which talks about Life and Fate being a considered statement of his moral and political philosophy. So, 51 is a pair. Between 2 and 3, 2 is more connected to the other three sentences because it introduces both titles. So, 2 has to come ahead of 51. On the other hand, 3 has a term 'this material' but there is no other sentence that refers to any material that may have gone into Stalingrad. So, 3 is the odd one-out. The required answer is 2514.   Ans: (2514)

Q33.   DIRECTIONS *for question 33*: The paragraph given below is followed by four summaries. Choose the option that best represents the author's primary position in the paragraph.

For a long time in the past, it was the rage to remark on the speed with which we were leaving the past behind. Now we happily talk about either how little has changed or that the past persists within or behind the newness of things. We will never be rid of the past. This is surely a fateful way of understanding the past's persistence. But this fate does not have to be bad. Just because we are shadowed by the old does not mean we are its puppets or have no freedom at all. What's more, the idea that the past persists can have a salutary effect. It may soften our fetish for change, turn our fever for forward movement to reticence, relax the continual, tortured desire to "move on." On the other hand, if we admit that the past persists, it does seem unlikely that we will ever achieve total freedom. Accepting this mode of fate ruins the fantasy that we could have no constraints whatever.

a) **One cannot innovate and renovate and at the same time admit that the past had never actually passed.**

b) **One is gripped by the discrepancy between the contemporaneity of a person's act and the primordiality of his intention and its persistence.**

c) **Conjuring up the past can be beneficial or onerous, but it is up to us to achieve a life of freedom without any constraints.**

d) **The past's persistence can have both positive and negative effects but admitting to it limits us in achieving complete freedom.**

Option A: The first part of choice A seems to relate to the idea of moving forward. The second part seems to say that the past has actually passed. But choice A does not adequately explain the persistence of the past and the effects that this idea has.
Option B: Choice B is entirely out of scope. 'Contemporaneity of a person's act and the primordiality of his intention' have not been discussed in the passage. The para talks about understanding the persistence of the past and not the persistence of a man's (past) intentions. So choice B does not capture the author's position.
Option C: Choice C is incorrect as it is not the conjuring up of the past but the idea of the past being persistent that can be salubrious (What's more, the idea that the past persists can have a salutary effect) or repressive (...does seem unlikely that we will ever achieve total freedom). The second part of choice C is incorrect. "upto us to achieve a life of freedom without any constraints" is out of scope. The second half of the para has not been covered in choice C. Choice C does not aptly capture the author's position.
Option D: Choice D can be arrived at, from the third and the last two sentences of the para. It mentions both the positive and negative benefits (On the other hand) of the past's persistence.   Choice (D)

Q34. DIRECTIONS *for question 34*: The question consists of a paragraph with three blanks. For each blank choose one numbered word/ phrase from the corresponding column of choices that will best complete the text. Key in the appropriate numbers of the words/ phrases for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words/ phrases labelled (1), (5) and (9) can complete the text correctly, then enter 159 as your answer in the input box. (Note: Only one word/ phrase in each column can fill the respective blank correctly.)

Every individual is continually exerting himself to find out the most _____(i)_____ employment for whatever capital he can command. It is his own advantage, and not that of the society, which he has in view. But the study of his own advantage leads him to prefer that employment which is most advantageous to the society…As every individual endeavours as much as he can both to employ his capital in the support of domestic industry, and so to direct that industry that its produce may be of the greatest value; every individual necessarily labours to render the annual revenue of the society as great as he can. He neither intends to promote the public interest, nor knows how much he is promoting it. By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is led by _____(ii)_____ to promote an end which was no part of his intention. Nor is it always the worse for the society that it was no part of it. By pursuing his own interest, he frequently _____(iii)_____ that of the society more effectually than when he really intends to promote it.

Blank (i)	Blank (ii)	Blank (iii)
(1) expedient	(4) a wild goose chase	(7) facilitates
(2) detrimental	(5) an invisible hand	(8) jeopardises
(3) insidious	(6) a sense of duty	(9) quells

Consider the sentence: *Every individual is continually exerting himself to find out the most _____1_____ employment for whatever capital he can command.* From the structure of the sentence it can be understood that we need a positive word. An individual will exert himself to find out <positive> employment for whatever capital he can command – whatever money he can invest. Expedient (convenient) is the only positive word. Detrimental means harmful, and so does 'insidious'. So, 1.

Consider the sentences: *By preferring the support of domestic to that of foreign industry, he intends only his own security; and by directing that industry in such a manner as its produce may be of the greatest value, he intends only his own gain, and he is led by _____2_____ to promote an end which was no part of his intention.* If he is led by <something> to promote a consequence which is unintentional, we have to go for 'an invisible hand'. The first clue is the usage of the word 'led by'. One can be led by an invisible hand, not by a wild good chase. A wild goose chase in itself is a journey chasing something unattainable. Also, if one is led by a sense of duty, the consequences will be part of the intention. Hence, 5.

Consider the sentence: *By pursuing his own interest, he frequently _____3_____ that of the society more effectually than when he really intends to promote it.* It has to be a positive word, because the author seems to say that while a person is promoting his own interest, he <> that of the society more effectually (comparison) than when he really intends to promote it <positive>. Hence, if something is more effectual than something positive, it has to be a positive word. Jeopardise is putting something in danger. Quell is putting an end to something. So, 7.   Ans: (157)

DILR

DIRECTIONS *for questions 1 to 4:* **Answer the questions on the basis of the information given below.**

In a manufacturing plant, pen drives are manufactured 24 hours a day, without any break. After every four hours, a quality inspector inspects the pen drives that were manufactured in the previous four hours and discards all the defective pieces manufactured in those four hours. The following line chart presents the cumulative number of pen drives manufactured, on an hourly basis, on a particular day (24 hours, from 0:00 to 24:00). The dip in the line at the end of every four hours corresponds to the defective pieces discarded by the quality inspector.

Cumulative Pen Drives Manufactured
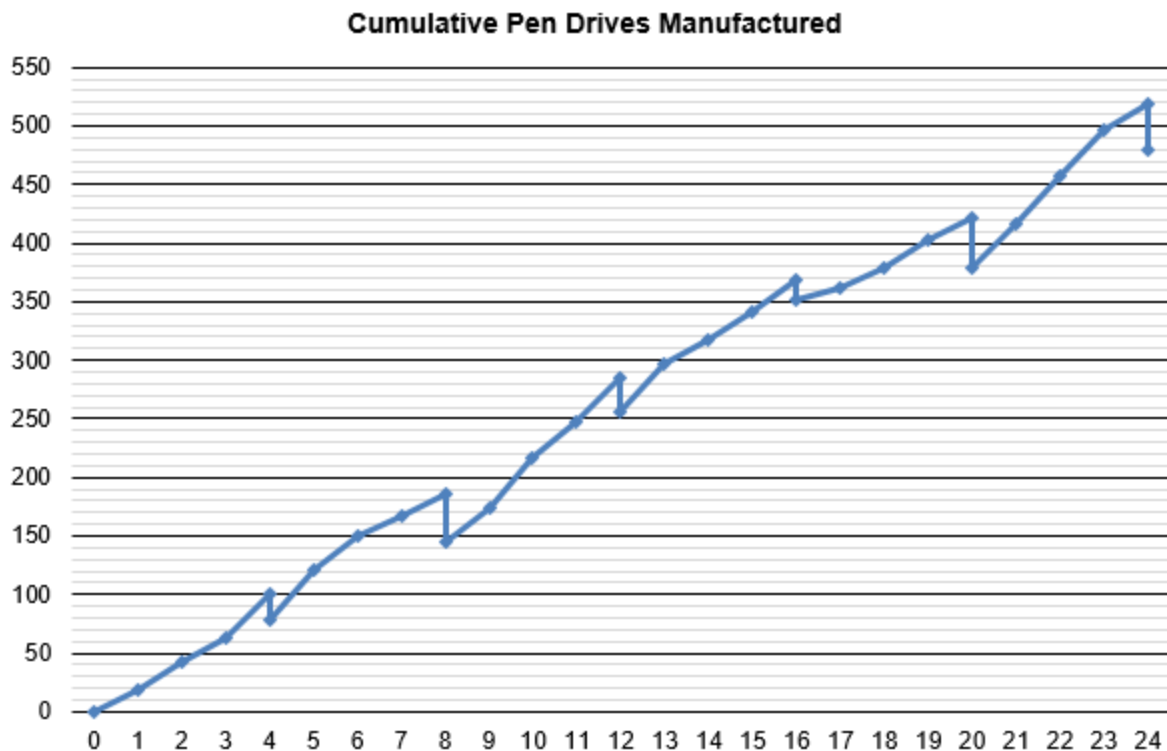
Q1. DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.

During which of the six four-hour periods in the day was the average production of non-defective pen drives per hour the highest?

a) **0:00 to 4:00**

b) **8:00 to 12:00**

c) **12:00 to 16:00**

d) **20:00 to 24:00**

Number of non-defective pen drives manufactured between 0:00 to 4:00 = 80
Number of non-defective pen drives manufactured between 8:00 to 12:00
= 255 – 145 = 110
Number of non-defective pen drives manufactured between 12:00 to 16:00
= 350 – 255 = 95
Number of non-defective pen drives manufactured between 20:00 to 23:59
= 480 – 380 = 100
Hence, the maximum average production was during 8:00 to 12:00.   Choice (B)

Q2. DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.

The total number of defective pen drives manufactured as a percentage of the total number of pen drives manufactured during the day is closest to

a) **28.97%.**

b) **27.91%.**

c) **28.36%.**

d) **27.31%.**

Total number of pen drives manufactured during the day = 670
Number of defective pieces = 190
Required percentage = 190/670 = 28.36%   Choice (C)

Q3. DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.

What was the average number of defective pen drives manufactured per hour between 8:00 and 18:00?

a) **7**

b) **5**

c) **9**

d) **Cannot be determined**

Number of defective pieces manufactured between 8:00 to 12:00 = 30
Number of defective pieces manufactured between 12:00 to 16:00 = 20
Number of defective pieces manufacture between 16:00 to 20:00 = 40
However, the exact number of defective pieces manufactured between 16:00 to 18:00 is not known.
Hence the required average cannot be determined.   Choice (D)

Q4. DIRECTIONS *for question 4:* Type in your answer in the input box provided below the question.

If the defect rate of the plant is defined as the average number of defective pen drives manufactured per hour as a percentage of the average number of non-defective pen drives manufactured per hour, what would be the defect rate of the plant for these 24 hours?

Enter your answer as a decimal value, <u>rounded off to two decimal places</u>.

The total number of non-defective pieces that were manufactured = 480
The number of defective pieces discarded = 20 + 40 + 30 + 20 + 40 + 40 = 190
Average number of defective pen drives manufactured per hour = 190/24
Average number of non-defective pen drives manufactured per hour = 480/24
∴ Defect percentage = 190/480*100 = 39.58%   Ans: (39.58)

Six students – Amar, Bhanu, Chitra, Dev, Eswar and Fatima – wrote an examination which had ten questions in total. A student was awarded one mark for every question he/she answered correctly and was awarded minus (i.e., a penalty of) half a mark for every question he/she answered incorrectly. Also, the students need not necessarily attempt all the questions in the examination since there was no penalty for leaving any question unattempted. Further, it is also known that

    i.   every student attempted at least seven questions and exactly one student answered more than four questions incorrectly.
    ii.   no two students answered the same number of questions correctly but every student answered at least three questions correctly.
    iii.   the number of questions attempted by each of Chitra and Fatima was the same and was less than that by Amar, who, in turn, answered less number of questions correctly than did Dev.
    iv.   though Bhanu attempted more questions than any other student, Bhanu did not get the highest net marks.
    v.   the number of questions answered incorrectly by Chitra was less than that by each of Amar and Dev.
    vi.   Fatima scored a net of 5.5 marks, whereas Bhanu scored a net of 6 marks.

Q5.   DIRECTIONS *for question 5 and 6:* Type in your answer in the input box provided below the question.

What is the maximum number of questions answered correctly by any of the six students?

Let A, B, C, D, E and F represent the six students.
Given that F received 5.5 marks in total. F must have attempted 7 questions and got 6 right and 1 wrong. This is the only possible way in which F would have received 5.5 marks.
Similarly, B would have attempted 9 questions and got 7 right and 2 wrong. From (iii), C would have attempted 7 questions and A would have attempted 8 questions. (Since A cannot attempt 9 questions and has to have attempted more than 7 questions). Also, since B got 7 right and 2 wrong, there has to be someone who attempted 8 questions and got all 8 right. Only then will B have attempted the maximum number of questions and not get the highest marks.
The student who got 8 questions right cannot be F or C. It also cannot be A or D because C got less number of question incorrect than each of A and D. Hence, it has to be E who got 8 questions right.
C has attempted 7 questions got at least 2 questions wrong (since C could not have answered 7 or 6 questions correctly from (ii)). Also, D should have got 5 or 4 questions correct from (ii) and (iii). A should have got 4 or 3 questions right.
If C got 4 questions wrong, A and D should have got more than 4 questions wrong. For D to get 5 questions wrong, D should have attempted at least 9 questions which is not possible from (iv).
If C got 3 questions wrong, C would have answered 4 questions correctly. D should have got more than 3 questions wrong. D should have attempted 8 questions in which he would have got 4 right and 4 wrong. But this is not possible because C also has 4 questions right.
If C got 2 questions wrong, C would have answered 5 questions correctly. D would have answered 4 questions correctly and 3/4 incorrectly attempting a total of 7 or 8 questions. A would have answered 3 correctly and 5 incorrectly also attempting 8 questions (from (i)).
The possible cases are tabulated below.

Student	Attempted	Correct	Incorrect	Marks
A	8	3	5	0.5
B	9	7	2	6.0
C	7	5	2	4.0
D	7/8	4	3/4	2.5/2
E	8	8	0	8.0
F	7	6	1	5.5

The maximum number of questions answered correctly by any student is 8.

Ans: (8)

Q6. DIRECTIONS *for question 5 and 6:* Type in your answer in the input box provided below the question.

How many of the six students scored a net of more than five marks in the examination?

Q7. DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.

The total of the net marks scored by all the six students in the examination is

a) **23.5.**

b) **26.5.**

c) **26.**

d) **Either B or C**

Let A, B, C, D, E and F represent the six students.

Given that F received 5.5 marks in total. F must have attempted 7 questions and got 6 right and 1 wrong. This is the only possible way in which F would have received 5.5 marks.

Similarly, B would have attempted 9 questions and got 7 right and 2 wrong. From (iii), C would have attempted 7 questions and A would have attempted 8 questions. (Since A cannot attempt 9 questions and has to have attempted more than 7 questions). Also, since B got 7 right and 2 wrong, there has to be someone who attempted 8 questions and got all 8 right. Only then will B have attempted the maximum number of questions and not get the highest marks.

The student who got 8 questions right cannot be F or C. It also cannot be A or D because C got less number of question incorrect than each of A and D. Hence, it has to be E who got 8 questions right.

C has attempted 7 questions got at least 2 questions wrong (since C could not have answered 7 or 6 questions correctly from (ii)). Also, D should have got 5 or 4 questions correct from (ii) and (iii). A should have got 4 or 3 questions right.

If C got 4 questions wrong, A and D should have got more than 4 questions wrong. For D to get 5 questions wrong, D should have attempted at least 9 questions which is not possible from (iv).

If C got 3 questions wrong, C would have answered 4 questions correctly. D should have got more than 3 questions wrong. D should have attempted 8 questions in which he would have got 4 right and 4 wrong. But this is not possible because C also has 4 questions right.

If C got 2 questions wrong, C would have answered 5 questions correctly. D would have answered 4 questions correctly and 3/4 incorrectly attempting a total of 7 or 8 questions. A would have answered 3 correctly and 5 incorrectly also attempting 8 questions (from (i)).

The possible cases are tabulated below.

Student	Attempted	Correct	Incorrect	Marks
A	8	3	5	0.5
B	9	7	2	6.0
C	7	5	2	4.0
D	7/8	4	3/4	2.5/2
E	8	8	0	8.0
F	7	6	1	5.5

The sum of all the marks obtained by the students in the examinations is
0.5 + 6 + 4 + 2.5 or 2 + 8 + 5.5 = 26.5 or 26.   Choice (D)

Q8.   DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.

Among the students who attempted exactly seven questions, the student who scored the highest net marks is

a) **Fatima.**

b) **Eswar.**

c) **Dev.**

d) **Cannot be determined.**

Let A, B, C, D, E and F represent the six students.

Given that F received 5.5 marks in total. F must have attempted 7 questions and got 6 right and 1 wrong. This is the only possible way in which F would have received 5.5 marks.

Similarly, B would have attempted 9 questions and got 7 right and 2 wrong. From (iii), C would have attempted 7 questions and A would have attempted 8 questions. (Since A cannot attempt 9 questions and has to have attempted more than 7 questions). Also, since B got 7 right and 2 wrong, there has to be someone who attempted 8 questions and got all 8 right. Only then will B have attempted the maximum number of questions and not get the highest marks.

The student who got 8 questions right cannot be F or C. It also cannot be A or D because C got less number of question incorrect than each of A and D. Hence, it has to be E who got 8 questions right.

C has attempted 7 questions got at least 2 questions wrong (since C could not have answered 7 or 6 questions correctly from (ii)). Also, D should have got 5 or 4 questions correct from (ii) and (iii). A should have got 4 or 3 questions right.

If C got 4 questions wrong, A and D should have got more than 4 questions wrong. For D to get 5 questions wrong, D should have attempted at least 9 questions which is not possible from (iv).

If C got 3 questions wrong, C would have answered 4 questions correctly. D should have got more than 3 questions wrong. D should have attempted 8 questions in which he would have got 4 right and 4 wrong. But this is not possible because C also has 4 questions right.

If C got 2 questions wrong, C would have answered 5 questions correctly. D would have answered 4 questions correctly and 3/4 incorrectly attempting a total of 7 or 8 questions. A would have answered 3 correctly and 5 incorrectly also attempting 8 questions (from (i)).

The possible cases are tabulated below.

Student	Attempted	Correct	Incorrect	Marks
A	8	3	5	0.5
B	9	7	2	6.0
C	7	5	2	4.0
D	7/8	4	3/4	2.5/2
E	8	8	0	8.0
F	7	6	1	5.5

Only three students, Chitra, Dev, and Fatima, attempted more than seven questions. Among the three of them, Fatima got the highest marks.   Choice (A)

Match	Player 1	Player 2	Player 3	Player 4
Match 1	49	48	45	50
Match 2	50	50	45	44
Match 3	56	34	38	57

Q9. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

What can be said regarding the following two statements?

Statement 1: In Match 2, Rohit scored the lowest runs among the four.

Statement 2: Gambhir scored more runs than Rohit in the three matches combined.

a) **If statement 1 is true, then statement 2 is necessarily true.**

b) **If statement 1 is true, then statement 2 is necessarily false.**

c) **Exactly one of the statements is true.**

d) **Both (B) and (C)**

It is given that in match 2, Sehwag scored a half century and that Dhoni scored four runs more than Gambhir in the three matches combined. There are two possible cases.

Case 1: Player 1 – Sehwag, Player 2 – Dhoni, Player 3 – Gambhir and Player 4 – Rohit.
Case 2: Player 1 – Dhoni, Player 2 – Sehwag, Player 3 – Rohit and Player 4 – Gambhir.

If statement 1 is true, Rohit is player 4, in which case it is the first arrangement which is valid. According to case 1, Rohit scored a total of 151 runs, while Gambhir scored 128 runs and so statement 2 is not true and it is true only in case – 2. ∴ Exactly one of the statements is true and if statement 1 is true, then statement 2 is false and vice versa.   Choice (D)

Q10. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

What can be said regarding the following two statements?

Statement 1: In Match 3, Gambhir scored the highest runs among the four.

Statement 2: Dhoni scored the highest runs among the four in the three matches combined.

a) **Both statements could be true.**

b) **At least one of the statements must be true.**

c) **Exactly one of the statements must be true.**

d) **At most one of the statements could be true.**

It is given that in match 2, Sehwag scored a half century and that Dhoni scored four runs more than Gambhir in the three matches combined. There are two possible cases.

Case 1: Player 1 – Sehwag, Player 2 – Dhoni, Player 3 – Gambhir and Player 4 – Rohit.

Case 2: Player 1 – Dhoni, Player 2 – Sehwag, Player 3 – Rohit and Player 4 – Gambhir.

If statement 1 is true, case – 2 is valid and in this case, Dhoni who scored 155 runs would have scored the highest among all the four players. If statement 1 is false, then statement 2 is also false. Choice (A)

Q11. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

If in the three matches, Rohit had his lowest score in Match 3, then which of the following statements is definitely true?

a) **Sehwag had his lowest score in Match 2.**

b) **Sehwag had his lowest score in Match 1.**

c) **Sehwag had his lowest score in Match 3.**

d) **Sehwag scored the highest number of runs, in the three matches combined.**

It is given that in match 2, Sehwag scored a half century and that Dhoni scored four runs more than Gambhir in the three matches combined. There are two possible cases.

Case 1: Player 1 – Sehwag, Player 2 – Dhoni, Player 3 – Gambhir and Player 4 – Rohit.
Case 2: Player 1 – Dhoni, Player 2 – Sehwag, Player 3 – Rohit and Player 4 – Gambhir.

If Rohit had his lowest score in match 3, then the second arrangement is valid. In this case, Sehwag would be player 2 and only choice (C) is true.   Choice (C)

Q12. DIRECTIONS *for questions 9 to 12:* **Select the correct alternative from the given choices.**

What can be said regarding the following two statements?

Statement 1: In the three matches, Gambhir had his lowest score in Match 2.

Statement 2: In the three matches, Dhoni had his lowest score in Match 1.

a) If statement 2 is true, then statement 1 is necessarily false.

b) If statement 1 is false, then statement 2 is necessarily true.

c) If statement 1 is true, then statement 2 is necessarily true.

d) Both (A) and (B)

It is given that in match 2, Sehwag scored a half century and that Dhoni scored four runs more than Gambhir in the three matches combined. There are two possible cases.

Case 1: Player 1 – Sehwag, Player 2 – Dhoni, Player 3 – Gambhir and Player 4 – Rohit.
Case 2: Player 1 – Dhoni, Player 2 – Sehwag, Player 3 – Rohit and Player 4 – Gambhir.

If Gambhir has his lowest score in match 2, he is player 3 and arrangement 2 is valid. In this arrangement, Dhoni is player 1 and he would have the lowest score in match 1.
If statement 1 is true, then statement 2 is necessarily true.   Choice (C)

Each of five persons, Mani, Viswa, Uday, Rahul and Satish, knows exactly two software languages among C, Java, PHP, Python and Ruby. Each of them now wants to learn a language different from the ones that he already knows, from any of the other persons who already knows that language. The languages that the five persons want to learn are all distinct and each person can teach only one other person. Further, it is also known that

i. at least one person knows each language and no two persons know the same set of languages.
ii. three people know Java and at most two people know any of the other four languages.
iii. both Uday and Satish know Python and one of them teaches Mani.
iv. Rahul wants to learn Ruby and only one person knows that language.
v. Mani does not know C but wants to learn Java.

Q13. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.

Who wants to learn Python?

a) **Viswa**

b) **Satish**

c) **Uday**

d) **Cannot be determined**

Given that Uday and Satish know Python. Also from (i) and (v), only one of the two must know Java. From (ii) and (v), Mani cannot know Java. Hence, both Viswa and Rahul both must know Java.

Also, two people must know PHP and two people must know C (since it cannot be more than two).

Mani does not know Java and C and he cannot know Python (since two people already know the language). Hence, Mani must know PHP and Ruby. Therefore, Mani must have taught Rahul.

Between Uday and Satish, one of them must know Java. The other must know either PHP or C. If the other knows PHP, then both Viswa and Rahul will know Java and C. Hence, Uday and Satish must know Python and Java, Python and C in any order. Viswa and Rahul must know PHP and C in any order.

If Rahul teaches Viswa (for example C), then Uday cannot learn Python, Java, Ruby and C. hence, Uday has to learn PHP. Satish cannot learn Python, Java, Ruby and C. hence, Satish also has to learn PHP. This is not possible. Hence, Rahul cannot teach Viswa. Therefore, one among Uday and Satish must teach Viswa. Uday and Satish must be taught by Viswa and Rahul in any order.

Also, Between Uday and Satish, the person who knows Python and C will teach Viswa. If Viswa learns C, Uday and Satish both can learn only PHP. Hence, Viswa must learn Python.

The following table presents this information:

Person	Languages Known	Language to learn	Learn from
Mani	PHP, Ruby	Java	Uday/Satish
Rahul	Java, C/PHP	Ruby	Mani
Satish	Python, C/Java	PHP/C	Rahul/Viswa
Uday	Python, Java/C	C/PHP	Viswa/Rahul
Viswa	Java, PHP/C	Python	Satish/Uday

Viswa wants to learn Python.   Choice (A)

Q14.   DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.

If Satish teaches Mani, which language does Uday want to learn?

a) Java

b) C

c) PHP

Given that Uday and Satish know Python. Also from (i) and (v), only one of the two must know Java. From (ii) and (v), Mani cannot know Java. Hence, both Viswa and Rahul both must know Java.

Also, two people must know PHP and two people must know C (since it cannot be more than two).

Mani does not know Java and C and he cannot know Python (since two people already know the language). Hence, Mani must know PHP and Ruby. Therefore, Mani must have taught Rahul.

Between Uday and Satish, one of them must know Java. The other must know either PHP or C. If the other knows PHP, then both Viswa and Rahul will know Java and C. Hence, Uday and Satish must know Python and Java, Python and C in any order. Viswa and Rahul must know PHP and C in any order.

If Rahul teaches Viswa (for example C), then Uday cannot learn Python, Java, Ruby and C. hence, Uday has to learn PHP. Satish cannot learn Python, Java, Ruby and C. hence, Satish also has to learn PHP. This is not possible. Hence, Rahul cannot teach Viswa. Therefore, one among Uday and Satish must teach Viswa. Uday and Satish must be taught by Viswa and Rahul in any order.

Also, Between Uday and Satish, the person who knows Python and C will teach Viswa. If Viswa learns C, Uday and Satish both can learn only PHP. Hence, Viswa must learn Python.

The following table presents this information:

Person	Languages Known	Language to learn	Learn from
Mani	PHP, Ruby	Java	Uday/Satish
Rahul	Java, C/PHP	Ruby	Mani
Satish	Python, C/Java	PHP/C	Rahul/Viswa
Uday	Python, Java/C	C/PHP	Viswa/Rahul
Viswa	Java, PHP/C	Python	Satish/Uday

If Satish teaches Mani, Satish knows Java. Hence, Uday knows C ⇒Uday wants to learn PHP.   Choice (C)

Q15.   DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.

If Rahul knows PHP, then who teaches Uday?

Given that Uday and Satish know Python. Also from (i) and (v), only one of the two must know Java. From (ii) and (v), Mani cannot know Java. Hence, both Viswa and Rahul both must know Java.

Also, two people must know PHP and two people must know C (since it cannot be more than two).

Mani does not know Java and C and he cannot know Python (since two people already know the language). Hence, Mani must know PHP and Ruby. Therefore, Mani must have taught Rahul.

Between Uday and Satish, one of them must know Java. The other must know either PHP or C. If the other knows PHP, then both Viswa and Rahul will know Java and C. Hence, Uday and Satish must know Python and Java, Python and C in any order. Viswa and Rahul must know PHP and C in any order.

If Rahul teaches Viswa (for example C), then Uday cannot learn Python, Java, Ruby and C. hence, Uday has to learn PHP. Satish cannot learn Python, Java, Ruby and C. hence, Satish also has to learn PHP. This is not possible. Hence, Rahul cannot teach Viswa. Therefore, one among Uday and Satish must teach Viswa. Uday and Satish must be taught by Viswa and Rahul in any order.

Also, Between Uday and Satish, the person who knows Python and C will teach Viswa. If Viswa learns C, Uday and Satish both can learn only PHP. Hence, Viswa must learn Python.

The following table presents this information:

Person	Languages Known	Language to learn	Learn from
Mani	PHP, Ruby	Java	Uday/Satish
Rahul	Java, C/PHP	Ruby	Mani
Satish	Python, C/Java	PHP/C	Rahul/Viswa
Uday	Python, Java/C	C/PHP	Viswa/Rahul
Viswa	Java, PHP/C	Python	Satish/Uday

If Rahul knows PHP, Viswa knows C. Either of Viswa and Rahul can teach Uday. Hence, the answer cannot be determined.   Choice (D)

Q16. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.

If Uday teaches Python, which language does Satish want to learn?

a) PHP

b) C

c) Java

d) Python

Given that Uday and Satish know Python. Also from (i) and (v), only one of the two must know Java. From (ii) and (v), Mani cannot know Java. Hence, both Viswa and Rahul both must know Java.

Also, two people must know PHP and two people must know C (since it cannot be more than two).

Mani does not know Java and C and he cannot know Python (since two people already know the language). Hence, Mani must know PHP and Ruby. Therefore, Mani must have taught Rahul.

Between Uday and Satish, one of them must know Java. The other must know either PHP or C. If the other knows PHP, then both Viswa and Rahul will know Java and C. Hence, Uday and Satish must know Python and Java, Python and C in any order. Viswa and Rahul must know PHP and C in any order.

If Rahul teaches Viswa (for example C), then Uday cannot learn Python, Java, Ruby and C. hence, Uday has to learn PHP. Satish cannot learn Python, Java, Ruby and C. hence, Satish also has to learn PHP. This is not possible. Hence, Rahul cannot teach Viswa. Therefore, one among Uday and Satish must teach Viswa. Uday and Satish must be taught by Viswa and Rahul in any order.

Also, Between Uday and Satish, the person who knows Python and C will teach Viswa. If Viswa learns C, Uday and Satish both can learn only PHP. Hence, Viswa must learn Python.

The following table presents this information:

| Person	Languages Known	Language to learn	Learn from
Mani	PHP, Ruby	Java	Uday/Satish
Rahul	Java, C/PHP	Ruby	Mani
Satish	Python, C/Java	PHP/C	Rahul/Viswa
Uday	Python, Java/C	C/PHP	Viswa/Rahul
Viswa	Java, PHP/C	Python	Satish/Uday

. If Uday teaches Python, Satish teaches Java. Hence, Satish wants to learn C

Choice (B)

DIRECTIONS *for questions 17 to 20:* **Answer these questions on the basis of the information given below.**

The workers in a factory work in shifts, wherein each day is divided into six shifts – Shift I to Shift VI – each of a duration of four hours. The timings of Shift I to Shift VI are 00:00 hrs to 04:00 hrs, 04:00 hrs to 08:00 hrs and so on up to 20:00 hrs to 00:00 hrs respectively. Ranjith, the floor manager in this factory, has to assign exactly three workers to each shift. There are a total of fifteen workers in the factory whom Ranjith can assign to any shift. Each worker can

be assigned to multiple shifts but no worker can be assigned to two consecutive shifts. Each worker is available during a different time of the day and can be assigned to any shift only if he is available for the entire duration of the shift. The following graph provides the times (from midnight to midnight) during which the workers are available on a particular day:

Time of the day
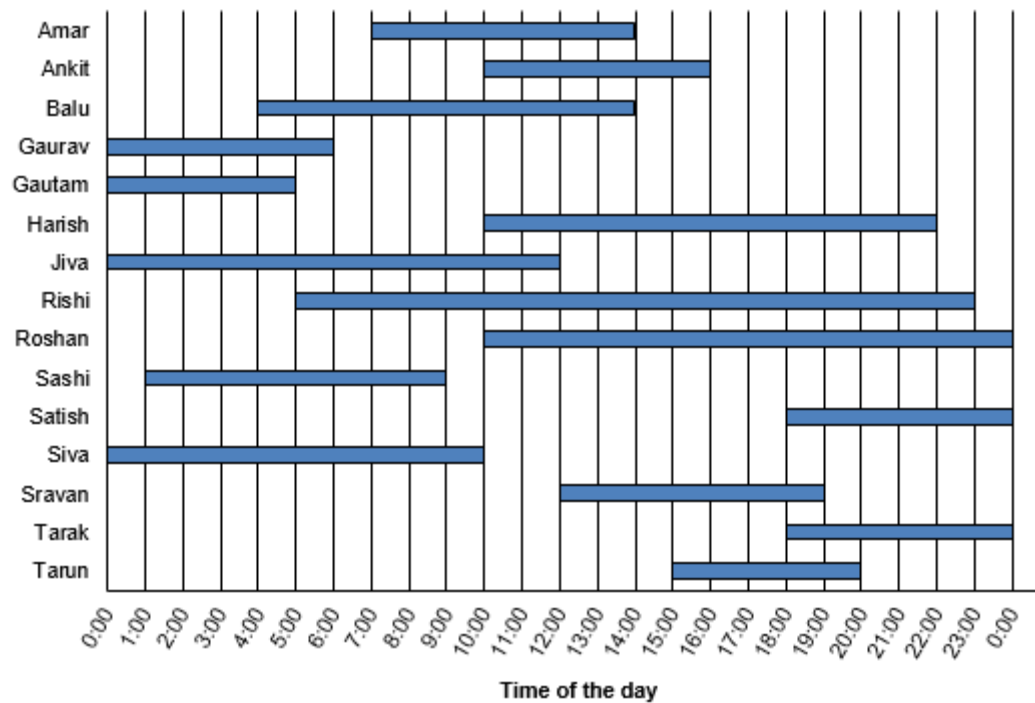
Q17. DIRECTIONS *for question 17:* **Select the correct alternative from the given choices.**

Which of the following sets of workers will work in Shift IV?

a) Sravan, Rishi, Ankit

b) Rishi, Harish, Ankit

c) Sravan, Roshan, Ankit

d) More than one of the above

We can tabulate the availability of each person for different shifts from the graph:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Siva	Siva	Rishi	Sravan	Tarun	Tarak
Jiva	Sashi	Jiva	Roshan	Roshan	Satish
Gautam	Jiva	Balu	Rishi	Rishi	Roshan
Gaurav	Balu	Amar	Harish	Harish	
			Ankit		

We can see that for Shift VI, only three persons are available. Hence, they have to be assigned Shift VI. Since a person cannot work in consecutive shifts, Tarak, Satish and Roshan cannot work in Shift V. Hence, Tarun, Rishi and Harish will be in Shift V. Similarly, Rishi and Harish cannot be in Shift IV and Sravan, Roshan and Ankit will be in Shift IV.
If Siva, Gautam and Gaurab are in Shift I, Shashi, Jiva and Balu will be in Shift II. In this case Jiva and Balu cannot be in Shift III and hence, this case is not possible (since there will only be two people available for Shift III).
If Jiva, Gautam, Gaurav are in Shift I, Siva, Shashi and Balu can be in Shift II. In Shift III, Rishi, Jiva and Amar can be in Shift III.
This is the only possible case.
Hence, Ranjith can select in only one way which is given below:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Jiva	Siva	Rishi	Sravan	Tarun	Tarak
Gautam	Sashi	Jiva	Roshan	Rishi	Satish
Gaurav	Balu	Amar	Ankit	Harish	Roshan

Sravan, Roshan and Ankit will work in Shift IV.   Choice (C)

Q18.   DIRECTIONS *for question 18:* Type in your answer in the input box provided below the question.

How many of the fifteen workers will work for more than one shift?

We can tabulate the availability of each person for different shifts from the graph:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Siva	Siva	Rishi	Sravan	Tarun	Tarak
Jiva	Sashi	Jiva	Roshan	Roshan	Satish
Gautam	Jiva	Balu	Rishi	Rishi	Roshan
Gaurav	Balu	Amar	Harish	Harish	
			Ankit		

We can see that for Shift VI, only three persons are available. Hence, they have to be assigned Shift VI. Since a person cannot work in consecutive shifts, Tarak, Satish and Roshan cannot work in Shift V. Hence, Tarun, Rishi and Harish will be in Shift V. Similarly, Rishi and Harish cannot be in Shift IV and Sravan, Roshan and Ankit will be in Shift IV.

If Siva, Gautam and Gaurab are in Shift I, Shashi, Jiva and Balu will be in Shift II. In this case Jiva and Balu cannot be in Shift III and hence, this case is not possible (since there will only be two people available for Shift III).

If Jiva, Gautam, Gaurav are in Shift I, Siva, Shashi and Balu can be in Shift II. In Shift III, Rishi, Jiva and Amar can be in Shift III.

This is the only possible case.

Hence, Ranjith can select in only one way which is given below:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Jiva	Siva	Rishi	Sravan	Tarun	Tarak
Gautam	Sashi	Jiva	Roshan	Rishi	Satish
Gaurav	Balu	Amar	Ankit	Harish	Roshan

Three workers, Jiva, Rishi and Roshan, will work in more than one shift.

Ans: (3)

Q19. DIRECTIONS *for questions 19 and 20:* **Select the correct alternative from the given choices.**

Which of the following shifts will be assigned to Rishi?

a) Shift III

b) Shift IV

c) Shift V

d) More than one of the above

We can tabulate the availability of each person for different shifts from the graph:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Siva	Siva	Rishi	Sravan	Tarun	Tarak
Jiva	Sashi	Jiva	Roshan	Roshan	Satish
Gautam	Jiva	Balu	Rishi	Rishi	Roshan
Gaurav	Balu	Amar	Harish	Harish	
			Ankit		

We can see that for Shift VI, only three persons are available. Hence, they have to be assigned Shift VI. Since a person cannot work in consecutive shifts, Tarak, Satish and Roshan cannot work in Shift V. Hence, Tarun, Rishi and Harish will be in Shift V. Similarly, Rishi and Harish cannot be in Shift IV and Sravan, Roshan and Ankit will be in Shift IV.

If Siva, Gautam and Gaurab are in Shift I, Shashi, Jiva and Balu will be in Shift II. In this case Jiva and Balu cannot be in Shift III and hence, this case is not possible (since there will only be two people available for Shift III).

If Jiva, Gautam, Gaurav are in Shift I, Siva, Shashi and Balu can be in Shift II. In Shift III, Rishi, Jiva and Amar can be in Shift III.

This is the only possible case.

Hence, Ranjith can select in only one way which is given below:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Jiva	Siva	Rishi	Sravan	Tarun	Tarak
Gautam	Sashi	Jiva	Roshan	Rishi	Satish
Gaurav	Balu	Amar	Ankit	Harish	Roshan

Rishi will be assigned Shift III and Shift V.   Choice (D)

Q20.   DIRECTIONS *for questions 19 and 20:* **Select the correct alternative from the given choices.**

For which of the following shifts will all the workers assigned to that shift not be assigned to any other shift?

a) Shift I

b) Shift II

c) Shift III

d) Shift IV

We can tabulate the availability of each person for different shifts from the graph:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Siva	Siva	Rishi	Sravan	Tarun	Tarak
Jiva	Sashi	Jiva	Roshan	Roshan	Satish
Gautam	Jiva	Balu	Rishi	Rishi	Roshan
Gaurav	Balu	Amar	Harish	Harish	
			Ankit		

We can see that for Shift VI, only three persons are available. Hence, they have to be assigned Shift VI. Since a person cannot work in consecutive shifts, Tarak, Satish and Roshan cannot work in Shift V. Hence, Tarun, Rishi and Harish will be in Shift V. Similarly, Rishi and Harish cannot be in Shift IV and Sravan, Roshan and Ankit will be in Shift IV.

If Siva, Gautam and Gaurab are in Shift I, Shashi, Jiva and Balu will be in Shift II. In this case Jiva and Balu cannot be in Shift III and hence, this case is not possible (since there will only be two people available for Shift III).

If Jiva, Gautam, Gaurav are in Shift I, Siva, Shashi and Balu can be in Shift II. In Shift III, Rishi, Jiva and Amar can be in Shift III.

This is the only possible case.

Hence, Ranjith can select in only one way which is given below:

Shift I	Shift II	Shift III	Shift IV	Shift V	Shift VI
Jiva	Siva	Rishi	Sravan	Tarun	Tarak
Gautam	Sashi	Jiva	Roshan	Rishi	Satish
Gaurav	Balu	Amar	Ankit	Harish	Roshan

The workers in Shift II will not work in any other shift.   Choice (B)

DIRECTIONS *for questions 21 to 24:* **Answer the questions on the basis of the information given below.**

John was the CEO of Gauss Inc., an electronics company. During the recent past, the company lost several of its client contracts and this became a cause of alarm for him. Therefore, he called a meeting of the senior executives in his company. He scheduled the

meeting for 3:00 p.m. and he sent a memo to Albert, Jack, Melinda, William, and Steve, who are the heads of Manufacturing, Strategy, Marketing, Finance, and Human Resources, not necessarily in that order. He was the first to arrive at the Conference Hall, where the meeting was scheduled. The following information is also known about the order in which the rest of them arrived:

   i.   John arrived ten minutes before Jack, the Head of Manufacturing, arrived.
   ii. The Head of Human Resources was the second to arrive and Melinda arrived exactly on time.
   iii. The Head of Marketing was the only person who came late for the meeting.
   iv. Albert arrived exactly five minutes after Jack arrived and five minutes before Melinda arrived.
   v.   The Head of Strategy did not arrive after the Head of Finance.

Q21.   DIRECTIONS *for questions 21 to 24:* **Select the correct alternative from the given choices.**

At what time did John arrive at the Conference Hall?

 a) **2:30 p.m.**

 b) **2:35 p.m.**

 c) **2:40 p.m.**

 d) **Cannot be determined**

Given that John was the first to arrive and HR head was the second to arrive. The Marketing head would be the last to arrive since he was the only person late for the meeting.

Also from iv, Jack arrived before Albert and Melinda and none of them are the Marketing head (because none of them were late). Hence, Jack should have been the third to arrive.

Since Albert and Melinda are neither the Marketing Head nor the HR head, they can only be either Strategy or Finance heads. Also, from v, the head of Strategy arrived before the head of Finance. Therefore, Albert must be the Strategy head and Melinda the Finance head.

Melinda arrived exactly on time, i.e. at 3:00 p.m. Albert arrived 5 minutes before Melinda, at 2:55 p.m. Jack arrived 5 minutes before Albert, at 2:50 p.m. and John arrived at 2:40 p.m.

Name	John	Steve / William	Jack	Albert	Melinda	William / Steve
Head of	CEO	HR	Manufacturing	Strategy	Finance	Marketing
Arrived at	2:40		2:50	2:55	3:00	

John arrived at 2:40 p.m.   Choice (C)

Q22.   DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.

Who is the Head of Strategy?

a) Albert

b) Melinda

c) Steve

d) William

Given that John was the first to arrive and HR head was the second to arrive. The Marketing head would be the last to arrive since he was the only person late for the meeting.

Also from iv, Jack arrived before Albert and Melinda and none of them are the Marketing head (because none of them were late). Hence, Jack should have been the third to arrive.

Since Albert and Melinda are neither the Marketing Head nor the HR head, they can only be either Strategy or Finance heads. Also, from v, the head of Strategy arrived before the head of Finance. Therefore, Albert must be the Strategy head and Melinda the Finance head.

Melinda arrived exactly on time, i.e. at 3:00 p.m. Albert arrived 5 minutes before Melinda, at 2:55 p.m. Jack arrived 5 minutes before Albert, at 2:50 p.m. and John arrived at 2:40 p.m.

Name	John	Steve / William	Jack	Albert	Melinda	William / Steve
Head of	CEO	HR	Manufacturing	Strategy	Finance	Marketing
Arrived at	2:40		2:50	2:55	3:00	

Albert is the Head of Strategy. Choice (A)

Q23. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.

If Steve is the Head of Marketing, who was the second person to arrive?

a) Albert

b) Melinda

c) Jack

d) William

Given that John was the first to arrive and HR head was the second to arrive. The Marketing head would be the last to arrive since he was the only person late for the meeting.

Also from iv, Jack arrived before Albert and Melinda and none of them are the Marketing head (because none of them were late). Hence, Jack should have been the third to arrive.

Since Albert and Melinda are neither the Marketing Head nor the HR head, they can only be either Strategy or Finance heads. Also, from v, the head of Strategy arrived before the head of Finance. Therefore, Albert must be the Strategy head and Melinda the Finance head.

Melinda arrived exactly on time, i.e. at 3:00 p.m. Albert arrived 5 minutes before Melinda, at 2:55 p.m. Jack arrived 5 minutes before Albert, at 2:50 p.m. and John arrived at 2:40 p.m.

Name	John	Steve / William	Jack	Albert	Melinda	William / Steve
Head of	CEO	HR	Manufacturing	Strategy	Finance	Marketing
Arrived at	2:40		2:50	2:55	3:00	

If Steve is the Head of Marketing, the second person to arrive would be William.

Choice (D)

Q24. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.

Which of the following can be the time at which the Head of Human Resources arrived?

a) 2:35 p.m.

b) 2:45 p.m.

c) 2:55 p.m.

d) 2:54 p.m.

Given that John was the first to arrive and HR head was the second to arrive. The Marketing head would be the last to arrive since he was the only person late for the meeting.

Also from iv, Jack arrived before Albert and Melinda and none of them are the Marketing head (because none of them were late). Hence, Jack should have been the third to arrive.

Since Albert and Melinda are neither the Marketing Head nor the HR head, they can only be either Strategy or Finance heads. Also, from v, the head of Strategy arrived before the head of Finance. Therefore, Albert must be the Strategy head and Melinda the Finance head.

Melinda arrived exactly on time, i.e. at 3:00 p.m. Albert arrived 5 minutes before Melinda, at 2:55 p.m. Jack arrived 5 minutes before Albert, at 2:50 p.m. and John arrived at 2:40 p.m.

Name	John	Steve / William	Jack	Albert	Melinda	William / Steve
Head of	CEO	HR	Manufacturing	Strategy	Finance	Marketing
Arrived at	2:40		2:50	2:55	3:00	

The Head of HR could have arrived between 2:40 and 2:50 p.m. The only option between this time is option B. **Choice (B)**

DIRECTIONS *for questions 25 to 28:* Answer the questions on the basis of the information given below.

Shankar, a financial analyst in an investment bank, was calculating the Enterprise Value of seven companies. The Enterprise Value of a company is the sum of the Equity Value and the Debt Value of that company. The Equity Value of a company is calculated as the product of the number of shares of the company and the share price of each share of the company. The following table presents the number of shares, share price and the ratio of Debt Value to Equity Value (D/E ratio) of the company at the beginning and the end of a particular quarter.

Company	Number of Shares (in mn)	Beginning of the Quarter		End of the Quarter	
		Share Price (in Rs.)	D/E Ratio	Share Price (in Rs.)	D/E Ratio
Company A	1.667	15.60	1.20	17.50	1.13
Company B	2.540	10.20	0.80	8.80	0.74
Company C	5.420	5.70	2.50	7.70	1.20
Company D	0.587	25.20	1.20	30.20	1.50
Company E	4.570	10.40	2.40	7.40	2.10
Company F	1.245	9.70	1.25	15.70	0.90
Company G	15.247	3.10	1.40	3.30	0.90

Note: The number of shares of the company remained constant during this quarter.

Q25. DIRECTIONS *for questions 25 and 26:* Select the correct alternative from the given choices.

The percentage decrease in the Debt Value at the end of the quarter as compared to the beginning of the quarter was the maximum for which of the following companies?

a) Company C

b) Company E

c) Company B

d) Company G

The Debt Value needs to be calculated at the beginning and the end of the quarter.

Company	Equity at beginning	Equity at end	Debt Value at beginning	Debt Value at end	Percentage Change
Company C	30.9	41.7	77.2	50.1	-35.1%
Company E	47.5	33.8	114.1	71.0	-37.8%
Company B	25.9	22.3	20.7	16.5	-20%
Company G	47.3	50.3	66.2	45.3	-31.6%

The highest percentage decrease was for Company E.   Choice (B)

Q26.   DIRECTIONS *for questions 25 and 26:* **Select the correct alternative from the given choices.**

What was the approximate difference (in Rs.mn) between the Enterprise Value of Company D at the beginning of the quarter and that at the end of the quarter?

a) 11.8

b) 12.3

c) 10.8

d) 11.3

At the beginning of the quarter, (all are in ₹mn)
Enterprise value = 0.587 × 25.2 × (1.2 + 1)
At the end of the quarter,
Enterprise value = 0.587 × 30.2 × (1.5 + 1)
∴ Difference in Enterprise value
= 0.587 × (30.2 × 2.5 – 25.2 × 2.2)
= 0.587 × 20.06.
≅ 11.7752
≅ 11.78 (rounded off to two decimal places)   Choice (A)

Q27. DIRECTIONS *for question 27:* **Type your answer in the text box provided below the question.**

Among the seven companies, what is the second highest value of the ratio of the Debt Value to the Enterprise Value at the end of the quarter?

Ratio of debt value to enterprise value = $\dfrac{\frac{D}{E}}{1+\frac{D}{E}} = \dfrac{D}{D+E}$

If this value is to be high, $\dfrac{D+E}{D}$ has to be low.

This ratio can be rewritten as $1+\dfrac{E}{D} \Rightarrow 1+\dfrac{1}{\frac{D}{E}}$.

If $\dfrac{D}{E}$ is high, $\dfrac{D+E}{D}$ will be low. The second highest $\dfrac{D}{E}$ ratio is for company D.

This company will have the second highest $\dfrac{D}{D+E}$

$\dfrac{D+E}{D} = 1+1/1.5 = 5/3$

$\therefore \dfrac{D}{D+E} = 3/5 = 0.6$ Ans: (0.60)

Q28. DIRECTIONS *for question 28:* **Select the correct alternative from the given choices.**

Which of the following companies has the highest Enterprise Value at the end of the quarter?

a) Company C

b) Company G

c) Company A

d) Company E

The Enterprise value can be calculated as Number of Shares*Share Price*(1+D/E).
For Company C, Enterprise value = 91.8 (from the previous questions)
For Company G, Enterprise value = 95.6
For Company E, Enterprise value = 104.8
For Company A, Enterprise value is around 60. Hence, the highest Enterprise Value is
for Company E.   Choice (D)

DIRECTIONS *for questions 29 to 32:* **Answer the questions on the basis of the information given below.**

There is a grid of cells of m rows and n columns, as shown below, in which each cell is coloured either Red, Blue or Green.
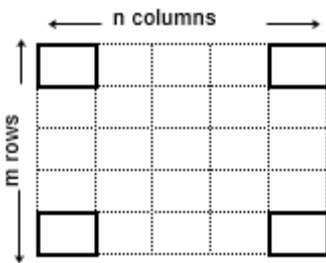
Now, 12 colour-changing operations, belonging to four different classes – A, B, C and D – are defined using two-character codes as follows:

A5, A2, A1

B3, B2, B1

C4, C3, C1

D5, D3, D1

The first character of each operation defines its class and the second character represents the number of cells on which it is applied. Each class of operations changes the colour of the

specified number of cells, i.e., the second character in the operation, from one colour to another as follows:

A – From Red to Green

B – From Green to Red

C – From Blue to Red

D – From Red to Blue

Any operation is performed only if the relevant numbers of cells are available to be acted upon.

Q29.   DIRECTIONS *for question 29:* Select the correct alternative from the given choices.

Three operations B3, C4 and A5 are carried out on a grid containing 25 cells, in five rows and five columns. After these operations it was noticed that the grid can be restored to its original configuration by performing exactly three operations. Which of the following could be those three operations?

a) A2, C3, D5

b) B2, D3, D1

c) B2, B3, D5

d) A2, C1, D3

The change in the number of red, green and blue cells as a result of the operations performed is depicted below.

	G	R	B
B3	−3	+3	
C4		+4	−4
A5	+5	−5	
	+2	+2	−4

To return to the original configuration, the net change in the number of green, red and blue cells must be −2, −2 and +4 respectively.
In option (A),

	G	R	B
A2	+2	−2	
C3		+3	−3
D5		−5	+5
	+2	−4	+2

In option (B),

	G	R	B
B2	−2	+2	
D3		−3	+3
D1		−1	+1
	−2	−2	+4

∴ Option (B) is the correct answer.   Choice (B)

Q30. DIRECTIONS *for question 30:* **Type your answer in the text box provided below the question.**

In a grid of 24 cells, in six rows and four columns, five operations are carried out, one after the other. If there are no Blue cells in the initial grid, and there are no Green cells in the final grid, what is the minimum possible difference between the number of Red cells and the number of Blue cells in the final grid?

If there are no Green cells in the final grid, the difference is minimized if the number of Blue cells is equal to the number of Red cells. The difference is minimized when there are 1, 2 or 3 green cells in the initial grid. By using the operation B1, B2 or B3 the Green cells can be turned Red. Then by using D3 four times or by using D5 twice and D1 twice, 12 Red cells can be converted to Blue cells, there by making the difference between Red and Blue cells zero.   Ans: (0)

Q31. DIRECTIONS *for question 31:* **Select the correct alternative from the given choices.**

In a grid of 12 cells, in 4 rows and 3 columns, there are an equal number of cells of each of the three colours. Now, if five additional operations, A3, A7, C5, D2 and D4, are also defined in a similar manner, then which of the following is not a possible sequence of operations that can be performed on the grid (in the same order as they are listed, from left to right)?

a) A3, B2, C4

b) D2, C5, A7

c) A2, D2, C4

d) B2, D4, A3

Option A:

	R	B	G
	4	4	4
A3	1	4	7
B2	3	4	5
C4	7	0	5

Option B:

	R	B	G
	4	4	4
D2	2	6	4
C5	7	1	4
A7	0	1	11

Option C:

	R	B	G
	4	4	4
A2	2	4	6
D2	0	6	6
C4	4	2	6

Option D:

	R	B	G
	4	4	4
B2	6	4	2
D4	2	8	2
A3	−1	8	5

∴ Option D is not possible.   Choice (D)

Q32.   DIRECTIONS *for question 32:* **Type your answer in the text box provided below the question.**

If each class of operations (A, B, C, D) can be applied on any number of cells, and there is a grid of 15 cells, with at least one cell of each of three colours, arranged in 5 rows and 3 columns and the operations are carried out in the sequence A, B, C, D, A, B, ….. and so on, such that each operation is applied on at least one cell, what is the minimum number of operations after which the grid has 15 cells of a single colour?

Let r be the number of red cells and b be the number of blue cells.

∴ Initially, there will be 15 – r – b green cells.

Let Ar be performed first.

There will now be 0 red cells, b blue cells and 15 – b green cells.

Let B(15 – b) be performed later.

There will now be (15 – b) red cells and 0 green cells.

If Cb is performed next, there will be 15 red cells in the grid.

Hence, the answer is 3.   Ans: (3)

Q1. DIRECTIONS *for questions 1 to 4:* **Type in your answer in the input box provided below the question.**

If the roots of the equation $x^3 - 21x^2 + ax - 168 = 0$ are in arithmetic progression, find the value of a.

We know for a quadratic equation, $ax^2 + bx + c = 0$, that sum of roots $= \dfrac{-b}{a}$ and product of roots $= \dfrac{c}{a}$.

Similarly for a higher order equation, say $ax^3 + bx^2 + cx + d = 0$; sum of roots $= \dfrac{-b}{a}$; sum of product of two roots at a time $= \dfrac{c}{a}$ and product of all three roots $= \dfrac{-d}{a}$.

Now, let the roots of the given equation be $x - d$, x and $x + d$ respectively.

Sum of the three roots = 21

$\therefore 3x = 21 \Rightarrow x = 7$

Product of the roots = $(7 - d)(7)(7 + d) = 168$

$(7 - d)(7 + d) = 24$

$49 - d^2 = 24$

$\Rightarrow d = \pm 5$

Therefore the roots are 2, 7 and 12

The value of a = Sum of the roots taken two at a time = $(2 \times 7) + (2 \times 12) + (7 \times 12)$

= 122   Ans: (122)

Q2. DIRECTIONS *for questions 1 to 4:* **Type in your answer in the input box provided below the question.**

In a triangle ABC, medians AD and BE are perpendicular to each other. If the length of the median AD is 8 cm and the area of the triangle is 144 sq. cm, find the length (in cm) of the median BE.
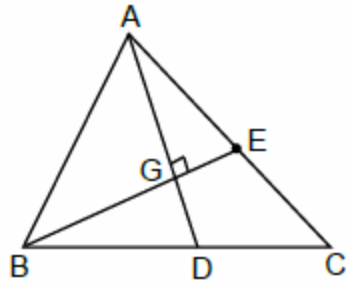
Let G be the centroid of the triangle.

As AD = 8, AG = $\dfrac{16}{3}$ and GD = $\dfrac{8}{3}$ $\left[\because \dfrac{AG}{GD} = \dfrac{2}{1}\right]$

Let the length of BE be k

Area of $\triangle ABE = \dfrac{1}{2}$ (BE) (AG) $= \dfrac{1}{2}$(BE)$\left(\dfrac{16}{3}\right)$

We know that any median divides the area of a triangle into two equal parts.

$\therefore \dfrac{1}{2}$ (k) $\left(\dfrac{16}{3}\right) = \dfrac{144}{2}$

Therefore $k = 27$

Ans: (27)

Q3. DIRECTIONS *for questions 1 to 4:* **Type in your answer in the input box provided below the question.**

What is the largest number which leaves remainders of 4, 6 and 2 when it divides 460, 690 and 990 respectively?

The largest number which leaves remainders of 4, 6 and 2 when it divides 460, 690 and 990 respectively will be HCF (460–4, 690–6, 990–2)
= HCF (456, 684, 988) = HCF (684 – 456, 988 – 684)
= HCF (228, 304) = 76.
Hence, the required number = 76.

Ans: (76)

Q4. DIRECTIONS *for questions 1 to 4:* **Type in your answer in the input box provided below the question.**

If *a* = log₃12 and *b* = log₈72, and (*a* – 1) (*b* – 1) = K, find the value of 15 K.

$a = \log_3 12 = \log_3 3 \times 4 = \log_3 3 + \log_3 4 = 1 + 2\log_3 2$

$b = \log_8 72 = \log_8 8 \times 9 = \log_8 8 + \log_8 9 = 1 + \dfrac{2}{3}\log_2 3$

$\therefore (a-1) = 2\log_3 2$ and $b - 1 = \dfrac{2}{3}\log_2 3$

$\therefore K = (a-1)(b-1) = \dfrac{4}{3}\log_3 2 \; \log_2 3 = \dfrac{4}{3}$

$\Rightarrow 15\,K = 20$ Ans: (20)

Q5. DIRECTIONS *for questions 5 to 7:* **Select the correct alternative from the given choices.**

If $f(x) = \dfrac{1}{1+x}$, then $f(3x)$, when expressed in terms of $f(x)$, will be

a) $3\,f(x)$.

b)

$\dfrac{f(x)}{3 + 2f(x)}$.

c)

$\dfrac{f(x)}{3 - 2f(x)}$.

d)

$\dfrac{f(x)}{2 - 3f(x)}$.

Given, $f(x) = \dfrac{1}{1+x} \Rightarrow 1 + x = \dfrac{1}{f(x)}$

$\Rightarrow x = \dfrac{1}{f(x)} - 1 = \dfrac{1 - f(x)}{f(x)}$

Now $f(3x) = \dfrac{1}{1+3x} = \dfrac{1}{1 + 3\left(\dfrac{1 - f(x)}{f(x)}\right)} = \dfrac{f(x)}{f(x) + 3 - 3f(x)}$

Hence, $f(3x) = \dfrac{f(x)}{3 - 2f(x)}$

Alternative Solution:

By observation, $f(0) = 1$ and $f(3.0) = f(0) = 1$. Considering each answer choice, we see that only option (C) satisfies.   Choice (C)

Q6. DIRECTIONS *for questions 5 to 7:* **Select the correct alternative from the given choices.**

In the right angled triangle given below, AB = BC = $6\sqrt{2}$ cm. The side AB is divided into 13 equal parts by drawing 12 line segments, each parallel to BC, from AB to AC. Find the sum of the lengths of these 12 line segments.
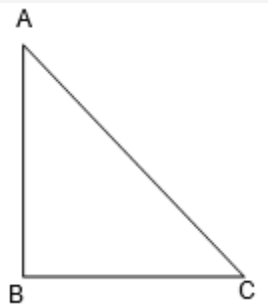
a)

$36\sqrt{2}$ cm

b)

$39\sqrt{2}$ cm

c)

$42\sqrt{2}$ cm

d)

$72\sqrt{2}$ cm
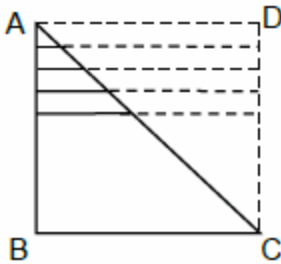
Constructing triangle ADC as shown above we get a square ($\because$ AB = BC)

Now, the length of each line is equal to the side of the square which is $6\sqrt{2}$

So, the total length of the 12 lines will be 12($6\sqrt{2}$).

But we need only half of this i.e., $6 \times 6\sqrt{2} = 36\sqrt{2}$ cm.   Choice (A)

Q7. DIRECTIONS *for questions 5 to 7:* **Select the correct alternative from the given choices.**

There are two series of numbers in geometric progression, each having the same number of terms, such that the fourth term and the sixth term of the first series are equal to the second term and the third term of the second series respectively. If the last term of the second series is 64 times the last term of the first series and the fifth term of the first series is eight times the second term of the first series, then find the number of terms present in each of the series.

a) 8

b) 6

c) 10

d) 9

Let the two series be

$$a_1, a_1r_1, a_1r_1^2 \ldots\ldots a_1r_1^{n-1}$$

$$a_2, a_2r_2, a_2r_2^2 \ldots\ldots a_2r_2^{n-1}$$

Given $a_1r_1^3 = a_2r_2 \rightarrow (1)$

$a_1r_1^5 = a_2r_2^2 \rightarrow (2)$

$(2) \div (1)$ gives $r_2 = r_1^2 \rightarrow (3)$

and (3) in (1) gives $a_2 = a_1r_1$ —— (4)

also given $a_2r_2^{n-1} = 64a_1r_1^{n-1} \rightarrow$ (5)

substituting $r_2 = r_1^2$ and $a_2 = a_1r_1$ in (5)

$r_1^n = 64 \rightarrow (6)$

Also given fifth term of first series = 8(second term)

$\Rightarrow a_1r_1^4 = 8.a_1r \Rightarrow r_1^3 = 8 \Rightarrow r_1 = 2 \rightarrow (7)$

Now $2^n = 64 \Rightarrow n = 6$ Choice (B)

Q8. DIRECTIONS *for questions 8 to 11:* **Type in your answer in the input box provided below the question.**

A number has six factors, of which three are even. If the sum of all the odd factors of the number is 57 less than the sum of all its even factors, then what is the sum of all its factors?

A number with 3 even factors and 3 odd factors must be of the form $2^1 (x)^2$, where x is odd and prime.

Sum of the odd factors $= x^0 + x^1 + x^2$

Sum of the even factors $= 2 (x^0 + x^1 + x^2)$

Now, if sum of odd factors $= X$ (say), then clearly sum of even factors $= 2X$ and total sum (of all factors) $= 3X$.

Given that $2X - X = 57$, we get $X = 57$.

Hence, required answer $= 3 \times 57 = 171$.

Ans: (171)

Q9. DIRECTIONS *for questions 8 to 11:* **Type in your answer in the input box provided below the question.**

If the roots of the quadratic equation $x^2 - 24x + N = 0$ are prime numbers, how many distinct values can N assume?

$x^2 - 24x + N = 0$.

Sum of the roots $= 24$

Since, both the roots are prime numbers, there are three possibilities i.e., (7,17) (5,19) and (11,13), and N will assume a distinct value in each case.   Ans: (3)

Q10. DIRECTIONS *for questions 8 to 11:* **Type in your answer in the input box provided below the question.**

The average age of a group of persons is 16 years. A person of age 36 years leaves the group and another person joins the group, thereby reducing the average age by two years. Find the age (in years) of the newly joined person, if there are eight persons in the group.

The total age of all the members before any change
$= 16 \times 8 = 128$ years
The total age of all the members after the changes $= 14 \times 8 = 112$ years
Let the age of the new person be x years
$128 + x - 36 = 112 \Rightarrow x = 20$ years.   Ans: (20)

Q11. DIRECTIONS *for questions 8 to 11:* **Type in your answer in the input box provided below the question.**

Find the maximum number of distinct regions into which the area inside a circle can be divided by drawing six chords.

The maximum number of regions into which the area inside a circle can be divided by drawing n straight lines

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

For n = 6, we get the number of regions as 22   Ans: (22)

Q12. DIRECTIONS *for questions 12 to 14:* **Select the correct alternative from the given choices.**

In rectangle ABCD, a semicircle is constructed with AB as the diameter. The semicircle intersects CD at points P and Q. M is a point on AB such that PM is perpendicular to AB. If the perimeters of rectangles AMPD and MBCP are 18 cm and 36 cm respectively, find the area (in sq.cm) of the semicircle.

a) 28.125π

b) 32.625π

c) 36.375π

d) 38.125π
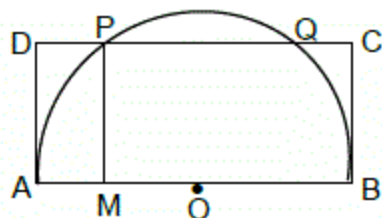
Given AM + MP = 9 → (1)
And MP + BM = 18 → (2)
Let AM = x and PM = kx
∴ BM = k^2x (In ΔAPB, rightangled at P, AM, PM and BM are always in geometric progression, because $\dfrac{AM}{PM} = \dfrac{PM}{BM}$)
(1) ⇒ $x(1 + k) = 9$
(2) ⇒ $xk(1 + k) = 18$
∴ $k = 2$ and $x = 3$
∴ AB = AM + MB = $x + k^2x = 3(1 + 4) = 15$
⇒ Area of semicircle = $\dfrac{\pi}{2}(7.5)^2 = 28.125\pi$

Alternative solution:

Let the length and breadth of the rectangle ABCD be ℓ and b respectively and let O be the centre of AB. Now, OP = OA $\dfrac{\ell}{2}$ (Radius of the semicircle).

Let AM be x. $2x + 2b = 18$ → (1) and
$2(\ell - x) + 2b = 36$ → (2)

Again OP² = OM² + PM² ⇒ $\left(\dfrac{\ell}{2}\right)^2 = (\ell - x)^2 + b^2$

⇒ $\ell x = x^2 + b^2$
From (1), $x^2 + b^2 + 2bx = 81$
∴ $81 - 2bx = \ell x$ or
$x(\ell + 2b) = 81$
From (1) and (2), we get $\ell + 2b = 27$,
So $x = 3$, $b = 6$ and $\ell = 15$

Area of the semicircle = $\dfrac{\pi}{2}(7.5)^2 = 28.125\pi$ Choice (A)

Q13. DIRECTIONS *for questions 12 to 14:* Select the correct alternative from the given choices.

Two cars P and Q start from two points A and B towards each other simultaneously. They meet for the first time 40 km from B. After meeting they exchange their speeds as well as directions and proceed to their respective starting points. On reaching their starting points,

they turn back with the same speeds and meet at a point 20 km from A. Find the distance between A and B.

a) 130 km

b) 100 km

c) 120 km

d) 110 km

The exchange of speeds and directions at the first meeting does not make a difference to the time or place of their second meeting. The two cars start together. By the first meeting (when the 2 cars together cover L, the distance between A and B), Q covers 40 km. By the 2nd meeting, the two cars together cover 3L and the distance covered by Q upto the first meeting plus the distance covered by P between the 1st and 2nd meetings is 120 km. Since the point of the 2nd meeting is 20 km from A, L = 100 km.   Choice (B)

Q14.   DIRECTIONS *for questions 12 to 14:* Select the correct alternative from the given choices.

If *a* and *b* are positive real numbers, then which of the following is necessarily TRUE?

a) $|a + b| < |a| + |b|$

b) $|a + b| = |a| + |b|$

c) $|a - b| \geq |a| + |b|$

d) $|a - b| = |a| - |b|$

Since a, b are positive real numbers

$|a + b| = |a| + |b|$ Choice (B)

Q15. DIRECTIONS *for question 15:* **Type in your answer in the input box provided below the question.**

Sethi and Wilson play a snooker match consisting of nine games. The winner is decided by the method of 'Race to 5', i.e., the first person to win five games is declared the winner and the match ends the moment the winner is declared. In how many ways can the match conclude?

Let us initially find the number of ways Sethi can win. If Sethi wins, the match he should be the one who wins the last game and the previous results could be internally arranged to get the number of ways.

Games won by		
Sethi	Wilson	Number of ways
5	0	1
5	1	5!/4! = 5
5	2	6!/4!2! = 15
5	3	7!/4!3! = 35
5	4	8!/4!4! = 70

∴ Sethi can win in 126 ways.
Similarly Wilson can win in 126 ways. Hence the match can conclude in 252 ways.

Alternative Solution:

Consider a string of 5 wins (W's) and 4 Losses (L's). Now these nine games can be arranged in $\dfrac{(5+4)!}{5!\,4!}$ = 126 ways. These ways include all cases where the match ends after five wins. Hence, there are 126 ways in which Sethi wins and 126 cases in which Wilson wins. Therefore a total of 252 ways.   Ans: (252)

Q16. DIRECTIONS *for question 16:* **Select the correct alternative from the given choices.**

If the cost of three pencils and six erasers is Rs.24 and the cost of a pencil is 20% more than that of an eraser, what is the cost of one pencil?

a) Rs.2.5

b) Rs.3

c) Rs.3.5

d) Rs.4

Let the cost of a pencil be p and the cost of an eraser be e.
$3p + 6e = 24$
$p = 1.2e$
Hence, $3.6e + 6e = 24 \Rightarrow e = 2.5$
$p = 3.$ Choice (B)

Q17. DIRECTIONS *for question 17:* **Type in your answer in the input box provided below the question.**

Find the total number of distinct prime factors of the number $40C_{30}$

$$40C_{30} = \frac{40!}{30! \ 10!} = \frac{31 \times 32 \dots \dots 40}{1 \times 2 \times \dots \dots 10}$$

We need to check for each of the primes from 1 to 40, if their highest power in the numerator exceeds that in the denominator. This is true only for 2, 11, 13, 17, 19, 31 and 37, i.e., a total of 7 prime factors.   Ans: (7)

Q18. DIRECTIONS *for questions 18 to 22:* **Select the correct alternative from the given choices.**

An unbiased coin is tossed nine times and a total of five heads and four tails turned up. If the coin is now tossed for the tenth time, what is the probability that a tails will turn up?

a) $\dfrac{1}{5}$

b)

$\dfrac{1}{2}$

c)

$\dfrac{4}{5}$

d)

1

The tenth toss is an independent event and so, the probability of a tail turning up will be the same as for any toss, i.e., $\dfrac{1}{2}$. Choice (B)

Q19. DIRECTIONS *for questions 18 to 22:* **Select the correct alternative from the given choices.**

If $y = \min \{|6x - 4|, |12 - 9x|\}$, find the range of x for which the value of y increases with x.

a)

$\left(x \le \dfrac{2}{3}\right) \cup \left(x > \dfrac{4}{3}\right)$

b)

$\dfrac{2}{3} \le x \le \dfrac{16}{15}$

c)

$$x \geq \frac{4}{3}$$

d)

$$\left(\frac{2}{3} \leq x \leq \frac{16}{15}\right) \cup \left(x \geq \frac{4}{3}\right)$$

$|6x - 4| = 0 \Rightarrow x = \dfrac{2}{3}$

$|12 - 9x| = 0 \Rightarrow x = \dfrac{4}{3}$

x must satisfy either $x < \dfrac{2}{3}$ or $\dfrac{2}{3} \le x \le \dfrac{4}{3}$ or $x > \dfrac{4}{3}$

When $x < \dfrac{2}{3}$, $|6x - 4| = 4 - 6x$ and $|12 - 9x| = 12 - 9x$.

As x increases both these modulii decrease.

$\therefore y$ also decreases with x.

When $\dfrac{2}{3} \le x < \dfrac{4}{3}$, $|6x - 4| = 6x - 4$ and $|12 - 9x| = 12 - 9x$ in this case as

x increases, $|6x - 4|$ increases and $|12 - 9x|$ decreases.

Minimum possible y is the value of each modulii when are equal.

$|6x - 4| = |12 - 9x| \Rightarrow 6x - 4 = 12 - 9x \Rightarrow x = \dfrac{16}{15}$

When $\dfrac{2}{3} \le x \le \dfrac{16}{15}$, $y = |6x - 4|$.

When $\dfrac{16}{15} \le x \le \dfrac{4}{3}$, $y = |12 - 9x|$.

$\therefore$ When $\dfrac{2}{3} \le x \le \dfrac{4}{3}$, y increases when x lies in the range $\dfrac{2}{3} \le x \le \dfrac{16}{15}$.

When $x \ge \dfrac{4}{3}$, $|6x - 4| = 6x - 4$ and $|12 - 9x| = 9x - 12$

As x increases, both these modulii increase.

$\therefore y$ also increases with x.

Required range $= \dfrac{2}{3} \le x \le \dfrac{16}{15}$ or $x \ge \dfrac{4}{3}$

Alternative solution:
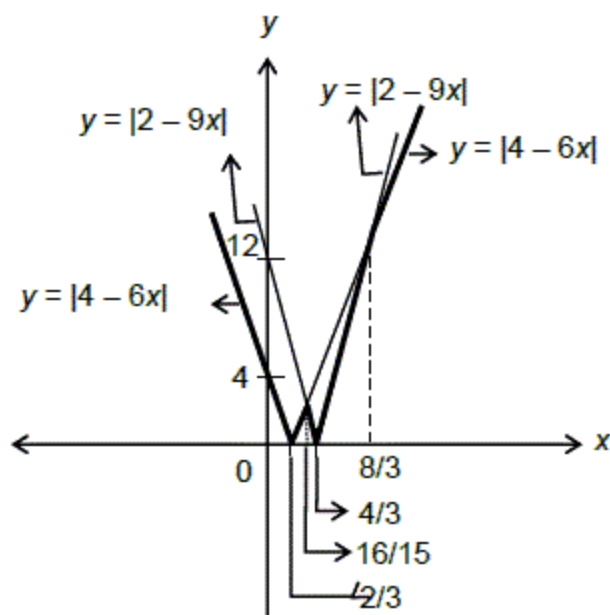
Q20. DIRECTIONS *for questions 18 to 22:* **Select the correct alternative from the given choices.**

If in a certain race, the distance by which A beats B is the same as that by which B beats C, then which of the following is true regarding the speeds of A, B and C?

a) Speed of B is the Arithmetic Mean of the speeds of A and C.

b) Speed of B is the Harmonic Mean of the speeds of A and C.

c) Speed of B is the Geometric Mean of the speeds of A and C.

d) None of the above.

Let the length of the race be ℓ metres and let us consider the distance by which A beats B or that by which B beats C be 'a' metres
We get,

$$\frac{\ell}{v_A} = \frac{\ell - a}{v_B} \quad \text{and} \quad \frac{\ell}{v_B} = \frac{\ell - a}{v_C}$$

$$\Rightarrow \frac{v_A}{v_B} = \frac{\ell}{\ell - a} \Rightarrow \frac{v_C}{v_B} = \frac{\ell - a}{\ell}$$

$$\therefore \frac{v_A}{v_B} \times \frac{v_C}{v_B} = \frac{\ell}{\ell - a} \times \frac{\ell - a}{\ell}$$

$$\therefore v_A \times v_C = (v_B)^2 \Rightarrow v_B = \sqrt{v_A v_C}$$

Thus, the speed of B is the G.M of the speeds of A and C   Choice (C)

The sum $\dfrac{3}{2} + \dfrac{5}{4} + \dfrac{9}{8} + \dfrac{17}{16} + \ \dots\dots\dots\ \dots\ $ to 99 terms is

a)

$100 - \dfrac{1}{2^{99}}$.

b)

$101 - \dfrac{1}{2^{99}}$.

c) 100 + $\dfrac{1}{2^{99}}$.

d)

$99 + \dfrac{1}{2^{100}}$.

Given

$S = \dfrac{3}{2} + \dfrac{5}{4} + \dfrac{9}{8} + \dfrac{17}{16} \dots\dots(99\ \text{terms})$

$S = \left(1 + \dfrac{1}{2}\right) + \left(1 + \dfrac{1}{4}\right) + \left(1 + \dfrac{1}{8}\right) + \left(1 + \dfrac{1}{16}\right)\dots\dots + \left(1 + \dfrac{1}{2^{99}}\right)$
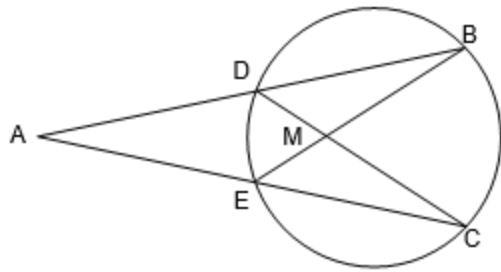
$\Rightarrow S = \left(1 + 1 + \dots 99\ \text{times}\right) + \left(\dfrac{1}{2} + \dfrac{1}{2^2} + \dfrac{1}{2^3} + \dots + \dfrac{1}{2^{99}}\right)$

$\Rightarrow S = 99 + \dfrac{\dfrac{1}{2}\left[1 - \left(\dfrac{1}{2}\right)^{99}\right]}{1 - \dfrac{1}{2}} \Rightarrow S = 99 + 1 - \dfrac{1}{2^{99}}$

$S = 100 - \dfrac{1}{2^{99}}$

Choice (A)

In the figure below, if DM = 4 cm, MC = 18 cm and $\dfrac{AE}{AD} = \dfrac{9}{11}$, then find the measure (in cm) of MB.

a) 6

b) 8

c) 10

d) 12
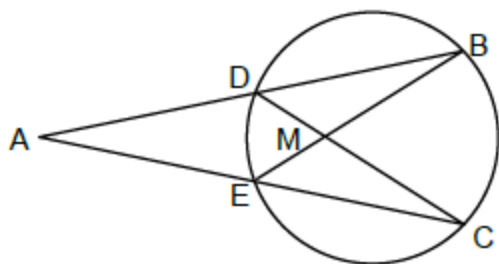
ΔABE ≈ ΔACD [AAA]

∴ $\dfrac{BE}{CD} = \dfrac{AE}{AD} = \dfrac{AB}{AC} = \dfrac{9}{11}$ (given)

Again ΔMBD ≈ ΔMCE [AAA]

[∠DBM = ∠MCE, ∠BDM = ∠CEM and ∠DMB = ∠EMC]

∴ (DM)(MC) = (EM)(MB)

∴ (EM)(MB) = 4(18)

∴ $\dfrac{BE}{CD} = \dfrac{9}{11} \Rightarrow BE = \dfrac{9}{11}(22) = 18$

∴ EM + MB = 18

MB + $\dfrac{72}{MB}$ = 18 [∵ (EM)(MB) = 72)]

(MB)² + 18(MB) + 72 = 0

(MB − 6)(MB − 12) = 0

∴ MB = 6 or MB = 12.

As EM < MB, MB = 12.   Choice (D)

A boy is running on a circular track around a playground. There is a tower situated outside the playground. The boy observes that while making one complete round along the track, the angle of elevation of the top of the tower is 45° at two points on the track and 60° at two other points on the track. If these four points, when joined, form a square, the area of which is $800\,(12 - 6\sqrt{2})$ sq. m., find the height (in m) of the tower.

In the figure below, AB represents the tower, points P and Q are those points from where the angle of elevation is 60° and R and S are those from where the angle of elevation is 45°.
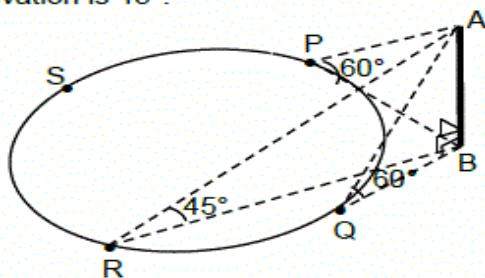
If we take the top view, it gives us the following figure.
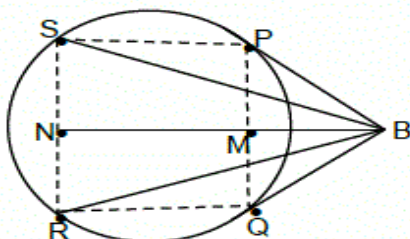
From the first figure, we get,
AB = BR tan 45° = BQ tan 60°
We can conclude that a perpendicular BN dropped from the foot of the tower (pt B) will bisect the lines PQ and SR. (as shown in the second figure).
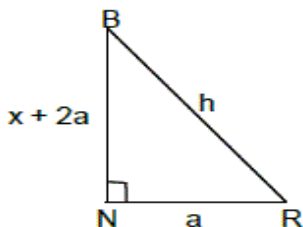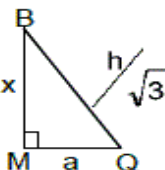Considering the side of the square as 2a and the horizontal distance (BM) of the foot of the tower from the side PQ as x, and the height of the tower as h, we get

$$\left(\frac{h}{\sqrt{3}}\right)^2 = x^2 + a^2 \quad (\because BQ^2 = BM^2 + MQ^2)$$

$\Rightarrow h^2 = 3x^2 + 3a^2 \quad \text{—— (1)}$
Similarly, in $\triangle BNR$
$h^2 = (x + 2a)^2 + a^2 \quad \text{_____ (2)}$

equating h^2, we get
$3x^2 + 3a^2 = (x + 2a)^2 + a^2$
$\Rightarrow 3x^2 + 3a^2 = x^2 + 5a^2 + 4ax \Rightarrow x^2 - 2ax - a^2 = 0$

$$\Rightarrow x = \frac{2a \pm \sqrt{4a^2 + 4a^2}}{2} = a \pm a\sqrt{2} \quad \text{_____ (3)}$$

Since $x > 0$, $x = a + a\sqrt{2}$

Substituting $x = a\left(\sqrt{2} + 1\right)$ in equation (1), we get

$h^2 = 3a^2(3 + 2\sqrt{2}) + 3a^2; \ h^2 = 12a^2 + 6\sqrt{2}\,a^2$

$\therefore h = a(12 + 6\sqrt{2})^{1/2}$

It is given that $4a^2 = 800(12 - 6\sqrt{2}) \quad \text{_____ (4)}$

$$\Rightarrow a = 10\sqrt{2}\left(12 - 6\sqrt{2}\right)^{\frac{1}{2}}$$

$$\therefore h = 10\sqrt{2}\left(12 - 6\sqrt{2}\right)^{\frac{1}{2}}\left(12 + 6\sqrt{2}\right)^{\frac{1}{2}}$$

$= 10\sqrt{2}\,(\sqrt{72}) = 120 \text{ m}$

Ans: (120)

Q24. DIRECTIONS *for question 24:* **Select the correct alternative from the given choices.**

Find the area of the circle inscribed inside the triangle formed by the *x*-axis, the *y*-axis and the line **15*x* + 8*y* – 120 = 0.**
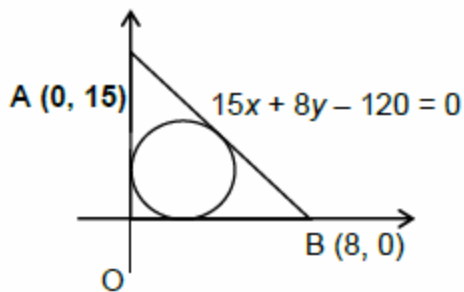
a) 4π sq.units

b) 9π sq.units

c) 6.25π sq.units

d) 16π sq.units

Let us denote the triangle by AOB. Where AO = 15 units, OB = 8 units and AB = 17 units.

Let *r* be the radius of the circle inscribed inside the triangle.

r . *s* = Area of the triangle where *s* = $\dfrac{15+8+17}{2}$ units = 20 units

∴*r*(20) = $\dfrac{1}{2}$ (8) (15) ⇒ *r* = 3 units

Therefore area of the circle = π(3)² sq.units = 9π sq.units   Choice (B)

Q25. DIRECTIONS *for questions 25 and 26:* **Type in your answer in the input box provided below the question.**

A and B, working together, can do a certain work in 20 days, whereas B and C, working together, can do it in 30 days. A, B and C together started the work but A left after 8 days, while B left after another 10 days and the remaining work was completed by C alone in

another 8 days. Had A and B not left, then in how many days would A, B and C together have completed the work?

Let the total work be 60 units and let the outputs per day for A, B and C be a units, b units and c units respectively.
Given the days worked:
$20a + 20b = 60 \Rightarrow (a + b) = 3$
$30b + 30c = 60 \Rightarrow (b + c) = 2$ and
$8a + 18b + 26c = 60$
$\Rightarrow 8 (a + b) + 10 (b + c) + 16c = 60$
$\Rightarrow 8 (3) + 10 (2) + 16\ c = 60$
$\Rightarrow c = 1.$
output per day $= (a + b) + c = 3 + 1 = 4$

Therefore A, B and C together will take $\dfrac{60}{4} = 15$ days   Ans: (15)

Q26. DIRECTIONS *for questions 25 and 26:* **Type in your answer in the input box provided below the question.**

If $x^{\frac{1}{5}} > x^{\frac{1}{3}}$, then how many of the following statements are definitely true about x?

I. $x^2 > x^3$

II. $x^{\frac{1}{3}} > x^4$

III. $x^{\frac{1}{3}} > x^{-3}$

IV. $x^{\frac{-1}{3}} > x^3$

$x^{1/5} > x^{1/3}$

$\Rightarrow x < -1$ or $0 < x < 1$. Now we can consider the cases for $x = \dfrac{1}{8}$ and $x = -8$, and check for each of the options.

(I) $x^2 > x^3 \Leftrightarrow x < 1$
    $\therefore$ This statement is true
(II) $x^{1/3} > x^4 \Leftrightarrow 0 < x < 1$
    But this statement is not true for $x < -1$
(III) $x^{1/3} > x^3$
    $\Rightarrow x > 1$ or $-1 < x < 0$
    Hence, this is false.
(IV) $x^{-1/3} > x^3$
    $\Rightarrow x < -1$ or $0 < x < 1$
    $\therefore$ this statement is true.
So, of the four statements only two are true.   Ans: (2)

Each of three friends, A, B and C, has a certain number of marbles with him, such that the number of marbles with B is 12% more than that with C and 12% less than that with A and C together. If the number of marbles with B is less than 500, then find the total number of marbles with all the three friends.

a) 658

b) 940

c) 846

d) Cannot be determined

Let the numbers of marbles with C be x and that with (A + C) be y. Let N be the number of marbles with B.

It is given that, $N = \dfrac{88}{100}y$ and $N = \dfrac{112}{100}x$

$\therefore \dfrac{88}{100}y = \dfrac{112}{100}x \Rightarrow \dfrac{22}{25}y = \dfrac{28}{25}x$, i.e., N must be a multiple of 28 and 22. Now, the only common multiple of 28 and 22 between 1 and 500 is 308.

$\Rightarrow y = \dfrac{100}{88} \times 308$ i.e., $y = 350$

Hence the total number of marbles with all three of them is 350 + 308 = 658.

Choice (A)

Q28. DIRECTIONS *for questions 27 to 29:* Select the correct alternative from the given choices.

If *x*, *y* and *z* are odd integers, which of the following statements is not true?

a) **$(x^2y + y^2z + z^2x)xyz$ is odd**

b) **$(xy + yz + zx)(x + 2y + 3z)$ is even**

c) **$(xy + yz + zx)(2x + y)^2$ is odd**

d) **$(2x + 3y + 4z)(xyz + 6)$ is even**

Choice (A): Each of x^2y, y^2x and z^2x is odd. Hence their sum is odd, which, in turn, when multiplied by xyz will result in an odd number.
$\therefore$ (A) is true
Choice (B): $(xy + yz + zx)$ is odd $(x + 2y + 3z)$ is even. Therefore, their product is even.
$\therefore$ (B) is true.
Choice (C) : $(xy + yz + zx)$ and $(2x + y)^2$ are odd. Hence their product is also odd.
$\therefore$ (C) is true.
Choice (D): $(2x + 3y + 4z)$ is odd and $(xyz + 6)$ is also odd. Hence their product is odd.
$\therefore$ (D) is not true.
Choice (D)

Q29. DIRECTIONS *for questions 27 to 29:* Select the correct alternative from the given choices.

If the cost price, the selling price and the marked price of an article are in arithmetic progression and it is known that a profit was registered by selling the article, then which of the following statements is true?

a) The profit percentage was less than the discount percentage.

b) The profit percentage was equal to the discount percentage.

c) The mark up percentage was double the profit percentage.

d) The profit percentage when calculated on the selling price was more than the actual profit percentage (i.e., when calculated on the cost price).

Let the cost price, the selling price and the marked price of the article be denoted by C, C + d and C + 2d respectively.

Percentage profit $= \dfrac{d}{C} \times 100$

Discount percentage $= \dfrac{d}{C+2d} \times 100$

Clearly, the percentage profit is more than the percentage discount. Thus, option (A) and option (B) are ruled out

Markup percentage $= \dfrac{2d}{C} \times 100$

Therefore the mark up percentage is twice the percentage profit. Hence, option (C) is true.

Now the percentage profit when calculated on the selling price $= \dfrac{d}{C+d} \times 100$

Now, $\dfrac{d}{C+d} \times 100 < \dfrac{d}{C} \times 100$. Thus, option (D) is incorrect.   Choice (C)

Q30.   DIRECTIONS *for questions 30 and 31:* **Type in your answer in the input box provided below the question.**

A man deposited Rs.9600 in each of two different schemes, both paying *r* % interest per annum, one under simple interest and the other under compound interest, compounded

annually. If the difference between the two amounts receivable at the end of two years from the start of the two schemes was Rs.150, then find r.

Let $R = \dfrac{r}{100}$

Year	SI	CI
1	PR	PR
2	PR	PR + PR²

$\therefore$ Difference in simple and compound interest at the end of 2ⁿᵈ year $= PR^2$

$$= P\left(\frac{r}{100}\right)^2$$

It is given that $P = 9600$ and $P\left(\dfrac{r}{100}\right)^2 = 150$

$\therefore 9600 \left(\dfrac{r}{100}\right)^2 = 150 \Rightarrow \left(\dfrac{r}{100}\right)^2 = \dfrac{1}{64}$

$\Rightarrow \dfrac{r}{100} = \dfrac{1}{8} \Rightarrow r = 12.5$ Ans: (12.5)

Q31. DIRECTIONS *for questions 30 and 31:* **Type in your answer in the input box provided below the question.**

If x and y are distinct prime numbers less than 30, how many ordered pairs (x, y) satisfy the inequality 4x + y > 100?

Prime numbers less than 30 are 2, 3, 5, 7, 11, 13, 17, 19, 23 and 29.
y can be a maximum of 29. Hence, x has to be greater than 17.
If x is 19, y can be 29. (1 possibility)
If x is 23, y can be 11, 13, 17, 19 and 29. (5 possibilities)
If x is 29, y can be any prime number less than 30 except 29. (9 possibilities)
Total number of possibilities = 15.   Ans: (15)

Q32. DIRECTIONS *for question 32 to 34:* **Select the correct alternative from the given choices.**

Sumanta said to Tamal, "When I was half as old as you are today, you were one-sixth as old as I am now", If Sumanta is eight years older than Tamal, what is the sum of their present ages? (in years)

a) 48

b) 64

c) 60

d) 56

Let the present age of Sumanta and Tamal be $6x$ and $2y$ respectively.

	Sumanta	Tamal
Past	y	x
Present	$6x$	$2y$

Now $y - x = 6x - 2y$

$3y = 7x$

$y = \dfrac{7}{3}x$

It is given that $y - x = 8$

$\dfrac{7}{3}x - x = 8$

$\dfrac{4x}{3} = 8$

$\Rightarrow x = 6$

$\therefore 6x = 36$ and $2y = 2 \times \dfrac{7}{3}x = 2 \times \dfrac{7}{3} \times 6 = 28$

Hence, the sum of their present ages is 64 years.   Choice (B)

Q33. DIRECTIONS *for question 32 to 34:* **Select the correct alternative from the given choices.**

Find the distance between the lines $5x + 12y + 21 = 0$ and $15x + 36y + 297 = 0$.

a) 3

b) 6

c) 13

d) 39

The equations of the lines are as follows.
$5x + 12y + 21 = 0$
$5x + 12y + 99 = 0$

The distance between them is $\left| \dfrac{99-21}{\sqrt{5^2 + 12^2}} \right| = \dfrac{78}{13} = 6$

Choice (B)

Q34. DIRECTIONS *for question 32 to 34:* **Select the correct alternative from the given choices**

If $x \in R - \{-1, -3\}$, and $y = \dfrac{x+2}{(x+1)(x+3)}$, find the range of y.

Let $\dfrac{x+2}{(x+1)(x+3)} = y$

$\therefore x + 2 = (x^2 + 4x + 3) y$

$x^2 y + 4xy - x + 3y - 2 = 0$

$yx^2 + x(4y - 1) + 3y - 2 = 0$

as x is real, the discriminant ≥ 0

$(4y - 1)^2 - 4y (3y - 2) \geq 0$

$16y^2 - 8y + 1 - 12y^2 + 8y \geq 0$

$4y^2 + 1 \geq 0$

Now $4y^2 + 1$ will be positive for any real value of y

Hence, range of $y = (-\infty, \infty)$.

Choice (D)