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AIMCAT 2025

VARC

DIRECTIONS *for questions 1 to 5:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

As a supplier of momentary relief, the Great Depression seems an unlikely candidate. But when it turns up on page 363 of Walter Scheidel's "The Great Leveler" it feels oddly welcome. For once − and it is only once, for no other recession in American history boasts the same achievement − real wages rise and the incomes of the most affluent fall to a degree that has a "powerful impact on economic inequality".

Only four things, Mr Scheidel argues, cause large-scale levelling. Epidemics and pandemics can do it, as the Black Death did when it changed the relative values of land and labour in late medieval Europe. So can the complete collapse of whole states and economic systems, as at the end of the Tang dynasty in China and the disintegration of the western Roman Empire. When everyone is pauperised, the rich lose most. Total revolution, of the Russian or Chinese sort, fits the bill. So does the 20th-century sibling of such revolutions: the war of mass-mobilisation.

And that is about it. Financial crises increase inequality as often as they decrease it. Political reforms are mostly ineffectual, in part because they are often aimed at the balance of power between the straightforwardly wealthy and the politically powerful, rather than the lot of the have-nots. Land reform, debt relief and the emancipation of slaves will not necessarily buck the trend much, though their chances of doing so increase a bit if they are violent. But violence does not in itself lead to greater equality, except on a massive scale.

Perhaps the most fascinating part of this book is the careful accumulation of evidence showing that mass-mobilisation warfare was the defining underlying cause of the unprecedented decrease in inequality seen across much of the Western world between 1910 and 1970 (though the merry old Great Depression lent an unusual helping hand). By demanding sacrifice from all, the deployment of national resources on such a scale under such circumstances provides an unusually strong case for soaking the rich.

Income taxes and property taxes rose spectacularly during both world wars (the top income-tax rate reached 94% in America in 1944, with property taxes peaking at 77% in 1941). Physical damage to

capital goods slashed the assets of the wealthy, too, as did post-war inflations. The wars also drove up membership in trade unions − one of the war-related factors that played a part in keeping inequality low for a generation after 1945 before it started to climb back up in the 1980s.

Catastrophic levelling will be less likely in future. Pandemics are a real risk, but plagues similar in impact to the Black Death are not. Nor are total revolutions and wars fought over years by armies of millions. On top of that, since the Industrial Revolution, general prosperity, regardless of inequality, has risen. And in past decades, global inequality has fallen.

There are two other possibilities. One is to note that historical circumstances change. Is it not possible that another less horrible but equally profound transformation in the way that people and nations get along with each other, or fail to, is yet to come? If, for example, increasingly economically important non-human intelligences decided that they would rather not be owned by anyone? The other possibility is that some may see civilizational collapse as a price worth paying for the Utopia they might build in the rubble − or may just like to see the world burn.

Q1.   The Great Depression offers momentary relief according to the author because:

 a) it caused large-scale levelling.

 b) it is not one of the four causes of large-scale levelling.

 c) financial crises increase inequality.

 d) **it led to a universal increase in minimum wages**

Number of words and Explanatory notes for RC:

Number of words: 570

Option A: 'Momentary relief' is a positive term and in the passage that would refer to something that can achieve economic levelling. Option A seems to explain what good came out of the Great Depression. Hence, Option A is the answer.
Option B: If it isn't one of the four causes, it doesn't make sense to call it a momentary relief. What else could make it a relief is not clear from the first para of the passage. Hence, Option B is not the answer.
Option C: This contradicts the overall content and idea of the passage itself, since the passage suggests that a crisis increases inequality as often as it decreases it. Also, it doesn't explain why that is a momentary relief. Hence, Option C is not the answer.
Option D: The Great Depression didn't lead to a universal increase in minimum wages. This is misrepresentation of information. Hence, Option D is not the answer.

Choice (A)

Q2.   World wars contributed to income equality in all the following ways EXCEPT:

a) income and property taxes were on the ascent.

b) physical damage to goods and inflation adversely affected affluence.

c) trade union memberships led to a rise in wages.

d) **wars provided a strong case for soaking the rich**

Number of words and Explanatory notes for RC:

Number of words: 570

Consider the sentences: *Income taxes and property taxes rose spectacularly* during both world wars. *Physical damage to capital goods slashed the assets of the wealthy*, too, as did post-war inflations. The wars also *drove up membership in trade unions*—one of the war-related factors that played a part in keeping inequality low for a generation after 1945 before it started to climb back up in the 1980s.

Option A: From the first underlined portion, it is clear that world wars contribute to income equality. Hence, Option A is not the answer.

Option B: the second underlined portion clearly suggests that world wars affect the affluent/wealthy because of physical damage to goods. Hence, Option B is not the answer.

Option C: While trade union memberships went up, nothing has been mentioned about its effect on the wages. Hence, Option C is the answer.

Option D: By soaking in the rich, and wiping out assets, wars reduced the wealth gap between people. Therefore, we can understand that Option D has been mentioned as one of the ways wars contribute to income equality.   Choice (C)

Q3.   Which of the following, if true, will weaken the author's argument about catastrophic levelling?

a) The threat of a nuclear war which could wipe-off civilisation is unreal.

b) We do not have enough medical technology to restrict breaking out of epidemics.

c) Overall standard of living has increased since the Second World War.

d) **Relative values of land and labour could be upset by large-scale epidemics.**

Number of words and Explanatory notes for RC:

Number of words: 570

Consider the sentences: *Catastrophic levelling will be less likely* in future. Pandemics are a real risk, *but plagues similar in impact to the Black Death are not*. *Nor are total revolutions and wars fought over years* by armies of millions. On top of that, since the Industrial Revolution, general prosperity, regardless of inequality, has risen. And in past decades, *global inequality has fallen*.

Option A: The author feels catastrophic levelling is not possible because the threat of a war is very low. So, Option A doesn't weaken the author's argument.

Option B: Epidemics cannot go out of hand according to the author (low probability of plagues). But, this option says an epidemic can break out, which means catastrophic levelling is possible. Hence, Option B weakens the author's argument.

Option C: The author's argument about the unlikelihood of catastrophic levelling isn't affected by the standard of living and the way it is affected by wars. Hence, Option C is not the answer.

Option D: The relative values of land and labour could be upset by epidemics but the author's argument is that catastrophic levelling is unlikely because an epidemic is unlikely. Hence, Option D is not the answer.   Choice (B)

The author thinks political reforms are ineffective because:

a) **political reforms do not target the less privileged.**

b) they increase inequality as much as they decrease it.

c) they are not intended to really bring about reforms.

d) **land reforms and debt-relief are ineffective unless accompanied by violence**

Number of words and Explanatory notes for RC:

Number of words: 570

Consider the sentences: Political reforms are mostly ineffectual, in part because they are **_often aimed_** at the **_balance of power_** between **_the straightforwardly wealthy_** and **_the politically powerful_**, rather than the lot of the have-nots.
Option A: This option agrees with the underlined portions of the para above, that the reforms are merely to benefit the powerful and the wealthy. Hence, Option A is right.
Option B: Whether political reforms both increase and decrease inequality has not been mentioned in the passage (financial crisis does that). Hence, Option B is distortion of information, and not the answer.
Option C: While this mentions half the truth, it is circular reasoning, in that it doesn't mention why the reforms are ineffective. Hence, Option C is not the answer.
Option D: While this talks about land reforms and their relation with violence, it doesn't bring political reforms into the argument. Hence, Option D is not the answer.

Choice (A)

Q5.   By 'So does the 20th-century sibling of such revolutions: the war of mass-mobilisation', the author means that:

a) **revolutions are impossible in the 20th century.**

b) both revolutions and wars lead to mass pauperisation.

c) **both revolutions and wars lead to mass-mobilisation.**

d) **revolutions lead to wars.**

Number of words and Explanatory notes for RC:

Number of words: 570

Consider the sentences: *When everyone is pauperised, the rich lose most*. *Total revolution*, of the Russian or Chinese sort, *fits the bill*. *So does the 20th-century sibling of such revolutions: the war of mass-mobilisation*. The author is trying to equate wars with revolutions as they wipe out the wealth of the rich and bring about equality.

Option A: The parameter of comparison wasn't the impossibility of revolutions and wars. Option A is not the answer.

Option B: Mass pauperisation (wiping off wealth) is what the author was referring to in the para above. Both revolutions and wars achieve it. Hence, Option B is the answer.

Option C: Mass-mobilisation is not the issue being discussed; mass pauperisation is. Hence, Option C isn't giving the reason why the author compared revolutions with wars.

Option D: There is no causation being established by the author. Wars are like revolutions. That doesn't mean revolutions cause wars. Hence, Option D can be eliminated.

                                                                                          Choice (B)

One of the great unexplained wonders of human history is that written philosophy first flowered entirely separately in different parts of the globe at more or less the same time. The origins of Indian, Chinese and ancient Greek philosophy, as well as Buddhism, can all be traced back to a period of roughly 300 years, beginning in the 8th century BC.

These early philosophies have shaped the different ways people worship, live and think about the big questions that concern us all. Most people do not consciously articulate the philosophical assumptions they have absorbed and are often not even aware that they have any, but assumptions about the nature of self, ethics, sources of knowledge and the goals of life are deeply embedded in our cultures and frame our thinking without our being aware of them.

Yet, for all the varied and rich philosophical traditions across the world, the western philosophy I have studied for more than 30 years − based entirely on canonical western texts − is presented as the universal philosophy, the ultimate inquiry into human understanding. Comparative philosophy − study in two or more philosophical traditions − is left almost entirely to people working in anthropology or cultural studies. This abdication of interest assumes that comparative philosophy might help us to understand the intellectual cultures of India, China or the Muslim world, but not the human condition.

This has become something of an embarrassment for me. Until a few years ago, I knew virtually nothing about anything other than western philosophy, a tradition that stretches from the ancient Greeks to the great universities of Europe and the US. Recently and belatedly, I have been exploring the great classical philosophies of the rest of the world, travelling across continents to encounter them first-hand. It has been the most rewarding intellectual journey of my life.

My philosophical journey has convinced me that we cannot understand ourselves if we do not understand others. Getting to know others requires avoiding the twin dangers of overestimating either how much we have in common or how much divides us. Our shared humanity and the perennial problems of life mean that we can always learn from and identify with the thoughts and practices of others, no matter how alien they might at first appear. At the same time, differences in

ways of thinking can be both deep and subtle. If we assume too readily that we can see things from others' points of view, we end up seeing them from merely a variation of our own.

To travel around the world's philosophies is an opportunity to challenge the beliefs and ways of thinking we take for granted. By gaining greater knowledge of how others think, we can become less certain of the knowledge we think we have, which is always the first step to greater understanding.

Q6.   Comparative philosophy is left to people working in anthropology or cultural studies because:

a) **there is no interest left in comparing philosophical traditions.**

b) it is important to understand the intellectual cultures of India, China or the Muslim world.

c) **human condition is more related to anthropology than to universal philosophy.**

d) **study of different philosophical traditions are thought to throw light on cultures rather than on humanity.**

Number of words and Explanatory notes for RC:

Number of words: 468

Consider the sentences: Comparative philosophy – study in two or more philosophical traditions – is left almost entirely to people working in anthropology or cultural studies. *This abdication of interest assumes* that *comparative philosophy might help us to understand the intellectual cultures* of India, China or the Muslim world, *but not the human condition*.

Option A: This doesn't explain the reason why it is left to those in anthropology or cultural studies. It is a circular reasoning fallacy, not explaining why there is no interest left. Hence, Option A is not the answer.

Option B: The importance of understanding the intellectual cultures is not the reason why comparative philosophy is left to those in anthropology or cultural studies. That would mean more emphasis or demand for understanding intellectual cultures, higher priority. There is no evidence to believe so. Hence, Option B is not the answer.

Option C: We are discussing why comparative philosophy is ignored or rather left to anthropologists. And the reason is that an association between comparative philosophy and human condition is not easily made, contradicting this option.

Option D: Study of philosophical traditions (comparative philosophy) throws light on cultures rather on humanity – this is the assumption. It is *thought to throw light.* Hence, this is the most accurate depiction.   Choice (D)

Q7. The author feels that we can get to know ourselves if:

a) **we do not overestimate how much unites or separates humanity.**

b) we do not overestimate how much all philosophies have in common.

c) **we do not overestimate the deep and subtle differences in our thinking.**

d) **we do not overestimate the perennial problems others faces in life.**

Number of words and Explanatory notes for RC:

Number of words: 468

Consider the sentences: ...we cannot understand _ourselves if we do not understand others_. Getting to know others requires _avoiding the twin dangers of overestimating either how much we have in common or how much divides us_. Our _shared humanity_ and _the perennial problems of life_ mean that we can always learn from and identify with the thoughts and practices of others, no matter how alien they might at first appear.
Option A: This represents both the sides – what we shouldn't overestimate – the commonalities and the differences. Option A is the answer.
Option B: This once again, only considers one side of the story. We shouldn't also overestimate the differences. Hence, Option B is not the answer.
Option C: It is not just the differences we shouldn't overestimate but also what we have in common, which is not mentioned in this option.
Option D: This only depicts half of the issue. We shouldn't overestimate the differences or what is shared between us. Hence, Option D is not the answer.

Choice (A)

Q8. Which of the following is a study the author is likely to advocate?

a) **A study that determines the similarities between philosophical traditions.**

b) A study that determines the differences between philosophical traditions.

c) **A study that compares various philosophical traditions.**

d) **A study of the salient features of Eastern philosophical traditions.**

Number of words and Explanatory notes for RC:

Number of words: 468

Consider the sentences: By gaining greater knowledge of how others think, we can become less certain of the knowledge we think we have, which is always the first step to greater understanding. So, the author would advocate studying philosophical traditions.
Option A: It is not just the similarities, that the author is concerned about. The author is concerned about various philosophies and how they compare with each other. Hence, Option A is not the answer.
Option B: Once again, the author doesn't limit himself to just what divides humanity and what the differences are between philosophies. Option B is not the answer.
Option C: The author wants to look at other philosophies so that the assumptions one makes without even knowing, and takes for granted, can be challenged. This is possible only through comparison of philosophies. Hence, Option C is the answer.
Option D: While this is close, the author is not looking at a siloed understanding of only Eastern philosophies. Rather, the author wants to understand all the philosophies and where they stand with respect to each other. Hence, Option D is not the answer.

Choice (C)

Q9.   The philosophical assumptions absorbed by people who do not consciously articulate them are associated to:

a) **the ways in which people worship, live and think about big questions.**

b) moralities, knowledge and the purpose of life.

c) **the cultural assumptions deeply embedded in our philosophies.**

d) **assumptions we consciously adopt to frame our thinking.**

Number of words and Explanatory notes for RC:

Number of words: 468

Consider the sentences: Most people do not consciously articulate the philosophical assumptions they have absorbed and are often not even aware that they have any, ***but assumptions about the nature of self, ethics, sources of knowledge and the goals of life*** are deeply embedded in our cultures and frame our thinking without our being aware of them.

Option A: The way they worship is not the assumption in their philosophies. Hence, Option A is not the answer.

Option B: Ethics, nature of self, sources of knowledge and the goals – can be equated to moralities, knowledge and the purpose of life. This depicts the assumptions accurately. Option B is the answer.

Option C: This option talks about cultural assumption, which have not been mentioned anywhere. The passage talks about assumptions that have been embedded in our culture and philosophy. They are not necessarily ***cultural assumptions***. Hence, Option C is not the answer.

Option D: This is circular reasoning. The question asks about the assumptions, assumptions we use to frame our thinking. This choice simply mentions that without listing out the assumptions. Option D is not the answer.   Choice (B)

DIRECTIONS *for questions 10 to 14:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

Some of the most high-profile findings in social sciences of the past decade do not stand up to replication, a major investigation has found.

The project, which aimed to repeat 21 experiments that had been published in Science or Nature − science's two preeminent journals − found that only 13 of the original findings could be reproduced.

The research, which follows similar efforts in psychology and biomedical science, raises fresh concerns over the reliability of the scientific literature. However, the project's leaders say their results do not reflect a "crisis" in the social sciences.

Prof Brian Nosek, executive director of the Center for Open Science and a professor at the University of Virginia, said: "I don't think it's a crisis, it's a reformation. We're in the midst of a dramatic increase in the rigour and transparency of research in the social sciences."

Nosek said that, while some previous replication efforts had been viewed with hostility, this effort had been collaborative. Authors from nearly all of the papers under scrutiny engaged with the project to help ensure the repeat experiments were close replicas of the originals − and several of these scientists published responses that ran alongside the latest paper.

"It's not recriminations about who is a bad researcher or otherwise," said Nosek. "That's something that has completely changed over the last five years. Replication in 2012 felt like an attack because it was so rare in science at the time. Now it's become normal."

Findings that failed to replicate included a study suggesting that viewing a picture of Rodin's sculpture The Thinker led to people reporting weaker religious beliefs (a possible explanation being that analytical thought, as represented by the sculpture, counteracted religious beliefs). The finding that the physical act of washing your hands leads to less muddled thinking (a phenomenon known as cognitive dissonance) also failed the replication test.

"That doesn't mean it's unreplicable, no study is definitive," said Nosek. "Science is really a process of uncertainty reduction."

In total, the team tried to replicate one main finding from each of the 21 social science papers published between 2010 and 2015 in Science or Nature…

They found evidence to back the original conclusions in 13 of the 21 (62%) studies. But, on average, the sizes of the effects recorded were about 75% as big in the replication studies, despite these using sample sizes that were on average five times as big.

The latest work revealed scientists were also uncannily accurate at predicting which studies would later succeed or fail to replicate. About 200 scientists were recruited and on average predicted the replication outcomes for 18 out of the 21 papers under scrutiny.

Prof Malcolm Macleod, a neurologist at the University of Edinburgh, said there was a need to prioritise the quality of science as well as the novelty of findings. "We need to wean ourselves off the nectar and the crack cocaine of highly exciting results and work out what we can do to maximise the quality" he said. "That's becoming much more of a thing now."

Nosek agreed, saying that the growing trend for pre-registering the aims of a study and the increasing number of journals to have adopted policies promoting transparency were encouraging.

Q10.   From the passage we can infer that the author wants:

 a) **more stringent standards for studies that have significant consequences.**

 b) more rigorous methods to reach conclusions in various studies.

 c) **more policies to ensure the refinement of findings.**

 d) **more standards for replicating studies.**

Number of words and Explanatory notes for RC:

Number of words: 533

It should be noted that the passage ends with: 'Nosek agreed, saying that the growing trend for pre-registering the aims of a study and the increasing number of journals to have adopted policies promoting transparency were encouraging.' The author mainly discusses the idea of being able to replicate studies and be more serious about checking whether studies hold good, rather than just focusing on whether they are exciting.

Option A: The focus was on all studies and not just those which had significant consequences. Hence, Option A is not the answer.

Option B: The method of reaching the conclusion in studies wasn't exactly discussed in the passage directly. Yes, the discussion was around replicating the studies – but without a negative judgment on the studies which couldn't be replicated. This is understood from the lines: "It's not recriminations about who is a bad researcher or otherwise," said Nosek. "That's something that has completely changed over the last five years. Replication in 2012 felt like an attack because it was so rare in science at the time. Now it's become normal." Hence, Option B is not the answer.

Option C: The focus is on the quality of the studies. Also the author isn't too concerned about findings being replicated. The author wants findings to be refined. The passage also ends with a reference to policies which improve transparency. This can be understood from the lines - "That doesn't mean it's unreplicable, no study is definitive," said Nosek. "Science is really a process of uncertainty reduction." Hence, this is an eventuality the author would vote for.

Option D: The author isn't concerned about replicating studies. The discussion is around whether the findings of a study can be replicated and if not, can it be refined. The difference between replication of studies and replication of findings needs to be understood here. Hence, Option D is not the answer.   Choice (C)

Q11.   Which of the following, if true, would invalidate the approach taken by the author in the passage?

a) **Policies promoting transparency can bring down the number of studies across fields.**

b) **Creating similar conditions as mentioned in a study is virtually impossible.**

c) **Replication efforts are confronted with hostility in academic circles.**

d) **Replicability of findings is not the best way of identifying the veracity of a study.**

Number of words and Explanatory notes for RC:

Number of words: 533

The author's main conclusion in the passage is that quality of scientific studies must not be compromised. The approach he has used to arrive at this conclusion is that of replicability of findings, if studies are conducted multiple times. Option A: This statement is negative towards 'policies promoting transparency' whereas the passage exhorts policies to be put in place to improve the quality of studies. However, the overall message of the passage was not about how many studies are there around fields – quality over quantity was the discussion. Hence, Option A is not the answer.
Option B: This option tends to assert that studies cannot be replicated, virtually making it impossible to certify studies or improve their quality. If studies cannot be repeated, then we can never know about the replicability of findings of a study. Hence, this will invalidate the approach that the author has chosen to drive his point home.
Option C: This doesn't counter the message of the passage (about improving quality of studies). Rather, it talks about attitude of academicians which although important, is not the main idea. Hence, Option C is not the answer.
Option D: The author's conclusion is based on a study that checked the replicability of findings. Hence, replicability not being the best way of identifying the veracity of a study would weaken the main message, but does not attack the approach that the author has chosen.
If we compared Option B and Option D – they both weaken different aspects of the passage. However, one talks about replicability not being the most important parameter. The other talks about replicability being 'impossible'. Hence, while option D weakens the argument of the author, option B invalidates the approach that the author has chosen. Therefore, choice B is the answer.   Choice (B)

Q12.   All of the following are changes in recent times according to Nosek EXCEPT:

a) **the practice of pre-registering aims of a study has increased.**

b) **transparency has gained relevance amongst journals.**

c) **replicating studies is now a well-received practice.**

d) **recrimination of bad researchers happens more regularly.**

Number of words and Explanatory notes for RC:

Number of words: 533

Option A: From 'Nosek agreed, saying that the growing trend for pre-registering the aims of a study and the increasing number of journals to have adopted policies promoting transparency were encouraging', we can understand that this is one of the changes. Option A is not the answer.

Option B: From 'We're in the midst of a dramatic increase in the rigour and transparency of research in the social sciences', we can understand that Nosek agrees with this. Option B is not the answer.

Option C: From 'Replication in 2012 felt like an attack because it was so rare in science at the time. Now it's become normal', we can understand that Nosek agrees with this being one of the changes. Hence, Option C is not the answer.

Option D: Recrimination doesn't happen more regularly now according to Nosek. This can be understood from the sentences: "'It's not recriminations about who is a bad researcher or otherwise," said Nosek. "That's something that has completely changed over the last five years. Replication in 2012 felt like an attack because it was so rare in science at the time. Now it's become normal.'" Hence, Option D is the answer.

Choice (D)

Q13.   The 'nectar and the crack cocaine of highly exciting results' is:

a) **an accurate description of the quality of present studies.**

b) **a metaphor to indicate the focus on results rather than on the accuracy of the process.**

c) **an analogy for maximising the quality of studies.**

d) **a sign of studies being extremely unreliable.**

Number of words and Explanatory notes for RC:

Number of words: 533

Option A: Not all of present studies are represented by the term nectar and crack cocaine – only the ones with exciting results. Hence, this is not the answer.
Option B: The exciting results are being compared to nectar and crack cocaine. Hence, 'metaphor' is the right term. Option B is the answer.
Option C: Maximising the quality is not being referred to in 'nectar and crack cocaine'. Because, it clearly uses the term 'exciting', which is not akin to high quality, rather a distraction from checking if the study was indeed of high quality. Also, analogy is comparing one situation with another situation. Hence, Option C is not the answer.
Option D: The 'nectar and crack cocaine' expression is not a 'sign' since it is not a fact or an event or inference. It is a literary expression to explain that the focus is on how exciting the results are rather than whether they are reliable. Option D is not the answer.
Choice (B)

Q14.   Which of the following can be inferred from the first sentence of the antepenultimate para of the passage ('The latest work revealed…succeed or fail to replicate')?

a) **Scientists publishing studies know the vulnerabilities of the evidence used.**

b) **The reasons behind why studies fail are hard to decipher.**

c) **Studies that won't pass the replication test should be abandoned.**

d) **Peer group review is a reasonably accurate way of whetting published studies.**

Number of words and Explanatory notes for RC:

Number of words: 533

Consider the sentence: The latest work revealed scientists were also uncannily accurate at predicting which studies would later succeed or fail to replicate. We can understand that there was a pattern as far as predicting the replicability of a particular study and the reliability of a study was something a majority could assess.

Option A: If this is true, it casts aspersions on scientists who conduct studies. We are not discussing their sincerity, or showing them in negative light if their studies failed during replication. Hence, Option A is not the answer.

Option B: We are not talking about reasons behind studies failing. Rather we are discussing the 'replicability'. Hence, Option B is not the answer.

Option C: What should be done with studies if they fail to be replicated is not the primary concern of the sentence in consideration. Hence, Option C is not the answer.

Option D: Since, most peers agree with each other 'uncannily', they can be trusted to have the ability to 'whet' or approve studies. This can be inferred from the sentence given. Option D is the answer.

Choice (D)

Politicians have always exploited the past. But just now, rich countries and emerging economies are experiencing an outbreak of nostalgia. Right and left, democracies and autocracies, all are harking back to the glories of yesteryear. Even as President Donald Trump vows to "Make America great again", President Xi Jinping is using his "Chinese dream" to banish a century of humiliation and return China to its golden age.

This orgy of reminiscence has different causes in different countries. In emerging markets, past glories are often a foretaste of future triumphs. China, which has enjoyed 40 years of transformative growth, senses that it is on the threshold of something great. Under Narendra Modi, India has been celebrating its growing geopolitical heft with a Hindu-nationalist revival.

In the rich world, by contrast, nostalgia usually stems from what Sophia Gaston, of the Henry Jackson Society, calls "an omnipresent, menacing feeling of decline". Almost two-thirds of Britons think that life used to be better. A similar share of the French do not feel at home in the present. This year's World Happiness Report found that Americans are becoming less content. Large majorities in rich and developing countries believe that robots and automation will increase inequality and harm employment. A poll of 28 countries in 2017 found that over half of respondents expected their living conditions to stagnate or worsen.

Vaults full of research attest to how emerging-market optimism is more soundly based than rich-country pessimism. People around the world are living longer, healthier lives; fewer fall victim to war and famine; as education spreads, discrimination and prejudice are waning. Similarly, the summers were rarely as idyllic or the nation as glorious as sentiment would have it.

But to reject pessimism and nostalgia as simply inaccurate misses the point. They are powerful forces that are shaping politics. To harness them, you must first understand them.

Nostalgia serves optimists and pessimists alike as an anchor in a world being transformed. New technologies, including artificial intelligence, threaten to disrupt entire industries and to alter the relationship between the state and the citizen. After two centuries power is shifting from the West back to China. The planet is ageing faster than at any time in history. Its climate is changing. It is ever more racially and culturally mixed.

At such moments, people are drawn to nostalgia as a source of reassurance and self-esteem. Many Brexiteers hope that leaving the European Union means they will once again belong to a dynamic "global Britain". Catalans evoke an idealised past in pursuit of a distinctive identity.

In the rich world, nostalgia also offers a way to rebel against someone else's idea of progress − to "take back control". This makes nostalgia dangerous. Protesters do not necessarily expect to put back the clock − they may just be seeking to slow it down. In addition, the self-esteem that nostalgists crave often seems to feed xenophobia. Because of the taint of xenophobia, progressives are quick to treat all nostalgia as prejudice, leading them to dismiss the fears of whole sections of society. That sweeping judgment is one more reason why populists have been able to exploit nostalgia so successfully.

The best way to harness the past is demolishing prejudice and opening horizons. A proper sense of history can help you grasp that progress and it depends on facing up to hard choices. Sometimes it can inspire, too.

Q15. The author's argument can be repudiated by which of the following findings, if they are true?

 a) People across the globe feel change is inevitable.

 b) People across the globe are anxious about how things will unravel.

 c) People across the globe feel things are changing too fast.

 d) **People across the globe feel the world always changes for the better.**

Number of words and Explanatory notes for RC:

Number of words: 561

The author's argument is that around the world people are feeling nostalgic, for various reasons – glorifying the past and hoping for it to repeat or bemoaning the present.
Option A: If people feel, change is inevitable, it doesn't tell us whether they are happy about it or unhappy about it. Hence, this option doesn't affect the author's argument.
Option B: This means the people aren't optimistic about the future. They are more likely to prefer what existed in the past or what exists in the present. Hence, this doesn't repudiate the author. In a way, it agrees with the author.
Option C: This option doesn't tell us whether people are comfortable with things changing too fast. Hence, Option C is not the answer.
Option D: This clearly shows people are happy with the changes, and hence, nostalgia associated with past glory or better times, isn't really true. Changing for the better also implies the world is not going back to the past but is positively becoming something else, something new. Option D can repudiate the author's argument.   Choice (D)

Q16.   Progressives mistake nostalgia for bias because what nostalgists crave

a) is a sign of racism.

b) leads to intolerance.

c) leads to rebellions.

d) **is a populist emotion.**

Number of words and Explanatory notes for RC:

Number of words: 561

Consider the sentences: In addition, _**the self-esteem that nostalgists crave often**_ _**seems to feed xenophobia**_. Because of the taint of xenophobia, progressives are quick to treat all nostalgia as prejudice, leading them to dismiss the fears of whole sections of society. It is clear that progressives dismiss nostalgia as prejudice because of the xenophobia or fear of foreigners, which comes with the nostalgia or longing for the past glory. From these sentences we can understand that the craving for self-esteem is the cause behind nostalgia, and that self-esteem feeds xenophobia.
Option A: Racism and xenophobia, although close, cannot be equated. They are not one and the same thing. Hence, Option A is close but not the answer.
Option B: From 'the self-esteem that nostalgists crave often seems to feed xenophobia' we can understand that nostalgia stems from people craving for self-esteem and that feeds xenophobia. So, the cause of nostalgia – self-esteem - does lead to intolerance.
Option C: Rebellions haven't been discussed in the abovementioned para. This is easy to eliminate.
Option D: Populists exploit the nostalgia. But, this has got nothing to do with the progressives hating nostalgia and banishing it. Nostalgia or the craving for self-esteem is not necessarily a populist emotion. Hence, Option D is not the answer.

Choice (B)

Q17.   'Chinese dream' and 'Make America great again' show that:

a) politicians are adept at exploiting the past.

b) past glories are being invoked to encourage future triumphs.

c) rich worlds are mourning the decline of their society.

d) **countries around the world, irrespective of forms of government, are in a mood of reminiscence.**

Q18. The author uses the expression 'the summers were rarely as idyllic' to highlight his

a) disillusionment with the past.

b) disagreement with the nostalgists.

c) concern over the growing populism in rich worlds.

d) **stance on the glorification of the past.**

Number of words and Explanatory notes for RC:

Number of words: 561

Option A: Disillusionment is caused when someone holds something in high regard but then realises it didn't deserve that. However, the author mentions the given sentence to correct the people who are nostalgic about over-glorified past. Hence, Option A is not the answer.

Option B: The summers were mentioned by the author to show that he didn't really think things were as glorious as some of the nostalgists, talking about decline in the present, make them out to be. However, this is not the closest explanation of what the author meant by summers were rarely as idyllic (leisurely and beautiful), because not all nostalgists can be included in this explanation. As per the para, the author talks about summers to support how the present is a good time and how those from emerging countries are right. Hence, Option B is not the best answer.

Option C: The abovementioned sentence is not linked to populism in any way. Hence, this option can be eliminated.

Option D: The summers clearly imply the author's stance about the glorification of the past. The option doesn't mention what the stance is – positive or negative, since the author is positive towards some and negative towards some nostalgists in the relevant lines. Hence, Option D is the answer.   Choice (D)

Q19. The difference between the nostalgia of emerging countries and that of rich countries is that:

a) in the former, it gives a taste of success, while in the latter, it gives a sense of failure.

b) in the former, it brings a sense of pride, whereas in the latter, it is a sense of embarrassment.

c) in the former, it indicates future triumphs, whereas in the latter, it invokes a bleak future.

d) **in the former, it represents disappointment, whereas in the latter, it represents hope.**

Number of words and Explanatory notes for RC:

Number of words: 561

Consider the sentences: This orgy of reminiscence has different causes in different countries. In emerging markets *past glories are often a foretaste of future triumphs*...*In the rich world, by contrast, nostalgia usually stems from* what Sophia Gaston, of the Henry Jackson Society, calls "*an omnipresent, menacing feeling of decline*". These are the two reasons for nostalgia.
Option A: Future triumph doesn't exactly translate to 'taste of success'. More importantly, in case of rich countries, it is a sense of decline, not necessarily 'failure'. Hence, Option A is not the answer.
Option B: Sense of decline doesn't quite equate to embarrassment. Similarly, optimism for the future doesn't quite equate to 'a sense of pride'. Hence, Option B is an inaccurate representation.
Option C: In case of emerging countries, nostalgia is about a glorious past which is invoked to indicate future triumphs and in case of rich countries, it is about the sense of decline, a bleak future. Hence, this option correctly represents the difference.
Option D: It is more positive in case of emerging countries and negative in case of rich countries. Hence, the implication of nostalgia is incorrect in this choice, negative for emerging countries and positive for rich countries. Option D is not the answer.
<div align="right">Choice (C)</div>

The modern world is experiencing a "sixth great extinction" of animal species even when the lowest estimates of extinction rates are considered, scientists have warned. The rate of extinction for species in the 20th century was up to 100 times higher than it would have been without man's impact, they said.

Many conservationists have been warning for years that a mass extinction event akin to the one that wiped out the dinosaurs is occurring as humans degrade and destroy habitats. But the authors of a study published on Friday said that even when they analysed the most conservative extinction rates, the rate at which vertebrates were being lost forever was far higher than in the last five mass extinctions.

Previous studies have warned that the impact of humans taking land for buildings, farming and timber has been to make species extinct at speeds unprecedented in Earth's 4.5bn-year history. Dr Gerardo Ceballos of the National Autonomous University of Mexico said that his study, co-authored by Paul R Ehrlich who famously warned of the impact of humanity's "population bomb", employed better knowledge of natural or so-called background extinction rates. He said it was conservative because it looked only at species that had been declared extinct, which due to stringent rules can sometimes take many years after a species has actually gone extinct.

Under a "natural" rate of extinction, the study said that two species go extinct per 10,000 species per 100 years, rather than the one species that previous work has assumed. Modern rates of extinction were eight to 100 times higher, the authors found. For example, 477 vertebrates have gone extinct since 1900, rather than the nine that would be expected at natural rates.

"It's really signalling we've entered a sixth extinction and it's driven by man," said Ceballos. However, Prof Henrique Miguel Pereira, the chair of the Group on Earth Observations Biodiversity Observation Network, said that the new paper did not add anything revolutionarily new. "They argue that recent extinction rates are up to 100 times higher than in the past. I think it improves our documentation of the process, but it does not yet confirm a sixth mass extinction. I tend to think we have a major biodiversity crisis, but it would take either a fast acceleration of current extinction rates or a couple of centuries at current extinction rates, for the current process to become a sixth mass extinction."

The team behind the new analysis said "rapid, greatly intensified efforts" would be needed to stop or slow the extinctions currently underway. Ceballos pointed to the Pope Francis's encyclical on the environment, which was published on Thursday and lamented the loss of the world's biodiversity, and interventions by Barack Obama, as signs of hope. "These important figures are starting to really grasp the problem," he said. On why people should be worried about the rate of extinctions, he said: "People say that's really sad, but why does it affect me? There are many reasons we should care. We are the species that are causing the loss of all these other species."

But the most important reason, he said, was that by losing species, humanity was losing what enabled us to have a "good standard of living".

Q20. Prof Henrique Miguel Pereira's main argument against the study discussed in the passage is that:

a) the current rate of extinction does not qualify to call it a mass extinction, yet.

b) it was already known that extinction rates had gone higher than in the past.

c) **the sixth mass extinction is not possible at the current extinction rate.**

d) **the new paper has copied its findings.**

Q21.   Which of the following additional studies will add the most depth to Ceballos' study?

a) A study to compare the rate of extinction of species now and a hundred years ago.

b) A study to identify if the current rate of extinction of species is rapid enough to cause a mass extinction in the immediate future.

c) **A study to identify the total number of species on the planet.**

d) **A study to compare the extinction rates of the previous mass extinctions**

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Number of words and Explanatory notes for RC:

Number of words: 537

Option A: From 'Under a "natural" rate of extinction, the study said that two species go extinct per 10,000 species per 100 years, rather than the one species that previous work has assumed. Modern rates of extinction were eight to 100 times higher, the authors found', we can understand that comparing the rates of extinction would be redundant, as the study has already done it. It cannot add any further depth. Option A is not the answer.

Option B: Since the study warns of a mass extinction based on the rapid rate of extinctions, a study to find out if this rate is rapid enough to cause the extinction in near future would be the obvious next step. This will result in a well-rounded analysis and add depth. Option B is the answer.

Option C: Identifying the total number of species on the planet wouldn't really affect the veracity of the study whose most important claim was that we are into the sixth mass extinction – inferred from the rate at which we are losing species. How many species exist doesn't matter. Option C is not the answer.

Option D: It has not been mentioned that the speed of extinctions is equal or comparable across various mass extinctions. So, comparing the extinction rates is a futile exercise. Option D is not the answer.   Choice (B)

22.   Ceballos mentioned Obama to demonstrate that:

a) everyone deserves a good standard of living.

b) intensified efforts are needed from powerful people.

c) **the problem deserves more attention from important figures**

d) **important people are comprehending the criticality of the extinction rate**

Q23. The author mentions that Ceballos' study is conservative because:

a) **it only considers species that have been declared extinct.**

b) it only takes into account background extinction rates.

c) **it only takes vertebrates into account.**

d) **it only warns of the impact of humanity's population bomb.**

Q24.   The author thinks the most important reason why people should be worried about the rate of extinctions is that:

a) **it will affect our standard of living.**

b) humanity is responsible for the extinction.

c) **we have entered into the phase of sixth mass extinction.**

d) **we are losing something important to our living standards.**

Number of words and Explanatory notes for RC:

Number of words: 537

Consider the sentences: On why people should be worried about the rate of extinctions, he said: "People say that's really sad, but why does it affect me? There are many reasons we should care. We are the species that are causing the loss of all these other species."

But the most important reason, he said, was that **_by losing species, humanity was losing what enabled us to have a "good standard of living"_**.

Option A: While it is true, the representation of the reason is not accurate. The author is not worried about our future standard of living. The author is worried about losing what helped us achieve the current standard of living. Hence, Option A is not the answer.

Option B: While this is a reason, it is not the most important reason according to the last line of the passage.

Option C: We are causing the extinction, true, but that is not the most important reason mentioned by the author to highlight the alarming rates of extinction. Option C is not the answer.

Option D: We are losing something that is important for our standard of living and enabled us to have a good standard of living. This is the most important reason why the rate of extinction is important to focus on. Option D is the answer.

Choice (D)

Q25.   DIRECTIONS *for question 25*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. They were unprepared for the Japanese bombers that arrived shortly after.

2. On the morning of December 7th, 1941, George Elliott Junior noticed "the largest blip" he had ever seen on a radar near America's naval base at Pearl Harbour.

3. His discovery was dismissed by his superiors.

4. As a credit-detector, the credit gap has some appealing operating characteristics.

5. The mistake prompted urgent research into "receiver operating characteristic", the ability of radar operators to distinguish between true and false alarms.

Sentence 2: Sentence 2 mentions the date, the person's name and the location.
Sentence 3: Sentence 4 has the pronoun 'his' (His discovery/ his superiors).
Sentence 1: Sentence 1 has the personal pronoun 'they'. And the clue 'shortly after'.
Sentence 5: Sentence 5 has the reference 'the mistake' and area of research "receiver operating characteristics".
Sentence 4: Sentence 3 introduces the 'credit gap'.
On a careful reading of the sentences, it can be observed that statement 2 is a general sentence that can begin the para. It has some proper nouns (names of persons and places) and a date. "noticed the largest blip" in sentence 2 establishes the topic of discussion. Sentence 2 is followed by sentence 3. The pronoun "his" in sentence 3 points to "George Elliott Junior" in sentence 2. Also "discovery" in sentence 3 relates to "noticed "the largest blip" he had ever seen on a radar" in sentence 2. Sentences 3 and 1 form a mandatory pair. "dismissed by his superiors" in sentence 3 links with "unprepared for the Japanese bombers" in sentence 1. So sentence 3 is followed by sentence 1. Sentence 5 concludes the para. "The mistake" in sentence 5 points to the facts mentioned in sentences 3 and 1. So, 2315. Sentence 4 is the odd sentence out as 'credit gap' needs a precedent. Though 'operating characteristics' has been mentioned in sentence 5, "some appealing operating characteristics" in sentence 4 needs more substantiation. Ans: (4)

Q26.   DIRECTIONS *for question 26*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. Those with academic inclinations took extra classes with the head teacher in their teenage years and with luck made it into teachers' college.

2. Chief among MacMillan's concerns was Jamaica's educational system.

3. Those with broader ambitions had to somehow find their way into a private school, and from there to a university in the US or England.

4. So called formal schooling "in the wooden barn next door" went only to fourteen years of age and there were no public high schools or universities.

Sentence 1: Sentence 1 has the demonstrative pronoun 'those' and it mentions how people managed to make it into teachers' college.
Sentence 2: Sentence 2 has the proper noun "MacMillan" and the location "Jamaica".
Sentence 3: Sentence 3 again has the demonstrative pronoun 'those' and mentions how people proceeded to a university abroad.
Sentence 4: Sentence 4 talks about some problems in the education system.
On a careful reading of the sentences, it can be observed that sentence 2 is a general sentence that can begin the paragraph. It introduces the topic of discussion: Jamaica's educational system. Sentence 2 is followed by sentence 4. It expands on the concerns of the educational system in Japan: schooling upto fourteen years of age, no public schools or universities. Sentence 4 is followed by sentence 1. Sentence 1 tells us how students with academic inclinations managed to study even though Jamaica's educational system was not rosy. Sentence 1 is followed by sentence 3. "broader ambitions" in sentence 3 is parallel to "academic inclinations" in sentence 1 and it follows "with luck made it into teachers' college" in sentence 1. So, 2413.

Ans : (2413)

Q27.   DIRECTIONS *for question 27*: The passage given below is followed by four summaries. Choose the option that best captures the author's position.

This ought to be a time when democracy leaps forward, an informed citizenry being essential to self-government. Instead, it's in retreat. Three decades after the Cold War defeat of a blunt and crude autocracy, a cleverer brand takes nourishment from the murk that surrounds us. The old-school despot embraced censorship. The modern despot, finding that more difficult, foments mistrust of credible fact, thrives on the confusion loosed by social media and fashions the illusion of legitimacy from supplicants.

  a) **Informed citizenry is disappearing because of modern-day dictators embracing censorship and false news.**

 b) Democracy is losing ground because of the misinformation floating in social media.

 c) **Modern-day tyrants discredit information dumbing down citizens fed by social media.**

 d) **Modern-day autocrats are harming democracy not by censoring information, but by propagating amongst citizens a mistrust of information.**

Option A: It is democracy which is in the retreat and not 'informed citizenry'. Secondly, old-school despots embraced censorship and not modern-day dictators. Hence, Option A is not the answer.
Option B: This is true, but it ignores the central idea of modern despots propagating the misinformation. Hence, Option B is not the best possible summary.
Option C: While the first part of this summary is correct, the second half – dumbing down citizens – is an extreme exaggeration. Hence, Option C is not the answer.
Option D: This option covers the central points of the para. Firstly, modern day autocrats/despots/dictators are spreading mistrust of credible information. Secondly, this is affecting democracy negatively. Hence, Option D is the answer.

Choice (D)

Q28. DIRECTIONS *for question 28*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. If you think about the world of preschoolers, they are surrounded by stuff they don't understand − things that are novel.
2. So the driving force for preschoolers is not a search for novelty, like it is with older kids, it's a search for understanding and predictability.
3. But, of course, kids don't always like repetition and whatever they are watching has to be complex enough to allow, upon repeated exposure, for deeper levels of comprehension.
4. Repetition of key elements enables this process of understanding and predictability and is really valued by them.

Sentence 1: Sentence 1 is a general sentence that can begin the para. It highlights a point – Preschoolers don't understand novel things.
Sentence 2: Sentence 2 explains preschoolers differ from older kids in terms of what they search for.
Sentence 3: Sentence 3 has the contrast conjunction 'but'. It talks about repetition and repeated exposure.
Sentence 4: Sentence 4 has the demonstrative adjective 'this' and has the clues: understanding and predictability.
So, sentence 1 is a general sentence that can begin the para. Sentence 1 is followed by sentence 2. " If you think about the world of preschoolers" in sentence 1 links with " driving force for preschoolers" in sentence 2. Also "surrounded by stuff they don't understand – things that are novel" in sentence 1 links with "not a search for novelty" in sentence 2. Sentences 2 and 4 form a mandatory pair. "a search for understanding and predictability" in sentence 2 links with "enables this process of understanding and predictability" in sentence 4. Sentence 4 explains the importance of repetition. Sentence 3 goes tangent to sentence 3. "But, of course, kids don't always like repetition" in sentence 3 contrasts "Repetition of key elements" in sentence 4. "repeated exposure, for deeper levels of comprehension" in sentence 3 links with "repetition ..... enables this process of understanding and predictability." So, 1243.

Ans: (1243)

Q29.   DIRECTIONS *for question 29*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. Seventy percent of the Eastern European Jews who came to America through Ellis Island before World War I were bookbinders, watchmakers, jewellers, tailors, cap and hat makers, furriers, and tanners.

2. For centuries in Europe, the Jews had been forbidden to own land, so they clustered in cities, taking up urban trades and professions.

3. The Irish and the Italians were peasants, tenant farmers from the impoverished countryside of Europe but not so the Jews.

4. Jewish immigrants like the Floms and the Borgenichts and the Janklows were not like the other immigrants who came to America in the early twentieth century.

Sentence 4: Sentence 4 is a general sentence that compares Jewish immigrants into America with other immigrants. It also mentions the various names associated with the Jewish immigrants.

Sentence 3: Sentence 3 contrasts the Irish and the Italians with the Jews.

Sentence 2: Sentence 2 tells us that the Jews took up urban professions in Europe.

Sentence 1: Sentence 1 explains what Professions the Jews had taken up in Europe.

On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that can begin the paragraph. It is the only sentence that has the word 'immigrant' in it (immigrants who came to America). So, sentence 4 has to precede the remaining sentences as the remaining sentences only talk about what the Jews and other immigrants pursued as trades before entering America. Sentence 4 is followed by sentence 3. "Jewish immigrants were not like the other immigrants" in sentence 4 links with "The Irish and Italians were peasants but not so the Jews" in sentence 3. Sentence 3 is followed by sentence 2. Both these sentences form a mandatory pair. "The Irish and the Italians were <u>peasants, tenant farmers</u> from the impoverished countryside of Europe but not so the Jews" in sentence 3 contrasts "the Jews had been forbidden to own <u>land</u>, so they clustered in cities, taking up urban trades and professions" in sentence 2. Sentence 2 is followed by sentence 1. "they clustered in cities, taking up urban trades and professions" in sentence 2 links with "they clustered in cities, taking up urban trades and professions" mentioned in sentence 1. So, 4321. Note that the para cannot start with sentence 2 as the arrangement will distort the thought flow.   Ans: (4321)

Q30.   DIRECTIONS *for question 30*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. Many things that you know about yourself are simply not true.

2. You could also be a genius in interpersonal intelligence, intrapersonal intelligence, intuitive intelligence, artistic intelligence or abstract intelligence.

3. Unfortunately, only two intelligences are measured and reported throughout school and university: verbal and mathematical.

4. According to Dr. Howard Gardner of Harvard University, you possess at least ten different intelligences, in any one of which you might be a genius.

5. But you could be a genius in the areas of visual-spatial intelligence, entrepreneurial intelligence, kinesthetic intelligence and musical intelligence.

Sentence 1: Sentence 1 does not have the word 'intelligence' and it is a general sentence that can begin another context.

Sentence 2: Sentence 2 has the clue 'also' and the names of several intelligences.

Sentence 3: Sentence 3 begins with 'unfortunately' which serves as a contrast marker here. It mentions two intelligences.

Sentence 4: Sentence 4 mentions the name of a person and the location. It establishes the topic of discussion: ten different intelligences (you may be a genius in any).

Sentence 5: Sentence 5 has the contrast conjunction 'but' and the names of several intelligences.

On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that can begin the para. It mentions the name of a Professor. It also introduces the background: ten different intelligences. Sentences 4 and 3 form a mandatory pair. "unfortunately, only two intelligences are measured" in sentence 3 contrasts "possess at least ten different intelligences" in sentence 4. So sentence 3 follows sentence 4. Sentence 3 is followed by sentence 5. The contrast conjunction 'but' in sentence 5 helps to connect sentence 5 to sentence 3. "you could be a genius in ..." in sentence 5 contrasts "only two intelligences are measured" in sentence 3. Sentence 2 adds to the list of intelligences and follows sentence 5. So, 4352. Sentence 1 is the odd sentence out. "Many things ...." in sentence 1 needs a precedent and more substantiation. Ans: (1)

Q31.   DIRECTIONS *for question 31*: The passage given below is followed by four summaries. Choose the option that best captures the author's position.

Instagram is imperatively filled with half-truths and optimizations of life, yet we still use it to gauge our own. For some reason, though, we don't consider Instagram photos to be as manipulative of reality as the photos in magazines. This is because despite the editing, they seem more accessible because we know the photographers. As I pour over my feed, I find myself asking why I can't look like one girl or another, why my outfits aren't as cute, why my "skinny arm" always fails or why my weekend outings aren't as exciting as everyone else's. I'm always saying, "I just want to be her," or "His life is so cool" because no matter how much I love my own life, someone's will always be better looking on Instagram.

a) **We don't consider Instagram photos, otherwise optimised, to be manipulative of reality because of proximity to the source.**

b) We have incorrect notions of others' lives because everything looks better on Instagram.

c) **Instagram optimises how your life looks on the outside and yet, we don't consider it as manipulative.**

d) **We can't stop ourselves from comparing our lives with those of others on Instagram despite knowing that what we see is only half-truth.**

Option A: This covers two important ideas – that Instagram stories are optimised (and therefore, manipulative and not real) and that we still accept it because we know the photographers (source) personally. Nevertheless, Option A is not the best possible answer because it leaves out the idea about comparison – the conclusion of the para.
Option B: 'Everything looks better' is an exaggeration because the central idea is that there will always be someone (at least one, not necessarily everyone) better looking. Hence, Option B is not the answer.
Option C: This is from the perspective of how one's life looks outside. The para is about how we look at others' lives through the lens of Instagram. Hence, Option C doesn't represent the right perspective and therefore, not the answer.
Option D: The manipulative aspect of Instagram and why we accept it has been pointed out subtly through 'half-truth'. Also, 'we can't stop ourselves' is what the author is trying to imply when he says 'someone is *always better'*. Therefore, Option D is the best possible answer.   Choice (D)

Q32.   DIRECTIONS *for question 32*: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. She gave the Russians one day to produce an explanation before she concluded that Britain had been the victim of "an unlawful use of force".
2. The prime minister pointed her finger directly at Russia's president, Vladimir Putin.
3. On 30th June 2018, a similar poisoning of two British nationals in Amesbury, seven miles from Salisbury, involved the same nerve agent.
4. She said that either the Russian state had sanctioned the attack on the former Russian spy or it had lost control of a deadly poison.

5. Theresa May kicked off a dramatic week on March 12th 2018 with her Commons statement on the poisoning of Sergei Skripal and his daughter Yulia by a powerful Novichok nerve agent in Salisbury.

Sentence 1: Sentence 1 mentions the personal pronoun 'she'. It speaks about the step she took and her conclusion.

Sentence 2: Sentence 2 has the proper noun "Vladimir Putin" and mentions the accusation being made by the (British) prime minister against him.

Sentence 3: Sentence 3 has the clues 'similar poisoning' and 'same nerve agent'. It mentions a date, a place and also the fact that two British nationals were poisoned.

Sentence 4: Sentence 4 mentions the personal pronoun 'she' and talks about her statement with reference to the attack.

Sentence 5: Sentence 5 mentions the name "Theresa May" which can be inferred to be the protagonist in the story. It mentions other proper nouns like Sergei Skripal, Yulia and Salisbury (name of a location). It mentions a proper adjective 'Novichok'. It talks about the topic of discussion: Theresa May's Commons statement on the poisoning.....Sentence 5 can serve as the opening sentence of the paragraph.

On a careful reading of the sentences, it can be observed that statement 5 is a general sentence that can begin the para. It has some proper nouns and a date. Sentence 5 is followed by sentence 2. "The prime minister" in sentence 2 points to "Theresa May" in sentence 5. "pointed her finger directly" in sentence 2 links with "poisoning by a powerful nerve agent" in sentence 5. Sentence 2 is followed by sentence 4. "the Russian state" in sentence 4 links with "Russia's president" in sentence 2. "sanctioned the attack" and "lost control of deadly poison" in sentence 4 links with "poisoning by powerful nerve agent" given earlier in sentence 5. Also, "former Russian spy" in sentence 4 points to "Sergei Skripal" in sentence 5. So, 524. Sentence 1 concludes the para. "produce an explanation" in sentence 1 follows the accusation made by Theresa May, as mentioned in sentence 4. Hence, 5241. Sentence 3 is the odd sentence out as 'similar poisoning' talks about another incident which took place on another day in another location (Amesbury, seven miles from Salisbury). Sentence 3 is parallel to the topic of discussion but does not fit in with the flow.   Ans: (3)

Q33. DIRECTIONS *for question 33*: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

1. Tchaikovsky's ballet 'The Nutcracker' is now an iconic holiday entertainment staple, performed by many companies around the world, including the Moscow Ballet.
2. Then in 1954, choreographer George Balanchine staged the show with the New York City Ballet; and his version, which caught on, inspired other dance companies to stage their own.
3. It was revived and restaged in the early 20th century, but still didn't make an impact.
4. But when 'The Nutcracker' debuted this day in 1892 in St. Petersburg, Russia, it was not a hit.

Sentence 1: Sentence 1 has the name of a ballet: Tchaikovsky's ballet 'The Nutcracker'. It has the clue "is now".
Sentence 2: Sentence 2 mentions "1954" and the fact that the show choreographed by George Balanchine caught on and inspired others.
Sentence 3: Sentence 3 has the pronoun "it" and a reference to another time period "the early 20th century".
Sentence 4: Sentence 4 has the contrast conjunction 'but' and a reference to the past – 1892.
Among the four sentences, only sentence 1 can begin the para. The remaining sentences need a precedent and more substantiation. Sentence 1 tells us that 'The Nutcracker' is an iconic ballet today. Sentence 1 is followed by sentence 4. "But it was not a hit, in 1892" in sentence 4 contrasts "now an iconic holiday entertainment staple" in sentence 1. Sentence 4 is followed by sentence 3. "It was revived and restaged but still didn't make an impact" in sentence 3 links with "it was not a hit, in 1892" in sentence 4. Sentence 3 is followed by sentence 2. "Then in 1954, the show was staged ..... (positive development)" in sentence 2 contrasts "still didn't make an impact" in sentence 3 and "it was not a hit" in sentence 4. So, 1432.
One can easily arrive at this answer if one follows the chronological order: now, 1892 - --- > early 20th century ----->1954.   Ans: (1432)

Q34.   DIRECTIONS *for question 34*: The passage given below is followed by four summaries. Choose the option that best captures the author's position.

Medicine and technology have much in common. Contrary to the natural sciences, neither of them is aimed at obtaining knowledge for its own sake. Both have an emphasis on techno rather than episteme, i.e. their goal is to find means of achieving practical results, to change the world rather than just to understand it. Medicine and technology also have a large and rapidly growing intersection, namely the use of technological methods to achieve the goals of healthcare. The use of complicated technology in hospitals has increased the role of engineers in healthcare. Due to the need for their expertise, some technological and engineering personnel are moving closer to the patient and assume roles that are more clinical in multidisciplinary healthcare teams. Unfortunately, their role is often insufficiently understood by the public and by members of the better-established healthcare professions.

 a) **Medicine and technology are pursued not for epistemological reasons but for practical necessities.**

 b) Technological experts play a crucial, albeit understated, role in medicine because of how much medicine and technology have in common.

 c) **Engineers have become more important in medicine because of the use of complex technological methods.**

 d) **Medicine and technology are intersecting more and more bringing engineers closer to patients.**

Option A: Medicine and technology are pursued for 'practical necessities' – while this is true, it doesn't tell the full story. Medicine and technology have things in common and that makes engineers important. Hence, this option is not the right choice.

Option B: Technological experts play a crucial role in medicine. Also that role is understated and sometimes misunderstood. These are the two important ideas in the passage.

Option C: Engineers have become important in medicine. This part is true. They have not become important because of 'complex ***technological methods***'. Also, the rest of the idea about the role of engineers being misunderstood is not mentioned.

Option D: This option summarises the first half of the para, but leaves out an important part – engineers' role being misunderstood. It should be noted that this option is quite similar to Option B except for the part where B mentioned 'understated' but D doesn't. Also, coming closer to patients is a sub-idea compared to 'playing a crucial role in medicine'.

Choice (B)

DILR

Nine letters − A, B, C, D, E, F, G, H, I − and nine numbers, 1 to 9, are to be arranged in nine boxes which are in three rows and three columns, such that each box contains exactly one letter and exactly one number.

The arrangement has to satisfy the following conditions:

i.   Two of the three vowels appear in a single row and no two vowels appear in a single column.
ii. The number in the second column of the first row is 1.
iii. The number in the third column of the first row is twice that in the third column of the second row, and the sum of these two numbers is in the third column of the third row.
iv. B, A, I and F, A, H are the elements in the two diagonals, while B and F are not in the first row.
v.   The number 3 is in the first column of the second row.
vi. The sum of the numbers in the first column is one less than that in the second column.
vii. The numbers 8 and 9 appear in the same row.

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

What is the value of the number that is in the second column of the second row?

From (IV) the letter common to both diagonals is 'A'. i.e 2nd row 2nd column contains 'A'.

From (III) and (V) the numbers in 2nd column are 4, 2, 6

From (I) E is present either in the 2nd row of 1st column as shown in case (I) or 2nd row of 3rd column as shown in case (III)

H5	1	I4
E3	A7	2
B8	9	F6

Case (i)

I5	1	H4
3	A7	E2
F8	9	B6

Case (ii)

The number in the 2nd column of the 2nd row is 7.   Ans: (7)

Q2. DIRECTIONS *for questions 2 to 4:* Select the correct alternative from the given choices.

If there is an odd number in the box which contains H, then what is the value of the number in the box which contains G?

a) **1**

b) 2

c) **3**

d) **Cannot be determined**

From (IV) the letter common to both diagonals is 'A'. i.e 2nd row 2nd column contains 'A'.

From (III) and (V) the numbers in 2nd column are 4, 2, 6

From (I) E is present either in the 2nd row of 1st column as shown in case (I) or 2nd row of 3rd column as shown in case (III)

H5	1	I4
E3	A7	2
B8	9	F6

Case (i)

I5	1	H4
3	A7	E2
F8	9	B6

Case (ii)

The number beside G can be any of 1, 2 or 9.   Choice (D)

Q3. DIRECTIONS *for questions 2 to 4:* Select the correct alternative from the given choices.

If the box (cell) in which G is contains a perfect square, then which of the following could be in the third column of the second row?

a) C, 2

b) D, 3

c) C, 1

d) D, 1

From (IV) the letter common to both diagonals is 'A'. i.e 2nd row 2nd column contains 'A'.

From (III) and (V) the numbers in 2nd column are 4, 2, 6

From (I) E is present either in the 2nd row of 1st column as shown in case (I) or 2nd row of 3rd column as shown in case (III)

H5	1	I4
E3	A7	2
B8	9	F6

Case (i)

I5	1	H4
3	A7	E2
F8	9	B6

Case (ii)

The letter present in 2nd row of the 3rd column might be E2 or C2 or D2.

Choice (A)

Q4. DIRECTIONS *for questions 2 to 4:* Select the correct alternative from the given choices.

If the sum of the numbers in the boxes which contain B and G is seven, what is the sum of the numbers in the boxes which contain C and D?

a) **10**

b) **12**

c) **4**

d) **Cannot be determined**

From (IV) the letter common to both diagonals is 'A'. i.e 2nd row 2nd column contains 'A'.

From (III) and (V) the numbers in 2nd column are 4, 2, 6

From (I) E is present either in the 2nd row of 1st column as shown in case (I) or 2nd row of 3rd column as shown in case (III)

H5	1	I4
E3	A7	2
B8	9	F6

Case (i)

I5	1	H4
3	A7	E2
F8	9	B6

Case (ii)

The given condition is possible only in case (ii) when G is beside 1. In this case, the sum of the numbers beside C and D is 12.   Choice (B)

DIRECTIONS *for questions 5 to 8:* Answer the questions on the basis of the information given below.

A group of five friends keep in contact with each other by calling each other over their mobile phones. It is known that the duration of any call made by A to any of his friends is always the same. Similarly, the duration of any call made by B to any of his friends is always the same. The same is the case for each of C, D and E. The table below gives the total duration of the calls made and the calls received by each of these friends during a particular week. During that week, each friend called each of the other friends exactly twice and none of the five friends made any call to or received any call from anyone else other than among themselves.

Name	Total Duration of Calls Made (min)	Total Duration of Calls Received (min)
A	8	
B	12	
C	10	15
D		
E		12

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

What is the total duration (in minutes) of the calls made by D during the week?

It is given that the duration of any call made by A to any of his friends is always the same. Similarly, the duration of any call made by B to any of his friends is always the same. The same is case for each of C, D and E.

Also, each friend made exactly two calls to each of the other friends in the group.

Hence A would have spoken to each of the other person for the same duration. So would have each of the other friends.
Since each person has talked with every other person for the same duration, A would have talked for 2 minutes with everyone else. B would have talked for 3 minutes and C would have talked for 2.5 minutes with every other person.
Let the total duration of dialed calls for D be 4x and the total duration of dialed calls for E be 4y.

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	3+2.5+x+y
B	12	2+2.5+x+y
C	10	2+3+x+y
D	4x	2+3+2.5+y
E	4y	2+3+2.5+x

Therefore, 2+3+2.5+x = 12→ x = 4.5
Also, 2+3+x+y =15→ y = 5.5

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	15.5
B	12	14.5
C	10	15
D	18	13
E	22	12

Total duration of dialed calls of D = 18 minutes   Ans: (18)

Q6. DIRECTIONS *for question 6:* Select the correct alternative from the given choices.

The difference between the total duration of calls made and the total duration of calls received during the week is the maximum for

a) **B.**

b) **C.**

c) **D.**

d) **E.**

It is given that the duration of any call made by A to any of his friends is always the same. Similarly, the duration of any call made by B to any of his friends is always the same. The same is case for each of C, D and E.

Also, each friend made exactly two calls to each of the other friends in the group.

Hence A would have spoken to each of the other person for the same duration. So would have each of the other friends.
Since each person has talked with every other person for the same duration, A would have talked for 2 minutes with everyone else. B would have talked for 3 minutes and C would have talked for 2.5 minutes with every other person.
Let the total duration of dialed calls for D be 4x and the total duration of dialed calls for E be 4y.

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	3+2.5+x+y
B	12	2+2.5+x+y
C	10	2+3+x+y
D	4x	2+3+2.5+y
E	4y	2+3+2.5+x

Therefore, $2+3+2.5+x = 12 \rightarrow x = 4.5$
Also, $2+3+x+y = 15 \rightarrow y = 5.5$

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	15.5
B	12	14.5
C	10	15
D	18	13
E	22	12

The difference is maximum for E (22 –12) = 10 min   Choice (D)

Q7. DIRECTIONS *for question 7:* **Type in your answer in the input box provided below the question.**

All the five friends subscribe to the same telecom service provider, which charges them Rs.1/min for calls made and Rs.0.50/min for calls received. For billing purposes, the duration of any call which did not last for a whole number of minutes is rounded up to the next highest whole number of minutes.

What were the total expenses incurred by E (in Rs.) on the calls made and the calls received by him during the given week?

It is given that the duration of any call made by A to any of his friends is always the same. Similarly, the duration of any call made by B to any of his friends is always the same. The same is case for each of C, D and E.

Also, each friend made exactly two calls to each of the other friends in the group.

Hence A would have spoken to each of the other person for the same duration. So would have each of the other friends.
Since each person has talked with every other person for the same duration, A would have talked for 2 minutes with everyone else. B would have talked for 3 minutes and C would have talked for 2.5 minutes with every other person.
Let the total duration of dialed calls for D be 4x and the total duration of dialed calls for E be 4y.

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	3+2.5+x+y
B	12	2+2.5+x+y
C	10	2+3+x+y
D	4x	2+3+2.5+y
E	4y	2+3+2.5+x

Therefore, 2+3+2.5+x = 12→ x = 4.5
Also, 2+3+x+y =15→ y = 5.5

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	15.5
B	12	14.5
C	10	15
D	18	13
E	22	12

The expense incurred by E will be for 8 dialed calls, of duration 2.75 minutes each, and for 2 calls each of durations 1, 1.5, 1.25 and 2.25 minutes respectively.
Hence, the bill will be (considering the rounding up of call durations to be done)
₹1 per min x 8 calls x each call billable for 3 min = ₹24 for dialed calls.
And ₹0.5 per min x 2 calls from each friend x calls billable for (1 + 2 + 2 + 3) min = ₹8 for received calls.
Hence, total bill of E = ₹(24 + 8) = ₹32.   Ans : (32)

All the five friends subscribe to the same telecom service provider, which charges them Rs.1/min for calls made and Rs.0.50/min for calls received. For billing purposes, the duration of any call which did not last for a whole number of minutes is rounded up to the next highest whole number of minutes.

During the following week, the total durations of the calls made and calls received by the friends among themselves remained the same as that in the given week. Further, it is known that every person in the group called only one other person, F, exactly once, and for a duration of exactly 2 minutes each, but received no calls from either F or anyone else outside the group. What will be the total expenses incurred by the five friends put together on the calls made and calls received by them during that week?

a) Rs.118

b) Rs.126.5

c) Rs.142

d) None of the above

It is given that the duration of any call made by A to any of his friends is always the same. Similarly, the duration of any call made by B to any of his friends is always the same. The same is case for each of C, D and E.

Also, each friend made exactly two calls to each of the other friends in the group.

Hence A would have spoken to each of the other person for the same duration. So would have each of the other friends.
Since each person has talked with every other person for the same duration, A would have talked for 2 minutes with everyone else. B would have talked for 3 minutes and C would have talked for 2.5 minutes with every other person.
Let the total duration of dialed calls for D be 4x and the total duration of dialed calls for E be 4y.

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	3+2.5+x+y
B	12	2+2.5+x+y
C	10	2+3+x+y
D	4x	2+3+2.5+y
E	4y	2+3+2.5+x

Therefore, 2+3+2.5+x = 12 → x = 4.5
Also, 2+3+x+y =15 → y = 5.5

Name	Duration of Dialed Calls (min)	Duration of Received Calls (min)
A	8	15.5
B	12	14.5
C	10	15
D	18	13
E	22	12

Since each friend made exactly two calls to every other friend, each call of A would have lasted 8 min/(4 friends x 2 calls per friend) = 1 min. Similarly, the duration of each call made by B, C, D and E would be 1.5, 1.25, 2.25 and 2.75 min respectively. These values will be rounded up to 1, 2, 2, 3, and 3 minutes respectively for the purpose of billing. This would lead to a total bill of 8 calls per friend x (1 + 2 + 2 + 3 + 3) minutes x ₹1 per minute
= ₹88 for the dialed calls.
Using the same information for calculating the bill for received calls, we get a value exactly half of the above (since the rate for received calls is half that of the dialed calls), i.e., ₹44.
Now, since each of the five friends called F exactly once, for a duration of two minutes each, an additional bill of 5 x 2 = ₹10 will be incurred.
Hence, the total bill for the five friends together will be ₹(88 + 44 + 10) = ₹142

Choice (C)

The line graph and the tables that follow give the details of the performance of three companies − A, B and C − for the years 2002 to 2007.

Profit as a Percentage of Expenditure
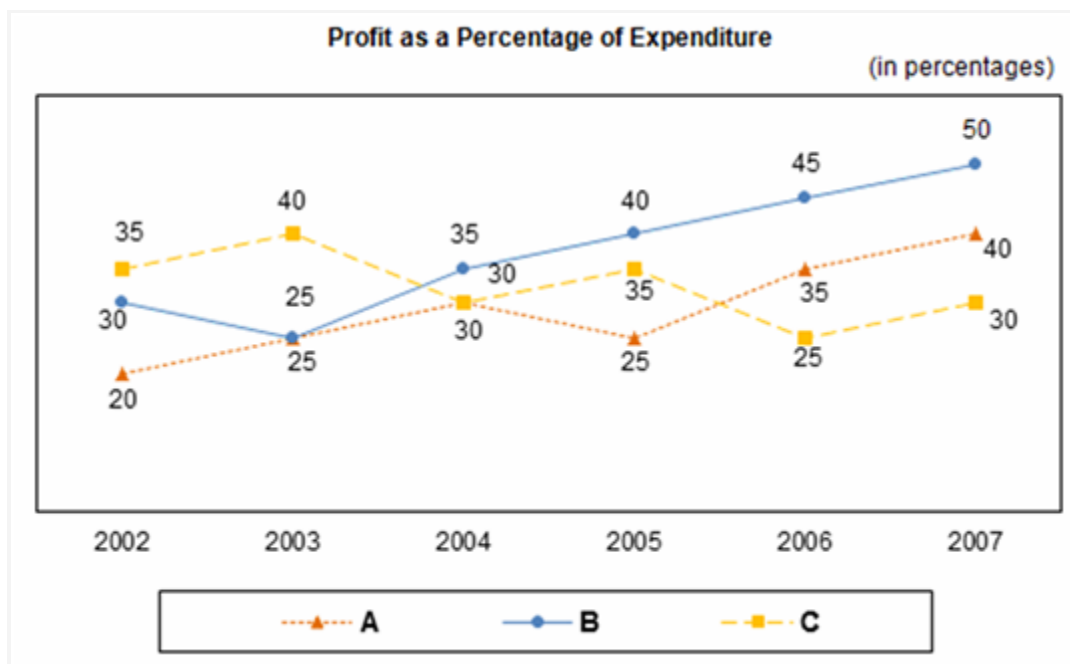
(in percentages)

Annual Income

(in ₹crore)

Year / Company	2002	2003	2004	2005	2006	2007
A	149.4	173.4	176.2	227.4	223.4	241.7
B	157.6	164.7	179.4	185.3	204.6	268.4
C	189.2	172.3	138.7	174.4	210.8	224.5

Percentage break-up of total Expenditure

(in percentages)

Year Cost Head	2002 A	2002 B	2002 C	2003 A	2003 B	2003 C	2004 A	2004 B	2004 C	2005 A	2005 B	2005 C	2006 A	2006 B	2006 C	2007 A	2007 B	2007 C
Raw materials	15	20	30	20	15	10	25	20	20	20	15	25	30	25	10	15	20	10
Salaries	25	30	25	20	20	35	30	30	30	35	25	35	25	20	20	40	35	30
Power	20	20	20	30	30	20	10	15	10	15	10	10	15	25	25	15	15	10
Overheads	15	10	15	10	20	15	15	20	20	15	30	15	25	20	20	20	10	20
Transport	25	20	10	20	15	20	20	15	20	15	20	15	5	10	25	10	20	30

$$\text{Profit Percentage} = \frac{\text{Income} - \text{Expenditure}}{\text{Expenditure}} \times 100$$

Q9. DIRECTIONS *for question 9:* Type in your answer in the input box provided below the question.

In how many of the given years is the expenditure on salaries of one or more companies equal to the profit of the respective company in that year?

The expenditure on salaries is equal to the profit in the following cases.
Company A – 2004 and 2007
Company B – 2002
Company C – 2004, 2005 and 2007
It happened for at least one company in the years 2002, 2004, 2005 and 2007.

Ans : (4)

Q10. DIRECTIONS *for question 10:* **Select the correct alternative from the given choices.**

In which of the following years is the ratio of the expenditure of company A to that of company B the highest?

a) 2002   b) 2005   c) 2003   d) 2006

From the formula given, the ratio of expenditures

$$= \frac{\text{Ratio of incomes}}{\text{Ratio of } (100 + \text{profit\%})}$$

Ratio of expenditure of company A to that of company B is (for different years)

2002	2003	2005	2006	2007
$\frac{149.4}{157.6} \times \frac{130}{120}$	$\frac{173.4}{164.7} \times \frac{125}{125}$	$\frac{227.4}{185.3} \times \frac{140}{125}$	$\frac{223.4}{204.6} \times \frac{145}{135}$	$\frac{241.7}{268.4} \times \frac{150}{140}$

By observation, it will be the highest in 2005. Choice (B)

Q11. DIRECTIONS *for question 11:* **Type in your answer in the input box provided below the question.** For how many of the given companies is the ratio of income to expenditure more than 5/4 but less than 3/2 in at most four of the years given?

The ratio of income to expenditure is more than $\frac{5}{4}$ (= 1.25) but less than $\frac{3}{2}$ (= 1.5) means profit percentage is more than 25% but less than 50%, it happened
for A in 2004, 2006 and 2007
for B in 2002, 2004, 2005 and 2006
for C in 2002, 2003, 2004, 2005 and 2007
∴ It happened for at most 4 years for companies A and B. Ans : (2)

Q12. DIRECTIONS *for question 12:* **Select the correct alternative from the given choices.**

In the year 2007, if the total expenditure incurred on each of the five cost heads by all the three companies together is considered, then the expenditure on which cost head is the highest in that year?

a) Raw materials

b) Salaries

c) Power

d) Transport

By observation, the share of salaries in the total expenditure is the highest for each of the three companies. Hence, the expenditure on salaries will be the highest even when all three companies are considered together.   Choice (B)

DIRECTIONS *for questions 13 to 16:* Answer the questions on the basis of the information given below.

The diagram below represents the distribution of the number of students of a class who passed in one or more subjects out of four different subjects − Maths, Physics, Hindi and English.
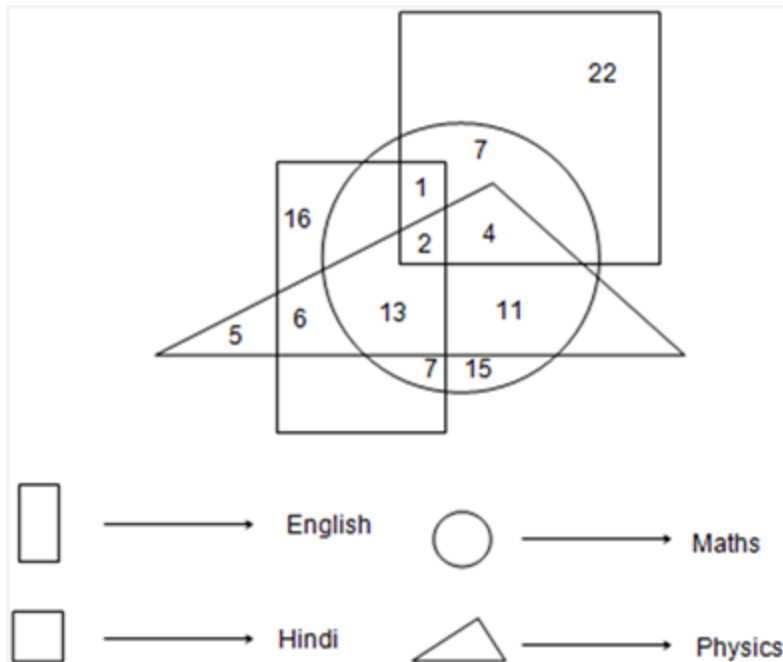
NOTE: In the figure above, the number of students belonging to any particular combination (i.e., combination of subjects passed in) which is not shown is zero.

Q13. DIRECTIONS *for question 13:* Type in your answer in the input box provided below the question.

How many students passed in at least one subject among Hindi and English but failed in at least one subject among Maths and Physics?

The number required should be within the square or rectangle but should not be within both circle and triangle. We get → 16 + 1 + 6 + 7 + 7 + 22 = 59.   Ans: (59)

Q14. DIRECTIONS *for questions 14 to 16:* **Select the correct alternative from the given choices.   If every student who failed in not more than one of the above mentioned four subjects gets promoted to the next class, then how many students are promoted to the next class?**

a) 3   b) 6   c) 18   d) 20

The number should be in three or more of the figures.

$\Rightarrow 13 + 2 + 4 + 1 = 20$

Choice (D)

Q15. DIRECTIONS *for questions 14 to 16:* Select the correct alternative from the given choices.

How many students failed in at most two of the above mentioned four subjects?

a) 51

b) 52

c) 53

d) Data Insufficient

Those who failed in at most 2 subjects = those who passed in exactly 4 or 3 or 2 subjects = total of all numbers given – the total of the numbers appearing in only one figure

$= 109 – (5 + 16 + 22 + 15) = 51.$

Choice (A)

Q16. DIRECTIONS *for questions 14 to 16:* Select the correct alternative from the given choices.

How many students passed in Maths but failed in English?

a) 44

b) 37

c) 33

d) 50

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

The MLAs in a state cast their votes for electing the chairman of a certain Public Administration Committee. There were four candidates − Ravi, Aditya, Suraj and Surya − running for the above mentioned post.

Each of the respective constituencies that these MLAs represent is known to have a population of either 1 lakh, or 2 lakh, or 5 lakh. Each MLA gets to cast only one vote. However, the value of the vote of an MLA is determined as one-thousandth of the population of the constituency that he represents. The candidate with the maximum total value of votes cast in his favor will be declared the winner.

The following bar-chart gives the details of the number of MLAs who voted for each of the four candidates, grouped according to the populations of the constituencies of the respective MLAs.
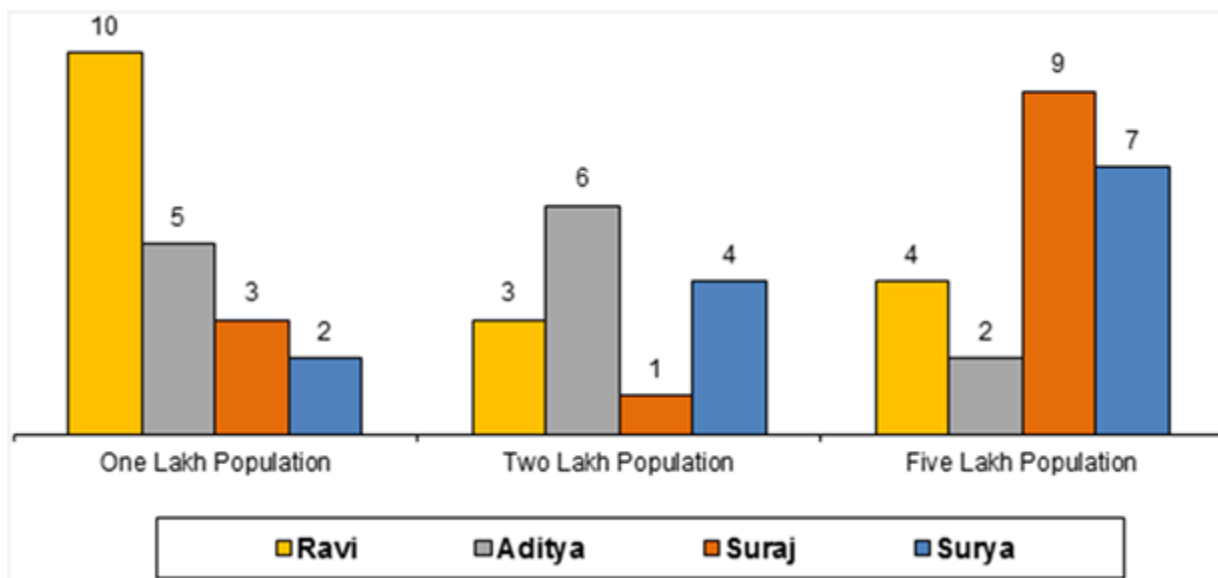
Q17.   DIRECTIONS *for question 17:* Select the correct alternative from the given choices.

Who will be declared the winner?

a) **Ravi**   b) **Aditya**   c) **Suraj**   d) **Surya**

The following table calculates the values of the votes received by each of the candidates.

	1 Lakh Votes	2 Lakh Votes	5 Lakh Votes	Value of Votes
Ravi	10	3	4	36
Aditya	5	6	2	27
Suraj	3	1	9	50
Surya	2	4	7	45

Hence, Suraj will be declared the winner.   Choice (C)

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

If these MLAs represent the population of the entire state and every person in the state is represented only by a single MLA, what is the total population (in lakhs) of the state?

The total population of the state = Total number of MLAs from constituencies with 1 L population*1 + Total number of MLAs from constituencies with 2 L population*2 + Total number of MLAs from constituencies with 5 L population * 5
= 20*1+14*2+22*5 = 158 Lakh   Ans: (158)

Q19.   DIRECTIONS *for questions 19 and 20:* **Select the correct alternative from the given choices. If the rules of counting the votes were changed and the candidate with the maximum number of votes (irrespective of their value) is to be declared the winner, then who will be declared the winner?**

 a) Ravi   b) Aditya   c) Suraj   d) Surya

The number of votes that Ravi got (17) was higher than the number of votes received by any other candidate (13 votes each).   Choice (A)

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

While counting the votes, it was found that, due to an inadvertent error, N votes, all of which were cast in favor of Aditya, were missed out from the above tally and these were then promptly included in the tally, which resulted in Aditya being declared the winner. If it is known that all such votes (included later) were of MLAs representing constituencies of a population of M lakh each, then which of the following combinations could be the values of N and M respectively?

a) **9 and 2**

b) **12 and 2**

c) **19 and 1**

d) **More than one of the above**

The difference between the value of votes of Suraj and Aditya is 23. Therefore, the product of the number of votes and its value should exceed this value for Aditya to win the election. This condition is satisfied only for option B.   Choice (B)

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

Five persons − Vinay, Pavan, Santosh, Raghu and Govind − ate a certain number of apples and bananas. The number of apples they ate were 2, 3, 5, 7, 8 and the number of bananas they ate were 1, 3, 4, 7 and 9, not necessarily in the same order.

The following information is also known:

    i.   Santosh ate thrice as many bananas as the number of apples Vinay ate.
    ii. Pavan ate twice as many apples as the number of bananas Raghu ate.
    iii. Vinay ate two bananas less than the number of apples Santosh ate.
    iv. Govind ate four apples more than the number of bananas Pavan ate.

Q21.   DIRECTIONS *for questions 21 to 23:* Select the correct alternative from the given choices.

Which of the following statements is true?

a) **Vinay ate 3 bananas more than the number of apples Govind ate.**

b) **Pavan ate 4 apples.**

c) **Exactly one person ate a total of 6 fruits.**

d) **The difference between the number of apples and bananas eaten by Raghu is six.**

Given the number of apples and bananas eaten by the five persons are 2, 3, 5, 7, 8 and 1, 3, 4, 7, 9 respectively, not necessarily in the same order. From statement (1), the only possibility is Santosh ate 9 bananas and Vinay ate 3 apples. From statement (3), the only possibility is Vinay ate 3 bananas and Santosh ate 5 apples.

From statement (4), the only possibility is

Govind ate 8 apples and Pavan ate 4 bananas.

From statement (2), the only possibility is Pavan ate 2 apples and Raghu ate 1 banana.

Tabulating the above information, we get

Person	No. of apples eaten	No. of bananas eaten
Vinay	3	3
Pavan	2	4
Santosh	5	9
Raghu	7	1
Govind	8	7

Only the statement given in option D is true.   Choice (D)

Q22.   DIRECTIONS *for questions 21 to 23:* Select the correct alternative from the given choices.

Which of the following statements is/are true?

    i.   The difference between the number of apples and bananas Vinay ate is zero.

    ii.   The difference between the number of apples and bananas Pavan ate is two.

    iii. The total number of fruits eaten by Raghu is nine.

    iv. The number of bananas eaten by Pavan and Santosh together is 14.

a) **Only (i)**

b) **Only (i) and (ii)**

c) **Only (iv)**

d) **Only (iii) and (iv)**

Given the number of apples and bananas eaten by the five persons are 2, 3, 5, 7, 8 and 1, 3, 4, 7, 9 respectively, not necessarily in the same order. From statement (1), the only possibility is Santosh ate 9 bananas and Vinay ate 3 apples. From statement (3), the only possibility is Vinay ate 3 bananas and Santosh ate 5 apples.
From statement (4), the only possibility is
Govind ate 8 apples and Pavan ate 4 bananas.
From statement (2), the only possibility is Pavan ate 2 apples and Raghu ate 1 banana.
Tabulating the above information, we get

Person	No. of apples eaten	No. of bananas eaten
Vinay	3	3
Pavan	2	4
Santosh	5	9
Raghu	7	1
Govind	8	7

Both (i) and (ii) are true.   Choice (B)

Q23.   DIRECTIONS *for questions 21 to 23:* Select the correct alternative from the given choices.

Which of the following statements is false?

a) **Raghu ate four bananas.**

b) **Vinay ate eight apples.**

c) **Govind ate five apples.**

d) **All of the above**

Given the number of apples and bananas eaten by the five persons are 2, 3, 5, 7, 8 and 1, 3, 4, 7, 9 respectively, not necessarily in the same order. From statement (1), the only possibility is Santosh ate 9 bananas and Vinay ate 3 apples. From statement (3), the only possibility is Vinay ate 3 bananas and Santosh ate 5 apples.
From statement (4), the only possibility is
Govind ate 8 apples and Pavan ate 4 bananas.
From statement (2), the only possibility is Pavan ate 2 apples and Raghu ate 1 banana.
Tabulating the above information, we get

Person	No. of apples eaten	No. of bananas eaten
Vinay	3	3
Pavan	2	4
Santosh	5	9
Raghu	7	1
Govind	8	7

All of the statements given are false.   Choice (D)

Given the number of apples and bananas eaten by the five persons are 2, 3, 5, 7, 8 and 1, 3, 4, 7, 9 respectively, not necessarily in the same order. From statement (1), the only possibility is Santosh ate 9 bananas and Vinay ate 3 apples. From statement (3), the only possibility is Vinay ate 3 bananas and Santosh ate 5 apples.
From statement (4), the only possibility is
Govind ate 8 apples and Pavan ate 4 bananas.
From statement (2), the only possibility is Pavan ate 2 apples and Raghu ate 1 banana.
Tabulating the above information, we get

Person	No. of apples eaten	No. of bananas eaten
Vinay	3	3
Pavan	2	4
Santosh	5	9
Raghu	7	1
Govind	8	7

Both (i) and (ii) are true.   Choice (B)

Q24.   DIRECTIONS *for question 24:* Type in your answer in the input box provided below the question.   What is the difference between the number of apples eaten by Govind and the number of bananas eaten by Raghu ?

Given the number of apples and bananas eaten by the five persons are 2, 3, 5, 7, 8 and 1, 3, 4, 7, 9 respectively, not necessarily in the same order. From statement (1), the only possibility is Santosh ate 9 bananas and Vinay ate 3 apples. From statement (3), the only possibility is Vinay ate 3 bananas and Santosh ate 5 apples.
From statement (4), the only possibility is
Govind ate 8 apples and Pavan ate 4 bananas.
From statement (2), the only possibility is Pavan ate 2 apples and Raghu ate 1 banana.
Tabulating the above information, we get

Person	No. of apples eaten	No. of bananas eaten
Vinay	3	3
Pavan	2	4
Santosh	5	9
Raghu	7	1
Govind	8	7

Required difference = 8 – 1 = 7   Ans: (7)

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

Five students, Abhinav, Akhil, Aman, Anand, and Anurag, were ranked from one to five in five different subjects among English, Hindi, Mathematics, Science, and Social (a numerically lower rank is considered a better rank). No two of the five students received the same rank in any subject and no student got the same rank in any two subjects. It is also known that,

i.   Anand received third rank in Hindi and he received a better rank than Akhil in only Social and Mathematics.

ii.   Abhinav received first rank in neither Science nor Hindi but he received second rank in either Social or Mathematics.

iii. Anurag received a better rank than Akhil in Social, while the rank received by Anurag in English was the same as that received by Abhinav in Mathematics.

iv.   Akhil received fourth rank in Science and received a better rank than Abhinav in Mathematics.

Q25. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.

Which rank did Aman receive in Hindi?

a) **Second**

b) **Third**

c) **Fifth**

d) **Cannot be determined**

From (i), Akhil must have received fifth rank in either Social or Mathematics. But from (iv), he could not have got fifth rank in Mathematics. Hence, Akhil must have gotten fifth rank in Social. From (iv), Akhil got 4th rank in Science. Hence, Anand received 5th rank in Science.

Anand can have either second rank or fourth rank in English because his first rank must be in either Social or Mathematics. If Anand received second rank in English, Akhil should have got first rank in English. Since, Akhil cannot have received 5th rank in Mathematics (from (iv)) or Hindi (since Anand has 3rd rank), he must have received 5th rank in Social. Akhil must have got third rank in Mathematics (since Anand has 3rd rank in Hindi). He must have had 2nd rank in Hindi. Anand must have got 4th rank in Social and 1st rank in Mathematics.

From (ii), Abhinav must have got first rank in Social and second rank in Mathematics. Since Abhinav got second rank in Mathematics, Anurag must have got second rank in English. But this is not possible because Anand has second rank in English. Hence this case is not possible.

Hence, Anand has fourth rank in English. If Anand got 2nd rank in Social, Abhinav would have got 2nd rank in Mathematics. From (iv), Akhil must have got first rank in Mathematics. This is not possible.

Hence, Anand got second rank in Mathematics and first rank in Social. Akhil would have got fifth rank in Social. Abhinav would have got 2nd rank in Social. Since Abhinav did not get first rank in Science or Hindi (from (ii)) and he could not have got first rank in Mathematics (from (iv)), he must have got first rank in English. From (iii), Abhinav's Mathematics rank cannot be 1, 2 or 4. It has to be either 3 or 5. If it is 3, Akhil must have received 1 or 2 rank in Mathematics which violates (i). Hence, Abhinav's rank in Mathematics has to be 5. The following table gives the updated information.

	English	Science	Social	Mathematics	Hindi
Abhinav	1		2	5	
Akhil		4	5		
Aman					
Anand	4	5	1	2	3
Anurag	5				

Abhinav's rank in Science has to be 3, and his rank in Hindi has to be 4. Akhil's Mathematics rank has to be 3. Akhil's rank in English has to be 2 and his rank in Hindi has to be 1. Similarly filling up the other values, we get the following table.

	English	Science	Social	Mathematics	Hindi
Abhinav	1	3	2	5	4
Akhil	2	4	5	3	1
Aman	3	2	4	1	5
Anand	4	5	1	2	3
Anurag	5	1	3	4	2

Aman received fifth rank in Hindi.   Choice (C)

Q26.DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices. In which of the following subjects did Akhil receive a better rank than Aman?

a) **English**

b) **Mathematics**

c) **Science**

d) **Social**

From (i), Akhil must have received fifth rank in either Social or Mathematics. But from (iv), he could not have got fifth rank in Mathematics. Hence, Akhil must have gotten fifth rank in Social. From (iv), Akhil got 4th rank in Science. Hence, Anand received 5th rank in Science.

Anand can have either second rank or fourth rank in English because his first rank must be in either Social or Mathematics. If Anand received second rank in English, Akhil should have got first rank in English. Since, Akhil cannot have received 5th rank in Mathematics (from (iv)) or Hindi (since Anand has 3rd rank), he must have received 5th rank in Social. Akhil must have got third rank in Mathematics (since Anand has 3rd rank in Hindi). He must have had 2nd rank in Hindi. Anand must have got 4th rank in Social and 1st rank in Mathematics.

From (ii), Abhinav must have got first rank in Social and second rank in Mathematics. Since Abhinav got second rank in Mathematics, Anurag must have got second rank in English. But this is not possible because Anand has second rank in English. Hence this case is not possible.

Hence, Anand has fourth rank in English. If Anand got 2nd rank in Social, Abhinav would have got 2nd rank in Mathematics. From (iv), Akhil must have got first rank in Mathematics. This is not possible.

Hence, Anand got second rank in Mathematics and first rank in Social. Akhil would have got fifth rank in Social. Abhinav would have got 2nd rank in Social. Since Abhinav did not get first rank in Science or Hindi (from (ii)) and he could not have got first rank in Mathematics (from (iv)), he must have got first rank in English. From (iii), Abhinav's Mathematics rank cannot be 1, 2 or 4. It has to be either 3 or 5. If it is 3, Akhil must have received 1 or 2 rank in Mathematics which violates (i). Hence, Abhinav's rank in Mathematics has to be 5. The following table gives the updated information.

	English	Science	Social	Mathematics	Hindi
Abhinav	1		2	5	
Akhil		4	5		
Aman					
Anand	4	5	1	2	3
Anurag	5				

Abhinav's rank in Science has to be 3, and his rank in Hindi has to be 4. Akhil's Mathematics rank has to be 3. Akhil's rank in English has to be 2 and his rank in Hindi has to be 1. Similarly filling up the other values, we get the following table.

	English	Science	Social	Mathematics	Hindi
Abhinav	1	3	2	5	4
Akhil	2	4	5	3	1
Aman	3	2	4	1	5
Anand	4	5	1	2	3
Anurag	5	1	3	4	2

Akhil received a better rank than Aman in two subjects - English and Hindi. Among the given options, the answer is English.   Choice (A)

Q27.DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.

Who among the five students received the first rank in English?

a) Anand

b) Abhinav

c) Akhil

d) Anurag

From (i), Akhil must have received fifth rank in either Social or Mathematics. But from (iv), he could not have got fifth rank in Mathematics. Hence, Akhil must have gotten fifth rank in Social. From (iv), Akhil got 4th rank in Science. Hence, Anand received 5th rank in Science.

Anand can have either second rank or fourth rank in English because his first rank must be in either Social or Mathematics. If Anand received second rank in English, Akhil should have got first rank in English. Since, Akhil cannot have received 5th rank in Mathematics (from (iv)) or Hindi (since Anand has 3rd rank), he must have received 5th rank in Social. Akhil must have got third rank in Mathematics (since Anand has 3rd rank in Hindi). He must have had 2nd rank in Hindi. Anand must have got 4th rank in Social and 1st rank in Mathematics.

From (ii), Abhinav must have got first rank in Social and second rank in Mathematics. Since Abhinav got second rank in Mathematics, Anurag must have got second rank in English. But this is not possible because Anand has second rank in English. Hence this case is not possible.

Hence, Anand has fourth rank in English. If Anand got 2nd rank in Social, Abhinav would have got 2nd rank in Mathematics. From (iv), Akhil must have got first rank in Mathematics. This is not possible.

Hence, Anand got second rank in Mathematics and first rank in Social. Akhil would have got fifth rank in Social. Abhinav would have got 2nd rank in Social. Since Abhinav did not get first rank in Science or Hindi (from (ii)) and he could not have got first rank in Mathematics (from (iv)), he must have got first rank in English. From (iii), Abhinav's Mathematics rank cannot be 1, 2 or 4. It has to be either 3 or 5. If it is 3, Akhil must have received 1 or 2 rank in Mathematics which violates (i). Hence, Abhinav's rank in Mathematics has to be 5. The following table gives the updated information.

	English	Science	Social	Mathematics	Hindi
Abhinav	1		2	5	
Akhil		4	5		
Aman					
Anand	4	5	1	2	3
Anurag	5				

Abhinav's rank in Science has to be 3, and his rank in Hindi has to be 4. Akhil's Mathematics rank has to be 3. Akhil's rank in English has to be 2 and his rank in Hindi has to be 1. Similarly filling up the other values, we get the following table.

	English	Science	Social	Mathematics	Hindi
Abhinav	1	3	2	5	4
Akhil	2	4	5	3	1
Aman	3	2	4	1	5
Anand	4	5	1	2	3
Anurag	5	1	3	4	2

Abhinav received the first rank in English.   Choice (B)

Q28. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices. Which of the following statements is true?

a) **Abhinav received a better rank than Aman in Mathematics.**

b) **Anand received the same rank in Science as Anurag did in Social.**

c) **Aman received a better rank in English than Anurag did in Hindi.**

d) **Akhil received a better rank in English than Anurag did in Mathematics.**

From (i), Akhil must have received fifth rank in either Social or Mathematics. But from (iv), he could not have got fifth rank in Mathematics. Hence, Akhil must have gotten fifth rank in Social. From (iv), Akhil got 4th rank in Science. Hence, Anand received 5th rank in Science.

Anand can have either second rank or fourth rank in English because his first rank must be in either Social or Mathematics. If Anand received second rank in English, Akhil should have got first rank in English. Since, Akhil cannot have received 5th rank in Mathematics (from (iv)) or Hindi (since Anand has 3rd rank), he must have received 5th rank in Social. Akhil must have got third rank in Mathematics (since Anand has 3rd rank in Hindi). He must have had 2nd rank in Hindi. Anand must have got 4th rank in Social and 1st rank in Mathematics.

From (ii), Abhinav must have got first rank in Social and second rank in Mathematics. Since Abhinav got second rank in Mathematics, Anurag must have got second rank in English. But this is not possible because Anand has second rank in English. Hence this case is not possible.

Hence, Anand has fourth rank in English. If Anand got 2nd rank in Social, Abhinav would have got 2nd rank in Mathematics. From (iv), Akhil must have got first rank in Mathematics. This is not possible.

Hence, Anand got second rank in Mathematics and first rank in Social. Akhil would have got fifth rank in Social. Abhinav would have got 2nd rank in Social. Since Abhinav did not get first rank in Science or Hindi (from (ii)) and he could not have got first rank in Mathematics (from (iv)), he must have got first rank in English. From (iii), Abhinav's Mathematics rank cannot be 1, 2 or 4. It has to be either 3 or 5. If it is 3, Akhil must have received 1 or 2 rank in Mathematics which violates (i). Hence, Abhinav's rank in Mathematics has to be 5. The following table gives the updated information.

	English	Science	Social	Mathematics	Hindi
Abhinav	1		2	5	
Akhil		4	5		
Aman					
Anand	4	5	1	2	3
Anurag	5				

Abhinav's rank in Science has to be 3, and his rank in Hindi has to be 4. Akhil's Mathematics rank has to be 3. Akhil's rank in English has to be 2 and his rank in Hindi has to be 1. Similarly filling up the other values, we get the following table.

|	English	Science	Social	Mathematics	Hindi
Abhinav	1	3	2	5	4
Akhil	2	4	5	3	1
Aman	3	2	4	1	5
Anand	4	5	1	2	3
Anurag	5	1	3	4	2

Only the statement given in option D is true.   Choice (D)

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

Amnesty International conducted a survey across eight countries to analyse the crime statistics in each country during a certain year. It collected information on the Incidence of Crimes per capita and the Number of Policemen per capita present in each country. This information is presented in the bubble chart given below.

- ○ Vertical Axis: *The Incidence of Crimes per capita is presented as the number of crimes that occurred per 1,000 people.*
- ○ Horizontal Axis: *The total population of the country is shown in millions.*
- ○ Size of the Bubble: *The size (diameter) of the bubble in the chart represents the Number of Policemen per 100,000 people.*
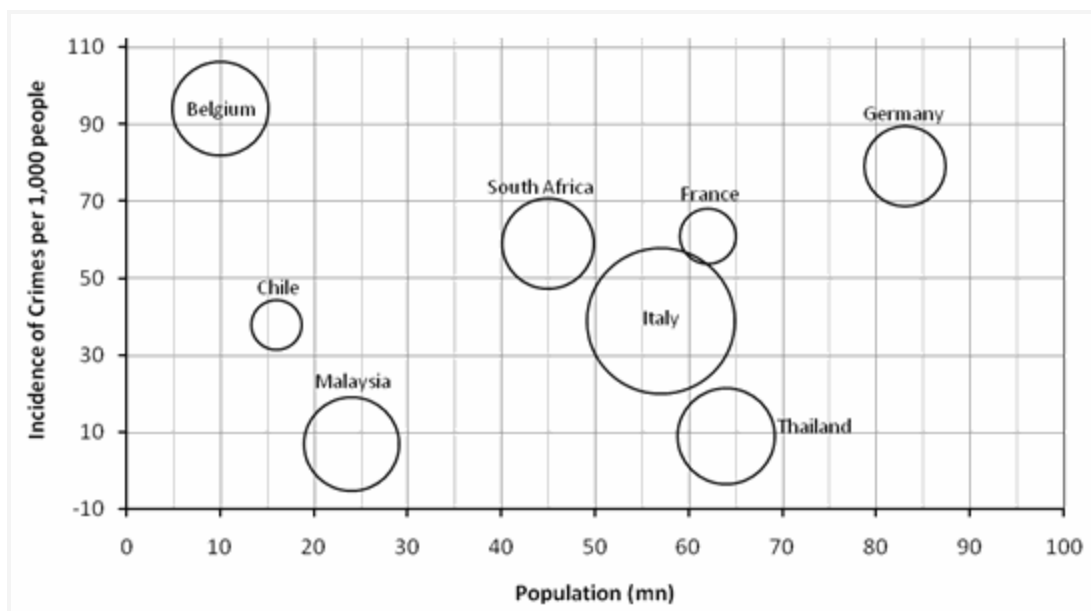
Note: *The number of policemen per 100,000 people is 210 in France and 350 in Belgium.*

Q29. DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.

Which country had the second highest incidence of crimes during the year ?

a) **Germany**

b) **Belgium**

c) **France**

d) **Italy**

The incidence of Crimes during the year is the product of the incidence of Crimes per capita and the population of the country. By observing the graph, we can see that Germany has a higher Population and Incidence of Crime per 1000 people than all the other countries except Belgium.
Total Incidence of Crime in Belgium = 92*10 = 920
Total Incidence of Crime in Germany = 80*83 = 6640
After Germany, France has a higher incidence by observing the graph = 60*62 = 3720
Therefore, the second highest incidence of Crimes occurred in France.

Choice (C)

Q30. DIRECTIONS *for questions 29 to 32:* **Select the correct alternative from the given choices.**

Which of the following countries has the highest number of policemen ?

a) **Italy**

b) **Germany**

c) **Thailand**

d) **France**

Since the number of policemen per 100,000 population is represented by the diameter of the bubble, we can use the product of the diameter and the total population of the country

For France $\simeq$ 1.2 × 61 $\simeq$ 72

For Germany $\simeq$ 1.7 × 83 $\simeq$ 140

For Thailand $\simeq$ 2 × 65 = 130

For Italy $\simeq$ 3.1 × 56 $\simeq$ 170

Hence, Italy has the highest number of policemen compared to that in other countries.

Choice (A)

Q31.   DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.

Which of the following countries has the maximum incidence of crimes per policeman present in that country?

a) Belgium

b) Malaysia

c) Chile

d) France

Number of crimes per policeman in Belgium = 92/350 (ignoring the magnitude) = 0.263
Number of crimes per policeman in France = 62/210 = 0.295
Number of crimes per policeman in Malaysia has to be lower than Belgium because the size of the bubble is the same but the number of crimes in Malaysia is very low.
Similarly, the number of crimes per policeman in Chile must be lower than that of France.
Therefore, between Belgium and France, France has the highest required ratio.

Choice (D)

Q32.   DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.

Approximately, what percentage of the population are policemen in Italy ?

a) 0.55%

b) 2.55%

c) 5.55%

d) 1.55%

Number of policemen per 100,000 in Italy = 550
Required percentage

$= \dfrac{550}{100,000} \times 100 = 0.55\%$ Choice (A)

QA

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

If $x - \dfrac{1}{x} = 3$, find the value of $x^3 - \dfrac{1}{x^3}$.

Given, $x - \dfrac{1}{x} = 3$

taking the cubes of both sides we get $\left(x - \dfrac{1}{x}\right)^3 = 27$

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

$\Rightarrow x^3 - \dfrac{1}{x^3} = \left(x - \dfrac{1}{x}\right)^3 + 3\left(x - \dfrac{1}{x}\right)$

$\Rightarrow x^3 - \dfrac{1}{x^3} = 27 + 3\,(3) = 36.$ Ans: (36)

Q2. DIRECTIONS *for questions 2 and 3:* Select the correct alternative from the given choices.

A certain sum lent under simple interest doubles itself in five years. After how many years will the sum become four times itself, if the rate of interest at which it is lent is increased by 5 percentage points?

a) **12**

b) **16**

c) **20**

d) **15**

Let the principal be P and the rate of interest be r% per annum.

Now, $P + \dfrac{5Pr}{100} = 2P$

$\dfrac{5Pr}{100} = P \Rightarrow r = 20\%$

Now rate of interest = 20% + 5% = 25%

Let the sum quadruple in n years at 25% per annum simple interest.

$P + \dfrac{Pn25}{100} = 4P$

$\dfrac{Pn}{4} = 3P \Rightarrow n = 12$ years.   Choice (A)

Q3.   DIRECTIONS *for questions 2 and 3:* Select the correct alternative from the given choices.

The value of a stock increased by 15% during the month of January and increased by a further 22% during February. If the value of the stock at the end of March became equal to its value at the beginning of January, by approximately what percentage did the value of the stock decrease during March?

a) **40.3%**

b) **28.72%**

c) **32.15%**

d) **15.47%**

Let the price of the stock be x.
Price of the stock at the end of February = 1.15 × 1.22 × x = 1.403 x
The value of the stock should become x at the end of March.

Percentage decrease = $\dfrac{0.403}{1.403}$ = 28.72%   Choice (B)

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

If the average of the first five terms of an arithmetic progression is 4 and the average of the first ten terms is 9, what is the fifteenth term of the progression?

Let a and d be the first term and common difference of the A.P.
Average of first five terms is the third term.
$\Rightarrow$ a + 2d = 4 —— (1)
Average of the first ten terms = average of 5th and 6th terms, i.e., a + 4.5d
$\Rightarrow$ a + 4.5d = 9 —— (2)
Solving (1) and (2), a = 0 and d = 2.
Therefore, 15th term = 0 + 14 × 2 = 28.   Ans: (28)

Q5. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

Ramu had two jars, one of which had 1 litre of 40% milk and the other, 1 litre of 18% milk. If he mixed 300 ml of the former and 700 ml of the latter to form a new solution, what is the ratio of water and milk in the solution?

a) **32 : 93**

b) **377 : 123**

c) **417 : 83**

d) **747 : 253**

300 ml of 40% milk contains 60% × 300 ml of water i.e.,
180 ml water and 120 ml milk.
700 ml of 18% milk contains 574 ml water and 126 ml milk.
Ratio of water and milk in the new mixture = 754 : 246
= 377:123   Choice (B)

Q6. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

If a cube of side 22 cm is melted and recast to form a sphere, what will be the radius of the sphere?

(Assume $\pi = \dfrac{22}{7}$)

a) $\sqrt[3]{2541}$ cm

b) $\sqrt[3]{2514}$ cm

c) $\sqrt[3]{2451}$ cm

d) $\sqrt[3]{2415}$ cm

Volume of the cube = 22^3 cm³

Volume of the sphere = $\dfrac{4}{3}\pi r^3 = 22^3 \Rightarrow r^3 = 2541$

Hence, $r = \sqrt[3]{2541}$ Choice (A)

Q7. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

A tap fills an empty tank in 8 hours, but due to a leak at the bottom of the tank it took 13 hours instead. If the tap is opened at 6:00 a.m. into the empty tank and then closed at 2:00 p.m., at what time would the tank be empty again?

a) **7:00 p.m.**

b) **3:00 a.m. next day**

c) **10:48 p.m.**

d) **02:48 a.m. next day**

Time taken by tap to fill the tank = 8 hrs
Time taken to fill tank if leak is present = 13 hrs
Let the lack alone empty the tank in 'ℓ' hours.

$$\frac{1}{8} - \frac{1}{\ell} = \frac{1}{13}$$

$$\frac{1}{\ell} = \frac{1}{8} - \frac{1}{13} = \frac{5}{8 \times 13} \text{ i.e } \ell = \frac{8 \times 13}{5} \text{ hours}$$

Amount of liquid filled in 8 hrs (from 6 a.m. to 2 p.m.), with leak present = $\frac{8}{13}^{th}$ of tank

Time taken by leak to empty $\frac{8}{13}^{th}$ of tank

$$\frac{8}{13} \times \frac{8 \times 13}{5} = \frac{64}{5} \text{ hrs} = 12 \text{ hrs } 48 \text{ min}$$

∴ At 2 : 48 a.m., next day, the tank would get empty.   Choice (D)

Q8.   DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.

Ten years ago, Lal was twice as old as Ram, whereas x years hence, Shyam will be twice as old as Lal. If ten years hence, Ram's age will be half the age of Shyam, which of the following values can x assume?

a) **4**

b) **11**

c) **16**

d) **24**

Let the current ages of Lal, Ram and Shyam be l, r and s respectively.

Given that $l - 10 = 2 (r - 10) \Rightarrow 2r - l = 10$

Also, $r + 10 = \dfrac{1}{2} (s + 10) \Rightarrow 2r - s = -10$

After x years, $s + x = 2 (l + x) \Rightarrow 2l - s = -x$

Adding the three equations above, we get $x = 20 - l$

$\therefore x$ must be less than 20.

Also, given the fact in the question "Ten years ago, Lal was twice as old as...", we can conclude that Lal must be more than 10 years old, i.e., $l > 10$.

Hence, $x (= 20 - l)$ must be less than 10.

From the options, x can only be 4.   Choice (A)

Q9. DIRECTIONS *for question 9:* Type in your answer in the input box provided below the question.

There were some bees in a garden. One-third of them went to the sunflower field; two-fifths of them went to the mustard field and the remaining 16 bees were undecided and returned to their hive. How many bees were there in the garden initially?

Let the initial number of bees in the garden be N.

No of bees going to the sunflower garden $= \dfrac{N}{3}$

No of bees going to the mustard field $= \dfrac{2}{5} N$

Remaining number of bees $= N - \left(\dfrac{N}{3} + \dfrac{2}{5} N \right)$

$= N - \dfrac{11}{15} N$

$= \dfrac{4}{15} N$

It is given that , $\dfrac{4}{15} N = 16$

$\Rightarrow N = 60$ Ans: (60)

Q10. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

If three runners, A, B and C, start simultaneously from the same point and run around a circular track of length 500 m, in the same direction, at speeds of 5 kmph, 8 kmph and 15 kmph respectively, what is the time taken by them to meet for the first time?

a) **60 minutes**

b) **30 minutes**

c) **15 minutes**

d) **10 minutes**

The time taken to meet for the first time =

$$LCM\left(\frac{0.5}{8-5}, \frac{0.5}{15-5}\right) = LCM\left(\frac{1}{6}, \frac{1}{20}\right) = \frac{1}{2} \ hours \ = 30 \ minutes \qquad \text{Choice (B)}$$

Q11. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

If $\log_a\left(\dfrac{\sqrt[4]{a^3 b^2}}{\sqrt[3]{a^2 b^2}}\right) + \log_b\left(\dfrac{\sqrt[5]{a^4 b^6}}{\sqrt[3]{a^5 b^2}}\right) = -\dfrac{13}{15}\log_b a,$ find the value of $\log_a b$.

a) **2.4**

b) **3.1**

c) **3.7**

d) **4.1**

$$\log_a\left(\frac{\sqrt[4]{a^3 b^2}}{\sqrt[3]{a^2 b^2}}\right) = \log_a\left(a^{\frac{1}{12}} b^{\left(-\frac{1}{6}\right)}\right) = \frac{1}{12} - \frac{1}{6}\log_a b$$

Similarly,

$$\log_b\left(\frac{\sqrt[5]{a^4 b^6}}{\sqrt[3]{a^5 b^2}}\right) = \log_b\left(a^{-\frac{13}{15}} b^{\frac{8}{15}}\right) = -\frac{13}{15}\log_b(a) + \frac{8}{15} \text{ Sum of the two terms}$$

$$= \frac{1}{12} - \frac{1}{6}\log_a b - \frac{13}{15}\log_b(a) + \frac{8}{15}$$

Let $\log_b(a)$ be x.

$$\Rightarrow \frac{1}{12} - \frac{1}{6x} - \frac{13}{15}x + \frac{8}{15} = -\frac{52}{60}x = -\frac{13}{15}x$$

$$\Rightarrow \frac{5x - 10 + 32x}{60x} = 0 \Rightarrow 37x = 10$$

$$\Rightarrow x = \frac{10}{37} \Rightarrow \log_b(a) = \frac{10}{37} \Rightarrow \log_a(b) = 3.7 \qquad \text{Choice (C)}$$

Q12. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

A retailer calculated his profit percent based on selling price (instead of cost price) and obtained it as 37.5%. If he had marked up the cost price by 100% before offering a certain discount, what was the percentage discount offered by him?

a) **40%**

b) **25%**

c) **20%**

d) **10%**

Let the selling price be 8k.

$\therefore$ Profit = 37.5% (8k) = $\dfrac{3}{8}$(8k)

SP	Profit	CP	MP
8k	3k	5k	10k

Therefore the percentage discount

$= \dfrac{10k - 8k}{10} \times 100 = 20\%$ Choice (C)

Q13. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices

If $x = \dfrac{1}{4 - \cfrac{1}{4 + \cfrac{1}{4 - \cfrac{1}{4 + ...\infty}}}}$, find the value of x.

a) $\dfrac{\sqrt{65} - 7}{4}$

b) $\dfrac{-7 - \sqrt{65}}{4}$

c) $7 - 3\sqrt{5}$

d)

$3\sqrt{5} - 7$

$$x = \cfrac{1}{4 - \cfrac{1}{4 + \cfrac{1}{4 - \left(\cfrac{1}{4 + ...\infty}\right)}}} \Rightarrow x = \cfrac{1}{4 - \left(\cfrac{1}{4+x}\right)}$$

$$x = \frac{4 + x}{(16 + 4x - 1)} \Rightarrow 15x + 4x^2 = 4 + x$$

$$\Rightarrow 4x^2 + 14x - 4 = 0$$

$$\Rightarrow 2x^2 + 7x - 2 = 0$$

$$\therefore x = \frac{-7 \pm \sqrt{49 + 16}}{4} = \frac{-7 \pm \sqrt{65}}{4}$$

As x cannot be a negative quantity, $x = \dfrac{\sqrt{65} - 7}{4}$ Choice (A)

Alternative Solution:

The given fraction can be written as $x = \dfrac{1}{4 - (B)}$, where

$B = \dfrac{1}{4 + (x)}$. Now, as 4 + x > 4, (because x is positive), B <0.25 and hence

$x = \dfrac{1}{4 - B}$ will be less than $\dfrac{1}{3.75}$

(i.e., 0.2667) but greater than $\dfrac{1}{4}$ (i.e., 0.25). Now; as 0.25 < x < 0.2667 using the onscreen calculator we can check for each of the given options. Clearly, choices (B) and (D) are negative and choice (C) $\cong$ 0.292. Hence, only choice (A) satisfies.

Q14. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

Rajesh has a bet with Thomas as to who can eat the maximum number of gulab jamuns in five minutes. Rajesh can eat six gulab jamuns per minute, whereas Thomas can eat eight per minute. The bet starts, but after three minutes, Thomas fell ill and gave up. For at least how many minutes (from the beginning) should Rajesh keep eating, so as to ensure that he wins the bet?

a) $4\frac{1}{6}$ minutes

b) $4\frac{1}{2}$ minutes

c) $4\frac{1}{3}$ minutes

d) **Rajesh can never win the bet.**

In the first three minutes, the number of gulab jamuns eaten by Rajesh and Thomas are 6 × 3 and 8 × 3 respectively.
Rajesh needs to eat at least 7 more gulab jamuns to beat Thomas.

To eat 7 more gulab jamuns Rajesh would take another $\frac{7}{6}$ minutes. Therefore Rajesh should keep eating for a total of $3 + \frac{7}{6} = 4\frac{1}{6}$ minutes to ensure that he wins the bet.

Choice (A)

Q15. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

Find the ratio of the sum of the roots of $ax^2 + \left(1 + \dfrac{a}{b}\right)x + \dfrac{b}{a} = 0$ to the product of the roots of $ax^2 + (a+b)x + \dfrac{b}{a} + 1 = 0.$

a) −1

b) $-\dfrac{a}{b}$

c) $-\dfrac{a^2}{b}$

d) $\dfrac{a}{b}$

Sum of the roots of $ax^2 + \left(1 + \dfrac{a}{b}\right)x + \dfrac{b}{a} = 0$ is $\dfrac{-\left(1 + \dfrac{a}{b}\right)}{a} = \dfrac{-(a+b)}{ab}$

Product of the roots of $ax^2 + (a+b)x + \dfrac{b}{a} + 1 = 0$ is $\dfrac{\left(\dfrac{b}{a} + 1\right)}{a} = \dfrac{(a+b)}{a^2}$

Required ratio $= \dfrac{-(a+b)}{ab} \times \dfrac{a^2}{(a+b)} = -\dfrac{a}{b}$ Choice (B)

Q16. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

If $f(x) = 3x^2$ and $g(x) = (f(x))^{\frac{1}{2}}$, then the value of $\log_{81}(g(g(3)))$ is

a) $5\,\dfrac{1}{2}$ b) 8.   c) 10.   d) $15\,\dfrac{3}{4}$.

$$g(x) = \dfrac{1}{\left(3x^2\right)^2} = \dfrac{1}{9x^4}$$

$$g(g(x)) = g\left(\dfrac{1}{9x^4}\right) = \dfrac{1}{9}\left(\dfrac{1}{9x^4}\right)^4 = 9^3\, x^{16}$$

$$\therefore g(g(3)) = 9^3\, (3)^{16} = 3^{22}$$

$$\log_{81} 3^{22} = \log_{3^4} 3^{22} = \dfrac{22}{4}\log_3 3 = \dfrac{22}{4} = 5\dfrac{1}{2}.$$

Choice (A)

Q17.   DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices

If four friends, A, B, C and D, shared a certain sum between themselves such that A's share was one-fourth of the total share of B, C and D; D's share was one-fourth of A's share and B's share was twice C's share, find the ratio of the shares of B and D.

a) 10 : 1

b) 5 : 2

c) 8 : 3

d) 5 : 1

Let the share of C = c
⇒ Share of B = 2c
Let share of D = d.

⇒ Share of A = $\left(\dfrac{2c+c+d}{4}\right) = \dfrac{3c+d}{4}$

But given, d = one-fourth of A's share

⇒ d = $\left(\dfrac{3c+d}{4}\right) \times \dfrac{1}{4}$ ⇒ c = 5d

⇒ Ratio of B's share to D's share = 2c : d
    = 10 : 1   Choice (A)

Q18. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

If $p\Psi q = \dfrac{p}{q^2 - 1}$, then find the value of 3 Ψ (4 Ψ 5).

a) $-\dfrac{108}{35}$

b) $-\dfrac{98}{35}$

c) $-\dfrac{36}{35}$

d) $-\dfrac{78}{35}$

(4 Ψ 5) = $\dfrac{4}{24} = \dfrac{1}{6}$.

$\left(3 \Psi \dfrac{1}{6}\right) = \dfrac{3}{\dfrac{1}{36}-1} = -\dfrac{3}{35} \times 36 = \dfrac{-108}{35}$ Choice (A)

Q19. DIRECTIONS *for questions 10 to 19:* Select the correct alternative from the given choices.

In a private organization, the average increment in the salary of all the employees was 14.3%. If the average increments of all the male and all the female employees were 15.2% and 13.2% respectively, then how many of the 500 employees working in the organization were females?

a) **200**

b) **225**

c) **275**

d) **Cannot be determined**

Using the given information it is possible to find the ratio of the total salary of all male employees and the total salary of all female employees. However, it is not possible to find anything about the number of male and female employees, unless some further information is provided regarding the salaries of male and female employees.

Choice (D)

Q20. DIRECTIONS *for question 20:* Type in your answer in the input box provided below the question.

If $y = \sqrt{13\sqrt{13\sqrt{13\sqrt{13.....\infty}}}}$, then find the value of $y - 8$.

$y = \sqrt{13\sqrt{13\sqrt{13\ldots\infty}}}$

squaring both sides, we get

$\therefore y^2 = 13\sqrt{13\sqrt{13\sqrt{13\ldots\infty}}} = 13y$

$y^2 - 13y = 0; \; y(y - 13) = 0$

$y \neq 0, \; y = 13,$

$\therefore y - 8 = 5$

Ans: (5)

Q21.   DIRECTIONS *for questions 21 and 22:* **Select the correct alternative from the given choices.**

What is the sum of the digits of the smallest number which when divided by 7 leaves a remainder of 6, when divided by 8 leaves a remainder of 7 and when divided by 9 leaves a remainder of 1?

a) 4

b) 7

c) 10

d) 13

The number can be represented as
$7a + 6 = 8b + 7 = 9c + 1$
If $7a + 6 = 8b + 7$, the number must be of the form $N = LCM (7, 8) - 1$, the least value of which $= 56 - 1 = 55$.
Now, clearly 55 also happens to be of the form $9c + 1$.
Hence, the required answer $= 5 + 5 = 10$.

Alternative Solution:

The number is of the form $9c + 1$. The sum of the digits of $9c$ will be a multiple of 9.
Hence, the sum of the digits of the number will be of the form $9k + 1$. From the options,
the answer can only be 10.   Choice (C)

Q22.   DIRECTIONS *for questions 21 and 22:* Select the correct alternative from the given choices.

If $2a = 3b = 5c$ and $4c = 5d = 6e$, then $\dfrac{bcd}{ae} =$

a) *a.*

b) *b.*

c) *c.*

d) *d.*

$2a = 3b = 5c$ _____ (1)
Multiplying by 4, we get $8a = 12b = 20c$
Similarly $4c = 5d = 6e$ _____ (2)
Multiplying by 5, we get $20c = 25d = 30e$
∴ $8a = 12b = 20c = 25d = 30e = N$ (say)

Now, $b = \dfrac{N}{12}$, $c = \dfrac{N}{20}$, $a = \dfrac{N}{8}$ and $e = \dfrac{N}{30}$

∴ $\dfrac{bcd}{ae} = \dfrac{\left(\dfrac{N}{12}\right)\left(\dfrac{N}{20}\right)d}{\left(\dfrac{N}{8}\right)\left(\dfrac{N}{30}\right)} = d$

Choice (D)

Q23.   DIRECTIONS *for question 23:* **Type in your answer in the input box provided below the question.**

Five men can complete a certain work in six days, while nine women take five days to complete the same work. If two men and x women completed the same work in five days, then find the value of x ?

5×6 man days of work = 9×5 women days of work.
⇒ 2 men = 3 women
2 men + x women = $(3 + x)$ women
Considering the total work in woman days, we get
$(3 + x)(5) = 9 \times 5$
⇒ $x = 6$

Ans: (6)

Q24.   DIRECTIONS *for questions 24 to 26:* **Select the correct alternative from the given choices.   Everyday, Ramu starts from his school at the same time, walks home at a speed of 4 kmph and reaches home at 5:00pm. If he walks at a speed of 5 kmph instead, he will reach home at 4:45 pm. At what time does Ramu start from the school everyday?**

a) 3:30 pm

b) 3:45 pm

c) 4:00 pm

d) 4:15 pm

Let the distance that Ramu walks be *d*.
The time taken to reach home when Ramu walks at 4 kmph

$= \frac{d}{4} \times 60$ minutes = 15*d* minutes

Time taken by Ramu to reach home when he walks at 5 kmph = 12*d* minutes
Given 15*d* – 12*d* = 15 $\Rightarrow$ *d* = 5
Hence, Ramu starts at 3:45 PM from the school.   Choice (B)

Alternative Solution:

When Ramu's speed becomes $\frac{5}{4}$ times, his time will become $\frac{4}{5}$th of his initial time

taken for the journey, i.e., he will save $\frac{1}{5}$th of his initial time. This saving in time is

clearly 15 minutes (from the given information). Hence, his initial time taken = 5 × 15
minutes. Hence, his starting time from school = 5.00 pm – 75 min = 3:45 pm.

Q25.   DIRECTIONS *for questions 24 to 26:* Select the correct alternative from the given
choices.

A milkman purchases milk for Rs.18 per litre but adds one litre of water to every 1.5 litres of
milk that he purchases and then sells the mixture to his customers at the same price per litre.
What is the percentage of profit that he makes in selling the mixture?

a) 40%

b) 50%

c) 66.67%

d) 33.33%

The milkman sells 1*l* of water+ 1.5*l* of milk = 2.5*l* of the mixture for ₹ (2.5 × 18) = ₹45.
But his effective cost price for the 2.5*l* of mixture is simply the price of the milk,
i.e., ₹ (1.5 × 18) = ₹27.
Hence, he makes a profit of ₹ (45 – 27) = ₹18 on every ₹27 of his investment.

Hence, the profit percentage that he makes = $\frac{18}{27} \times 100$ = 66.67%   Choice (C)

Q26. DIRECTIONS *for questions 24 to 26:* Select the correct alternative from the given choices.

What is the remainder when 6^{40} is divided by 217?

a) **216**

b) **6**

c) **1**

d) **211**

$6^{40} = 6 \times 216^{13}$

$$\text{Rem}\ \frac{6 \times 216^{13}}{217} = \text{Rem}\left(\frac{6}{217}\right) \times \text{Rem}\left(\frac{216^{13}}{217}\right)$$

Remainder when 216^{13} i.e., $(217-1)^{13}$ is divided by 217 is −1.
Hence, the answer is $217 - 6 = 211$.   Choice (D)

Q27. DIRECTIONS *for question 27:* **Type in your answer in the input box provided below the question. If *a* + *b* is a prime number and *ab* = 84, how many possible values can *a* + *b* assume ?**

84 can be written as a product of two numbers in the following ways: (1, 84); (2, 42); (3, 28); (4, 21); (6, 14); and (7, 12).
Among these combinations, only for (3, 28) and (7, 12) will the sum of the factors be a prime number. Hence, a + b can assume two values: 31 and 19.   Ans: (2)

Q28. DIRECTIONS *for questions 28 to 30:* Select the correct alternative from the given choices.

If $(7 + 4\sqrt{3})^{20}$ = I + F and $(7 - 4\sqrt{3})^{20}$ = f, where I is an integer, 0 < F < 1and 0 < f < 1, what is the value of F + f ?

a) $\dfrac{4}{3}$

b) $\dfrac{1}{2}$

c) $\dfrac{11}{7}$

d) **None of the above**

$(7+4\sqrt{3})^{20} = 7^{20} + 20_{C_1}7^{19}(4\sqrt{3})^{1} + 20_{C_2}7^{18}(4\sqrt{3})^{2}$
$+ ... + 20_{C_{19}}(7)(4\sqrt{3})^{19} + (4\sqrt{3})^{20}$

$(7-4\sqrt{3})^{20} = 7^{20} - 20_{C_1}7^{19}(4\sqrt{3})^{1} + 20_{C_2}7^{18}(4\sqrt{3})^{2}$
$+ ... - 20_{C_{19}}(7)(4\sqrt{3})^{19} + (4\sqrt{3})^{20}$

$\therefore (7+4\sqrt{3})^{20} + (7-4\sqrt{3})^{20} = 2\left[7^{20} + 20_{C_2}(7)^{18}(4\sqrt{3})^{2} + ... + (4\sqrt{3})^{20}\right]$ as

$(\sqrt{3})^{\text{Even no}}$ = Integer

$\therefore (7+4\sqrt{3})^{20} + (7-4\sqrt{3})^{20}$ = I + F + f = an integer
∵ I is an integer, (F + f) must also be an integer
 0 < F < 1
 0 < f < 1
 0 < F + f < 2
∴ F + f must be 1   Choice (D)

Q29. DIRECTIONS *for questions 28 to 30:* Select the correct alternative from the given choices.
Munir took a loan of Rs.15,000, intending to repay it in a lump sum at the end of five years. If the annual rate of interest on the loan is 15%, interest being compounded every six months, then what will the principal amount to (approximately) after five years?

a) **Rs.30,170**

b) **Rs.30,915**

c) **Rs.31,534**

d) **Rs.60, 683**

Principal after five years

$$=15000 \times \left(1 + \frac{15}{100 \times 2}\right)^{5\times2} = 15000 \times 1.075^{10} = 30915.$$
Choice (B)

Q30. DIRECTIONS *for questions 28 to 30:* Select the correct alternative from the given choices.

Amar has chocolates worth Rs.20 with him, while Akbar has biscuits worth Rs.30 with him. If Amar and Akbar exchange the items that they have, Amar will have twice the number of items that Akbar has. What is the ratio of the price of a chocolate to that of a biscuit?

a) **3 : 4**

b) **4 : 5**

c) **4 : 3**

d) **5 : 4**

Let Amar have n chocolates and Akbar have m biscuits. Given that $m = 2n$.

Also, price of one chocolate = $\dfrac{20}{n}$

Price of one biscuit = $\dfrac{30}{m}$

Ratio of the price of a chocolate to that of a biscuit

$= \dfrac{20}{n} : \dfrac{30}{m} = \dfrac{20}{n} : \dfrac{30}{2n} = 4 : 3$

Choice (C)

Q31. DIRECTIONS *for questions 31 to 34:* **Type in your answer in the input box provided below the question.**

How many values of p exist, such that both p and 199 − p are prime numbers?

If P is even, then P = 2 and 199 – P = 197 which is a prime number. If P is odd, then 199 – P will be an even number which must be prime. Therefore P must be 2.
Thus P can take only 2 values, 2 or 197.   Ans : (2)

Q32. DIRECTIONS *for questions 31 to 34:* **Type in your answer in the input box provided below the question.**

Fifty children attended a summer camp. If the average weight of the boys at the camp was 22 kg, with no boy weighing less than 15 kg, and there were at least 10 boys in camp who weighed more than 26 kg each, then the number of girls in the camp could have been at most

Let n be the number of boys at the camp.
For the number of girls to be the maximum, n must be minimum.
To minimize n, we need to ensure that the average weight of all the n boys equal exactly 22 kg, while meeting the given criteria. Hence, we can take10 (i.e., the least possible number) boys to have a weight of almost (but slightly above) 26 kg and all the remaining boys to have a weight of at least 15 kg.
$\therefore$ 26 × 10 + (n – 10) × 15 = 22n $\Rightarrow n \geq$ 15.7 (since each of the 10 boys weighs more than 26 kg)
Hence, there should be at least 16 boys at the camp and the maximum number of girls at the camp will be 50 – 16 = 34.   Ans: (34)

Q33. DIRECTIONS *for questions 31 to 34:* **Type in your answer in the input box provided below the question . Find the value of *x* + *y*, if 3*x* + 5*y* = 76 and 10*x* + 6*y* = 136.**

$10x + 6y = 136 \Rightarrow 5x + 3y = 68$

Now
$$3x + 5y = 76$$
$$\underline{5x + 3y = 68}$$

Adding, we get, $8x + 8y = 144$
$$\Rightarrow 8(x + y) = 8(18)$$
$$\Rightarrow x + y = 18 \qquad\qquad \text{Ans: (18)}$$

Q34. DIRECTIONS *for questions 31 to 34:* Type in your answer in the input box provided below the question.

If *x* and *y* are natural numbers, how many ordered pairs (*x*, *y*) satisfy the equation $\dfrac{1}{x} + \dfrac{3}{y} = \dfrac{1}{5}$?

$$\frac{1}{x} + \frac{3}{y} = \frac{1}{5}$$
$$\Rightarrow \frac{y + 3x}{xy} = \frac{1}{5}$$
$$\Rightarrow 5y + 15x = xy$$
$$\Rightarrow xy - 5y - 15x = 0$$
Adding 75 to both sides, we get,
$xy - 5y - 15x + 75 = 75$
$(x - 5)(y - 15) = 75$
We need to express 75 as the product of 2 natural numbers.

(x − 5)	(y − 15)	x	y
1	75	6	90
3	25	8	40
5	15	10	30
75	1	80	16
25	3	30	18
15	5	20	20

Therefore, we get a total of 6 pairs.   Ans: (6)