AIMCAT 2022

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.

BRITAIN has the widest gender pay gaps in Europe. For every pound that men earn, women make 80p... In 2018, organizations were required to annually publish the hourly pay gap between men and women. … The 10,000 employers that filed results revealed an average median pay gap of 12%. Some reported a 29.5% gap. …

The data doesn't adjust for employees' different roles. CEOs are compared directly with secretaries. Mean gaps are skewed by a few high-earners – nine of ten organizations with the greatest differences between median and mean pay-gaps are football clubs – leaving room for spin and counterproductive responses.

Two narratives have emerged: 1) The gaps prove how sexist the workplace still is. 2) They're explained by men's greater share of senior jobs, and not "discrimination". Neither is quite right.

Gender pay gap doesn't reveal pay discrimination. The new reporting exercise is not about that. Airlines with wide pay gaps are unlikely to have unequal pay, because collective bargaining tends to determine salaries. Of easyJet's pilots, 94% are men (average salary: £92,400) whereas 69% of cabin crew are women (average salary: £24,800). The airline industry does not have a "equal work, unequal pay" problem so much as a recruitment problem.

Other industries fail to promote enough women. A study by SKEMA Business School shows that whereas half of graduate entrants in American law firms were women, only one in five equity partners was. Women constituted 52% of banking employees globally but only 38% of middle managers and 16% of executive committee members were women. ….

Companies have accompanied their data with plans to fix things. Many firms aim to improve the figures for 2019, hoping to achieve gender balance across all ranks by 2030. They should be wary of quick fixes...

"Sensible solutions take time. One must diagnose what lies behind the numbers. I'm concerned that this British reporting is ostensibly focused on pay, but in reality it's just about representation," says Brian Levine of Mercer, a consultancy. "Companies need to check whether they are hiring equitably, paying equitably and offering equitable opportunities to advance."

Men's and women's salaries start diverging from the childbearing years. This "motherhood penalty" is often followed by the "good-daughter penalty", when elderly parents require care and daughters prove more conscientious than sons. The median pay gap is only 2% among full-time workers in their 30s, yet jumps to 14% in their 40s and 16% in their 50s.

It may be tempting to blame women's lack of progression on their wombs. This is only part of the explanation. The other is structural discrimination. One in nine new mothers is dismissed, made redundant or treated so poorly that she leaves. Subtler biases favour men in hiring, performance reviews, pay and promotions. A 2016 study by Warwick University found that, among workers who asked for pay rises, men were 25% more likely than women to get the nod.

Unlike Britain, many European countries tackling pay gaps have focused on discrimination between people with similar jobs, rather than gaps across whole companies. Nevertheless, Britain's blunter

exercise is having an impact. The data has got everyone talking about pay. Now that the numbers are out, executives are keen to improve women's positions.

It will be hard to say whether this improvement is caused by the companies' mandatory reporting of data on pay equality (under pressure from shareholders) or broader winds of change ….. The pay gap would endure as long as more women than men worked part-time and in industries that pay poorly. So, what pay gap size should be tolerated?

Q1. Which of the following has been cited as a problem that plagues the airline industry, as can be deduced from the passage?

a) Pay-discrimination problem

b) **Recruitment problem**

c) Collective bargaining

d) Structural discrimination

Number of words and Explanatory notes for RC:

Number of words: 590

Option A: Pay discrimination refers to people who do the same job, or jobs of similar value, being paid differently. Airlines have reported some of the widest pay gaps, yet are unlikely to have unequal pay. So choice A is incorrect.
Option B: The airline industry does not have a "equal work, unequal pay" problem so much as a recruitment problem. This makes choice B the correct answer.
Option C: Collective bargaining tends to determine salaries in the airline industry. Hence choice C which is a positive step cannot be termed as a problem.
Option D: While structural discrimination has been mentioned in the passage, we cannot specifically say that it is a problem facing the airline industry. Choice D is not the answer. Choice (B)

Q2. Which of the following best describes the purpose of the example of the study conducted by SKEMA Business School?

a) To demonstrate that the difference in the probability of a female employee at an entry level position and at a top level position is highest in the banking sector as compared to other sectors.

b) **To indicate that more women than men are employed in management roles that do not fall under the classical definitions of "equity partners" and "executive committee members".**

c) **To highlight that there are leaky pipelines in some sectors where the share of women drops at several levels of promotion.**

d) To reiterate that it is high time that the banking sector reduced the pay gap between male and female employees by providing female employees with opportunities to gain new skills.

Number of words and Explanatory notes for RC:

Number of words: 590

Option A: Although women made up 52% of banking employees globally, only 38% of middle managers and 16% of executive committee members were women. The study conducted by SKEMA Business School points to the percentage of women in entry level and senior positions in two sectors only – law and banking. So "as compared to other sectors" as given in choice A is incorrect.
Option B: The study by SKEMA Business School does not just point to "management roles" for men and women. It also talks about women graduate entrants. Further "roles that do not fall under the classical definition of "equity partners" and "executive committee members"" is out of scope and it certainly is not the purpose of the example of the study by SKEMA Business School. Further "more women than men" is a wrong comparison. Choice B is incorrect.
Option C: Other industries fail to promote enough women. Half of graduate entrants in American law firms were women, only one in five equity partners was. Although women made up 52% of banking employees globally, only 38% of middle managers and 16% of executive committee members were women. Although the number of women in an organization may be high, the number of women at the top positions is low. Choice C is the answer.
Option D: Though choice D emerges as the objective of the author overall in the passage, it is not the specific reason that the study conducted by SKEMA Business School has been mentioned. Choice D is not the answer. Choice (C)

Q3. Which of the following statements best reflects the main argument of the author in the passage?

a) **Despite its flaws, a new obligation to report the differences between men's and women's pay could spark a change in employment practices.**

b) **Income gaps exist because men are favored in hiring, performance reviews, pay and promotions to senior positions.**

c) **Companies should not remain in the bottom quartile for gender and ethnic diversity in leadership.**

d) A woman's lack of progression in the workplace can be solely attributed to the sexist workplace and not to the “womb” or the “good daughter-penalty”.

Number of words and Explanatory notes for RC:

Number of words: 590

Option A: The first part of choice A "despite its flaws" is correct. Refer to the third and fourth paras. The data doesn't adjust for employees' different roles …. This leaves room for spin and counterproductive responses. Two narratives have emerged. One, the gaps prove how sexist and discriminatory the workplace still is. Second, they are adequately explained by men's greater share of senior jobs, and do not point to discrimination. Neither is quite right. …..
Unlike Britain, many European countries tackling pay gaps have focused on discrimination between people with similar jobs, rather than gaps across whole companies. Nevertheless, Britain's blunter exercise is having an impact …. improve women's positions. So choice A encapsulates the central argument of the author. Choice A is the answer.
Option B: There is structural discrimination as well. One in nine new mothers is dismissed, made redundant or treated so poorly that she leaves. Subtler biases favour men in hiring, performance reviews, pay and promotions. Two narratives have emerged. One, the gaps prove how sexist the workplace still is. Second, they are adequately explained by men's greater share of senior jobs, and not "discrimination". Neither is quite right. Hence choice B is incorrect.
Option C: "ethnic diversity in leadership" is out of scope of the passage. The passage focuses on gender pay gaps. Choice C is not the answer.
Option D: Tempting as it may be to blame women's lack of progression on their wombs, this is only part of the explanation. The other is structural discrimination. One in nine new mothers is dismissed, made redundant or treated so poorly that she leaves. Subtler biases favour men in hiring, performance reviews, pay and promotions. …. Hence the mention of the sexist workplace being solely responsible in choice D is incorrect. The "motherhood-penalty" and the "good daughter-penalty" are partly responsible for a woman's lack of progression in the workplace. Choice (A)

Q4. Which of the following interventions would the author of the passage support?

a) **The impact of the "motherhood penalty" and "good-daughter penalty" needs to be studied.**

b) **Companies should hire equitably, pay equitably and offer equitable opportunities for women to advance.**

c) **Shareholders should pressurize firms to publish data on pay equality.**

d) The pay-reporting exercise in Britain should focus on income gaps across whole industries and not just discrimination.

Number of words and Explanatory notes for RC:

Number of words: 590

Option A: This "motherhood penalty" is often followed by the "good-daughter penalty", when elderly parents require care and daughters prove more conscientious than sons. The median pay gap is only 2% among full-time workers in their 30s, yet jumps to 14% in their 40s and 16% in their 50s. The impact of the "motherhood penalty" and good-daughter penalty" is already known. Choice A is not an intervention that the author will support.

Option B: "I'm concerned that this British reporting is ostensibly focused on pay, but in reality it's just about representation," says Brian Levine of Mercer, a consultancy. "Companies need to check whether they are hiring equitably, paying equitably and offering equitable opportunities to advance." His viewpoint is also echoed by the author. Women's positions need to improve. But even if every company became scrupulously fair, the pay gap would endure as long as more women than men worked part-time and in industries that pay poorly. Choice B is the correct answer.

Option C: It will be hard to say whether the improvement in women's position was caused by the companies' mandatory reporting of data on pay equality (often under pressure from shareholders) or broader winds of change. But "Shareholders **should** pressurize firms to publish data on pay equality" is not the author's argument.

Option D: Unlike Britain, many European countries tackling pay gaps have focused on discrimination between people with similar jobs, rather than gaps across whole companies. Nevertheless, Britain's blunter exercise is having an impact. From this we cannot infer that the author wants to argue that the pay-reporting exercise in Britain should focus on income gaps across whole industries. Choice D is not the answer.

Choice (B)

Q5. How is the second para related to the first para of the passage?

a) **It provides an example to support the finding presented in the first para.**

b) **It introduces evidence that undermines the argument presented in the first para.**

c) **It lays bare the shortcomings in the data, undermining the argument made in the first para.**

d) It demonstrates the potential dangers of a commonly used strategy.

Number of words and Explanatory notes for RC:

Number of words: 590

Option A: An example of 'few high earners in football clubs' is presented in the second para. But the related context does not support the finding presented in the first para. Hence choice A is not the answer.
Option B: The first para does not present an argument as such. It presents some findings – For every pound that men earn, women make 80p .... publish the gap in hourly pay between men and women. The results aren't pretty ..... paid women less than half what they paid men. Also the evidence does not really undermine the argument. It points to some limitations or some flaws in the method used. So choice B is not the answer.
Option C: The data doesn't adjust for employees' different roles, so CEOs are compared directly with secretaries. Mean gaps can be skewed by a few high-earners. This leaves room for spin and counterproductive responses. Hence we can say that the second para anticipates possible objections to the methodology presented in the first para. So choice C is correct.
Option D: "potential dangers" is too strong a word. "commonly used strategy" is incorrect. Choice D is not the answer. Choice (C)

PASSAGE 2:

DIRECTIONS *for questions 6 to 10:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

What has happened to our profession, and our art, to cause the supposed end of our most powerful means of conceptualizing and representing architecture – drawing?

The computer, of course. With its tremendous ability to organize and present data, the computer is transforming every aspect of how architects work, from sketching their first impressions of an idea to creating complex construction documents for contractors. Are our hands becoming obsolete as creative tools, replaced by machines? And where does that leave the architectural creative process?

Today, architects typically use computer-aided design software … [B]uildings are no longer just designed visually and spatially; they are “computed” via interconnected databases… There’s nothing inherently problematic about that, as long as it’s not just that. Architecture cannot divorce itself from drawing, no matter how impressive the technology gets. Drawings are not just end products: they are part of the thought process of architectural design. Drawings express the interaction of our minds, eyes and hands. This last statement is absolutely crucial to the difference between those who draw to conceptualize architecture and those who use the computer…

For decades I have argued that architectural drawing can be divided into three types, which I call the “referential sketch,” the “preparatory study” and the “definitive drawing.” The definitive drawing, the final and most developed of the three, is almost universally produced on the computer nowadays, and that is appropriate. But what about the other two? What is their value in the creative process?

The referential sketch serves as a visual diary, a record of an architect’s discovery. It can be as simple as a shorthand notation of a design concept or can describe details of a larger composition. It might not even be a drawing that relates to a building or any time in history. It’s not likely to represent “reality,” but rather to capture an idea.

The second type of drawing, the preparatory study, is typically part of a progression of drawings that elaborate a design. Like the referential sketch, it may not reflect a linear process. I personally like to draw on translucent yellow tracing paper, which allows me to layer one drawing on top of another, building on what I’ve drawn before and, again, creating a personal, emotional connection with the work.

With both of these types of drawings, there is a certain joy in their creation, which comes from the interaction between the mind and the hand. Our physical and mental interactions with drawings are formative acts. In a handmade drawing, whether on an electronic tablet or on paper, there are intonations, traces of intentions and speculation. This is not unlike the way a musician might intone a note or how a riff in jazz would be understood subliminally and put a smile on your face.

I find this quite different from today’s “parametric design,” which allows the computer to generate form from a set of instructions, sometimes resulting in so-called blob architecture. The designs are complex and interesting in their own way, but they lack the emotional content of a design derived

from hand; [on the other hand] drawing by hand stimulates the imagination and allows us to speculate about ideas, a good sign that we're truly alive.

Q6. A musician intoning a note, as mentioned in the passage, is:

a) **an accurate way of depicting the role of sketching by hand.**

b) **an analogy demonstrating the importance of human connect in architectural drawing.** ✓

Your answer is correct

c) **an example to highlight how music uses the same principles as drawing.**

d) an example to show how the way music is produced is unlike how drawings are made

Number of words and Explanatory notes for RC:

Number of words: 535

Consider the sentences: With both of these types of drawings, there is ***a certain joy in their creation***, which comes from ***the interaction between the mind and the hand***. Our physical and mental interactions with ***drawings are formative acts***. In ***a handmade drawing***, whether on an electronic tablet or on paper, there are ***intonations, traces of intentions and speculation***. This is not unlike the way ***a musician might intone a note*** or how a riff in jazz would be ***understood subliminally*** and put a smile on your face.

Option A: It is a comparison that the author draws up. It is hard to determine whether it is an accurate way or not, since analogies aren't really about accuracy. Rather, they are about helping someone understand the original situation better. Hence, Option A is not the answer.

Option B: Firstly, it is an analogy because it compares one event to another similar event to help readers comprehend what the author's central point of view is. Secondly, the bigger idea here is about intonations and traces of intentions which a handmade drawing will have – 'not unlike' the way a musician intones a note – which puts a smile on the listener's face. So, it is the human connect which is getting highlighted through this analogy. Option B is therefore a good choice.

Option C: While it is an example to highlight the similarities between drawing by hand and what a musician would do, it doesn't quite suggest that the '***principles used***' are one and the same. It is more an analogy rather than an assertion. Hence, Option C is not the answer.

Option D: The author draws up an analogy, a comparison between how music is made and how a drawing is made by hand and how the two are similar in the subliminal intonations. This option clearly contradicts this comparison. Hence, Option D can be easily eliminated.

Choice (B)

Q7. Referential sketch and preparatory study are different from each other in that:

a) **the former represents the idea whereas the latter represents further elaboration.**

b) **the latter represents the original idea whereas the former represents progressions.**

c) **the latter represents a primitive form whereas the former represents an advanced form.**

d) the former represents an incomplete idea whereas the latter represents the complete one.

Number of words and Explanatory notes for RC:

Number of words: 535

Consider the sentences: The referential sketch serves as a visual diary, ***a record of an architect's discovery***. It can be as simple as a shorthand notation of a design concept or can describe details of a larger composition. It might not even be a drawing that relates to a building or any time in history. ***It's not likely to represent "reality," but rather to capture an idea***. The second type of drawing, the preparatory study, is typically ***part of a progression of drawings that elaborate a design***. From these lines it can be understood that the referential sketch is to keep track of the idea, while the preparatory study allows architects to build or elaborate upon the idea.
Option A: This option captures the difference well. One represents the idea, whereas the other is the elaboration. Hence, Option A is a good choice.
Option B: Preparatory study doesn't represent the original idea. It is the other way around. It is elaboration of the design. Hence, Option B is not the answer.
Option C: While both are two stages of development of an idea, there isn't enough evidence to understand what can be called primitive and what can be called advanced. Also, the latter (preparatory study) is less likely to be termed primitive compared to the former (referential sketch). Hence, Option C is not the answer.
Option D: The former represents capturing an idea. We cannot quite call it incomplete. Similarly, the latter represents elaboration of the design in the first stage, and not necessarily a more complete version. Hence, Option D is not accurate.

Choice (A)

Q8. The author believes that definitive drawing:

a) **can be produced faster by computers than humans.**

b) **is more developed because of the impressiveness of technology.**

c) **lacks the emotional connection brought by human drawing.**

d) **is the final phase of the conceptualisation of an idea.**

Number of words and Explanatory notes for RC:

Number of words: 535

Consider the sentence: The definitive drawing, **the final and most developed** of the three, **is almost universally produced on the computer nowadays**, and that is **appropriate**.

Option A: The speed or efficiency with which drawings have been generated hasn't been discussed as a parameter when comparing drawings by hand and by using the machine. It is more to do with the human connection. Hence, Option A is not a good choice.

Option B: Impressiveness of technology hasn't been considered as part of the argument here. These are just the three stages of drawing, and the preferences of the architects. Hence, Option B is not a good choice.

Option C: The author feels that the third phase is accomplished by the machine as it is better suited. This can be understood from the sentences: The definitive drawing, the final and most developed of the three, is almost universally produced on the computer nowadays, and ***that is appropriate***. So, the negative opinion about the lack of emotional connection doesn't apply to 'definitive drawing'. Hence, Option C is not a good choice.

Option D: The idea is 'captured' in the first stage – referential sketch. It is elaborated in the preparatory study. ..... The definitive drawing, the final and most developed of the three ..... – From this we can understand that the author calls it the final step in the process. Hence, calling it the final phase of the conceptualisation is apt. Hence, Option D is a good choice. Choice (D)

Q9. The author feels that architecture cannot divorce itself from drawing because:

a) **drawing with a machine doesn't bring out the concept accurately.**

b) **only drawing can enable the interaction of mind, eyes and hands.**

c) **a design derived by hand is emotionally richer.**

d) **drawing is integral to the formative stage of conceptualisation.**

Number of words and Explanatory notes for RC:

Number of words: 535

The reason can be found in the sentences: Architecture cannot divorce itself from drawing, no matter how impressive the technology gets. Drawings are not just end products: they are part of the ***thought process*** of architectural design. Drawings ***express the interaction of our minds, eyes and hands***. Also consider the sentences: 'but they lack ***the emotional content of a design derived from hand***; [on the other hand] drawing by hand ***stimulates the imagination and allows us to speculate about ideas***'.

Option A: The accuracy of the concept is not the central concern of the author. The author believes that drawing by hand helps develop the concept in a more imaginative way, with a greater emotional connect. Hence, this is not a good choice.

Option B: Drawing by hand benefits thanks to the interaction of mind, eyes and hands. That is the reason the author favours drawing by hand. It is not necessarily the only way to make hands, eyes, and mind interact. The interaction gives drawing by hand an advantage; it is not the other way around. Hence, Option B is not the answer.

Option C: The emotional content is what makes drawing by hand more special as far as the author is concerned (see the underlined portions above). However, the emotional richness of hand-drawing is more a by-product of the process. The main reason why the author favours hand-drawing is because it adds to the process of thinking about the design and creating it. Hence, Option C is not the best choice.

Option D: Drawing by hand is an integral part of the formative stage of conceptualising, which is why the author thinks architecture cannot divorce itself from drawing. This can be understood from the sentences: Architecture cannot divorce itself from drawing, no matter how impressive the technology gets. Drawings are not just end products: ***they are part of the thought process of architectural design***. Hence, this is the best possible choice. Choice (D)

Q10. The author's argument about the process of drawing in architecture is refuted if:

a) **architects prefer to use computers instead of sketching themselves.**

b) **hand drawings are more emotionally satisfying than using computers.**

c) **drawing by hand does not help architects explore the idea as deeply as the computer does.**

d) **architects skip referential sketch and preparatory study to create a parametric design.**

Number of words and Explanatory notes for RC:

Number of words: 535

The author's argument is predominantly based on the belief that drawing by hand brings a distinctive edge to the process of conceptualisation and is an integral part of the thought process. So, if we need to refute the author's argument, we are looking for a choice that indicates that drawing doesn't add value, or that machines enable conceptualisation better.
Option A: The preference of architects doesn't tilt the scale either way as the author already mentions that more and more architects are using machines to do the drawing. Hence, Option A is not the answer.
Option B: This choice strengthens the author's central argument about drawing by hand boasting of a greater emotional connect. It doesn't refute the author's central argument. Hence, this is not apt.
Option C: Drawing by hand does not help architects explore the idea as deeply as the computer does. This choice negates the author's claim that drawing by hand stimulates imagination and conceptualisation, by stating the exact opposite – that ideas are explored better with a computer rather than by hand drawing. Hence, this option refutes the author's argument.
Option D: If architects skip the first two phases and go straight to the third, it only strengthens the author's claim that there is predominant usage of machine tools for drawing these days, taking architects away from the usual hand-drawing (which the author favours). Hence, this choice is not apt. Choice (C)

PASSAGE 3:

DIRECTIONS *for questions 11 to 15:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.
At the very centre of Teesside [an industrial landscape in England] is a vast empty area dotted with enormous rusting buildings … But now there is a plan to transform and revitalise this area by turning it into a free port. A free port, sometimes called a free trade zone or special economic zone, is an area of a country where its taxes and tariffs do not apply. So you can import goods, store them and re-export them without bothering the tax collectors.

[T]hese days they…allow firms to import raw materials, make finished goods and then export them, with none of the border taxes that the rest of the country has to pay. Within the EU's customs union, large industrial free zones have limited use; after all, you still have to pay customs taxes when bringing the goods into the EU from the free zone.

But after Brexit it could be a huge boost for areas like Teesside. For the mayor of the Tees Valley, Ben Houchen, the man behind the idea, turning Teesside into a free port is just common sense.

To see how well free ports can work, you have to travel back to the 1960s. Shannon Airport, on the Republic of Ireland's west coast, started as a flying boat base where planes could refuel just before attempting the long Atlantic crossing – a journey so perilous and tough that the local hotel barkeeper invented Irish coffee to revive passengers. But by the 1960s, planes could easily make it across the pond in one go. Shannon was facing a bleak future.

But then Shannon Airport's boss had the idea of making the airport an industrial free port, not just one with warehousing and depots for storing goods tax-free before they were exported again, but one with factories making pianos, textiles and electronic components. It was a triumph. The whole area is now one massive industrial estate, full of high-tech…and locally grown companies employing thousands.

But that does raise a problem for Teesside – free ports work best by rapidly turning an agrarian, closed economy into an open and industrialised one, just as it happened in Ireland and to a far larger extent in China.

The UK, on the other hand, has been an open and industrialised economy at least since Victorian times. Free ports can also just encourage firms and investment to move into the free port where they pay no tax, away from other parts of the country where they do pay tax.

Jerry Hopkinson is the chief operations officer at PD Ports, owner of Teesport, the main port on Teesside… "By 2040 there will be a £600m benefit. By 2040, 40,000 new jobs will be created," he says. "What we need to do is demonstrate that the upside benefits are proportionally greater than the loss of revenues in terms of taxes. We are doing the calculations that will demonstrate that to HM Treasury."

Even if that is true, a Teesside free port is not necessarily a good idea. It would be far more effective to cut tariffs for the whole country rather than abolish them for one small corner. After all, this is what has happened in Shannon – free port status was not really necessary after Ireland joined the EU and slashed business taxes, and the breaks were whittled away until they finally disappeared in 2016.

Q11. All of the following are features of free ports EXCEPT?

a) **They allow ships and planes to refuel before long journeys.**

b) **They are no-tax zones.**

c) **They allow free importing and exporting of goods.**

d) **They allow manufacture and export of finished products.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: A free port, sometimes called a ***free trade zone*** or special economic zone, is an area of a country where ***its taxes and tariffs do not apply***. So you can ***import goods, store them and re-export them*** without bothering the tax collectors.
Option A: This was only true for the Shannon airport, and has not been mentioned as a regular practice at all free ports. Hence, Option A is the answer.
Option B: That there would be no taxes and tariffs has been mentioned in the underlined portions above. Hence, this choice represents a feature of free ports.
Option C: Free importing and exporting of goods is possible without bothering the tax collectors, is what the passage mentions clearly (as noted above). Therefore, this is a feature of free ports.
Option D: This feature of free ports has been mentioned in '[T]hese days they…allow firms to import raw materials, make finished goods and then export them, with none of the border taxes that the rest of the country has to pay'. Hence, this is not the right choice. Choice (A)

Q12. The problem of turning Teesside into a free port is that:

a) **free ports turn agrarian economies into industrialised ones.**

b) **free ports turn closed economies into open ones.**

c) **a Teesside free port will encourage firms to invest more money in Teesside.**

d) **a Teesside free port will provide an avenue for firms in the country to shirk taxes.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: But that does raise a problem for Teesside…***Free ports can also just encourage firms and investment to move into the free port where they pay no tax***, away from other parts of the country where they do pay tax.
Option A: The UK is not an agrarian economy. It is an open, industrialised economy. Hence, this choice is not valid.
Option B: Once again, the UK is already an open economy, and hence, it is not rational to consider the choice as a problem for Teesside.
Option C: This is a positive choice as far as the passage is concerned, as it enhances the trade in a particular zone. We are looking for a problem, something that weakens the idea that starting a free port at Teesside is a good step. Hence, this is not the right choice.
Option D: As suggested in the underlined portion above, the free port attracts even firms from other parts of the country to move, thereby causing a loss in revenues in the form of taxes. This is the problem Teesside faces in an open economy – that it will give firms an opportunity to avoid taxes by shifting base to the free port. Hence, Option D is the answer. Choice (D)

Q13. The author's conclusion about the Teesside free port can be weakened if a study proves that:

a) **many firms will move to free ports to save on taxes.**

b) **the revenue loss from tariff cuts, if implemented across the country, will irreversibly cripple the economy.**

c) **only a small number of firms will shift base to free ports to save on tariffs.**

d) **free ports can lead to burgeoning industrial growth only in one part of the country.**

Number of words and Explanatory notes for RC:

Number of words: 560

The author's conclusion can be found in the sentences: 'Even if that is true, a Teesside free port is not necessarily a good idea. ***It would be far more effective to cut tariffs for the whole country*** rather than abolish them for one small corner.'
Option A: The author's conclusion about the idea of free ports is that it is a bad idea, and that tariffs should be rule should apply across the country. So, firms moving to free ports to save on taxes, supports the argument against free ports (revenue loss). It doesn't weaken the author's conclusion.
Option B: The revenue loss from tariff cuts, if implemented across the country, will irreversibly cripple the economy. If the statement is true, it refutes the author's recommendation to cut tariffs across the whole country instead of making Teesside a free port. Hence, Option B is the answer.
Option C: Even if this were true, it doesn't contradict the author's argument against free ports. Irrespective of how many firms shift to the free ports (if that is a small number the concept of free port won't work – a tangential idea) is not part of the author's main argument. The author is mainly focusing on how free ports are not a good idea in an open economy and tariff-cuts are so much better. Hence, this is not an apt choice.
Option D: The author feels that a better move would be to cut tariffs across the country and not just in free ports. Burgeoning industrial growth only in free ports, strengthens that opinion and doesn't weaken it. Hence, Option D is not the answer.

Choice (B)

Q14. The concept of free ports, according to the author, worked better for China than it would in the UK because:

a) **free ports work better for open economies than for closed ones.**

b) **free ports need special economic zones to thrive.**

c) **free ports need abandonment of taxes that the UK cannot afford.**

d) **free ports are more effective for agrarian, closed economies.**

Number of words and Explanatory notes for RC:

Number of words: 560

The answer can be found in the following lines: 'free ports work best by rapidly turning ***an agrarian, closed economy into an open and industrialised one***, just as happened in Ireland and ***to a far larger extent in China***. The UK, ***on the other hand, has been an open and industrialised economy*** at least since Victorian times. Free ports can also just encourage firms and investment to move into the free port where they pay no tax, away from other parts of the country where they do pay tax.'

Option A: This is contradictory to the idea. The lines clearly state that free ports work better for closed economies than they do for open ones like the UK. Hence, Option A is not the answer.

Option B: Free ports act as special economic zones. They don't need special economic zones to thrive. They thrive because of the incentive – the absence of tariffs and taxes. Hence, Option B is not the answer.

Option C: Whether the UK can afford loss of revenues or not has not been discussed in the passage. The discussion is only around whether the free port-incentive is worth it for an already open economy like the UK. Hence, Option C is not the answer.

Option D: As suggested above, the free port logic works well for closed agrarian economies transforming them into an open and industrialised one. The UK is already an open, industrialised one. Hence, free ports may be redundant. Hence, Option D is apt. Choice (D)

Q15. Jerry Hopkinson's stand on free ports is that:

a) **jobs and not tax revenues should be given higher priority.**

b) **a free port accrues loss of revenues in terms of taxes.**

c) **the benefits of free ports trump the loss in revenue.**

d) **the calculations to prove the benefits of a free port are not done yet.**

Number of words and Explanatory notes for RC:

Number of words: 560

Consider the sentences: Jerry Hopkinson is the chief operations officer at PD Ports, owner of Teesport, the main port on Teesside… "By 2040 there will be a £600m benefit. By 2040, 40,000 new jobs will be created," he says. "What we need to do is ***demonstrate that the upside benefits are proportionally greater than the loss of revenues in term of taxes***. We are doing the calculations that will demonstrate that to HM Treasury."

Option A: The para doesn't talk about priorities and whether or not jobs are more important than the revenue loss. It talks about how the upside benefits should be considered. Jerry Hopkinson claims there will be a financial benefit too, which the option doesn't seem to suggest. Hence, Option A is not the answer.

Option B: This is not compatible with the argument in favour of free ports that Jerry Hopkinson seems to be making. This merely talks about revenue loss in the form of taxes which is already understood. It doesn't talk about the upside benefits. Hence, Option B is not the answer.

Option C: This seems to be the reasoning used by Jerry – that one set of benefits trumps the possible loss in the form of revenues from taxes. Hence, Option C seems to be apt.

Option D: The calculations have been done and the number has also been presented by Jerry. Hence, this is not the right answer. Choice (C)

PASSAGE 4:

DIRECTIONS *for questions 16 to 19:* The passage given below is accompanied by a set of four questions. Choose the best answer to each question.

Savour that cup of coffee while you can. New research shows 60% of coffee species found in the wild could soon go extinct. Researchers at Kew Royal Botanic Gardens in the UK warn that climate change, deforestation, droughts and plant diseases are putting the future of coffee at risk.

"The important thing to remember is that coffee requires a forest habitat for its survival," senior researcher Aaron P. Davis told CNN. "With so much deforestation going on around the world, wild coffee species are being impacted at an alarming rate."

Davis added that coffee plants grow in very specific natural habitats, so rising temperatures and increased rainfall brought by climate change can make coffee impossible to grow in places the plants once thrived.

"Considering threats from human encroachment and deforestation, some (coffee species) could be extinct in 10 to 20 years, particularly with the added influence of climate change," Davis said.

The study published in Science Advances -- a collaboration between scientists in the UK and Ethiopia -- says that unless governments and commercial producers ramp up protections for coffee species and stockpile more seeds, it could impact your daily grind. Fewer coffee crops means your morning cup might get more expensive and taste worse.

Out of 124 types of wild coffee, 75 are at risk of extinction. About 35 of the 124 species grow in areas with no conservation protections. The most popular kind of coffee for commercial production, arabica, is already on the endangered species list. Davis' previous research revealed that arabica coffee could become extinct in as little as 60 years.

But even the less common types of coffee are vital, researchers said. Preserving a diverse crop of wild coffee plants is useful for developing commercial coffee that's resistant to changing climates and pests. To create genetically modified plants, researchers need to preserve diverse coffee genes.

The Kew scientists say that compared to other plants, it's more difficult and more expensive to keep coffee seeds alive in storage banks. So focusing on saving coffee's natural environment is key. Ethiopia recently created three new protected areas in an effort to save wild arabica coffee, according to Davis. But the study reveals the highest threat is to coffee growing in Madagascar and Tanzania.

"The first thing you need to do is conserve them in the wild, so we need to improve the management of protected areas," Davis said. "And we also need to designate new protected areas."

The study’s findings are not just important for coffee drinkers. “There are many countries which depend on coffee for the … bulk of their export earnings,” Davis told Reuters. “It’s estimated there are 100 million people producing coffee in farms around the world.”

Ethiopia, for example, is the natural birthplace of wild Arabica coffee and Africa’s largest coffee exporter. Around 15 million Ethiopians work in coffee production and annual exports have an estimated value of a $1 billion, according to Reuters.

The country has taken steps to preserve biodiversity through maintaining forest-based coffee farming systems and minimizing coffee farmers’ vulnerability to climate change by launching

initiatives such as the Yayu Forest Coffee Project, which encourages farmers to plant coffee inside forests, creating a cash crop while protecting precious woodlands.

Q16. According to the passage, extinction of some coffee species may directly affect which of the following?

a) **Export earnings of coffee producers**

b) **Forest-based coffee farming systems**

c) Precious woodlands

d) Number of coffee-drinkers

Number of words and Explanatory notes for RC:

Number of words: 537

Consider the sentences: The study's findings are not just important for coffee drinkers. "There are many countries which depend on coffee for the … ***bulk of their export earnings.***" Davis told Reuters. "It's estimated there are 100 million people producing coffee in farms around the world." Ethiopia, for example, is the natural birthplace of wild Arabica coffee and Africa's largest coffee exporter. Around 15 million Ethiopians work in coffee production and ***annual exports have an estimated value of $1 billion***, according to Reuters. Also: 'The country has taken steps to preserve biodiversity through ***maintaining forest-based coffee farming systems*** and minimizing coffee farmers' vulnerability to climate change by launching initiatives such as the Yayu Forest Coffee Project, which encourages farmers to plant coffee inside forests, ***creating a cash crop while protecting precious woodlands.***'

Option A: It is the exports which get affected as per the underlined portions above. This is an apt choice.

Option B: Forest-based coffee farming systems are a way to conserve forests and coffee species. It is a solution to the problem. It is therefore, not apt to say that forest-based coffee farming systems will be affected by coffee species going extinct. Hence, Option B is not the answer.

Option C: Precious woodlands can be conserved by growing a cash crop (coffee) amidst them. However, coffee going extinct is not directly going to affect the woodlands.

Option D: The passage doesn't discuss numbers as far as coffee-drinkers are concerned. Yes, the quality of coffee and availability of coffee variety will get affected. Whether that directly affects the number of coffee drinkers cannot be estimated. Hence, this is not an apt choice.

Choice (A)

Q17. Which of the following steps hasn't been recommended to lower the risk of extinction of coffee?

a) **Prevention of deforestation**

b) **Preservation of coffee seeds**

c) Growing climate change-resistant species

d) **Protection of natural habitats**

Number of words and Explanatory notes for RC:

Number of words: 537

Option A: From the sentence 'With so much deforestation going on around the world, wild coffee species are being impacted at an alarming rate', we can understand that deforestation presents a risk. From "so focusing on saving coffee's natural environment is key", we can infer that prevention of deforestation can lower the risk of coffee extinction. Hence, Option A is not the answer.
Option B: From 'The Kew scientists say that compared to other plants, it's more difficult and more expensive to keep coffee seeds alive in storage banks. So focusing on saving coffee's natural environment is key', we can understand that storage of coffee seeds is not a feasible idea. Hence, Option B is the answer.
Option C: From 'Preserving a diverse crop of wild coffee plants is useful for developing commercial coffee that's resistant to changing climates and pests' we can understand that this choice has been discussed in the passage. Option C is not the answer.
Option D: From the sentences 'The first thing you need to do is ***conserve them in the wild***, so we need to ***improve the management of protected areas***," Davis said. "And we also need to ***designate new protected areas***' and also from the sentence 'So focusing on ***saving coffee's natural environment is key***', we can understand that protection of natural habitat is an idea discussed in the passage. Option D is not the answer.
Choice (B)

Q18. Even less common types of coffee are vital, according to the author, because:

a) **diverse crops will help in battling the adverse effects of climate change.**

b) **Arabica coffee, the most popular one, will be extinct in about 60 years.**

c) it is expensive to keep coffee seeds alive in storage banks.

d) **diverse coffee genes add to the quality and taste of the coffee.**

Number of words and Explanatory notes for RC:

Number of words: 537

Option A: The answer could be found in the lines: But even the less common types of coffee are vital, researchers said. ***Preserving a diverse crop of wild coffee plants is useful*** for developing commercial coffee that's ***resistant to changing climates and pests***. ***To create genetically modified plants***, researchers need to preserve diverse coffee genes. As suggested by the underlined portion, we can understand that diversity of the coffee crop is helpful in making sure commercial coffee is protected from pests and adverse consequences of climate change. Option A is the answer.
Option B: The diverse crop is not so we could look for substitutes to Arabica. The author calls the diversity an important way of staying resistant to adverse consequences of climate change and pests. Hence, Option B is not an apt choice.
Option C: From the sentences – "The Kew scientists say that compared to other plants, it's more difficult and more expensive to keep coffee seeds alive in storage banks. So focusing on saving coffee's natural environment is key" – we can understand that while the statement is true, it doesn't provide a reason to maintain coffee diversity. Coffee seeds are more difficult to store. Hence, the author exhorts preservation of the natural environment. Hence, Option C is not a good choice.
Option D: The taste, while an important parameter for coffee, is not a reason as far as maintaining a diverse crop is concerned. Hence, this is not an apt choice.

Choice (A)

Q19. Which of the following is true according to the passage?

a) **Coffee grown in forests is resistant to climate change effects.**

b) **Coffee can only be grown in specific habitats.**

c) Commercial coffee is a diverse mix of wild coffee plants.

d) **Coffee cannot grow in places with high temperatures and rainfall.**

Number of words and Explanatory notes for RC:

Number of words: 537

Option A: From the sentence 'The country has taken steps to preserve biodiversity through maintaining forest-based coffee farming systems and minimizing coffee farmers' vulnerability to climate change by launching initiatives such as the Yayu Forest Coffee Project' we can understand that forest-based coffee farming systems are a way of addressing the adverse effects of climate change on coffee species. Nevertheless, the coffee species' immunity to climate change cannot really be inferred. Option A is not the answer.
Option B: Consider the information: Davis added that coffee plants grow in very ***specific natural habitats***. It has been stressed that coffee needs a particular set of conditions as far as habitat, temperature and rainfall are concerned. Hence, this choice can be inferred.
Option C: Consider the sentence: Preserving a diverse crop of wild coffee plants is useful ***for developing commercial coffee that's resistant to changing climates and pests***. From this we can understand that commercial coffee is not necessarily a mix of wild coffee plants. The author is of the opinion that a diverse crop can ensure the commercial coffee that is a diverse mix, survives climate change better. Hence, Option C is not the answer.
Option D: Consider the sentence, Davis added that coffee plants grow in very specific natural habitats, so ***rising temperatures and increased rainfall*** brought by climate change can make coffee impossible to grow in places the plants once thrived. This line clearly states that increase in temperature and rainfall will affect coffee production. Nevertheless, it doesn't state what were the previous temperatures and rainfall levels. The increase is bad news, but unless we knew previous numbers, it is hard to predict at what temperatures and rainfall levels will coffee production have a problem. Option D is not apt. Choice (B)

PASSAGE 5:

DIRECTIONS *for questions 20 to 24:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

Until 2008, going global seemed to make sense for just about every company in the world…In the aftermath of the recent global recession, we've entered a different phase, …[called], guarded globalization. Governments of developing nations have become wary of opening more industries to multinational companies and are zealously protecting local interests. They choose the countries or regions with which they want to do business, pick the sectors in which they will allow capital investment, and select the local, often state-owned, companies they wish to promote. That's a very different flavour of globalization: slow-moving, selective, and with a heavy dash of nationalism and regionalism.

Several factors have contributed to this trend. One, many governments find it risky to continue opening industries to foreign competition, because local companies and consumers often attempt to block new entrants. Two, some countries have built large foreign exchange reserves and boosted exports, so they are no longer trying to attract large amounts of foreign investment. Three, governments are defining national security more broadly. As financial instability, cyber espionage, and increases in food prices, for instance, become global issues, the financial services, information technology, telecommunications, and food sectors have all been politicized.

Four, China, which will soon have the world's largest economy, now establishes, rather than follows, international business rules and norms. Socialism with Chinese characteristics is casting a long shadow over globalization. Finally, policy makers in developing countries are intervening to create uneven playing fields that give local players an advantage. The state perceives more and more sectors to be of strategic importance and deters foreign companies from entering them. Indeed, the rise of state capitalism in some of the world's most important emerging markets has shifted the tectonic plates...Globalization now comes with new costs and risks.

In globalization's heyday, strategic sectors – those in which governments take an active interest – and nonstrategic ones were easy to identify. Multinational companies could enter some industries, such as soft drinks, all over the world; other sectors, such as aircraft manufacturing, were off-limits. That's why Coca-Cola sells its products in more than 200 countries today, while Lockheed Martin generates 80% of its revenues from sales to the U.S. government and employs 95% of its workforce in the United States. In the new era of guarded globalization, however, any sector could prove to be strategic, depending on a government's attitudes and policies…

CEOs of multinationals must understand the ways in which governments in developing countries are redefining their interests and drawing up new policies to further them. At one extreme, sticking close to home may ensure lower political risk, but it could also mean ceding market share to global competitors. At the other extreme, pursuing a strategy without considering geopolitical dynamics could boost growth in the short term but heighten the risk that politics could fatally undermine business operations in the future.

To factor globalization's new risks into strategy, executives must ask two questions: Is our industry strategically important to the government of the country we wish to enter? Is our industry strategically important to our home government?

Visualizing the answers in a two-by-two matrix can help a company determine its position on the globalization landscape. Two "no" answers place a company in the upper-right quadrant, where a globalization strategy generates little friction at home or abroad (à la Coke). Two "yes" answers land it in the lower-left quadrant, where national security concerns dominate its industry (Lockheed Martin's reality)

Q20. Guarded globalisation doesn't involve the government being

a) **selective about business partners and business sectors.**

b) **favourable towards companies which promote local interests.**

c) sceptical about multinational companies willing to invest capital.

d) **lenient towards state-owned companies when it comes to quality assurance.**

Number of words and Explanatory notes for RC:

Number of words: 568

Option A: From the sentences 'Governments of developing nations have become wary of opening more industries to multinational companies and are zealously protecting local interests. ***They choose the countries or regions with which they want to do business, pick the sectors in which they will allow capital investment***, and select the local, often state-owned, companies they wish to promote', we can understand that governments are being selective about business partners and sectors. Option A is not the answer.
Option B: From 'Governments of developing nations have become wary of opening more industries to multinational companies and are zealously protecting local interests' we can understand that this choice reflects one of the policies adopted by governments – favouring local companies and interests. Hence, Option B is not the answer.
Option C: From '***Governments of developing nations have become wary*** of opening more industries to ***multinational companies***', we can understand that this choice does reflect one of the steps taken by governments. Hence, Option C is not the answer.
Option D: The para doesn't discuss quality assurance. Also, the selective approach of governments to protect local interests doesn't bring quality into the picture at any point of time. Hence, this choice is the right answer. Choice (D)

Q21. Which of the following is NOT a reason that has contributed to the trend of guarded globalization, according to the author of the passage?

a) **Countries with massive foreign exchange reserves don't need to attract investments.**

b) **The powers that be are ensuring preferential treatment towards local companies.**

c) China is using its heft to alter socialism-driven international business rules.

d) **National security has broadened to include more sectors.**

Number of words and Explanatory notes for RC:

Number of words: 568

Option A: From 'some countries have built ***large foreign exchange reserves and boosted exports***, so they are ***no longer trying*** to attract large amounts of foreign investment', we can understand that the fact that some countries have huge foreign reserves actually contributes to the lack of their willingness to pursue multinational companies. This has contributed to the trend of guarded globalisation. Hence, Option A is not the answer.

Option B: From 'policy makers in developing countries are intervening ***to create uneven playing fields that give local players an advantage***', we can understand that policy-makers are indeed preferring local companies and that, in turn, has contributed to the trend of guarded globalisation. Hence, Option B is not the answer.

Option C: From the sentence 'China, which will soon have the world's largest economy, now establishes, rather than follows, international business rules and norms. Socialism with Chinese characteristics is casting a long shadow over globalization', it can be understood that China is contributing to the trend of guarded globalisation. But, that is not in a way mentioned in this choice. China is propagating its brand of socialism. That is not the same as altering ***socialism-driven international business rules***. Hence, Option C is the answer.

Option D: From 'governments are defining ***national security more broadly***. As financial instability, cyber espionage, and increases in food prices, for instance, become global issues, the financial services, information technology, telecommunications, and food sectors ***have all been politicized***', we can infer that more sectors brought under the ambit of national security which is being politicized is one of the contributing factors to the trend of guarded globalisation. Hence, Option D is not the answer.

Choice (C)

Q22. A company is most vulnerable to the risk of globalisation if it is a part of the industry which is

a) **strategically important to its home government as well as to the country it wishes to enter.**

b) **strategically important to the country it wishes to enter.**

c) strategically important to the home government.

d) **strategically unimportant to the home government as well as to the country it wishes to enter.**

Number of words and Explanatory notes for RC:

Number of words: 568

A country's vulnerability can be understood from the following questions: To factor globalization's new risks into strategy, executives must ask two questions: ***Is our industry strategically important to the government of the country we wish to enter? Is our industry strategically important to our home government***? If both the answers are yes, then the risk of globalisation is highest.
Option A: This choice represents a 'Yes' to both the questions. Hence, such a company is most vulnerable. Option A is the answer.
Option B: This choice represents 'Yes' to the first question, while we do not have information about the second. Hence, Option B is not the answer.
Option C: This choice represents 'Yes' only to the second question, while we do not have information about the answer to the first. Hence, Option C is not the answer.
Option D: This choice represents 'No' to both the questions, which according to the passage generates little friction. Hence, such a company will be least vulnerable.

Choice (A)

Q23. Coca-Cola can sell its products in more countries than Lockheed Martin does because:

a) **multinational companies have far more freedom than companies predominantly based in one country.**

b) **Coca-Cola is in the non-strategic sector, whereas Lockheed Martin is in a strategic sector.**

c) a majority of Lockheed Martin's employees are in the United States.

d) **Coca-Cola's globalisation strategy wouldn't meet as much opposition abroad as it does at home.**

Number of words and Explanatory notes for RC:

Number of words: 568

The answer can be found in the following sentences: ***Multinational companies could enter some industries, such as soft drinks, all over the world; other sectors, such as aircraft manufacturing, were off-limits***. That's why Coca-Cola sells its products in more than 200 countries today, while Lockheed Martin generates 80% of its revenues from sales to the U.S. government and employs 95% of its workforce in the United States.
'Two "no" answers place a company in the upper-right quadrant, ***where a globalization strategy generates little friction at home or abroad (à la Coke)***'
This indicates that Coca-Cola doesn't represent a strategic sector, whereas Lockheed Martin does.
Option A: The freedom of companies based in one country or multiple countries is irrelevant to the discussion here. Coca-Cola is not more or less free than Lockheed Martin. It has more to do with its not being of strategic importance, compared to Lockheed Martin. Hence, Option A is not the answer.
Option B: This choice correctly represents the reason behind Coca Cola's expanding to 200 countries. It is not in the strategic sector. Lockheed Martin is strategic to its government, and hence, would be vulnerable to guarded globalisation. 'Two "yes" answers land it in the lower-left quadrant, where national security concerns dominate its industry (Lockheed Martin's reality).' Hence, Option B is the answer.
Option C: The number of employees hasn't been discussed as a parameter as far as countries expanding outside and going global is concerned. Hence, Option C is not the answer.
Option D: Nothing has been discussed about opposition to Coca-Cola's strategies at home. Coca Cola can manage to expand because it is not of strategic importance to its government. Hence, Option D is not the answer. Choice (B)

Q24. The author's primary argument about guarded globalisation is that:

a) **global recession resulted in the increasing popularity of guarded globalisation.**

b) **governments of developing countries are promoting local companies, while being selective about the sectors open to multinational companies.**

c) guarded globalisation makes all multinational companies extremely vulnerable.

d) **guarded globalisation leads to the politicisation of national security concerns.**

Number of words and Explanatory notes for RC:

Number of words: 568

Option A: Until 2008 going global seemed to make sense for just about every company in the world…***In the aftermath of the recent global recession, we've entered a different phase, …[called], guarded globalization.*** From this sentence, we can understand that the phenomenon of guarded globalisation started in the aftermath of recession. However, it cannot be ascertained that recession was the cause. Hence, Option A is not apt.

Option B: Consider the sentences: 'In the aftermath of the recent global recession, we've entered a different phase, …[called], ***guarded globalization. Governments of developing nations have become wary of opening more industries to multinational companies and are zealously protecting local interests***. They choose the countries or regions with which they want to do business, pick the sectors in which they will allow capital investment, and ***select the local, often state-owned, companies they wish to promote. That's a very different flavour of globalization: slow-moving, selective, and with a heavy dash of nationalism and regionalism***.' From this it is clear that the author's main intention is to chart the rise of guarded globalisation – governments of developing countries are promoting local companies, while being selective about the sectors open to multinational companies. Hence, Option B is an apt choice.

Option C: While guarded globalisation does affect some multinational companies, it depends on whether they are strategic to their nation or not. Companies like Coco Cola, for example, aren't vulnerable to the risk of guarded globalisation. Option C is not the answer.

Option D: This is a cause and effect fallacy. It is politicisation of sectors under national security concerns which has contributed to the trending of guarded globalisation, and not the other way around. Hence, Option D is not the answer. Choice (B)

VERBAL ABILITY

Q25. DIRECTIONS *for question 25*: 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. When you dissolve the material at a high temperature and then cool the solution, the material sometimes doesn't crystallize out because the molecules don't know how.
2. This can occur because the saturation point becomes higher as the temperature of the solution is increased.
3. They require something to get them started, a seed crystal, or a grain of dust or even a sudden scratch or tap on the surrounding glass.

4. A supersaturated solution is one in which the saturation point, at which no more material will dissolve, has been exceeded.

Sentence 1: Sentence 1 provides details of a process.
Sentence 2: Sentence 2 has the demonstrative pronoun 'this'. It also has a reference to the term 'saturation point'.
Sentence 3: Sentence 3 has a reference to another demonstrative pronoun 'they'.
Sentence 4: Sentence 4 explains what a supersaturated solution is, referring to the 'saturation point'.
On a careful reading of the sentences, it can be observed that sentence 4 is a general sentence that begins the paragraph. It defines what a supersaturated solution is. Sentences 4 and 2 form a logical block. "saturation point has been exceeded" in sentence 4 links with "saturation point becomes higher" in sentence 2. So sentence 2 follows sentence 4.
Sentences 2 and 1 form another logical block. "When you dissolve the material at a high temperature" in sentence 1 links with "as the temperature of the solution is increased" in sentence 2. Also "When you dissolve the material at a high temperature" in sentence 1 follows from "at which no more material will dissolve i.e. saturation point" given earlier in sentence 4. Sentence 1 follows sentence 2. So, 421. Sentence 1 is followed by sentence 3 which concludes the para. The pronoun 'they' in sentence 3 links with "molecules" in sentence 1. Also "They require something to get them started" in sentence 3 links with "the molecules don't know how (to crystallize out)" in sentence 1. "a seed crystal, or a grain of dust or even a sudden scratch or tap on the surrounding glass" in sentence 3 points to "crystallize out" in sentence 1. Hence, 4213.
Ans: (4213)

Q26. DIRECTIONS *for question 26*: 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. Earlier this year, it gained three of the four spots in an annual ranking of Arab universities by *Times Higher Education*, a British weekly magazine.
2. Nor does it have Egypt's long history of scholarship, with the likes of the Al Azhar university, which has been going since the tenth century.
3. It may not be quite the country for the usual university experience: moving out of home; experimenting; dating.
4. The kingdom rarely pulls things off as well as, let alone better than, its more savvy fellow Gulf states.
5. But Saudi Arabia is gaining an unlikely reputation for learning in the Middle East.

Sentence 1: Sentence 1 has the clue 'it' and a mention of its ranking among Arab universities.
Sentence 2: Sentence 2 has the conjunction 'nor'.
Sentence 3: Sentence 3 sounds like a good way of introducing the para even though the name of the country is not mentioned.
Sentence 4: Sentence 4 has the reference to 'the kingdom'.
Sentence 5: Sentence 5 has the conjunction 'but' and the name of the country: Saudi Arabia.
On a careful reading of the sentences, it can be observed that sentence 3 is a general sentence that can begin the para. Sentence 5 has the name of the country but it is preceded by 'but'. So sentence 5 cannot begin the paragraph. Sentence 3 is followed by sentence 2. "may not be quite the country" in sentence 3 links with "Nor does it have" in sentence 2. Also "usual university experience: moving out of home; experimenting; dating" in sentence 3 is parallel to " scholarship, with the likes of the Al Azhar university" in sentence 2. Sentence 2 is followed by sentence 5. The pronoun "it" in sentences 3 and 2 point to the noun "Saudi Arabia" in sentence 5. "But .... gaining an unlikely reputation for learning" in sentence 5 contrasts "may not be quite the country ..... nor does it have" in sentences 3 and 2 respectively. Sentences 5 and 1 form a mandatory pair. "it gained three of the four spots in an annual ranking" in sentence 1 links with "Saudi Arabia is gaining an unlikely reputation" in sentence 5. So, 3251. Sentence 4 is the odd sentence out. "The kingdom rarely pulls things off as well as, let alone better than" puts Saudi Arabia in a negative light. "to pull things off" is an idiom which means "to succeed in doing something difficult or unexpected". This sentence can be a part of another para. Ans: (4)

Q27. DIRECTIONS *for question 27*: The paragraph given below is followed by four summaries. Choose the option that best captures the essence of the paragraph.
Previous studies, focussing on the difference in behaviors, cognitive function, and personality traits between 'only children' and 'those with siblings', had shown that 'only children' tend to exhibit more positive developmental outcomes, such as higher intelligence and creativity. However, the sole attention of parents, and grandparents to an extent, resulted in what they called "undesirable" personality traits: dependency, selfishness, and social ineptitude. 'Only children' miss out on early opportunities to practice social skills and empathy. A new study in China has shown that the 'only children' who performed higher on creativity showed a higher volume of grey matter in the parietal lobe, a part of the brain associated with mental flexibility and imagination. The scans of those 'only children' who showed less agreeable traits showed less grey matter in the medial prefrontal cortex, a part of the brain known to be involved in thinking about the self in relation to others.

a) **A new study has found that all children who grow up without siblings and who are branded selfish and socially inept are likely to have different brain structures than those who**

have siblings, as seen in the grey matter compositions of the parietal lobes and the medial prefrontal cortices.

b) **Corroborating previous findings, a new study has shown that Chinese 'only children' outperformed those with siblings on creativity but consistently scored lower on 'agreeable' personality traits.**

c) While previous studies have focussed on behavioural, cognitive and personality differences between those with and without siblings, a new study has found that parts of the brain associated with the development of agreeable personality traits were indeed structurally different in the two populations.

d) **While prior studies have revolved around psychological differences between 'only children' and 'those with siblings', a new study has shown that 'only children', who were more creative, showed a higher volume of grey matter in the parietal lobe, while those who displayed less agreeable social traits had lesser grey matter in the medial prefrontal cortex.**

Option A: Choice A, though partly true, does not substantiate on what the differences in the brain structure of 'only children' and 'those with siblings' are. Choice A is incomplete as a summary. Further the para mentions that "only children **tend to exhibit** more positive developmental outcomes, such as higher intelligence and creativity". The finding of the new study is relevant to the 'only children' who performed higher on creativity ... and those only children who showed less agreeable traits.... So "**all** children who grow up without siblings" in choice A is farfetched.
Option B: The new study does not just corroborate previous findings. The new study cites some new results in brain structure. The second part of choice B is incorrectly mentioned as the findings of the new study but the mentioned results are, in fact, those of previous studies. Also, the para says "A new study in China has shown that ....". So, "a new study has shown that **Chinese 'only children'** ...." as given in choice B would be too specific. Choice B is a distortion of information presented in the para and is also incomplete.
Option C: The first part of choice C is correct. The second part does not elaborate on what the brain structural differences in the relevant groups of children are. Choice C is not the answer. Choice C omits the word 'children' which is an important part of the discussion.
Option D: Choice D correctly summarizes the contents of the para. A new study has shown that 'only children', who were more creative and displayed less agreeable social traits, showed a higher volume of grey matter in the parietal lobe, known to influence imagination, but lesser grey matter in the medial prefrontal cortex, known to influence the self-other relationship. Choice (D)

Q28. DIRECTIONS *for question 28*: 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. Yet, intermarriage between African-Americans and other ethnicities is much less common than between different white ethnicities, or between white and Asian ethnicities.
2. The "melting pot" metaphor implies both a melting of cultures and intermarriage of ethnicities, yet cultural assimilation or acculturation can also occur without intermarriage.
3. In *The Melting Pot* (1908), Israel Zangwill combined a romantic denouement with a utopian celebration of complete cultural intermixing.
4. Thus African-Americans are fully culturally integrated into American culture and institutions.
5. In terms of immigrants to the United States, the "melting pot" process has been equated with Americanization, that is, cultural assimilation and acculturation.

Sentence 1: Sentence 1 has the contrast marker 'yet' and the clue word 'much less common'.
Sentence 2: Sentence 2 mentions the implication of the "melting pot" metaphor.
Sentence 3: Sentence 3 has the reference to Israel Zangwill's creation "The Melting Pot".
Sentence 4: Sentence 4 has the conclusion marker 'thus'.
Sentence 5: Sentence 5 relates "melting pot" with Americanization. Note the importance of "that is" which explains what Americanization is.
Sentences 4 and 1 have a reference to "African-Americans". Note that sentences 2 and 4 form a logical block. "metaphor implies both a melting of cultures and intermarriage of ethnicities" in sentence 2 is exemplified by "African-Americans are fully culturally integrated into American culture and institutions" in sentence 4. Sentences 4 and 1 form a mandatory pair. "African-Americans are fully culturally integrated" in sentence 4 is parallel to "intermarriage between African-Americans and other ethnicities" in sentence 1. "Yet, intermarriage between African-Americans and other ethnicities is much less common" in sentence 1 contrasts "African-Americans are fully culturally integrated" in sentence 4 and exemplifies "cultural assimilation or acculturation can also occur without intermarriage" given earlier in sentence 2. So sentences 2, 4 and 1 flow in a logical order. Sentence 5 which explains what Americanization is (that is, cultural assimilation and acculturation) has to precede sentence 2. Sentence 5 (cultural assimilation and acculturation) comes before sentence 2 (cultural assimilation or acculturation can also occur ...). So, 5241.
Sentence 3 does not refer to the melting pot of Americanized cultures and is the odd sentence out. It runs tangent to the topic of discussion explaining what Israel Zangwill's work is all about. Ans: (3)

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. They thought the first mind sparked awake sometime after we split from chimps and bonobos.
2. In the West, consciousness was long thought to be a divine gift bestowed solely on humans.
3. Even after Darwin demonstrated our kinship with animals, many scientists believed that the evolution of consciousness was a recent event.
4. Western philosophers historically conceived of nonhuman animals as unfeeling automatons.

Sentence 1 is a dependent statement that uses 'they' to indicate some group of people.
Sentence 2 is an independent sentence that talks about the general impression about consciousness.
Sentence 3 is also an independent sentence that talks about the general belief of several scientists.
Sentence 4 talks about Western philosophers and their conception about consciousness.
'They' in Sentence 1 needs a plural noun which could be 'scientists' in Sentence 3 or 'Western philosophers' in Sentence 4. However, Sentence 2 introduces the West, which means that it is a bigger idea than Western philosophers. Also, 'consciousness was a recent event' indicates time which is further elaborated in sentence 1 – 'the first mind sparked awake sometime after we split from chimps and bonobos.'
So, 31 is a couple and 24 is another, because of the connect between 'divine gift bestowed solely on humans' and 'unfeeling automatons'.
Now 24 is an upstream argument compared to 31 because 3 starts with 'even after' which is a connection to what was the perceived, but wrong, assumption about consciousness. Ans: (2431)

Q30. DIRECTIONS *for question 30*: The passage given below is followed by four summaries. Choose the option that best captures the author's position.
There is little controversy among economists that growth is essential for poverty reduction under the assumption that the distribution of income remains more or less constant. In fact, much evidence points in this direction. Likewise, much evidence suggests that a worsening of the distribution tends to increase poverty. Yet, the real issue in establishing a development strategy is whether growth and distribution are independent of each other or, strongly inter-related. Is it the case, for instance, that faster growth tends to reduce inequality or on the contrary, to increase it? Could too much inequality in a given country act to slow or, to accelerate growth?

a) **Growth cannot reduce poverty, unless distribution of income is consistent.**

b) **Too much inequality can sometimes affect growth and thereby, increase poverty.**

c) **It is not known whether growth and distribution can together reduce poverty.**

d)

Understanding the relationship between growth and distribution of income helps in formulating a better development strategy.

The para predominantly comprises two parts: the part that talks about how growth affects poverty and how distribution of income needs to be constant to tackle poverty. The second more important aspect is that ***the relation between growth and distribution isn't known***, which affects ***the development of proper strategies***. This part is what represents the essence of the para.
Option A: This option seems to be derived from the lines 'growth is essential for poverty reduction under the assumption that the distribution of income remains more or less constant.' Growth is essential to reduce poverty, considering distribution is constant. This cannot be equated to 'growth cannot reduce poverty ***unless*** distribution is constant. 'If distribution is considered constant' there is a relationship between growth and poverty. Distribution may not be constant. That doesn't mean that growth cannot reduce poverty. That only means, in that scenario, we need to figure out the relation between the distribution of income and growth (second para) to determine how poverty can be reduced. Hence, Option A is not the answer.
Option B: Could too much inequality in a given country act to slow or, to accelerate growth? This question in the para clearly states we do not know whether inequality can accelerate growth in the first place. So, concluding the same is incorrect. Hence, Option B is not the answer.
Option C: The para talks about growth and distribution being parameters in order to determine a course for poverty reduction. Hence, we cannot really state that together they cannot reduce poverty. In fact, growth and constant distribution of income can help in reducing poverty. Hence, Option C is not the answer.
Option D: From 'Yet, the real issue in establishing a development strategy is whether growth and distribution are independent of each other or, strongly inter-related' we can understand that the main issue in the para is about whether we can use the two parameters – growth and distribution – to draw up a better development strategy. This cannot be done at the moment because we do not know if the parameters are related or not. Hence, Option D is the answer. Choice (D)

Q31. DIRECTIONS *for question 31*: 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. So, the government incentivized Wall Street to step in.
2. Few Americans were in a buying mood, and for those who were, mortgages were harder to come by than they had been before the crash.

3. But who would fill the foreclosed homes?
4. In early 2012, it launched a pilot program that allowed private investors to easily purchase foreclosed homes by the hundreds from the government agency Fannie Mae.

Sentence 1 starts with a positive conclusion indicator, So, the sentence itself is positive thanks to the expression 'step in'.
Sentence 2 talks about the absence of a buying mood (few equates to 'almost none').
Sentence 3 starts with a contrast indicator But and asks a question around the keyword 'foreclosed homes'.
Sentence 4 is a dependent sentence where 'it' launched a program to buy foreclosed homes.
Sentence 3 should come before Sentence 2, since 2 tends to explain why no one is interested in filling these empty homes (hence, it cannot come before the 'but').
1 should follow 3 and 2 as it starts with So, and therefore gives us a reason as to why the government should incentivize Wall Street to step in. This expression is used only when something negative needs an intervention. It is also a solution.
Sentence 4 has 'it' and the only singular entity spoken about is the government. So, 4 follows 1. The correct answer is 3214. Ans: (3214)

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. The variations extend across many regions of the brain, including those that govern such essential cognitive functions as memory and the interpretation of visual and auditory stimuli.
2. We have to teach our minds how to translate the symbolic characters we see into the language we understand.
3. Experiments demonstrate that readers of ideograms, such as the Chinese, develop a mental circuitry for reading, that is very different from the circuitry found in those of us whose written language employs an alphabet.
4. We can expect as well that the circuits woven by our use of the internet will be different from those woven by our reading of books and other printed works.
5. And the media or other technologies we use in learning and practicing the craft of reading play an important part in shaping the neural circuits inside our brains.

If we look for keyword connections, Sentence 1 and Sentence 3 are connected. 3 talks about differences in mental circuitry. 1 talks about variations and how far do they extend. So, these two statements are dependent on each other. These two sentences establish the formation of mental circuitry.
Sentence 2 and Sentence 5 are both about learning, one talking about teaching our minds and another talking about the tools we use to learn or teach our minds. These two sentences talk about the voluntary creation of circuitry.
Sentence 4 on the other hand talks about the difference of circuits when we learn from the internet and when we read from books. That isn't coherent with the rest of the idea. Although it is connected, it is the least connected of the five. Ans: (4)

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. Picasso, in painting The Three Dancers in 1925, consciously restated the violence and ecstasy of the Demoiselles.
2. He saw surrealism in quotation marks, comprehending that it was both perceptive and naive.
3. And then he went farther.
4. He did not so much join surrealism as learn from its interpretation of his art.

Sentence 1 is an independent sentence talking about Picasso (referred to by the personal pronoun 'he' in the remaining three sentences).
Sentence 2 is about Picasso and surrealism and how he perceived it.
Sentence 3 starts with a positive connector 'and' and talks about a superlative degree – farther. So, some step has previously been taken. Also, Sentence 3 needs to be followed by another action, to explain what he did by going farther, or rather, how he went farther.
Sentence 4 once again talks about the connect between Picasso's art and surrealism.
2 and 4 are both about Picasso and his surrealism. Sentence 3 needs to come in between two sentences on a similar subject. Hence, 432 should be a block. It cannot be 234 because 2 talks about how he saw surrealism in quotation marks, something that fits with Picasso going farther than he already has. Sentence 1 obviously has to be the first sentence as the only one mentioning the name. The other clue is in sentence 4 which says, he learnt from its(surrealism) interpretation of his art (an example of which was referred to in the first sentence (The Three Dancers).
The correct answer is 1432. 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.
The way you become original is through imitation to some degree. When starting out as a creator, your work is likely going to largely reflect the ideas of your influences. That's how you find your

voice. The more you make things, the more your voice will become a collection of those influences and start to feel unique. When that happens, you'll rely less on the inputs you're getting from your influences and more on your own original thoughts. Sure, maybe something one of your influences did will be the inspiration for a creative project, but you'll be able to expand on it much more so than you used to. You'll have gotten some more world experience and have developed more of a unique point of view. Hopefully, you will have been able to build up your following as well so that your audience will have adapted to your voice and bought into your originality.

a) **One cannot create something that is entirely original and doesn't have even a little bit of another's creation.**

b) **One can evolve, from reflecting the ideas of influences to developing a unique point of view based on a collection of those ideas, by creating more.**

c) **One can evolve to develop a unique voice that is totally different from the voices of the influences one has been inspired by.**

d) **One can develop a unique voice only by gaining world experience which gives one a unique point of view.**

Option A: The para talks about imitation that eventually leads to originality. However, the para doesn't talk about the impossibility of creating something purely original. The author talks about how one is influenced by several voices and develops a unique voice. That doesn't mean one has to copy in order to create something. Also, this choice reflects the difference between taking something metaphorical (being influenced by a work of art doesn't literally mean copying something) and taking something literally. Hence, Option A is not the answer.
Option B: Only by creating more can one move from one phase to another according to 'The more you make things, the more your voice will become a collection of those influences and start to feel unique'. This choice reflects all the central ideas of the para – imitation, being influenced from other ideas and development of a unique voice.
Option C: The para doesn't really indicate that the unique voice is totally different from the influences. In fact, the para clearly states that even a unique voice is inspired from collection of influences. Only how much an individual depends on that collection reduces. Hence, Option C is not the answer.
Option D: A creator over a period of time, gains world experience which further enhances the uniqueness of the voice of the creation. However, it is refinement of a voice. The para doesn't suggest one has to gain world experience, and only then can one gain a unique voice. Hence, Option D is not the answer. Choice (B)

SECTION 2 : LRDI

SET A : LR

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

125 small, identical and unpainted cubes are arranged to form a large cube. All the six faces of the large cube are painted green. Now a 3 × 3 × 3 cube, comprising 27 small cubes, is removed out of one of the corners of the large cube. This 3 × 3 × 3 cube is now painted blue on all six faces, while all the three surfaces of the large cube exposed due to the removal of the 3 × 3 × 3 cube are painted black. Then, the 3 × 3 × 3 cube is put back in its original position in the large cube and the large cube is finally painted yellow on all six faces.

Q1. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
What is the number of small cubes with exactly three faces painted?

a) **16**

b) **18**

c) **19**

d) **15**

Cubes with three faces painted would be the ones at the corners. Now since there are two cubes the total number of small cubes with three faces painted would be 8 + 7 = 15 (as one corner is common to both the cubes). Also, there would be three small cubes along the three edges of the large cube from where the 3 × 3 cube was initially removed which will also have three faces painted.
∴ Total number of small cubes with three faces painted = 15 + 3 = 18.

Choice (B)

Q2. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
What is the number of small cubes with exactly one face painted?

a) **36**

b) **60**

c) **45** ✗ **Your answer is incorrect**

d) **48**

In the normal 5 × 5 cube, the number of small cubes with one face painted = 9 × 6 = 54.
Here three of the faces are not affected by the removal of the 3 × 3 cube and the subsequent repainting.
∴ Number of smaller cubes with just one face painted for these three faces = 9 × 3 = 27.
Now, there would be one small cube on each face of the 3 × 3 cube with just one face painted, i.e. a total of 6 small cubes.
On the larger cube on the three faces which are affected by the removal of the 3 × 3 cube, there would now be only one cube on each of these faces with just one face painted. Also, on the large cube, on the surfaces which are newly exposed due to the removal of the 3 × 3 cube, which were painted with black colour, there will be 4 small cubes on each of the three surfaces which have only one face painted.
∴ Total number of small cubes with just one face painted = 27 + 3 + 6 + 12 = 48.

Choice (D)

Q3. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
What is the number of small cubes with no face painted?

a) **1** ✗ **Your answer is incorrect**

b) **8**

c) **10**

d) **12**

In the initial $5 \times 5 \times 5$ cube, there will be a core of $3 \times 3 \times 3 = 27$ cubes that have no face painted. However, when a $3 \times 3 \times 3$ cube is taken out of one of the corners then a $2 \times 2 \times 2$ position of the earlier unpainted block (of $3 \times 3 \times 3$) is removed. Hence, there are 8 less unpainted cubes. Also, on each of the three exposed faces, 4 unpainted cubes get painted in black. Hence another 12 unpainted faces less. Now there are $27 - (8 + 12) = 7$ cubes in the large cube which would have no face painted. Also, there will be one small cube in the 3×3 cube with no face painted.
Hence, a total of $1 + 7 = 8$ unpainted faces will be there. Choice (B)

Q4. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
What is the number of small cubes that have exactly one face painted Black and exactly one face painted Yellow?

a) **12**

b) **20** ✗ **Your answer is incorrect**

c) **15**

d) **18**

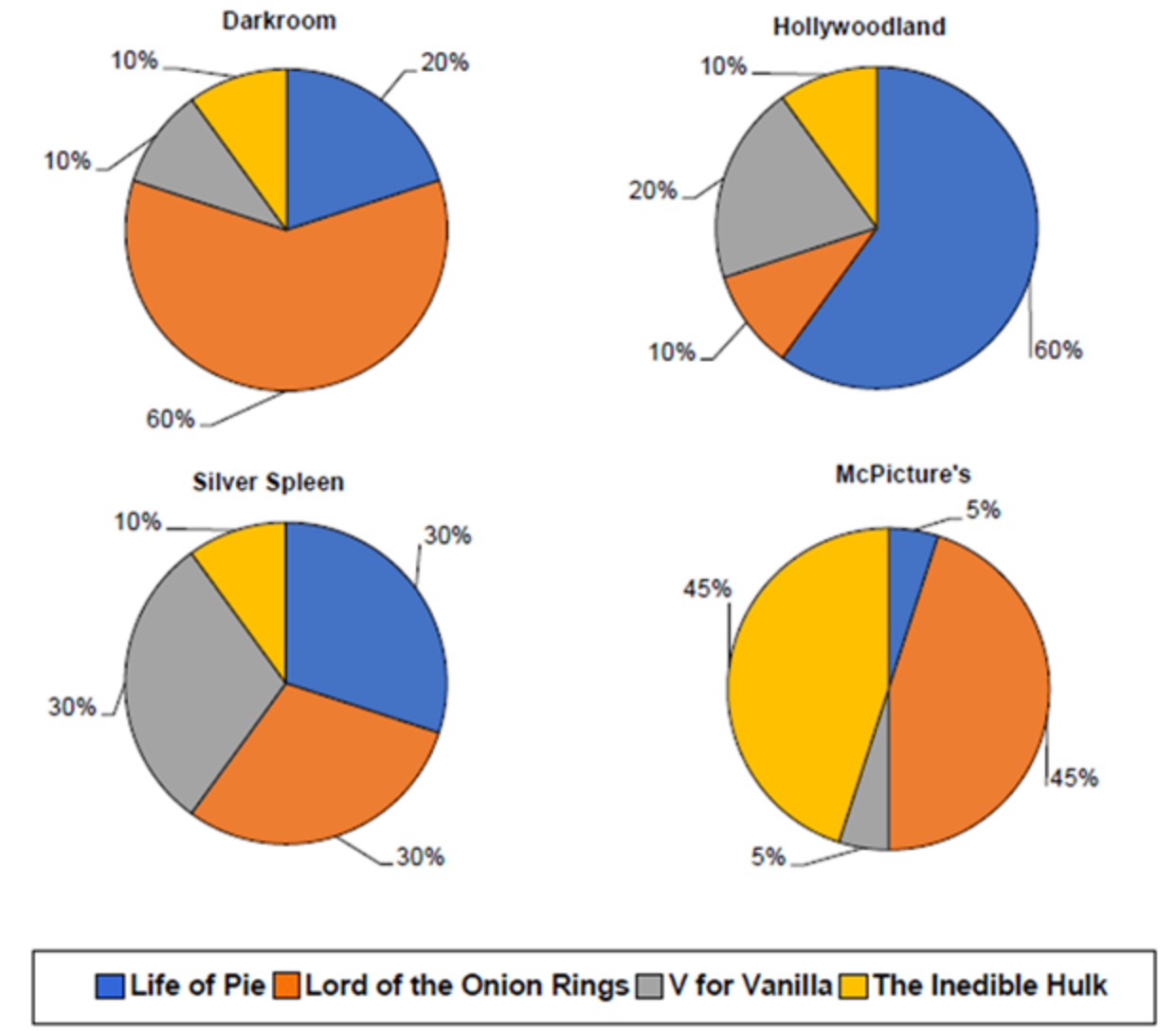
The cubes that were exposed when the $3 \times 3 \times 3$ cube was removed were painted black. All of these cubes that are along the outside border will satisfy the required condition. There will be 27 cubes (from 3 faces) that get exactly one face painted in black. Of these, on each face there will be 4 cubes (i.e., interior ones) that will not have any face painted yellow.
Further, among these 27 cubes there will be three corner cubes which will have exactly two faces painted yellow. All the remaining cubes out of the 27 will have exactly one face painted black and exactly one face painted yellow.
Hence, $27 - (4 \times 3) - 3 = 12$. Choice (A)

SET 2 : DI

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

In a village called Rawalpudi, there are exactly four movie theatres – Darkroom, Hollywoodland, Silver Spleen and McPicture's. Any movie released in that village is screened in all the four theatres, but in only one theatre at a time. For any movie, the number of people who watch it in a theatre is always the highest for the first theatre that screens the movie, the second highest for the second theatre that screens the movie, the third highest for the third theatre that screens the movie and the lowest for the last theatre that screens the movie.

In a particular month, four movies – Life of Pie, Lord of the Onion Rings, V for Vanilla and The Inedible Hulk – were screened in the four theatres. The following pie charts present, for each theatre, the percentage breakup, by movie, of the total number of people who watched the four movies in that theatre:



Further, it is also known that

i. each of the four movies was first screened in a different theater.
ii. two of the movies were both screened the last in the same theater, while the other two movies were both screened the last in another theater.
iii. Darkroom was not the third theatre to screen any of the four movies.

Q5. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
Which movie was first screened in Silver Spleen?

a) **Life of Pie**

b) **Lord of the Onion Rings**

c) **V for Vanilla**

d) **The Inedible Hulk**

Let D, H, S and M represent the four theatres. Let d, h, s and m represent the total number of people who watched the four movies in that theatre respectively.

If Life of Pie played in D first, then 0.2d > 0.6h. Then for Lord of the Onion Rings, 0.6d will be greater than 0.1b. Similarly, for other movies also, the number of people who watched in D will be greater than the number of people who watched the movie in H. Hence, Life of Pie must have been shown in D only after H. Similarly, Life of Pie must have been shown in S only after H.

If Life of Pie played first in M, then 0.05m > 0.6h. This would imply that for all the movies, the number of people who watched that movie in M will be greater than the number of people who watched it in H. Hence, between M and H, the movie must have been played first in H.

Therefore, Life of Pie must have been played first in H.
For Lord of the Onion Rings, if 0.1h > 0.6d, then for the other three movies also, the number of people who watched that movie in H will be greater than the number of people who watched it in D. Hence, this movie must have been played in H only after it was played in D. Similarly, we can conclude that this movie must have been played in S only after it was played in D. Between M and D, we cannot conclude in which theatre it was played first.

Following the same reasoning, we can conclude that V for Vanilla must have been played in D and M only after S. We cannot conclude the same for H. However, since Life of Pie is already played first in H, this movie must have been played first in S.

The Inedible Hulk must have been played first in M. Hence, The Lord of the Onion Rings must have been played first in D.
Also, if Life of Pie is played last in D, 0.05m must be greater than 0.2d $\Rightarrow$ 0.45m will be greater than 0.6d. But this will mean that M must have played Lord of the onion rings first which is a contradiction. Hence, Life of Pie must have played in D before M. Similarly, between M and S, the movie must have played in S before M. Hence, Life of Pie must have played last in M.

If V for Vanilla played last in D, 0.05m must be greater than 0.1d $\Rightarrow$ 0.45m will be greater than 0.6d. This will contradict the first theatre in which Lord of the Onion Rings is played. Hence, V for Vanilla must have been played in D before M. The last theatre in which V for Vanilla will be played can be either M or H.

The Inedible Hulk must have played in D before H (since V for Vanilla played in D before H $\Rightarrow$ 0.1d > 0.2h $\Rightarrow$ 0.1d > 0.1h). The last theatre in which The Incredible Hulk must have been played can be H or S. From (ii), this has to be H. Also, V for Vanilla would have been played last in M from (ii).

From (iii), Darkroom must have played Life of Pie, V for Vanilla and The Inedible Hulk second.
The following table presents the order in which the movies were shown in the theatres:

Life of Pie	Hollywoodland	Darkroom	Silver Spleen	McPicture's
Lord of the Onion Rings	Darkroom	McPicture's/ Silver Spleen	Silver Spleen/ McPicture's	Hollywoodland
V for Vanilla	Silver Spleen	Darkroom	Hollywoodland	McPicture's
The Inedible Hulk	McPicture's	Darkroom	Silver Spleen	Hollywoodland

V for Vanilla was first played in Silver Spleen. Choice (C)

Q6. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
Lord of the Onion Rings was first screened in which of the following theaters?

a) **Darkroom**

b) **Hollywoodland**

c) **McPicture's**

d) **Cannot be determined**

Let D, H, S and M represent the four theatres. Let d, h, s and m represent the total number of people who watched the four movies in that theatre respectively.

If Life of Pie played in D first, then $0.2d > 0.6h$. Then for Lord of the Onion Rings, 0.6d will be greater than 0.1b. Similarly, for other movies also, the number of people who watched in D will be greater than the number of people who watched the movie in H. Hence, Life of Pie must have been shown in D only after H. Similarly, Life of Pie must have been shown in S only after H.

If Life of Pie played first in M, then $0.05m > 0.6h$. This would imply that for all the movies, the number of people who watched that movie in M will be greater than the number of people who watched it in H. Hence, between M and H, the movie must have been played first in H.

Therefore, Life of Pie must have been played first in H.
For Lord of the Onion Rings, if $0.1h > 0.6d$, then for the other three movies also, the number of people who watched that movie in H will be greater than the number of people who watched it in D. Hence, this movie must have been played in H only after it was played in D. Similarly, we can conclude that this movie must have been played in S only after it was played in D. Between M and D, we cannot conclude in which theatre it was played first.

Following the same reasoning, we can conclude that V for Vanilla must have been played in D and M only after S. We cannot conclude the same for H. However, since Life of Pie is already played first in H, this movie must have been played first in S.

The Inedible Hulk must have been played first in M. Hence, The Lord of the Onion Rings must have been played first in D.
Also, if Life of Pie is played last in D, $0.05m$ must be greater than $0.2d \Rightarrow 0.45m$ will be greater than 0.6d. But this will mean that M must have played Lord of the onion rings first which is a contradiction. Hence, Life of Pie must have played in D before M. Similarly, between M and S, the movie must have played in S before M. Hence, Life of Pie must have played last in M.

If V for Vanilla played last in D, $0.05m$ must be greater than $0.1d \Rightarrow 0.45m$ will be greater than 0.6d. This will contradict the first theatre in which Lord of the Onion Rings is played. Hence, V for Vanilla must have been played in D before M. The last theatre in which V for Vanilla will be played can be either M or H.

The Inedible Hulk must have played in D before H (since V for Vanilla played in D before H $\Rightarrow 0.1d > 0.2h \Rightarrow 0.1d > 0.1h$). The last theatre in which The Incredible Hulk must have been played can be H or S. From (ii), this has to be H. Also, V for Vanilla would have been played last in M from (ii).

From (iii), Darkroom must have played Life of Pie, V for Vanilla and The Inedible Hulk second.
The following table presents the order in which the movies were shown in the theatres:

Life of Pie	Hollywoodland	Darkroom	Silver Spleen	McPicture's
Lord of the Onion Rings	Darkroom	McPicture's/ Silver Spleen	Silver Spleen/ McPicture's	Hollywoodland
V for Vanilla	Silver Spleen	Darkroom	Hollywoodland	McPicture's
The Inedible Hulk	McPicture's	Darkroom	Silver Spleen	Hollywoodland

Lord of the Onion Rings was first screened in Darkroom. Choice (A)

Q7. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
If Darkroom, Hollywoodland and Silver Spleen charged the same price per ticket for all the movies, which of the three theaters would have had the highest revenue from the four movies put together?

a) **Darkroom**

b) **Hollywoodland**

c) **Silver Spleen**

d) **Data Insufficient**

Let D, H, S and M represent the four theatres. Let d, h, s and m represent the total number of people who watched the four movies in that theatre respectively.

If Life of Pie played in D first, then 0.2d > 0.6h. Then for Lord of the Onion Rings, 0.6d will be greater than 0.1b. Similarly, for other movies also, the number of people who watched in D will be greater than the number of people who watched the movie in H. Hence, Life of Pie must have been shown in D only after H. Similarly, Life of Pie must have been shown in S only after H.

If Life of Pie played first in M, then 0.05m > 0.6h. This would imply that for all the movies, the number of people who watched that movie in M will be greater than the number of people who watched it in H. Hence, between M and H, the movie must have been played first in H.

Therefore, Life of Pie must have been played first in H.
For Lord of the Onion Rings, if 0.1h > 0.6d, then for the other three movies also, the number of people who watched that movie in H will be greater than the number of people who watched it in D. Hence, this movie must have been played in H only after it was played in D. Similarly, we can conclude that this movie must have been played in S only after it was played in D. Between M and D, we cannot conclude in which theatre it was played first.

Following the same reasoning, we can conclude that V for Vanilla must have been played in D and M only after S. We cannot conclude the same for H. However, since Life of Pie is already played first in H, this movie must have been played first in S.

The Inedible Hulk must have been played first in M. Hence, The Lord of the Onion Rings must have been played first in D.
Also, if Life of Pie is played last in D, 0.05m must be greater than 0.2d $\Rightarrow$ 0.45m will be greater than 0.6d. But this will mean that M must have played Lord of the onion rings first which is a contradiction. Hence, Life of Pie must have played in D before M. Similarly, between M and S, the movie must have played in S before M. Hence, Life of Pie must have played last in M.

If V for Vanilla played last in D, 0.05m must be greater than 0.1d $\Rightarrow$ 0.45m will be greater than 0.6d. This will contradict the first theatre in which Lord of the Onion Rings is played. Hence, V for Vanilla must have been played in D before M. The last theatre in which V for Vanilla will be played can be either M or H.

The Inedible Hulk must have played in D before H (since V for Vanilla played in D before H $\Rightarrow$ 0.1d > 0.2h $\Rightarrow$ 0.1d > 0.1h). The last theatre in which The Incredible Hulk must have been played can be H or S. From (ii), this has to be H. Also, V for Vanilla would have been played last in M from (ii).

From (iii), Darkroom must have played Life of Pie, V for Vanilla and The Inedible Hulk second.
The following table presents the order in which the movies were shown in the theatres:

Life of Pie	Hollywoodland	Darkroom	Silver Spleen	McPicture's
Lord of the Onion Rings	Darkroom	McPicture's/ Silver Spleen	Silver Spleen/ McPicture's	Hollywoodland
V for Vanilla	Silver Spleen	Darkroom	Hollywoodland	McPicture's
The Inedible Hulk	McPicture's	Darkroom	Silver Spleen	Hollywoodland

The Inedible Hulk was first shown in Darkroom followed by Silver Spleen and Hollywoodland. Since for all the three theatre, 10% of the people watched that movie, we can say that the total number of people who watched all the four movies will be the highest in Darkroom. Between McPicture's and Darkroom, we cannot conclude. But from the given choices, the answer will be Darkroom. Choice (A)

Q8. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
If 540 people watched Lord of the Onion Rings in Darkroom, which of the following can be the number of people who watched V for Vanilla in McPicture's?

a) **5**

b) **50**

c) **80**

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

Let D, H, S and M represent the four theatres. Let d, h, s and m represent the total number of people who watched the four movies in that theatre respectively.

If Life of Pie played in D first, then 0.2d > 0.6h. Then for Lord of the Onion Rings, 0.6d will be greater than 0.1b. Similarly, for other movies also, the number of people who watched in D will be greater than the number of people who watched the movie in H. Hence, Life of Pie must have been shown in D only after H. Similarly, Life of Pie must have been shown in S only after H.

If Life of Pie played first in M, then 0.05m > 0.6h. This would imply that for all the movies, the number of people who watched that movie in M will be greater than the number of people who watched it in H. Hence, between M and H, the movie must have been played first in H.

Therefore, Life of Pie must have been played first in H.
For Lord of the Onion Rings, if 0.1h > 0.6d, then for the other three movies also, the number of people who watched that movie in H will be greater than the number of people who watched it in D. Hence, this movie must have been played in H only after it was played in D. Similarly, we can conclude that this movie must have been played in S only after it was played in D. Between M and D, we cannot conclude in which theatre it was played first.

Following the same reasoning, we can conclude that V for Vanilla must have been played in D and M only after S. We cannot conclude the same for H. However, since Life of Pie is already played first in H, this movie must have been played first in S.

The Inedible Hulk must have been played first in M. Hence, The Lord of the Onion Rings must have been played first in D.
Also, if Life of Pie is played last in D, 0.05m must be greater than 0.2d ⇒ 0.45m will be greater than 0.6d. But this will mean that M must have played Lord of the onion rings first which is a contradiction. Hence, Life of Pie must have played in D before M. Similarly, between M and S, the movie must have played in S before M. Hence, Life of Pie must have played last in M.

If V for Vanilla played last in D, 0.05m must be greater than 0.1d ⇒ 0.45m will be greater than 0.6d. This will contradict the first theatre in which Lord of the Onion Rings is played. Hence, V for Vanilla must have been played in D before M. The last theatre in which V for Vanilla will be played can be either M or H.

The Inedible Hulk must have played in D before H (since V for Vanilla played in D before H ⇒ 0.1d > 0.2h ⇒ 0.1d > 0.1h). The last theatre in which The Incredible Hulk must have been played can be H or S. From (ii), this has to be H. Also, V for Vanilla would have been played last in M from (ii).

From (iii), Darkroom must have played Life of Pie, V for Vanilla and The Inedible Hulk second.
The following table presents the order in which the movies were shown in the theatres:

Life of Pie	Hollywoodland	Darkroom	Silver Spleen	McPicture's
Lord of the Onion Rings	Darkroom	McPicture's/ Silver Spleen	Silver Spleen/ McPicture's	Hollywoodland
V for Vanilla	Silver Spleen	Darkroom	Hollywoodland	McPicture's
The Inedible Hulk	McPicture's	Darkroom	Silver Spleen	Hollywoodland

Given 0.6d = 540.
0.45m has to be less than 540 ⇒ m has to be less than 1200.
0.2d > 0.05m ⇒ m < 3600
0.45m has to be greater than 0.1d ⇒ m > 200
The number of people who watched V for Vanilla in McPicture's can be between 5% of 200 and 5% of 1200. Hence, the required number can be between 10 and 60.
From the options only option B satisfies. Choice (B)

SET 3:

DIRECTIONS *for questions 9 to 12:* Answer the questions on the basis of the information given below.

Paul, a school principal, has to select students from among Anil, Bhagat, Chandu, Deepak, Emran, Farah and Girish to represent the school in an upcoming inter-school competition. The following additional information is given regarding the selection of the students:

i. If Chandu is there in the team then Emran should not be there but Farah should be there in the team.
ii. Only if Anil is not there in the team, Bhagat is there in the team.
iii. If Emran is there in the team then Anil is also there in the team.
iv. If Bhagat is there in the team then Deepak must also be there in the team.
v. Only if Girish is there in the team, Bhagath is there in the team.

Q9. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
If the number of students selected into the team is '*n*', then what is the number of values that '*n*' can assume?

a) **2**

b) **4**

c) **6**

d) **5**

Let A, B, C, D, E, F, G denote the seven students in alphabetical order.
Consider the conditions given.
(i) C ⇒ CF but CE is not possible.
(ii) B ⇒ BA
(iii) E ⇒ EA
(iv) B ⇒ BD
(v) B ⇒ BG
From (ii), (iv) and (v), BGD should, if B is selected, be selected together.

For a team of size 1, i.e., consisting of only one member, any one out of A, D, F and G can be selected.
For a team of size 2 members, AD, AE, AF, AG are some of the possible combinations.
For a team of size 3 members, BGD is one of the possible combinations.
For a team of size 4 members, ACFG is one of the possible combinations.
For a team of size 5 members, BCDFG is one of the possible combinations.
No team of size 6 is possible because out of A and B only one can be selected and out of C and E only one can be selected.
∴ Out of 7 at most only 5 can be selected.
∴ Five different team sizes are possible. Choice (D)

Q10. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
If a team of maximum size is selected for the inter-school competition, then who among the following cannot be present in the team?

a) **Emran**

b) **Anil**

c) **Bhagat**

d) **None of the above**

Let A, B, C, D, E, F, G denote the seven students in alphabetical order.
Consider the conditions given.
(i) C ⇒ CF but CE is not possible.
(ii) B ⇒ BA
(iii) E ⇒ EA
(iv) B ⇒ BD
(v) B ⇒ BG
From (ii), (iv) and (v), BGD should, if B is selected, be selected together.

EADFG, BDGCF and ACDFG are three possible 5 member combinations.
∴ None of E, A, B can be definitely ruled out. Choice (D)

Q11. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
If Chandu is selected in a five member team, who among the following need not necessarily be selected into the team?

a) **Bhagat**

b) **Deepak**

c) **Farah**

d) **Girish**

Let A, B, C, D, E, F, G denote the seven students in alphabetical order.
Consider the conditions given.
(i) C ⇒ CF but CE is not possible.
(ii) B ⇒ BA
(iii) E ⇒ EA
(iv) B ⇒ BD
(v) B ⇒ BG
From (ii), (iv) and (v), BGD should, if B is selected, be selected together.

If Chandu is in the team, two possible combinations are possible. BDGCF and ACDFG. From the given choices. Bhagat need not be in the team. Choice (A)

Q12. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
If a team of two students is to be selected, who among the following cannot be in the team?

a) **Girish**

b) **Deepak**

c) **Bhagat**

d) **Chandu**

Let A, B, C, D, E, F, G denote the seven students in alphabetical order.
Consider the conditions given.
(i) C ⇒ CF but CE is not possible.
(ii) B ⇒ BA
(iii) E ⇒ EA
(iv) B ⇒ BD
(v) B ⇒ BG
From (ii), (iv) and (v), BGD should, if B is selected, be selected together.

If Bhagat must be in the team, both Girish and Deepak must be in the team. Hence, if Bhagat is selected, a team with two members cannot be formed. Choice (C)

SET 4 :

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

A vegetable vendor has four weighing measures with him marked 2 kg, 5 kg, 7 kg, and 9kg. But none of the measures he has is marked with the actual weight of the measure. Therefore, the vendor decided to find out the actual weight of each measure. In the process, he made the following observations about the measures:

i. The actual weights (in kg) of all the measures were natural numbers.
ii. The actual weight of none of the four measures equals the weight marked on any of the four measures.
iii. The difference between the marked weight and the actual weight of none of the four measures was more than 3 kg.
iv. The actual weight of the 2 kg measure was less than that of the 7 kg measure.
v. The actual weight of the 2 kg measure and the 7 kg measure combined was the same as that of the 9 kg measure.

vi. The 5 kg measure and the 7 kg measure together weighed the same as a bag of potatoes that was actually 10 kg in weight.

For measuring the weight of the vegetables, the vendor uses a common balance but always places the measures in only one of the pans.

Q13. DIRECTIONS *for questions 13 and 14:* Select the correct alternative from the given choices. How much does the 2 kg measure weigh?

a) **1 kg**

b) **3 kg**

c) **4 kg**

d) **Cannot be determined**

From condition vi, the 5 kg and 7 kg measures has a weight of 10 kg. Since these weights should not be 2kg, 5 kg, 7 kg or 9 kg, the possible actual weights for 5kg and 7 kg are 4,6 OR 6,4.

Case 1: Let 5 kg measure weigh 6 kg
Given that the 2 kg measure weighs less than 7 kg measure. Hence the 2 kg measure can have a weight of 1 kg or 3 kg. It cannot be 4 kg because that is the weight of the 7 kg measure.
If the 2 kg measure weighs 1 kg, from v, the 9 kg measure must weigh 5 kg (total of 2 kg measure and 7 kg measure). This is not possible from ii.
If the 2 kg measure weighs 3 kg, the 9 kg measure must weigh 7 kg which is also not possible.
Hence, this case is not possible.

Case 2: Let 5 kg measure weigh 4 kg
The 2 kg measure, in this case, can weigh 1 kg or 3 kg or 4 kg.
If it weighs 1 kg, the 9 kg measure must weigh 7 kg which is not possible.
If it weighs 3 kg, the 9 kg measure must weigh 9 kg, which is not possible.
If it weighs 4 kg, the 9 kg measure must weigh 10 kg which is possible.
Hence, the only possible case is the 2kg measure has a weight of 4 kg, the 5 kg measure has a weight of 4 kg, the 7 kg measure has a weight of 6 kg and the 9 kg measure has a weight of 10 kg.

The 2 kg measure weighs 4 kg. Choice (C)

Q14. Which of the following weights will the vendor not be able to measure using the measures in any combination?

a) **20 kg**

b) **16 kg**

c) **18 kg**

d) **None of the above**

From condition vi, the 5 kg and 7 kg measures has a weight of 10 kg. Since these weights should not be 2kg, 5 kg, 7 kg or 9 kg, the possible actual weights for 5kg and 7 kg are 4,6 OR 6,4.

Case 1: Let 5 kg measure weigh 6 kg

Given that the 2 kg measure weighs less than 7 kg measure. Hence the 2 kg measure can have a weight of 1 kg or 3 kg. It cannot be 4 kg because that is the weight of the 7 kg measure.

If the 2 kg measure weighs 1 kg, from v, the 9 kg measure must weigh 5 kg (total of 2 kg measure and 7 kg measure). This is not possible from ii.

If the 2 kg measure weighs 3 kg, the 9 kg measure must weigh 7 kg which is also not possible.

Hence, this case is not possible.

Case 2: Let 5 kg measure weigh 4 kg

The 2 kg measure, in this case, can weigh 1 kg or 3 kg or 4 kg.

If it weighs 1 kg, the 9 kg measure must weigh 7 kg which is not possible.

If it weighs 3 kg, the 9 kg measure must weigh 9 kg, which is not possible.

If it weighs 4 kg, the 9 kg measure must weigh 10 kg which is possible.

Hence, the only possible case is the 2kg measure has a weight of 4 kg, the 5 kg measure has a weight of 4 kg, the 7 kg measure has a weight of 6 kg and the 9 kg measure has a weight of 10 kg.

The vendor will be able to measure 14 kg, 16 kg (10 + 6), 18 kg (10 + 4 + 4). Hence the vendor will be able to measure all the given weights using the measures.

Choice (D)

Q15. DIRECTIONS *for questions 15 and 16:* Type in your answer in the input box provided below the question.

The vendor has a common balance in which he places the measures on only one side of the balance.

If he uses the common balance only once, in how many different ways can he measure a weight of 14 kg using the four measures in any combination?

From condition vi, the 5 kg and 7 kg measures has a weight of 10 kg. Since these weights should not be 2kg, 5 kg, 7 kg or 9 kg, the possible actual weights for 5kg and 7 kg are 4,6 OR 6,4.

Case 1: Let 5 kg measure weigh 6 kg

Given that the 2 kg measure weighs less than 7 kg measure. Hence the 2 kg measure can have a weight of 1 kg or 3 kg. It cannot be 4 kg because that is the weight of the 7 kg measure.

If the 2 kg measure weighs 1 kg, from v, the 9 kg measure must weigh 5 kg (total of 2 kg measure and 7 kg measure). This is not possible from ii.

If the 2 kg measure weighs 3 kg, the 9 kg measure must weigh 7 kg which is also not possible.

Hence, this case is not possible.

Case 2: Let 5 kg measure weigh 4 kg

The 2 kg measure, in this case, can weigh 1 kg or 3 kg or 4 kg.

If it weighs 1 kg, the 9 kg measure must weigh 7 kg which is not possible.

If it weighs 3 kg, the 9 kg measure must weigh 9 kg, which is not possible.

If it weighs 4 kg, the 9 kg measure must weigh 10 kg which is possible.

Hence, the only possible case is the 2kg measure has a weight of 4 kg, the 5 kg measure has a weight of 4 kg, the 7 kg measure has a weight of 6 kg and the 9 kg measure has a weight of 10 kg.

Since the actual weights are 4 kg, 4 kg, 6 kg and 10 kg, 14 kg can be measured in the following ways: 10 + 4, 10 + 4, 6 + 4 + 4. Hence 14 kg can be measured in 3 different ways using the measures. Ans: (3)

Q16. DIRECTIONS *for questions 15 and 16:* Type in your answer in the input box provided below the question.

The vendor has a common balance in which he places the measures on only side of the balance.

If the vendor uses the common balance only once, how many distinct weights will the vendor be able to weigh using the four measures in any combination?

From condition vi, the 5 kg and 7 kg measures has a weight of 10 kg. Since these weights should not be 2kg, 5 kg, 7 kg or 9 kg, the possible actual weights for 5kg and 7 kg are 4,6 OR 6,4.

Case 1: Let 5 kg measure weigh 6 kg

Given that the 2 kg measure weighs less than 7 kg measure. Hence the 2 kg measure can have a weight of 1 kg or 3 kg. It cannot be 4 kg because that is the weight of the 7 kg measure.
If the 2 kg measure weighs 1 kg, from v, the 9 kg measure must weigh 5 kg (total of 2 kg measure and 7 kg measure). This is not possible from ii.
If the 2 kg measure weighs 3 kg, the 9 kg measure must weigh 7 kg which is also not possible.
Hence, this case is not possible.

Case 2: Let 5 kg measure weigh 4 kg

The 2 kg measure, in this case, can weigh 1 kg or 3 kg or 4 kg.
If it weighs 1 kg, the 9 kg measure must weigh 7 kg which is not possible.
If it weighs 3 kg, the 9 kg measure must weigh 9 kg, which is not possible.
If it weighs 4 kg, the 9 kg measure must weigh 10 kg which is possible.
Hence, the only possible case is the 2kg measure has a weight of 4 kg, the 5 kg measure has a weight of 4 kg, the 7 kg measure has a weight of 6 kg and the 9 kg measure has a weight of 10 kg.

The vendor will be able to measure the following weights using the measures.

Using 1 measure: 4 kg, 6 kg, 10 kg	Total: 3
Using 2 measures: 8 kg, 10 kg, 14 kg, 16 kg	Total: 4
Using 3 measures: 14 kg, 18 kg, 20 kg	Total: 3
Using 4 measures: 24 kg	Total: 1

Total number of distinct weights that can be weighed is 9 (after removing duplicates).

Ans: (9)

SET 5:

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

The table below presents the values of various financial indicators for eight companies – Company 1 through Company 8. However, only the second column, representing the Total Assets (in Rs. mn) of each company, is labelled accurately and the other seven columns (labelled A through G) represent the seven indicators (values rounded off to three decimal places) defined below, not necessarily in the same order:

- *Net Sales* - in Rs.mn.
- *Total Costs* - in Rs.mn.

- *Shareholders' Equity* - in Rs.mn.
- *Debt Equity Ratio* - calculated as $\frac{\text{Total Debt}}{\text{Shareholders' Equity}}$
- *Asset Turnover* - calculated as $\frac{\text{Net Sales}}{\text{Total Assets}}$
- *Leverage* - calculated as $\frac{\text{Total Assets}}{\text{Shareholders' Equity}}$
- *Return on Equity* - calculated as $\frac{\text{Net Sales} - \text{Total Costs}}{\text{Shareholders' Equity}}$

Company	Total Assets (₹ mn)	A	B	C	D	E	F	G
Company 1	2.000	0.600	1.200	0.167	0.700	3.000	0.667	0.700
Company 2	2.500	0.720	1.800	0.040	1.600	5.000	0.500	0.640
Company 3	1.400	2.429	3.400	0.050	3.200	4.000	0.350	0.450
Company 4	2.600	0.962	2.500	0.033	2.450	1.500	1.733	0.333
Company 5	3.100	0.613	1.900	0.056	1.700	3.600	0.861	0.861
Company 6	2.400	0.583	1.400	0.031	1.250	4.800	0.500	0.438
Company 7	1.200	2.917	3.500	0.088	3.050	5.100	0.235	0.235
Company 8	0.800	3.000	2.400	0.125	2.100	2.400	0.333	0.333

Q17. DIRECTIONS *for question 17:* Select the correct alternative from the given choices.
What is the Asset Turnover of Company 5?

a) **1.9**

b) **0.613**

c) **0.861**

d) **3.6**

We have to find what each column represents in the given table.

Consider Company 1. Using the formula for Asset Turnover, A, B, C, D, E, F or G divided by Total Assets must be equal to one among these 7 values. These values are 0.3, 0.6, 0.083, 0.35, 1.5, 0.333, 0.35 respectively. Among these values, only 0.6 (in Column A) is present in the table. Hence, B/Total Assets = A. Therefore, B must be Net Sales and A must be the Asset Turnover Ratio.

Similarly, using the formula for Leverage, Total Assets divided by C, D, E, F or G must be equal to one among these five values. These values are 11.98, 2.86, 0.667, 3, 2.86 respectively. Hence, Total Assets/E = F. Hence, E and F must be Leverage and Shareholders' Equity in any order.

We still need to find C, D and G. These three must represent Total Cost, Debt Equity Ratio and Return on Equity in any order.

Since the values in columns D and G are the same for Company 1, let us consider Company 8. Return on Equity for Company 8 must be $\frac{2.4 - (\text{C or D or G})}{\text{E or F}}$. This can take six different values which are 0.948, 6.832, 0.125, 0.9, 0.861 and 6.207. Of these six values, only 0.125 is present in the table (column C). 0.125 is obtained using Total cost as 2.1 (in column D) and Shareholders' Equity as 2.4 (in column E). Hence, column C represents Return on Equity, column D represents Total Cost, column E represents Shareholders' Equity and column F represents Leverage. Hence, column G must represent Debt Equity Ratio.

The Asset Turnover (column A) for Company 5 is 0.613. Choice (B)

Q18. DIRECTIONS *for question 18:* Type in your answer in the input box provided below the question.
If Net Profit is defined as Net Sales – Total Cost, the highest Net Profit for any company (in Rs.) is

We have to find what each column represents in the given table.

Consider Company 1. Using the formula for Asset Turnover, A, B, C, D, E, F or G divided by Total Assets must be equal to one among these 7 values. These values are 0.3, 0.6, 0.083, 0.35, 1.5, 0.333, 0.35 respectively. Among these values, only 0.6 (in Column A) is present in the table. Hence, B/Total Assets = A. Therefore, B must be Net Sales and A must be the Asset Turnover Ratio.

Similarly, using the formula for Leverage, Total Assets divided by C, D, E, F or G must be equal to one among these five values. These values are 11.98, 2.86, 0.667, 3, 2.86 respectively. Hence, Total Assets/E = F. Hence, E and F must be Leverage and Shareholders' Equity in any order.

We still need to find C, D and G. These three must represent Total Cost, Debt Equity Ratio and Return on Equity in any order.

Since the values in columns D and G are the same for Company 1, let us consider Company 8. Return on Equity for Company 8 must be $\frac{2.4 - (\text{C or D or G})}{\text{E or F}}$. This can take six different values which are 0.948, 6.832, 0.125, 0.9, 0.861 and 6.207. Of these six values, only 0.125 is present in the table (column C). 0.125 is obtained using Total cost as 2.1 (in column D) and Shareholders' Equity as 2.4 (in column E). Hence, column C represents Return on Equity, column D represents Total Cost, column E represents Shareholders' Equity and column F represents Leverage. Hence, column G must represent Debt Equity Ratio.

Net Sales is in column B and Total Cost is in column D. The highest Net Profit is for Company 1, which is ₹500,000. Ans: (500000)

Q19. DIRECTIONS *for questions 19 and 20:* Select the correct alternative from the given choices. The company which has the second highest value of Total Debt is

a) **Company 1.**

b) **Company 2.**

c) **Company 7.**

d) **Company 5.**

We have to find what each column represents in the given table.

Consider Company 1. Using the formula for Asset Turnover, A, B, C, D, E, F or G divided by Total Assets must be equal to one among these 7 values. These values are 0.3, 0.6, 0.083, 0.35, 1.5, 0.333, 0.35 respectively. Among these values, only 0.6 (in Column A) is present in the table. Hence, B/Total Assets = A. Therefore, B must be Net Sales and A must be the Asset Turnover Ratio.

Similarly, using the formula for Leverage, Total Assets divided by C, D, E, F or G must be equal to one among these five values. These values are 11.98, 2.86, 0.667, 3, 2.86 respectively. Hence, Total Assets/E = F. Hence, E and F must be Leverage and Shareholders' Equity in any order.

We still need to find C, D and G. These three must represent Total Cost, Debt Equity Ratio and Return on Equity in any order.

Since the values in columns D and G are the same for Company 1, let us consider Company 8. Return on Equity for Company 8 must be $\frac{2.4 - (\text{C or D or G})}{\text{E or F}}$. This can take six different values which are 0.948, 6.832, 0.125, 0.9, 0.861 and 6.207. Of these six values, only 0.125 is present in the table (column C). 0.125 is obtained using Total cost as 2.1 (in column D) and Shareholders' Equity as 2.4 (in column E). Hence, column C represents Return on Equity, column D represents Total Cost, column E represents Shareholders' Equity and column F represents Leverage. Hence, column G must represent Debt Equity Ratio.

Total Debt can be calculated by multiplying Debt Equity Ratio (column G) with Shareholders' Equity (column E). Company 2 has the highest Debt (₹3.2 mn) while Company 5 has the second highest Total Debt (₹3.1 mn). Choice (D)

Q20. DIRECTIONS *for questions 19 and 20:* Select the correct alternative from the given choices. Which of the following statements is true?

a) **The company with the highest Net Sales also has the highest Total Cost.**

b) **The company with the lowest Return on Equity also has the lowest Asset Turnover.**

c) **The company with the highest Leverage also has the lowest Return on Equity.**

d) **The company with the lowest Shareholders' Equity also has the lowest Debt Equity Ratio.**

We have to find what each column represents in the given table.

Consider Company 1. Using the formula for Asset Turnover, A, B, C, D, E, F or G divided by Total Assets must be equal to one among these 7 values. These values are 0.3, 0.6, 0.083, 0.35, 1.5, 0.333, 0.35 respectively. Among these values, only 0.6 (in Column A) is present in the table. Hence, B/Total Assets = A. Therefore, B must be Net Sales and A must be the Asset Turnover Ratio.

Similarly, using the formula for Leverage, Total Assets divided by C, D, E, F or G must be equal to one among these five values. These values are 11.98, 2.86, 0.667, 3, 2.86 respectively. Hence, Total Assets/E = F. Hence, E and F must be Leverage and Shareholders' Equity in any order.

We still need to find C, D and G. These three must represent Total Cost, Debt Equity Ratio and Return on Equity in any order.

Since the values in columns D and G are the same for Company 1, let us consider Company 8. Return on Equity for Company 8 must be $\frac{2.4 - (\text{C or D or G})}{\text{E or F}}$. This can take six different values which are 0.948, 6.832, 0.125, 0.9, 0.861 and 6.207. Of these six values, only 0.125 is present in the table (column C). 0.125 is obtained using Total cost as 2.1 (in column D) and Shareholders' Equity as 2.4 (in column E). Hence, column C represents Return on Equity, column D represents Total Cost, column E represents Shareholders' Equity and column F represents Leverage. Hence, column G must represent Debt Equity Ratio.

Option A: Highest Net Sales = Company 7; Highest Total Cost = Company 3 → False
Option B: Lowest Return on Equity = Company 6; Lowest Asset Turnover = Company 6 → True
Option C: Highest Leverage = Company 4; Lowest Return on Equity = Company 6 → False
Option D: Lowest Shareholders' Equity = Company 4; Lowest Debt Equity Ratio = Company 7 → False
Hence, options B is true. Choice (B)

SET 6:

:

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

A and B are two traders who trade in gold futures at the commodity exchange. They trade from Monday (Day 1) to Friday (Day 5). On Day 1, A started with 100 grams of gold and Rs.50000, while B started with 50 grams of gold and Rs.100000. Gold is sold or bought only in multiples of 10 grams

and at the beginning of Day 1, the price of 10 grams of gold was Rs.8600, while at the end of Day 5, the price was Rs.8400. At the end of each day, the price of 10 grams of gold went up by Rs.200, or else it came down by Rs.200. Both A and B took buying and selling decisions, at the end of each trading day. On each day the beginning price of gold was the same as the ending price on the previous day. Below are some additional facts about how A and B traded over the five trading days.

Each day if the price went up, A sold 10 grams of gold at the closing price. On the other hand, each day if the price went down, he bought 10 grams at the closing price.

If on any day, the closing price per 10 grams of gold was above Rs.8800, then B sold 10 grams of gold, and if the closing price was below Rs.8400, he bought 10 grams, all at the closing price.

Q21. DIRECTIONS *for questions 21 to 24:* Type in your answer in the input box provided below the question.
If both A and B sold gold on a particular day from Day 1 to Day 5, then what was the closing price (in Rs.) of gold per 10 gms on Day 3?

It is given that A started with 100 grams of gold and ₹50000 while B started with 50 grams of gold and ₹100000.

Given that both A and B sold gold on the same day of the week. This can only happen when the price of gold is ₹9000.
∴ The only possible price movement of gold, at the end of each day from Day 1 to Day 5 is ₹8800, ₹9000, ₹8800, ₹8600 and ₹8400.
∴ The closing price of gold on Day 3 was ₹8800. Ans: (8800)

Q22. DIRECTIONS *for questions 21 to 24:* Type in your answer in the input box provided below the question.
If both A and B bought gold on a particular day, while on the next day, A sold but B did not buy gold, then what was the beginning price (in Rs.) of gold per 10 gms on Day 4?

It is given that A started with 100 grams of gold and ₹50000 while B started with 50 grams of gold and ₹100000.

If both A and B bought gold on the same day and only A sold on the next day, the only possibility is that the price of gold was ₹8200 on the day they bought, ₹8400 on the day before it and ₹8400 on the day after it, i.e. on the day A alone sold. This is possible in the following ways when the closing prices from Day 1 to Day 5, are given.

Case I : 8800, 8600, 8400, 8200, 8400
Case II : 8400, 8200, 8400, 8200. 8400
Case III : 8400, 8200, 8400, 8600, 8400
Case IV : 8400, 8600, 8400, 8200, 8400

In all the cases the closing price of Day 3 or the price on the morning of Day 4 is ₹8400. Ans: (8400)

Q23. DIRECTIONS *for questions 21 to 24:* Type in your answer in the input box provided below the question.
What could have been the minimum possible value of the total amount of cash (in Rs.) with both A and B together at the end of Day 5?

It is given that A started with 100 grams of gold and ₹50000 while B started with 50 grams of gold and ₹100000.

The minimum possible total amount with A and B happens when they have bought the maximum amount of gold. As the price at the beginning of Day 1 and that at the end of Day 5 is given it is clear that A would have bought three times and sold two times.
∴ We have to find the maximum number of time B would have bought gold. B would have bought atmost three times when the closing price at the end of each day from Day 1 to Day 5 was 8400, 8200, 8000, 8200, 8400.
∴ Change in amount with A
= (–8400) + (–8200) + (–8000) + 8200 + 8400 = ₹8000 decrease
Change in amount with B
= (–8200) + (–8000) + (–8200) = ₹24400 decrease
∴ Change in total amount = ₹32400 decrease
∴ Total final amount = 150000 – 32400 = ₹117600. Ans:(117600)

Q24. DIRECTIONS *for questions 21 to 24:* Type in your answer in the input box provided below the question.
If A had 40 grams of gold more than what B had at the end of Day 5, then what was the closing price (in Rs.) of gold per 10 gms on Day 3?

It is given that A started with 100 grams of gold and ₹50000 while B started with 50 grams of gold and ₹100000.

If A had 40 grams of gold more than B, it means that B bought gold exactly twice during the week. This can happen only if the closing prices of gold from Day 1 to Day 5 are ₹8400, ₹8200, ₹8400, ₹8200 and ₹8400 respectively.
∴ Price of gold at the end of Day 3 was ₹8400. Ans: (8400)

SET 7:

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

Shonika and Smaraki are playing a game where they pick up coins alternately from the coins kept on a table. The rules of the game say that

- each person has to pick up at least one coin in her turn
- no person can pick up more than six coins in each turn

The person who picks up the last coin from the table is the loser and the other person is the winner.

Assume that both Shonika and Smaraki play intelligently so as to win the game.

Q25. DIRECTIONS *for questions 25 to 27:* Select the correct alternative from the given choices.
If, at some stage of the game, there are 16 coins on the table, and it is Shonika's turn to pick up the coins, how many coins should she pick to ensure her win irrespective of what Smaraki does in later steps?

a) **1**

b) **2**

c) **3**

d) **4**

The minimum number of coins one can pick is 1 and the maximum is 6.
The Controlling Number (CN) of coins in this game is 7 (i.e., the Min + Max coins one can pick). We also know that the person picking up the last coin is the loser. Hence anyone trying to win the game has to ensure that he/she leaves 1 + 7 (1 coin + Controlling Number of coins) i.e., 8 coins one the table. The coins that have to be picked to be assured of a win are 16^{th} (9 + 7), 23^{rd} (16 + 7), 30^{th} (23 + 7) ..... coins.
We can write this in the general form as $7k + 2$ where $k = 0, 1, 2, 3$ .....
Now let us analyse the game with 9 coins.
Let us assume that Shonika picks up the 9^{th} coin. Smaraki can pick any number of coins in the range of 1 – 6.

I. If Smaraki picks 1 coin
Then Shonika picks 6 coins and leaves 1 coin.
II. If Smaraki picks 2 coins
Then Shonika picks 5 coins and leaves 1 coin.
III. Similarly if Smaraki picks 6 coins
Then Shonika picks 1 coin and leaves 1 coin.

The number of coins on the table is 16. To be assured of the win Shonika should ensure that she picks up the $(7k + 2)^{th}$ coin, which in this case is the 16^{th} coin. Hence, Shonika should pick up just 1 coin. Choice (A)

Q26. DIRECTIONS *for questions 25 to 27:* Select the correct alternative from the given choices.
At one stage during the game, when there were 28 coins on the table and it was Smaraki's turn, Smaraki had to leave to attend a phone call. Her sister Sonia who was watching the game volunteered to play for Smarika and picked up 2 coins. Is Sonia's move correct to ensure a win for Smaraki?

a) **Yes**

b) **No**

c) **She cannot win whatever she picks up when there are 28 coins**

d) **Data insufficient**

The minimum number of coins one can pick is 1 and the maximum is 6.
The Controlling Number (CN) of coins in this game is 7 (i.e., the Min + Max coins one can pick). We also know that the person picking up the last coin is the loser. Hence anyone trying to win the game has to ensure that he/she leaves 1 + 7 (1 coin + Controlling Number of coins) i.e., 8 coins one the table. The coins that have to be picked to be assured of a win are 16^{th} (9 + 7), 23^{rd} (16 + 7), 30^{th} (23 + 7) ..... coins.
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Then Shonika picks 5 coins and leaves 1 coin.
III. Similarly if Smaraki picks 6 coins
Then Shonika picks 1 coin and leaves 1 coin.

Number of coins = 28
Winning strategy = Pick the $7k + 2$ coin.
The $7k + 2$ coin in this case is the 23^{rd} coin.
$\therefore$ To win Sonia should have picked 6 coins (i.e., 28^{th}, 27^{th}, ... 23^{rd} coin). Hence the strategy adopted in this case is wrong. Choice (B)

Q27. DIRECTIONS *for questions 25 to 27:* Select the correct alternative from the given choices.
Some time during the game when it was Shonika's turn, there were 38 coins on the table. Without Shonika realising it, Smaraki wanted to remove some coins from the table. How many coins should she remove to ensure her own win irrespective of what moves Shonika makes later?

a) **4**

b) **3**

c) **2**

d) **1**

The minimum number of coins one can pick is 1 and the maximum is 6.
The Controlling Number (CN) of coins in this game is 7 (i.e., the Min + Max coins one can pick). We also know that the person picking up the last coin is the loser. Hence anyone trying to win the game has to ensure that he/she leaves 1 + 7 (1 coin + Controlling Number of coins) i.e., 8 coins one the table. The coins that have to be picked to be assured of a win are 16^{th} (9 + 7), 23^{rd} (16 + 7), 30^{th} (23 + 7) ..... coins.
We can write this in the general form as $7k + 2$ where $k = 0, 1, 2, 3$ .....
Now let us analyse the game with 9 coins.
Let us assume that Shonika picks up the 9^{th} coin. Smaraki can pick any number of coins in the range of 1 – 6.

I. If Smaraki picks 1 coin
Then Shonika picks 6 coins and leaves 1 coin.
II. If Smaraki picks 2 coins
Then Shonika picks 5 coins and leaves 1 coin.
III. Similarly if Smaraki picks 6 coins
Then Shonika picks 1 coin and leaves 1 coin.

Number of coins = 38
Winning strategy = 7k + 2 coin is to be picked. $7k + 2$ coin in this case is 37. Hence Smaraki should remove 2 coins (38^{th} and 37^{th}). Choice (C)

Q28. DIRECTIONS *for question 28:* Type in your answer in the input box provided below the question.
What is the least number of coins greater than 20 at the beginning of the game to ensure a win for Shonika if Smaraki makes the first move?

The minimum number of coins one can pick is 1 and the maximum is 6.
The Controlling Number (CN) of coins in this game is 7 (i.e., the Min + Max coins one can pick). We also know that the person picking up the last coin is the loser. Hence anyone trying to win the game has to ensure that he/she leaves 1 + 7 (1 coin + Controlling Number of coins) i.e., 8 coins one the table. The coins that have to be picked to be assured of a win are 16^{th} (9 + 7), 23^{rd} (16 + 7), 30^{th} (23 + 7) ..... coins.
We can write this in the general form as $7k + 2$ where $k = 0, 1, 2, 3$ .....
Now let us analyse the game with 9 coins.
Let us assume that Shonika picks up the 9^{th} coin. Smaraki can pick any number of coins in the range of 1 – 6.

I. If Smaraki picks 1 coin
Then Shonika picks 6 coins and leaves 1 coin.
II. If Smaraki picks 2 coins
Then Shonika picks 5 coins and leaves 1 coin.
III. Similarly if Smaraki picks 6 coins
Then Shonika picks 1 coin and leaves 1 coin.

Number of coins on the table should be greater than 20.
Winning strategy is $7k + 2$ coin which has to be picked. The number greater than 20 satisfying this is 23. If Smaraki makes the first move (with the number of coins on the table being 23 or greater) then Smaraki can ensure that she picks the 23^{rd} coin to win. However if there are 22 coins on the table Smaraki will not win irrespective of the strategy she uses. Ans: (22)

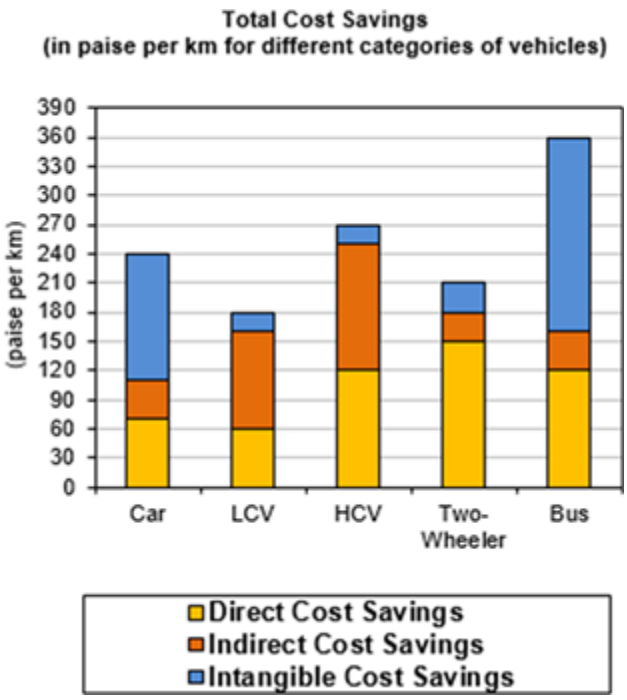
SET 8:

DIRECTIONS *for questions 29 to 32:* Answer the questions on the basis of the information given below.
Central Road Research Institute carries out cost studies for road users periodically. The following tables and graph represent the survey results for the year 2017. The survey studied the cost savings involved, for different categories of vehicles, in shifting from a previously existing 'two-lane bad road' to a new 'four-lane good road' in Mehrauli, Uttar Pradesh.

This new four-lane good road is 100 km long and has no other routes connecting into it. In other words a vehicle that enters this road from one end can exit only from the other end of the road (i.e., after 100 km). The same was the case for the previously existing two-lane bad road. However, after moving to the new four-lane good road, the government set up Toll-gates, to collect toll from the road users every time they use the road. Toll is charged according to the category of the vehicle.

Distribution of Total Cost Savings

Type of Savings		
A – Direct Cost Savings	B – Indirect Cost Savings	C – Intangible Cost Savings
Fuel : 60%	Spares : 50%	Time : 60%
Tyres : 15%	Maintenance : 50%	Commodity : 40%
Oil : 25%	–	–



Note : Total Cost Savings are the cost savings due to using the new four-lane good road over the previously existing two-lane bad road.

In the above table, for example, of the total direct cost savings, the money saved due to the decreased consumption of fuel forms 60%.

Toll Charged as a percentage of the Total Cost Savings for different categories of vehicles

Category of vehicle	Percentage
Car	50
LCV	80
HCV	90
Two – Wheeler	30
Bus	45

Net Cost Savings = Total Cost Savings – Toll Charged

Q29. DIRECTIONS *for questions 29 and 30:* Select the correct alternative from the given choices.
If one uses a two-wheeler on the new road, then what are the savings on fuel for a to and fro journey?

a) **Rs.126**

b) **Rs.252**

c) **Rs.180**

d) **Rs.90**

As per the given graph a two-wheeler has a direct cost saving of 150 paise per km, and of this Fuel accounts for 60%.
∴ Total Direct Cost Saving for a to and fro journey
= 150 × 100 × 2 = ₹300

$\therefore$ Savings on Fuel = $\frac{300 \times 60}{100}$ = ₹180 Choice (C)

Q30. DIRECTIONS *for questions 29 and 30:* Select the correct alternative from the given choices.
The users of which of the following categories of vehicles will have the highest net cost savings by using the new road?

a) **Car**

b) **Two-Wheeler**

c) **HCV**

d) **Bus**

Total Cost Savings on Car = 240 × 100 = ₹240

Toll paid for travel by Car = $240 \times \frac{50}{100}$ = ₹120

∴ Net Cost Savings = 240 – 120 = ₹120
Similarly the Net Cost Savings for other categories can be found.
Net cost savings – LCV = ₹36
Net cost savings – HCV = ₹27
Net cost savings – Two wheeler = ₹147
Net cost savings – Bus = ₹198
∴ Bus has the highest net cost savings. Choice (D)

Q31. DIRECTIONS *for question 31:* Type in your answer in the input box provided below the question.
What is the difference in the sum of the Indirect and Intangible cost savings (in paise/km) on using a HCV on the new road and on using a Bus on the new road?

This question can be answered by simple observation of the cost savings graph.
Indirect and Intangible cost savings are denoted by B and C respectively.
∴ Indirect + Intangible cost savings for a HCV
= 270 – 120 = 150 paise/km.
Indirect + Intangible cost savings for a Bus
= 360 – 120 = 240 paise/km
∴ Difference is 240 – 150 = 90 paise/km. Ans: (90)

Q32. DIRECTIONS *for question 32:* Select the correct alternative from the given choices.
Which of the following is the highest?

a) **The cost savings on fuel for a one-way trip for a two-wheeler.**

b) **The cost savings on time for a one-way trip for a bus.**

c) **The cost savings on spares for a two-way trip for a HCV.**

d) **The cost savings on fuel for a two-way trip for a HCV.**

The cost savings on fuel for a one-way trip for a two-wheeler = $1.50 \times \frac{60}{100} \times 100$
= ₹90
The cost savings on time for a one-way trip for a bus
= $2.00 \times \frac{60}{100} \times 100$ = ₹120
The cost savings on spares for a two-way trip for a HCV
= $1.30 \times \frac{50}{100} \times 200$ = ₹130
The cost savings on fuel for a two-way trip for a HCV
= $1.20 \times \frac{60}{100} \times 200$ = ₹144 Choice (D)

SECTION 3 QA

Q1. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
In how many ways can a person pay an amount Rs.120 using two-rupee or five-rupee coins?

Let the number of ₹2 and ₹5 coins used be denoted by x and y respectively
Now $2x + 5y = 120$. Where $x, y \geq 0$
The solutions are

x	60	55	50	0
y	0	2	4	24

Thus, there are 13 ways in all. Ans: (13)

Q2. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
If $f(n) = 1(1!) + 2(2!) + 3(3!) + \ldots.. + n(n!)$, find the remainder when $f(117) + f(111)$ is divided by 100.

$f(n) = 1(1!) + 2(2!) + 3(3!) + \ldots.. + n(n!)$
$= (2-1)\,1! + (3-1)\,2! + (4-1)\,3! + \ldots. + [(n+1) - 1]n!$
$= 2! - 1! + 3! - 2! + 4! - 3! + \ldots + (n+1)! - n! = (n+1)! - 1$
$\therefore f(117) = 118! - 1$ and $f(111) = 112! - 1$
$\therefore f(117) + f(111) = 118! + 112! - 2$
As both 118! And 112! are multiples of 100, the remainder is $100 - 2 = 98$.

Alternative Solution:

Since $f(10)$, onwards all are divisible by 100, we only need to find the last two digits of $2\,(f(9)) = 2\,(1(1!) + 2(2!) + 3(3!) \ldots\ldots 9(9!))$
Now, using the onscreen calculator we can easily calculate the above value and find that the last two digits to be 98. Ans: (98)

Q3. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
If $p : q = q : r = r : s = 6$, then $\dfrac{pq + qr + rs}{q^2 + r^2 + s^2} =$

As $\frac{p}{q}=\frac{q}{r}=\frac{r}{s}=6$

$\frac{p}{q}=\frac{pq}{q^2}=6,\ \frac{q}{r}=\frac{qr}{r^2}=6$

$\frac{r}{s}=\frac{rs}{s^2}=6$

Therefore $\frac{pq+qr+rs}{q^2+r^2+s^2}=6$ Ans: (6)

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

Ajay had N coins with him and he gave one more than half the number of coins with him to Bulu and then gave two more than one-third of the remaining number of coins to Chintu. If N is a two-digit number, how many distinct values can N assume?

Let the initial number of coins with Ajay be N

Firstly, N must be even, (since he gave one more than half of N to Bulu). Further, let $\frac{1}{3}\left[\frac{N}{2}-1\right]=k$, _____ (1) where k is a natural number and $\frac{2}{3}\left[\frac{N}{2}-1\right]\geq 2$ ___ (2)

(Since he gave two coins more than one-third of the remaining to Chintu).

Hence, Chintu got a total of $(k + 2)$ coins.

If k is a natural number, from (1), we get N must be of the form $6k + 2$, which also is even (the first requirement).

Further, from (2), $N \geq 8$.

Hence, N can be any number of the form $6k + 2$, where $k = 1, 2, 3$.....

Since it is mentioned that N is a two-digit number, $10 \leq N \leq 99$.

Hence, the possible values of k are 2, 3, 4, ... 16, i.e., N can assume a total of $16 – 2 + 1 = 15$ distinct values. Ans: (15)

Q5. DIRECTIONS *for question 5:* Select the correct alternative from the given choices.

Find the range of y, if $|2y – 3| \leq 11$.

a) **[–4, 7]** ✓ **Your answer is correct**

b) **[3, 7]**

c) [–2, 7]

d) [0, 8]

$|2y - 3| \leq 11$
$\therefore -11 \leq 2y - 3 \leq 11$
$-11 + 3 \leq 2y \leq 11 + 3$
$-8 \leq 2y \leq 14$
$-4 \leq y \leq 7.$ Choice (A)

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

The average of the marks of five students in a test is 134. The average increases by 23 marks, if the two lowest scoring students are excluded and decreases by 16 marks, if the two highest scoring students are excluded. What is the third highest score among the five students?

Let the marks of the students in decreasing order be a, b, c, d and e.
$a + b + c + d + e = 134 \times 5 = 670$
$a + b + c = (134 + 23) \times 3 = 471$
$c + d + e = (134 - 16) \times 3 = 354$
$c = 471 + 354 - 670 = 155.$ Ans: (155)

Q7. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.

If $a = \sqrt{17} + \sqrt{8}$, $b = \sqrt{14} + \sqrt{11}$, $c = \sqrt{16} + \sqrt{9}$, and $d = \sqrt{13} + \sqrt{12}$, which of the following is true?

a) ***b > d > a > d***

b) ***d > b > c > a***

c) $d > c > b > a$

d) $a > c > b > d$

We compare the squares of the terms as
whichever term is greater, its square will also be greater.

$a^2 = 25 + 2\sqrt{136}$

$b^2 = 25 + 2\sqrt{154}$

$c^2 = 25 + 2\sqrt{144}$

$d^2 = 25 + 2\sqrt{156}$

Now, $\sqrt{156} > \sqrt{154} > \sqrt{144} > \sqrt{136}$

$\therefore d^2 > b^2 > c^2 > a^2$

$\therefore d > b > c > a$ Choice (B)

Note: In general, for positive real numbers, where $x + y$ = constant, the product (xy) is maximum when $x = y$, or x is as close to y as possible. This property alone is sufficient to arrive at the appropriate order of the given surds.

Q8. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
If the total surface area of cube A is 36% less than that of cube B, by what percent is the length of the side of cube B more than that of cube A?

a) **25%** ✓ **Your answer is correct**

b) **20%**

c) 37.5%

d) 50%

Let the total surface area of cube B be 100
Thus the total surface area of cube A= 64
Total surface area of a cube α $(\text{side})^2$.

	Cube B	Cube A
Total surface Area	100	64
Ratio of surface Area	10^2	8^2
Ratio of the sides	10	8
Sides of the cubes	10 k	8k

Therefore the side cube B is more than the side of cube A by $\frac{2k}{8k} \times 100 = 25\%$.

Choice (A)

Q9. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
Two points A (4, –2) and B (5, 5) lie on the circumference of a circle of radius 5 units. If P is another point lying on the circumference of the same circle, find the maximum possible area (in sq. units) of triangle PAB.

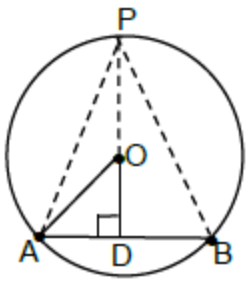
a) $\frac{25}{4}\left(\sqrt{2}+1\right)$

b) $\frac{25}{2}\left(\sqrt{2}+1\right)$

c) $\frac{25}{4}\left(\sqrt{2}-1\right)$

d) $\frac{25}{2}\left(\sqrt{2}-1\right)$

As the area of ΔPAB is maximum, we can conclude that P is farthest from the line joining A and B and lies on the perpendicular to AB through O (the centre). Hence, ΔPAB is an isosceles triangle.



The distance between AB = $\sqrt{(5-4)^2+(5+2)^2} = \sqrt{50}$.

The perpendicular distance of the centre of the circle from the line AB

$$= \sqrt{OA^2 - \left(\frac{AB}{2}\right)^2} = \sqrt{5^2 - \left(\frac{\sqrt{50}}{2}\right)^2} = \frac{5}{\sqrt{2}}.$$

The height of the triangle PAB = PO + OD

$$= 5 + \frac{5}{\sqrt{2}} = \frac{5\left(\sqrt{2}+1\right)}{\sqrt{2}}$$

Area of the triangle PAB

$$= \frac{1}{2}(AB)(PD)$$

$$= \frac{1}{2}\left(\sqrt{50}\right)\left[\frac{5\left(\sqrt{2}+1\right)}{\sqrt{2}}\right] = \frac{25}{2}\left(\sqrt{2}+1\right)$$

Choice (B)

Q10. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
Consider the following three equations:

$2x + 3y + 4z = 33$

$4x + 2y + 3z = 29$

$3x + 4y + 2z = 28$

Which of the following equations is inconsistent with the above equations?

a) $x + y + z = 10$

b) $6x + 5y + 7z = 62$

c) $y + z - 2x = 4$

d) $5x + 3y + z = 23$

$2x + 3y + 4z = 33$ ---- (1)
$4x + 2y + 3z = 29$ ---- (2)
$3x + 4y + 2z = 28$ ---- (3)
(1) + (2) + (3)
$\Rightarrow 9(x + y + z) = 90 \Rightarrow x + y + z = 10$
$\therefore$ Choice (A) is consistent.
Accordingly (1) + (2) gives Choice (B)
And (1) – (2) gives choice 3
While (2) + (3) – (1) gives
$5x + 3y + z = 24$
but choice (D) reads as $5x + 3y + z = 23$ which is not consistent. Choice (D)

Q11. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
Find the quadratic equation whose roots are half the roots of the equation $x^2 + 5x + 3 = 0$.

a) $x^2 + 10x + 12 = 0$

b) $4x^2 + 20x + 3 = 0$

c) $x^2 + 9x + 7 = 0$

d) $4x^2 + 10x + 3 = 0$

The quadratic equation whose roots are half the roots of the equation $f(x) = 0$ is $f(2x) = 0$.
The required equation is
$(2x)^2 + 5(2x) + 3 = 0$
$\Rightarrow 4x^2 + 10x + 3 = 0$ Choice (D)

Q12. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
A country wanted to select four mixed-doubles tennis teams for the upcoming Rio Olympics from 6 female players and 6 male players available for selection. If the selection panel chose the players at

random, then in how many ways they could have done that? (A mixed doubles tennis team comprises one male and one female player)

a) **129600**

b) **64800**

c) 5400

d) 1800

4 male players and 4 female players can be chosen in ${}^{6}C_{4} \times {}^{6}C_{4}$ i.e., 225 ways.
Now, we have 4 female players. We need to pair them with the male players. The first female player can be paired in 4 ways, the second in 3 ways, the third in 2 ways and the fourth in 1 way.
Therefore, the total number of selections
$= 225 \times 4! = 5400$ Choice (C)

Q13. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
If two percent of the population of constituency A are octogenarians, whereas six percent of the population of constituency B are octogenarians, and the population of B is three times that of A, what percent of the population of A and B together are octogenarians?

a) **5%** ✓ **Your answer is correct**

b) **4%**

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

d) $4\frac{1}{3}\%$

Let the population of A be 100
Therefore the population of B will be 300.

	A	B	Total
No. of octogenarians	2	18	20

Therefore the percentage of octogenarians = $\frac{20}{400} \times 100$

= 5% Choice (A)

Q14. DIRECTIONS *for questions 7 to 14:* Select the correct alternative from the given choices.
If an arithmetic progression has the sum of its first *n* terms as zero but none of the terms is zero, then '*n*'

a) **is always even.** ✓ **Your answer is correct**

b) **is always odd.**

c) is always a multiple of 4 or 5.

d) More than one of the above.

When an arithmetic progression, none of the terms of which are zero, has sum of its terms as zero, there are equal number of terms above zero and below zero. Hence, it always has an even number of terms. Choice (A)

Q15. DIRECTIONS *for questions 15 and 16:* Type in your answer in the input box provided below the question.
If $f(x) = x^3 - x^2 - f(x-1)$, for $x \geq 2$ and $f(1) = 1$, then find the value of $f(25)$.

$f(25) = 25^3 - 25^2 - f(24)$
$= 25^3 - 25^2 - 24^3 + 24^2 + f(23)$
$= 25^3 - 25^2 - 24^3 + 24^2 + 23^3 - 23^2 - f(22)$
$= (25^3 - 24^3 + 23^3 - 22^3 + .- 2^3) - (25^2 - 24^2 + 23^2 - 22^2 + ... + 2^2) + f(1)$
Now, $(25^3 - 24^3 + 23^3 - 22^3 + ... + 3^3 - 2^3)$
$= (1^3 + 2^3 + 3^3 + ...+25^3) - 2(2^3 + 4^3 + 6^3 + ... + 24^3) - 1^3$

$$= \left(\frac{25 \times 26}{2}\right)^2 - 16(1^3 + 2^3 + ... + 12^3) - 1$$

$$= (325)^2 - 16\left(\frac{12 \times 13}{2}\right)^2 - 1 = 8280$$

Similarly, $25^2 - 24^2 + 23^2 - 22^2 + ... + 3^2 - 2^2$
$= (1^2 + 2^2 + ...+25^2) - 2(2^2 + 4^2 + ... + 24^2) - 1$

$$= \frac{25 \times 26 \times 51}{6} - 8(1^2 + 2^2 + ... + 12^2) - 1$$

$$= 25 \times 13 \times 17 - 8\left(\frac{12 \times 13 \times 25}{6}\right) - 1 = 324.$$

$\therefore$ f (25) = 8280 – 324 + 1 = 7957 Ans: (7957)

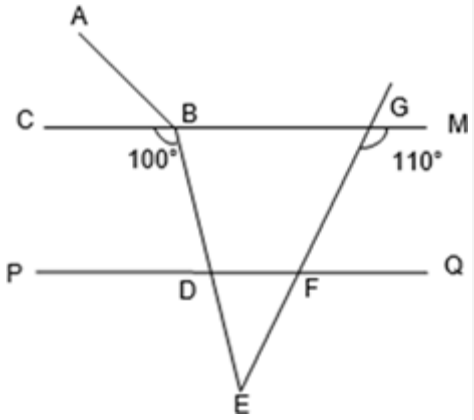
Q16. DIRECTIONS *for questions 15 and 16:* Type in your answer in the input box provided below the question.
If $1 + 3 + 5 + ... + (2n - 1) = 1 + m(m+1)(m+2)(m+3)$, where m and n are natural numbers, find the value of n, when $m = 25$

L.H.S = 1+3+5+.....(2n – 1), i.e., the sum of the first 'n' odd numbers, which is equal to n^2.
Since $m = 25$, R.H.S = 1+25.26.27.28 = 491401
Hence, $n^2 = 491401$ and $n = \sqrt{491401} = 701$
(The on-screen calculator be used for the calculations)

Alternative Solution:

$m(m+1)(m+2)(m+3)$
$= m(m+3)(m+1)(m+2)$
$= [m^2 + 3m][m^2 + 3m + 2]$
$= [m^2 + 3m + 1 - 1][m^2 + 3m + 1 + 1]$
$= (m^2 + 3m + 1)^2 - 1$
$\Rightarrow 1 + m(m+1)(m+2)(m+3) = (m^2 + 3m + 1)^2$
Given $m = 25$, we get $[25^2 + 3(25) + 1]^2 = 701^2$.
Now $1 + 3 + 5 + ... + (2n - 1) = n^2$
Now, $n^2 = 701^2$
$\Rightarrow n = 701$ Ans: (701)

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



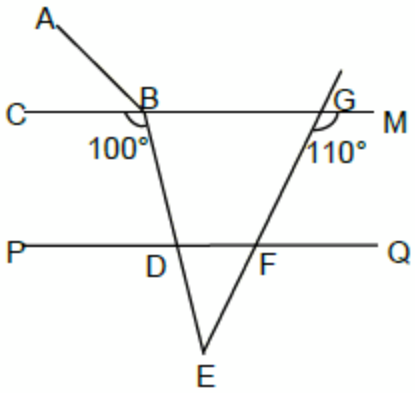
In the given figure, if ∠ABC = 2 ∠DEF and CM is parallel to PQ, find ∠ABC.

a) **30°**

b) **80°**

c) 40°

d) **60°**



⇒ ∠GBE = 180° – 100° = 80°
⇒ ∠BGE = 180° – 110° = 70°
⇒ ∠BEG = ∠DEF = (180° – 80° – 70°) = 30°
∴ ∠ABC = 2∠DEF = 2 × 30° = 60°
Note: In this case, the information that PQ ||CM is redundant. Choice (D)

Q18. DIRECTIONS *for question 18:* Type in your answer in the input box provided below the question.
If P is 30% more efficient than Q and can complete a certain job in 46 days, how long would P and Q together take to complete the same job

Let efficiency (i.e., work done per day) of Q = 1
$\Rightarrow$ efficiency of P = 1.3
P alone takes 46 days.
That is, it takes 46 days to complete the work with an efficiency of 1.3.
Hence, it will take $46 \times \frac{(1.3)}{(1+1.3)}$ = 26 days to complete the work when both P and Q work together. Ans: (26)

Q19. DIRECTIONS *for question 19:* Select the correct alternative from the given choices.
There are two concentric circles. From a point on the outer circle, a tangent is drawn to the inner circle. If the length of the tangent is one-third the radius of the outer circle, then find the ratio of the radius of the inner circle to that of the outer circle.

a)

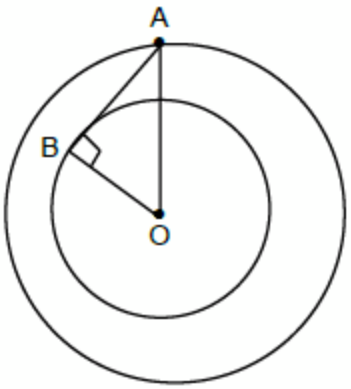
$1 : \sqrt{2}$

b) **2 : 3**

c)

$2\sqrt{2} : 3$

d) **8 : 9**



In ΔOBA,

$OB = \sqrt{OA^2 - AB^2}$

It is given that $AB = \frac{1}{3}OA$

$\therefore OB = \sqrt{(3AB)^2 - (AB)^2} = 2\sqrt{2}\ AB.$

Therefore the ratio of $\frac{OB}{OA} = \frac{AB2\sqrt{2}}{3AB} = \frac{2\sqrt{2}}{3}$ Choice (C)

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

Raghu, Ram and Rajan work in ABC Pvt. Ltd. If their monthly salaries are in the ratio 2 : 3 : 5, and sum of their monthly salaries is Rs.720000, find Raghu's monthly salary (in Rs.).

Your Answer:144000

Let the salaries of Raghu, Ram and Rajan be $2k$, $3k$ and $5k$ respectively.
Their total salary = $2k + 3k + 5k = 10k$.
It is given that, $10k = 720000$
$\therefore 2k = 144000$.
Therefore Raghu's monthly salary is ₹1,44,000 Ans: (144000)

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

If x is positive, such that $2x - 9y = 10$ and $kx + 2y = 15$, what is the range of k?

a) $\left(-\frac{4}{9}, \infty\right)$

b) $\left[-\frac{4}{9}, \infty\right)$

c) $\left[-\frac{4}{9}, \frac{4}{9}\right)$

d) $\left(-\frac{4}{9}, \frac{155}{9}\right)$

Given that $2x - 9y = 10 \Rightarrow \frac{4}{9}x - 2y = \frac{20}{9}$

Also, $kx + 2y = 15$

Adding the two equations, we get

$$\frac{4+9k}{9}x = \frac{155}{9} \Rightarrow x = \frac{155}{4+9k}$$

Since x is positive, $4 + 9k > 0 \Rightarrow k > -\frac{4}{9}$

Hence, the range of k is $\left(-\frac{4}{9}, \infty\right)$.

Alternative Solution:

This question can also by solved by graphically visualising the two equations as two straight lines in the co-ordinate plane. The first line has a slope of $\frac{2}{9}$ and a y-intercept of $\frac{-10}{9}$. The slope of the second line is $\frac{-k}{2}$ and its y-intercept is $\frac{15}{2}$.

For the x-coordinate of the intersection to be positive the slope of the second line can be at most (i.e., less than) $\frac{2}{9}$, i.e., parallel to the first line, and a minimum of $-\infty$, i.e., almost vertical (but negative slope).

Hence, $-\infty < \frac{-k}{2} < \frac{2}{9} \Rightarrow k \in \left(-\frac{4}{9}, \infty\right)$. Choice (A)

Q22. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Maaldar Reddy bequeathed his property comprising 'A' acres of land to his three sons, such that the areas of the shares of land given to the sons were in geometric progression. If the maximum difference between the shares of any two sons is 385 acres and the least possible sum of the shares of any two sons is 770 acres, then find the value of A.

a) **650**

b) **975**

c) **1463**

d) **1580**

Let the shares of land be a, ar and ar^2 ($r > 1$). Now, given $a(r^2 - 1) = 385$ and $a(r + 1) = 770$

$$\Rightarrow \frac{a(r^2-1)}{a(r+1)} = \frac{385}{770}$$

$\Rightarrow r - 1 = 0.5$

$\Rightarrow r = 1.5$ and $a = 308$

Hence A = 308 (1 + 1.5 + 2.25) = 1463. Choice (C)

Q23. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
If fresh grapes contain 80% water and 20% pulp, by weight, and 10 kg of fresh grapes yield 2.5 kg of dry grapes, then find the percentage of pulp, by weight, in dry grapes.

a) **20%**

b) **40%**

c) **75%**

d) **80%**

The pulp content by weight in fresh grapes
= 100 – 80 = 20%

$\Rightarrow$ 10 kg of fresh grapes which have 2 kg of pulp, finally yield 2.5 kg of dry grapes.

This 2 kg of pulp is $\left(\frac{2}{2.5} \times 100\right)\%$ by weight of dry grapes.

$\Rightarrow$ Dry grapes have 80% pulp by weight. Choice (D)

Q24. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Two painters, Arjo and Bulu, together got a contract to paint a house for Rs.6000. On the day of the work, Arjo started the work as scheduled but Bulu turned up one hour late and as a result they took 45 minutes more to complete the job. What would be Bulu's share in the total amount had they both worked for an equal amount of time?

a) **Rs.2400**

b) **Rs.3600**

c) **Rs.4000**

d) **Rs.4500**

Since they together took 45 minutes to do the work that Bulu alone would have done in one hour, together they are $\frac{60}{45} = \frac{4}{3}$ times as efficient as Bulu.

$a = \frac{b}{3}$ (where, a and b are their rates of doing work)

Had they worked for equal intervals of time they would have shared the amount in the ratio of their rates of work.

∴ Bulu's share would have been

$\frac{3}{(1+3)}(6000) = ₹4500$ Choice (D)

Q25. DIRECTIONS *for questions 25 to 28:* Type in your answer in the input box provided below the question.

If $\frac{(x)_6}{(10)_{10}} = (40)_8$, what is the value of x?

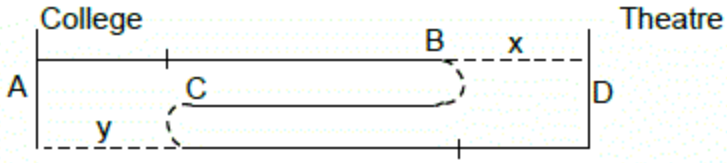
$(40)_8 = (32)_{10}$

$\Rightarrow (x)_{10} = (320)_{10}$

$\Rightarrow (x)_6 = (1252)_6$ Ans: (1252)

Q26. DIRECTIONS *for questions 25 to 28:* Type in your answer in the input box provided below the question.

Arif, Bill and Chetan were classmates and wanted to watch a movie at South City Mall right after their class got over. Bill had an Activa bike which could accommodate a maximum of two persons at a time and they wanted to reach the mall in the minimum time possible. They started simultaneously from their college, Bill and Arif on the bike and Chetan on foot. Bill dropped Arif at a certain point along the route to the mall, turned back and on his way met Chetan. He picked up Chetan and then traveled towards the mall such that all three of them reached the mall simultaneously. What is the total time (in minutes) taken by them to reach the mall from their college, if the speed of the bike was 30 km/hr, the walking speed of each of them was 6 km/hr and the distance between their college and the mall was 22.5 km?



Let the distance covered by each of Arif and Chetan on foot be x and y respectively.
In the time Chetan covered y, Bill with five times his speed must have covered $5y$.
$\therefore$ AB + BC = $5y \Rightarrow$ BC = $2y$
Similarly for Arif, BD = x and BC = $2x \Rightarrow x = y$
Now, total distance from A to D = $4x$ = 22.5 Km
$\therefore$ The bike covered AB + BC + CD = $3x + 2x + 3x = 8x$
= 45 Km.

To cover 45 Km, it took $\frac{45}{30}$ = 1.5 hrs or 90 minutes. Ans: (90)

Q27. DIRECTIONS *for questions 25 to 28:* Type in your answer in the input box provided below the question.

If for all real numbers, a and b, $a * b = 2 - ab$, then how many of the following statements are true?

I. $(3 * 2) * (2 * 3) = -14$

II. $(4 * 2) * (2 * 3) = (1 * 6) * (8 * 1)$

III. $(-1 * 2) * (-2 * 1) = (2 * 8)$

IV. $(6 * 1) * (3 * 2) = (7 * 3) * (1 * 2)$

Among the conclusions, 13 ordered pairs appear we the But, we note that (a * b) depends only on the product ab.

$\therefore (3 * 2) = (2 * 3) = (1 * 6) = (6 * 1) = -4$

$(4 * 2) = (8 * 1) = -6$

$(-1 * 2) = (-2 * 1) = 4$

$(2 * 8) = -14$

$6 * 3 = -16, 1 * 2 = 0, 7 * 3 = -19$

We consider the conclusions

I. GE = $(-4) * (-4) = -14$ True

II. LHS = $(-6) * (-4) = -22$
RHS = $(-4) * (-6) = -22$ True

III. LHS = $4 * 4 = -14$
RHS = -14 True

IV. LHS = $(-4) * (-4) = -14$
RHS = $(-19) * 0 = 2$ False

$\therefore$ Exactly three statements are true. Ans: (3)

Q28. DIRECTIONS *for questions 25 to 28:* Type in your answer in the input box provided below the question.

If the inradius and the circumradius of a rightangled triangle, when expressed in cm, are equal to the roots of the equation $x^2 - 14x + 40 = 0$, find the area (in sq. cm) of the triangle.

$x^2 - 14x + 40 = 0$

$(x - 4)(x - 10) = 0$

$\therefore x = 4$ or $x = 10$

$\therefore$ The inradius measures 4 and the circumradius measures 10

The area of a right angled triangle with inradius r and circumradius R is $r(r + 2R)$.

$= 4(4 + 20) = 96$

Alternative Solution:

Since $r = 4$ and R = 10, the hypotenuse = 20. By observation, one could try the Pythagorean triplet (12, 16, 20). It can be seen that (12, 16, 20) works by using the formula $r = \frac{(a+b-c)}{2}$.

Hence, area = $\frac{1}{2}ab = \frac{1}{2}(12)(16) = 96$. Ans: (96)

Q29. DIRECTIONS *for questions 29 to 33:* Select the correct alternative from the given choices.

If the quadratic equations $x^2 - ax + 3 = 0$ and $x^2 + ax - 5 = 0$ have one positive root in common, find the value of a.

a) – 4

b) **2**

c) **4**

d) Cannot be determined

Let the root common to both the equations be denoted by t.
$\therefore t^2 - at + 3 = 0$ and $t^2 + at - 5 = 0$
$\therefore t^2 - at + 3 = t^2 + at - 5$
$\therefore 2at = 8$

$$t = \frac{4}{a}$$

Substituting $\frac{4}{a}$ in $x^2 - ax + 3 = 0$, we get

$$\frac{16}{a^2} - 4 + 3 = 0$$

$\Rightarrow a = \pm 4$
Only for $a = 4$, we get a positive root (i.e., 1) in common.
Hence, the value of a is 4. Choice (C)

Q30.DIRECTIONS *for questions 29 to 33:* Select the correct alternative from the given choices.

A thief escaped from a jail and started running at a speed of 10 kmph. Half an hour later, the police started chasing him. If the police brought the thief back to the jail in exactly one hour from the moment they started chasing him, then the distance run by the thief before he was caught is

a) **7.5 km.**

b) **9 km.**

c) **10 km.**

d) 12 km.

As the police took one hour for the round trip and they travelled with a constant speed, they took half an hour for catching the thief and half an hour for bringing him back. The thief on the whole ran for half an hour before the police started chasing and half an hour after police started chasing him. So, he ran for 10 km before he was caught.

Choice (C)

Q31. DIRECTIONS *for questions 29 to 33:* Select the correct alternative from the given choices.
Find the value of the least natural number which is divisible by both 112 and 180.

a) **5460**

b) **2520**

c) **5040**

d) 4620

The lowest number divisible by 112 and 180
$= \text{LCM}(112, 180) = \text{LCM}(2^4 \times 7, 2^2 \times 3^2 \times 5)$
$= 2^4 \times 3^2 \times 5 \times 7 = 5040.$ Choice (C)

Q32. DIRECTIONS *for questions 29 to 33:* Select the correct alternative from the given choices.

P is a prime number, which is also a factor of ${}^{240}C_{120}$. If P is a two-digit number, then find the maximum value of P.

a) **71**

b) **83**

c) **97**

d) None of the above

$${}^{240}C_{120} = \frac{240!}{120!\,120!}$$

P is a two-digit prime number, so P is present twice in the denominator. P will be a factor of ${}^{240}C_{120}$, if P is present (atleast) thrice in the numerator.

$\therefore 3P \leq 240$

$P \leq 80.$

Thus the maximum value of P is 79 (the greatest prime under 80). Choice (D)

Q33. DIRECTIONS *for questions 29 to 33:* Select the correct alternative from the given choices.

A shopkeeper offers a discount of 20% on the marked price of a product and makes a profit of 25%. To make a profit of 10% on the product, the shopkeeper should offer a discount of

a) **25** $\frac{3}{5}\%$

b) **29** $\frac{3}{5}\%$

c) **42** $\frac{1}{22}\%$

d) 26 $\frac{2}{5}\%$

Let the marked price be 100.

$\therefore$ The selling price = $\frac{100-20}{100} \times 100 = 80$

As he made a profit of 25%, C.P. $\times$ (1.25) = 80 $\Rightarrow$ C.P. = 64
Now, to get a profit of 10%
S.P. = 1.1(64) = 70.4

$\therefore$ Discount percentage = $\frac{100-70.4}{100} \times 100 = 29.6\%$ Choice (B)

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

For how many integral values of x will $f(x) = |x - 1!| + |x - 2!| + |x - 3!| + |x - 4!|$ assume a minimum value?

$f(x) = |x-1| + |x-2| + |x-6| + |x-24|$
Now $|x-1| + |x-24|$ will be minimum when $1 \le x \le 24$
Again $|x-2| + |x-6|$ will be minimum when $2 \le x \le 6$
For $|x-1| + |x-2| + |x-6| + |x-24|$ to be minimum x must lie in the interval [2, 6].
$\therefore$ $f(x)$ takes a minimum value of 27 for x = 2, 3, 4, 5 or 6
There are 5 integral values of x. Ans: (5)