AIMCAT 2003

VARC

DIRECTIONS *for questions 1 to 4*: The passage given below is accompanied by a set of four questions. Choose the best answer to each question.

"The business centre", a sprawling warehouse in Wolka Kosowska outside Warsaw, has a distinctly East Asian feel. The air is filled with zither music and haggling in Vietnamese. Impromptu bouts of *tien len*, a card game, are set up on cardboard boxes. A sign warns that "burning incense is prohibited"; another that tea dregs are not to clog the wash basin.

Poland and the Czech Republic, both of which vehemently oppose European efforts to redistribute Syrian refugees, are home to large Asian communities. The first Vietnamese arrived in the 1980s as part of a student exchange between their country and the socialist republics of Eastern Europe. Many settled and brought over relatives. Today there are an estimated 40,000-50,000 of them in Poland, and 60,000-80,000 in the Czech Republic, the highest by proportion in Europe. The Buddhist temples and cultural centres sprouting up suggest that they are here to stay.

In both countries, the Vietnamese have integrated well. The consonant-heavy local languages initially forced them into mute professions such as wholesaling food and textiles. The more industrious flocked to trading centres in Poland and fanned out across the Czech Republic to open grocery stores and even retail chains. Some struck gold: Tao Ngoc Tu, who came as a student, now runs an Asian condiment import company and is one of Poland's richest people. "I call myself a bat,"

says Phan Chau Thanh, who came as a student in the 1990s. “Neither mouse nor bird: still a Vietnamese head, but Polish thoughts.”

Local acceptance of the Vietnamese contrasts with views on other migrants. Czechs re-elected an anti-immigrant firebrand as president last year, and a survey by the Pew Research Centre, a think-tank, shows that almost half of Poles think there should be less immigration. Many in the Vietnamese diaspora say Czechs and Poles have over time come to see them as a “safe” type of migrant. Anh Tuyet Nguyen, a café-owner in Prague, says she has often heard Czechs contrast the “hardworking” Vietnamese with other migrants who they think “leech off the state”.

Yet the welcome can sometimes feel brittle. Many Vietnamese, particularly in Poland, recount instances of finger-pointing on public transport and bullying in schools. After the financial crash of 2008, some Vietnamese-Czechs turned to drug dealing, a trend exaggerated by media scaremongers. As both countries have made it harder for people to immigrate to them, the flow of new arrivals from Vietnam is now a trickle, mostly consisting of people reuniting with relatives who are already in Europe.

Still, second-generation migrants are fitting in well. Most attended local state schools and some are Czech or Polish citizens. Trang Do Thu, a Czech blogger born in Vietnam, says that like many other Vietnamese-Czechs, she learned the local tongue from a Czech nanny while her parents worked long shifts in clothes markets. Her generation’s speaking out against the drug-dealer stereotype was crucial in dispelling it, she says. And pho (noodle soup) is now all the rage in Prague and Warsaw.

Q1. Which of the following can be most reasonably inferred from the second para of the passage?

a) Poland and the Czech Republic are not socialist republics now.

b) **The Vietnamese migrants subscribe to Buddhist culture.** ✓ **Your answer is correct**

c) A majority of the settlers prefer to bring their relatives over to the countries they settle in.

d) Asian communities are preferred to Syrian communities in Europe.

Number of words and Explanatory notes for RC:

Number of words: 498

Option A: This cannot be understood from the second para since all it says is that the first Vietnamese arrived in the 80s as part of a student exchange between their country and the socialist republics of Eastern Europe. So, it is quite likely that Poland and the Czech Republic were socialist republics back then (because it names these two countries amongst those where the Vietnamese settled). However, whether they are still socialist republics or not is open to conjecture. Hence, Option A is not the answer.

Option B: Consider this: '*The Buddhist temples and cultural centres sprouting up suggest that they are here to stay.*' If the Buddhist temples and cultural centres are a sign that they will stay here, it means those centres will be frequented by the Vietnamese migrants. So, the Vietnamese migrants must be those who subscribe to Buddhist culture. Option B is the answer.

Option C: Many who settled brought over their relatives. However, it cannot be inferred that ***a majority of the*** settlers ***prefer*** to bring over their relatives to wherever they have settled. Hence, Option C is not the answer.

Option D: Consider this: '*Poland and the Czech Republic, both of which vehemently oppose European efforts to redistribute Syrian refugees, are home to large Asian communities.*' From this we can understand that the countries vehemently oppose the ***redistribution*** of refugees. Also, they ***have Asian communities currently***. Whether they are okay with the Vietnamese refugees/immigrants is not something that can be understood from this para. So, the question of preference isn't implied. Option D is not the answer.

Choice (B)

Q2. Which of the following can be understood from the passage about the Czechs' attitude towards the migrants?

a) They treat all Vietnamese as drug-dealing migrants.

b) **They respect immigrants who are not dependent on the state for welfare.**

c) They favour those who can speak the consonant-heavy local language.

d) **They have restricted entry to just the relatives of second-generation migrants.**

Number of words and Explanatory notes for RC:

Number of words: 498

Option A: From 'After the financial crash of 2008, some Vietnamese-Czechs turned to drug dealing, a trend exaggerated by media scaremongers' we cannot extrapolate that Czechs treat all Vietnamese as drug-dealing migrants. Besides, from '*Her generation's speaking out against the drug-dealer stereotype was crucial in dispelling it, she says*' we can say that the 'stereotype' has been dispelled to a certain extent. Hence, Option A is not the answer.
Option B: Consider: '*Anh Tuyet Nguyen, a café-owner in Prague, says she has often heard Czechs contrast the "hardworking" Vietnamese with other migrants who they think "leech off the state".*' Since, the lines present the aversion of the Czechs towards those who '***leech off the state***' it can be said that they respect immigrants who are not dependent – also implied from the fact that they contrast those who are dependent on the state with the '***hardworking Vietnamese***'. Option B is the answer.
Option C: The consonant-heavy language was mentioned to highlight the initial handicap of the Vietnamese in doing business. It has got nothing to do with the attitude of the Czechs. Hence, Option C is easy to eliminate.
Option D: They have restricted entry for most immigrants in general which is why immigration has come down to a trickle (very small number). Nothing has been particularly said about relatives getting restricted. Option D is not the answer.

Choice (B)

Q3. In the last para, the author tries to establish that

a) not all Vietnamese migrants fit the drug-dealer stereotype.

b) **many Vietnamese have succeeded in acquiring citizenship of European countries they have settled in.**

c) **second generation Vietnamese migrants have managed to integrate themselves in the European countries they've settled in.**

d) **Vietnamese migrants are respected for their hardworking ethic.**

Number of words and Explanatory notes for RC:

Number of words: 498

Option A: While this has been mentioned in the para, the para overall is not just about this stereotype. There is a lot more that has been discussed about the identity of the Vietnamese. Hence, Option A is not the answer.
Option B: While this is true, this is not the focus of the author's last para, since the author mentions this earlier in the para too. Also, the idea is about the social integration of the Vietnamese and not the official citizenship. Option B is not the answer.
Option C: This is the author's central point given it is mentioned that second-generation Vietnamese migrants are fitting well, and the pho is quite popular in both the countries, not to mention the dispelling of the drug-dealer stereotype. Option C is the answer.
Option D: While this is true, it is not the central idea of the last para. This has been mentioned in a previous para. Hence, Option D is easy to eliminate. Choice (C)

Q4. One of the reasons for the author to say 'the welcome can sometimes feel brittle' is that

a) finger-pointing and bullying of Vietnamese has spiked in recent times.

b) **media exaggeration targets Vietnamese-Czechs.**

c) **Poland and the Czech Republic have made immigration extremely difficult for the Vietnamese.**

d) **only those with relatives already settled in the Czech Republic and Poland can enter these countries.**

Number of words and Explanatory notes for RC:

Number of words: 498

Consider the sentences: *'Yet the welcome can sometimes feel brittle. Many Vietnamese, particularly in Poland, recount instances of finger-pointing on public transport and bullying in schools. After the financial crash of 2008, some Vietnamese-Czechs turned to drug dealing, a trend exaggerated by media scaremongers. As both countries have made it harder for people to immigrate to them, the flow of new arrivals from Vietnam is now a trickle, mostly consisting of people reuniting with relatives who are already in Europe.'*

Option A: While this has happened previously there is no evidence to say that it has spiked in recent times. Hence, Option A is not the answer.

Option B: This is apt. '*After the financial crash of 2008, some Vietnamese-Czechs turned to drug dealing, a trend exaggerated by media scaremongers.*' This propagation of a stereotype and scaremongering to alienate Vietnamese is one of the indicators that the welcome could feel brittle (the acceptance of Vietnamese in these countries is brittle/easily breakable/not strong). Hence, Option B is the answer.

Option C: Immigration itself has been made difficult, and not just for the Vietnamese who haven't necessarily been singled out as per the evidence in the passage. So, it cannot be said that this slowing down of immigration is a sign of their welcome being brittle. Option C is not the answer.

Option D: Most people who come in now are relatives. This doesn't mean that only those who have relatives can come in. Also, this doesn't indicate that the welcome is brittle or that the locals don't quite accept them. Hence, Option D is not the answer.

Choice (B)

DIRECTIONS *for questions 5 to 9*: The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

As in real warfare, the weapons against cancer are conventional (surgery), chemical (cancer-killing drugs), nuclear (radiation therapy) or biological (viruses specifically tailored to seek out and eliminate their tumorous targets). Which is all well and good as strategies go. But as Sun Tzu observed, the wisest general is not one who wins one hundred victories in one hundred battles, but rather one who overcomes the armies of his enemies without having to fight them himself.

That, in an oncological context, is where immunotherapy comes in. Instead of attacking cancer directly, immunotherapy recruits a patient's immune system to do it. The latest way is by removing the controls which keep the immune system in check during times of bodily peace, lest it damage the person it is supposed to protect….

The treatment of melanoma that started the ball rolling employed a monoclonal antibody called ipilimumab. This locks onto and blocks the action of a protein, CTLA-4, which sits on the outer membranes of immune-system cells called T-lymphocytes. These lymphocytes exist to kill body cells that pose a threat (cancer cells).

CTLA-4 calms lymphocytes down and stops them from proliferating. That is a good thing when there is no threat around. But some cancer cells hide from the immune system, so a drug that switches CTLA-4 off can unleash lymphocytes in circumstances when they are needed but otherwise unavailable.

Ipilimumab's success has spurred the development of other antibodies that work in similar ways: Nivolumab and lambrolizumab gum up another surface protein, PD-1; and a fourth, so new that it still goes by its laboratory identifier of MPDL3280A, binds to PD-L1, a protein that would otherwise help PD-1 to do its job. …

In the original trials of ipilimumab, 11% of patients responded. Ipilimumab's successors have pushed the response rate up while maintaining the long-term benefits. A trial of nivolumab, led by Mario Sznol [of Yale Cancer Centre], showed a success rate of almost a third in a group of 107 melanoma patients, when success was defined as a tumour shrinking by 30%. The median survival time of these successes is 16.8 months, quite a gain over the nine months that might have been expected a few years ago.

Lambrolizumab, too, looks promising. Antoni Ribas [University of California] reported that the tumours of more than a third of the 135 advanced-melanoma patients have shrunk after the treatment with lambrolizumab. Some of these people had previously been treated, unsuccessfully, with ipilimumab…

Jedd Wolchok [of Memorial Sloan-Kettering Cancer Centre] reported that a combination of ipilimumab and nivolumab causes faster and more complete responses than either does on its own. So far, they have treated 52 people. The tumours of around three-quarters of these patients began shrinking in the first 12 weeks of treatment. …

This is good news for those with melanoma. Roy Herbst [of Yale University] is testing MPDL3280A in a trial open to people who have any type of metastatic tumour. Preliminary results suggest a fifth of the 140 patients in this trial are responding and these responses are long-lasting. What was once a

treatment specifically for melanoma now looks as if it might work for at least some cases of half a dozen common cancers. If such results are confirmed by future studies, a new front will have opened in the war on cancer. Moreover, the troops on this front will be not untested conscripts but confederates who are familiar with the enemy and just needed a little encouragement to join the battle. Sun Tzu would surely have approved.

Q5. According to the passage, which of the following immunotherapies is currently the most effective in the battle against cancer?

a) **A judicious combination of ipilimunab and nivolumab.**

b) **A generous dosage of ipilimunab alone.**

c) **Sparing use of either lambrolizumab alone or ipilimunab alone.**

d) **Drugs which keep the immune system in check during times of bodily peace.**

Number of words and Explanatory notes for RC:

Number of words: 586

Option A: A combination of ipilimumab and nivolumab causes faster and more complete responses than either does on its own. So far, they have treated 52 people. The tumours of around three-quarters of these patients began shrinking in the first 12 weeks of treatment. …
Option B: Option B is ruled out as explained for option A.
Option C: Lambrolizumab, too, looks promising. Antoni Ribas of the University of California, Los Angeles, and his colleagues reported that the tumours of more than a third of the 135 advanced-melanoma patients whom they had treated with it have shrunk. Some of these people had previously been treated, unsuccessfully, with ipilimumab. We can infer that these two drugs (ipilimumab and lambrolizumab) alone will not be as effective as the combination of drugs suggested in option A. So option C is not the answer.
Option D: The latest way of doing so is **by removing the controls** which keep the immune system in check during times of bodily peace, lest it damage the person it is supposed to be protecting…. option D is not the answer. Choice (A)

Q6. Which of the following is most likely the point of similarity in the mode of action of the antibodies Nivolumab, Lambrolizumab, Ipilimumab and MPDL3280A?

a) **They facilitate the process of programmed cell death, a mechanism that allows T-lymphocytes to self-destruct in response to an appropriate trigger.**

b) **They target and inactivate the surface proteins of T-lymphocytes leading to a decrease in lymphocyte proliferation.**

c) **They work by shutting down proteins that limit the proliferation of lymphoctyes.**

d) **They cut off the food supply of tumourous cells while sneaking vital nutrients to T-lymphocytes.**

Number of words and Explanatory notes for RC:

Number of words: 586

Option A: Option A is a clever distraction. It is not the answer. T-lymphocytes do not self-destruct. Their proliferation increases as these checkpoint inhibitors remove the controls which keep the immune system in check during times of bodily peace.
Option B: The antibodies Nivolumab, Lambrolizumab, Ipilimumab and MPDL3280 do not cause a decrease in the proliferation of T-lymphocytes. They block the actions of proteins whose role is to calm lymphocytes down and prevent them from proliferating. Hence option B is not the answer.
Option C: Ipilimumab locks onto and thus blocks the action of a protein, CTLA-4, which sits on the outer membranes of immune-system cells called T-lymphocytes. These lymphocytes exist to kill body cells that pose a threat, such as cells infected by viruses, and also cancer cells.
CTLA-4's role is to calm lymphocytes down and stop them proliferating. That is a good thing when there is no threat around. But some cancer cells are skilled at hiding from the immune system, so a drug that switches CTLA-4 off can unleash lymphocytes in circumstances when they are needed but otherwise unavailable. Nivolumab and lambrolizumab gum up (to stop a process from working smoothly) another surface protein, PD-1; and a fourth, MPDL3280A, binds to PD-L1, a protein that would otherwise help PD-1 to do its job. Hence option C is correct and is the answer.
Option D: Option D is out of scope of the given passage and is not the answer.

Choice (C)

Q7. All of the following additional studies will strengthen the research findings mentioned in the passage EXCEPT?

a) **A study which confirms that monoclonal antibody treatment for melanoma works on cancer of the lungs, kidneys, bladder, colon, stomach, head and neck too.**

b) **A study that shows that administering ipilimumab and nivolumab together resulted in tumours shrinking by 80% in a 12-month window with patients continuing to respond at their last check-up.**

c) **A study which shows that administering lambrolizumab and nivolumab together resulted in tumours shrinking by 90% with the median survival time of these successes going up to 19 months.**

d) **A study which showcases the most cost-effective way of synthesizing ipilimumab and nivolumab.**

Number of words and Explanatory notes for RC:

Number of words: 586

Option A: This is good news for those with melanoma. Roy Herbst [Yale University] is testing MPDL3280A in a trial open to people who have any type of metastatic tumour. Preliminary results suggest a fifth of the 140 patients in this trial are responding and these responses are long-lasting. What was once a treatment specifically for melanoma **now looks as if** it might work for at least some cases of half a dozen common cancers. **If such results are confirmed by future studies**, a new front will have opened in the war on cancer. Hence option A supports the research findings given in the passage and is not the answer.
Option B: Jedd Wolchok of the Memorial Sloan-Kettering Cancer Centre reported that a combination of ipilimumab and nivolumab causes faster and more complete responses than either does on its own. So far, they have treated 52 people. The tumours of around three-quarters of these patients began shrinking in the first 12 weeks of treatment. …So option B will strengthen the research findings mentioned in the passage. Option B is not the answer.
Option C: A trial of nivolumab, led by Mario Sznol [Yale Cancer Centre], showed a success rate of almost a third in a group of 107 melanoma patients, when success was defined as a tumour shrinking by 30%. The median survival time of these successes is 16.8 months, quite a gain over the nine months that might have been expected a few years ago. So option C will strengthen the research findings mentioned in the passage. Option C is not the answer.
Option D: While this will help in making the drug available to the public, this is not the focus of the research presented in the passage. The research related to these drugs is still in the testing phase. Hence, this study will not strengthen the findings of the passage. Option D is the required answer. Choice (D)

Q8. The passage ends with the sentence “Sun Tzu would surely have approved”. It can be understood from the passage that Sun Tzu would most likely also have approved of…

a) a general who wins one hundred victories in a hundred battles.

b) a general who overcomes the armies of his enemies without having to fight them himself.

c) an army general who recruits no one else to fight on his behalf.

d) an army general who is a war strategist par excellence.

Number of words and Explanatory notes for RC:

Number of words: 586

Option A: Which is all well and good as strategies go. But as Sun Tzu observed, the wisest general is not one who wins one hundred victories in one hundred battles. So option A is not the answer.
Option B: But as Sun Tzu observed, the wisest general is one who overcomes the armies of his enemies without having to fight them himself. That, in an oncological context, is where immunotherapy comes in. Instead of attacking cancer directly, immunotherapy recruits a patient's immune system to do the attacking. The latest way of doing so is by removing the controls which keep the immune system in check during times of bodily peace, lest it damage the person it is supposed to be protecting. Also refer to the last para: A new front will have opened in the war on cancer. Moreover, the troops on this front will be not untested conscripts but confederates who are familiar with the enemy and just needed a little encouragement to join the battle. Sun Tzu would surely have approved.
{Note: The literal meaning of confederates is: someone you work together with in a secret, sometimes illegal, activity.} Hence option B is correct and is the answer.
Option C: As Sun Tzu observed, the wisest general is one who overcomes the armies of his enemies without having to fight them himself. Option C would negate his view and is not the answer.
Option D: Which is all well and good as strategies go. But as Sun Tzu observed …Option D, though important, is not sufficient as an answer. Choice (B)

Q9. The primary purpose of the passage is to

a) **assess the effectiveness of a strategy employed in addressing a scientific question.**

b) **discuss multiple ways of analysing different perspectives on a scientific discipline.**

c) **evaluate a recently proposed argument concerning the mode of action of check-point inhibitors.**

d) **describe a controversy concerning the significance of evidence from cancer clinical trials.**

Option A: The passage discusses a new class of drugs being deployed in the struggle against cancer. As in real warfare, the weapons against cancer are .....which is all well and good as strategies go. ... The latest way of doing so is by removing the controls which keep the immune system in check during times of bodily peace, lest it damage the person it is supposed to be protecting....The treatment of melanoma that started the ball rolling employed a drug called ipilimumab. ... Ipilimumab's success has spurred the development of further antibodies that work in similar ways. Hence option A is the correct answer.
Option B: The primary purpose of the passage is not to identify differing perspectives on a scientific discipline related to cancer treatment and the like. The passage also does not describe multiple ways of treating cancer. So option B is out of the scope of discussion of the passage. So option B is not the answer.
Option C: There are no arguments against any research teams' conclusions in the passage. So option C does not apply.
Option D: There is no controversy or opposing argument about the significance of evidence from cancer clinical trials. Choice (A)

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

Programming computers is a piece of cake. Or so the world's digital-skills gurus would have us believe … [T]he art and science of making software is now as accessible as the alphabet. Unfortunately, this rosy portrait bears no relation to reality.

For starters, the profile of a programmer's mind is pretty uncommon. As well as being highly analytical and creative, software developers need almost superhuman focus to manage the complexity of their tasks. Manic attention to detail is a must; slovenliness is verboten. Attaining this level of concentration requires a state of mind called being 'in the flow', a quasi-symbiotic relationship between human and machine that improves performance and motivation.

Coding isn't the only job that demands intense focus. But you'd never hear someone say that brain surgery is 'fun', or that structural engineering is 'easy'. When it comes to programming, why do policymakers and technologists pretend otherwise? For one, it helps lure people to the field at a time when software, in the words of the venture capitalist Marc Andreessen, is 'eating the world' – and so, by expanding the labour pool, keeps industry ticking over and wages under control. Another reason is that the very word 'coding' sounds routine and repetitive, as though there's some sort of key that developers apply by rote to crack any given problem...

Insisting on the glamour and fun of coding is the wrong way to acquaint kids with computer science. It insults their intelligence and plants the pernicious notion in their heads that you don't need discipline in order to progress. As anyone with even minimal exposure to making software knows, behind a minute of typing lies an hour of study.

It's better to admit that coding is complicated, technically and ethically. Computers, at the moment, can only execute orders, to varying degrees of sophistication. So, it's up to the developer to be clear: the machine does what you say, not what you mean. More and more 'decisions' are being entrusted to software, including life-or-death ones: think self-driving cars; think semi-autonomous weapons... Yet, it's rarely in the interests of companies and governments to encourage us to probe what's going on beneath these processes.

All of these scenarios are built on exquisitely technical foundations. But we can't respond to them by answering exclusively technical questions. Programming is not a detail that can be left to 'technicians' under the false pretence that their choices will be 'scientifically neutral'. Societies are too complex: the algorithmic is political ... The digital giants of today run on a fraction of the employees of the industrial giants of yesterday, so the irony of encouraging more people to work as programmers is that they are slowly mobilising themselves out of jobs.

In an ever-more intricate and connected world, where software plays a larger and larger role in everyday life, it's irresponsible to speak of coding as a lightweight activity. Software is not simply lines of code, nor is it blandly technical. In just a few years, understanding programming will be an indispensable part of active citizenship. The idea that coding offers an unproblematic path to social progress and personal enhancement works to the advantage of the growing techno-plutocracy that's insulating itself behind its own technology.

Q10. Which of the following has not been alluded to as a characteristic of the programmer's uncommon mind?

a) **A superhuman focus on creativity and analysis**

b) **An eye for detail**

c) **A dislike for the lack of organisation**

d) **A high level of concentration tuned towards highly motivated performance**

Number of words and Explanatory notes for RC:

Number of words: 535

Option A: From '***As well as being*** *highly analytical and creative, software developers need almost superhuman focus to manage the complexity of their tasks*', we can understand being highly analytical and creative is a different set of characteristics and a superhuman focus to manage complexity is different. Option A is the answer.
Option B: An eye for detail is the ability to observe minutest of things. This can be understood from '*Manic attention to detail is a must*'. Hence, Option B is not the answer.
Option C: Slovenliness is verboten, means that clumsiness or untidiness is forbidden, which can help us infer that there is a dislike for the lack of organisation or messiness amongst coders. Option C is not the answer.
Option D: This can be understood from – '*Attaining this level of concentration requires a state of mind called being 'in the flow', a quasi-symbiotic relationship between human and machine that improves performance and motivation.*' So, coders need a level of concentration which comes from *a state of mind that improves performance and motivation*. It is important to note that motivation and performance and motivated performance can be inferred to be the same unlike in some cases where part of speech switch (motivation and motivated) alters the difference. Hence, Option D is not the answer. Choice (A)

Q11. The assumption that the author points to in his argument in para 4 is that

a) **one can be good at coding only through discipline.**

b) **coding is harmful if it is not accompanied with studying and research.**

c) **what's glamour and fun doesn't need discipline.**

d) **coding can be tedious for those who have no prior exposure to it.**

Number of words and Explanatory notes for RC:

Number of words: 535

Consider the sentences: '*Insisting on the glamour and fun of coding is the wrong way to acquaint kids with computer science. It insults their intelligence and plants the pernicious notion in their heads that you don't need discipline in order to progress. As anyone with even minimal exposure to making software knows, behind a minute of typing lies an hour of study.*' The author asserts that glamour and fun of coding is the wrong way because it is ***equated to the irrelevance of discipline***. That's the assumption, that glamour and fun is incompatible with discipline. Similarly, discipline has been equated to an hour of study, with the underlying assumption that such research cannot be equated to glamour and fun.

Option A: Whether one is good at coding or not does not address the question here, which concerns the author's assumptions. The argument here is more about encouraging people to take up coding and the way it is done. Hence, Option A is not the answer.

Option B: Whether coding is harmful or not has been discussed in this para. It is about how coding is sold to people/or how people are encouraged to take up coding. Hence, Option B is not the answer.

Option C: As explained above, the author says using the words glamour and fun for coding is wrong as it will be interpreted as the irrelevance of discipline. Here the author assumes that being disciplined goes against the grain of fun/glamour. Hence, Option C is the answer.

Option D: How much fun coding is and its dependence on how much exposure one has to coding has not been explored in this para. All the author says is that anyone with exposure to coding would know that research is needed before one can code fluently. This does not mean those with no exposure find it tedious. Hence, Option D is not the answer.

Choice (C)

Q12. The author develops on Marc Andreessen's comments to explain that

a) **a greater labour pool is needed to keep the demand for coders low and, therefore, their wages, low as well.**

b) **coding has to be advertised as easy and fun to attract people to what is actually complicated.**

c) **the monotonous nature of coding doesn't attract too many takers.**

d) **policymakers pretend as if there is nothing wrong with software when clearly there is.**

Number of words and Explanatory notes for RC:

Number of words: 535

Option A: While this is true, this doesn't explain why the author uses the expression 'eating the world' – something that is consuming the world, taking up more and more. Option A is not the answer.
Option B: Consider the sentences: '*For one, it helps **lure people** to the field at a time when software, in the words of the venture capitalist Marc Andreessen, is 'eating the world' – and so, by expanding the labour pool, keeps industry ticking over and wages under control.*' So, calling coding fun 'lures people' (which has a negative connotation – attract towards something deceptive) at a time when <XYZ> is happening. It can be inferred that XYZ is negative. So, this option is apt. Option B is the answer.
Option C: While this is true, this is the second reason why coding is advertised as fun. The author mentions the Andreesen's comments as the first reason. So, these two are not connected to each other. Hence, Option C is not the answer.
Option D: Policymakers are pretending as if coding is fun when it needs a lot of focus. The author doesn't imply that there is something **wrong** with coding. Hence, Option D is not the answer. Choice (B)

Q13. The advantage referred to in the last line of the passage is that

a) **the wealthy technology giants are gaining more and more control by packaging coding as a simplistic endeavour.**

b) **coding offers an easy path to social evolution besides helping individuals improve the quality of their life.**

c) **coding is not a boring and monotonous task as there is a lot that goes on behind the scenes.**

d) **coding helps technology companies mask their deeper projects behind a veil of secrecy.**

Number of words and Explanatory notes for RC:

Number of words: 535

Option A: Consider the sentences: '*The idea that coding offers an unproblematic path to social progress and personal enhancement* ***works to the advantage of the growing techno-plutocracy*** *that's insulating itself behind its own technology.*' This idea that coding is something that helps social progress is strengthening the techno-plutocracy. This can also be understood from *'it's irresponsible to speak of coding as a lightweight activity'*. Such an idea brings more people to coding and thereby, gives more control to the technology companies. Hence, Option A is the answer.
Option B: The idea that 'coding offers an unproblematic path' is working to the advantage of the techno-plutocracy (plutocracy is the rule of the wealthy). So, the advantage is not the idea itself. The 'advantage' benefits the techno-plutocracy. Also, since the idea is what gives the techno-plutocracy the advantage, the tone shouldn't be positive. Hence, Option B is not the answer.
Option C: This doesn't quite explain what the 'advantage' referred to in the last line. The subject in the last line is a much bigger idea compared to the idea of whether coding is monotonous or fun. Hence, Option C is not the answer.
Option D: This option is too rhetorical. For starters, we don't understand what is meant by veil of secrecy as nothing like that has been alluded to in the passage. Secondly, this hints at extreme scenarios which cannot be inferred from the last line, for example, deeper projects. Hence, Option D is easy to eliminate. Choice (A)

Q14. The irony mentioned in the penultimate para of the passage is that

a) **programmers are increasing in number while jobs in other sectors are going down.**

b) **more programmers are being hired even when jobs are being automated.**

c) **programmers are contributing to their own obsolescence.**

d) **digital giants run on a much smaller number of employees than industrial giants.**

Number of words and Explanatory notes for RC:

Number of words: 535

Option A: The increase in the number of jobs available for programmers hasn't been contrasted with jobs in other sectors. So, this isn't the irony being referred to in the passage. Option A is not the answer.
Option B: More programmers aren't being 'hired' even when jobs are being automated. The hiring of programmers hasn't been highlighted. Programmers are contributing to the eventual automation, not that they are being hired while the automation is taking place on the other end. Option B is not the answer.
Option C: This is the irony as the expected outcome and the eventual outcome are incongruent with each other. Programmers are being encouraged to participate in the process of automation – something that will eventually make them irrelevant/redundant/obsolescent. Hence, Option C is the answer.
Option D: The lower number of employees is not ironical since there is no contrast with respect to what is expected. In fact, the author is candidly and straightforwardly pointing out that ***since the number of employees is lower, it is ironical that they are being encouraged to take themselves out of jobs.*** Choice (C)

DIRECTIONS *for questions 15 to 19*: The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

…Costa Rica has announced that it would be putting itself forward as one of three candidates from Latin America for one of two seats on the United Nations Human Rights Council (UNHRC). Brazil is up for re-election and Venezuela is up for election to the international human rights body in the Oct. 17 vote, and Costa Rica's candidacy is intended to push out the autocratic Venezuelan regime. It is no surprise that Costa Rica, which in the 1980s negotiated an end to several civil wars in Central America – earning then-President Óscar Arias a Nobel Peace Prize – would step forward as a defender of human rights internationally. What is surprising is that, in a region that has long prided itself on regional solidarity, the country is mounting a direct and explicit challenge to Venezuela.

… Costa Rica's move to replace Venezuela on the UNHRC comes on the heels of a series of public rebukes of Venezuela's record on democracy and human rights from around the region. Earlier this year, the Lima Group – the ad hoc coalition of democratically elected governments, including Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Panama, Paraguay, and Peru – recognized opposition leader Juan Guaidó as Venezuela's legitimate elected interim president ... There were two notable exceptions, however. One was Mexico, under President Andrés Manuel López Obrador, who cited a prohibition in Mexico's constitution on interfering in matters of national sovereignty, a prohibition that he didn't seem to care much about when he called for international intervention in Mexico in 2006 after he said that the presidential elections had been stolen from him. The other was Uruguay, which has since participated in the International Contact Group, a European initiative that has implicitly recognized the illegitimacy of Venezuelan President Nicolás Maduro's May 2018 re-election and called for negotiations for his exit ...

Venezuela, a proud supporter of human rights abusers on the UNHRC, has consistently voted against resolutions condemning human rights violations in Iran, Syria, and North Korea. Even so, Latin American governments voted overwhelmingly for Venezuela to join the human rights group in 2016, and [also] in 2014 the region voted as a bloc – as it often does for its hemispheric neighbours – to support Venezuela's accession to the rotating seat on the U.N. Security Council. All of this despite growing concerns over the deterioration of democracy in Venezuela...

…[M]ore than 4.4 million Venezuelans have fled Venezuela's humanitarian meltdown. [As a result] 18 foreign ministers from the region have invoked the Rio Treaty which commits members to act against an attack against one member as "an attack against all the American States." In this case, though, the attack was against the Venezuelan people by the country's own government. The 18 Latin American governments that endorsed the treaty both hoped to use it as an injunction against threatened U.S. military intervention in Venezuela and as an avenue to permit diplomatic and economic sanctions against the Maduro regime. So far, though, no government in the region has stepped up to impose the now officially sanctioned sanctions. Their reluctance stems from two reasons: their traditional squeamishness in punishing hemispheric partners – even diplomatically – and the absence of precedent and legislation that permit governments to freeze assets and block trade and investment. All this has made Costa Rica's unusual challenge to Venezuela's seat on the UNHRC all the more important…

Q15. Which of the following is implied in the second para of the passage?

a) **Mexico didn't share the Lima Group's stand on who holds power in Venezuela not because of prohibitions in its constitution.**

b) **Uruguay has gone against the Lima Group's stand on who should hold power in Venezuela by participating in the International Contact Group.**

c) **Costa Rica is throwing its hat in the ring as a result of encouragement from other Latin American countries openly rebuking Venezuela's human rights record.**

d) **The Mexican President has been guilty of double standards as far as following Mexico's constitution is concerned.**

Number of words and Explanatory notes for RC:

Number of words: 558

Consider the second para of the passage: '… *Costa Rica's move to replace Venezuela on the UNHRC comes on the heels of a series of public rebukes of Venezuela's record on democracy and human rights from around the region. Earlier this year,* ***the Lima Group****—the ad hoc coalition of democratically elected governments, including Argentina, Brazil, Canada, Chile, Colombia, Costa Rica, Guatemala, Honduras, Mexico, Panama, Paraguay, and Peru –* ***recognized opposition leader Juan Guaidó as Venezuela's legitimate elected interim president*** *after he was sworn in as the head of the National Assembly in January. There were two notable exceptions, however. One was Mexico, under President Andrés Manuel López Obrador, who cited a prohibition in Mexico's constitution on interfering in matters of national sovereignty,* ***a prohibition that he didn't seem to care much about when he called for international intervention in Mexico in 2006*** *after he said that the presidential elections had been stolen from him. The other was Uruguay,* ***which has since participated*** *in the International Contact Group, a European initiative* ***that has implicitly recognized the illegitimacy of Venezuelan President Nicolás Maduro's*** *May 2018 re-election and called for negotiations for his exit...*'

Option A: Consider the following sentences: '*One was Mexico, under President Andrés Manuel López Obrador, who cited a prohibition in Mexico's constitution on interfering in matters of national sovereignty*'. While the author doesn't quite agree with Mexico's excuse it is more so because Mexico's president in the past hasn't shown regard for the prohibition (in interfering in matters of national sovereignty). But, we cannot be sure what else could be the reason. Option A cannot be inferred. Option A is not the answer.

Option B: While it is true that Uruguay did abstain itself from the stand taken by the Lima Group, the situation mentioned is not the proof of the same. In fact, from '*The other was Uruguay,* ***which has since participated*** *in the International Contact Group, a European initiative* ***that has implicitly recognized the illegitimacy of Venezuelan President Nicolás Maduro's*** *May 2018 re-election and called for negotiations for his exit...*' we can understand that Uruguay eventually came around and ratified the same stand by implicitly recognizing the ***illegitimacy*** of the President Nicolas Maduro (the Lima group had ***recognized opposition leader Juan Guaidó as Venezuela's legitimate elected interim president)***. So, Option B cannot be verified. Option B is not the answer.

Option C: This is a correlation-causation fallacy. '… *Costa Rica's move to replace Venezuela on the UNHRC comes on the heels of a series of public rebukes of Venezuela's record on democracy and human rights from around the region.*' Costa Rica's move comes on the heels of (immediately after) a series of public rebukes, not ***because of*** those rebukes. So, it cannot be inferred that Costa Rica has been encouraged by other countries in the region. Option C is not the answer.

Option D: The author clearly points out that Mexico's President didn't have regard for the same rule in the Constitution back in 2006 that he is citing now in order to distance himself from the Lima Group's stand. So, it can be inferred that the Mexican president has been guilty of double standards as far as the Constitutional law of not-interference in matters of national sovereignty was concerned. Option D is the answer.

Choice (D)

Q16. The author mentions Venezuela's support for human rights abusers to further the argument that Latin American countries have

a) **showed patience in the past despite Venezuela's transgressions.**

b) **put regional solidarity above the sanctity of the UNHRC in the past.**

c) **always voted as one bloc for their hemispheric neighbours at global platforms.**

d) **completely ignored the decadence of Venezuelan democracy in the past.**

Number of words and Explanatory notes for RC:

Number of words: 558

Option A: The author wanted to highlight that Venezuela has been up the wrong alley for quite a while and has been thwarting democratic principles. Despite this, the other Latin American countries have supported its entry into various groups. So, the author suggests there has been patience shown towards Venezuela. Option A is the answer.
Option B: This is an extreme allegation against the Latin American countries, since we cannot really conclude that they went against the spirit of human rights to an extent that they can be blamed for desecrating the sanctity of the UNHRC. True that they voted for a human rights violator but such an action cannot be generalized into a bigger pattern to state that they have preferred regional solidarity over preserving the UNHRC sanctity. Option B is not the answer.
Option C: True, that Latin American countries have voted as a bloc for Venezuela. That doesn't allow us to conclude that they always vote as a bloc at the global level. Hence, Option C is not the answer.
Option D: We cannot really conclude that the decadence or deterioration of Venezuelan democracy has been completely ignored by other Latin American countries. All we know is that these countries have voted for Venezuela in the past despite the deteriorating status of democracy there. Option D is not the answer.

Choice (A)

Q17. The reluctance of Latin American countries in imposing the 'officially sanctioned sanctions' can be explained by the fact that

a) **the chances of a US military intervention in Venezuela are high.**

b) **the Rio Treaty only allows the Latin American countries to act against external threats.**

c) **neither law nor example encourages Latin American countries to block trade against one of their own.**

d) **Latin American countries have traditionally turned a blind eye to Venezuela's human rights violations.**

Number of words and Explanatory notes for RC:

Number of words: 558

Option A: The para doesn't mention that the chances are high for US military intervention. In fact, it is clearly stated that the Latin American governments were hoping to use the treaty as an injunction ***against threatened US Military intervention in Venezuela.*** Hence, Option A is not the answer.
Option B: While this is true, in this case the author did explain that the 18 countries used the treaty to move things forward against Venezuela. This can be understood from: '*In this case, though, the attack was against the Venezuelan people by the country's own government. The 18 Latin American governments that endorsed the treaty both* ***hoped to use it as an injunction*** *against threatened U.S. military intervention in Venezuela and as an avenue to permit diplomatic and economic sanctions against the Maduro regime.*' So, it is clear that the Rio Treaty is not necessarily a roadblock for the Latin American countries to act against Venezuela and impose the said sanctions.
Option C: Consider this: '*and the* ***absence of precedent and legislation*** *that permit governments to freeze assets and block trade and investment*'. This shows that one of the reasons behind their reluctance is the fact that there is no legislation that the 18 governments can use or no precedent (case of this happening in the past) that can help these countries impose sanctions on Venezuelan trade. So, it can be said that neither law (legislation) nor example (precedent) encourages Latin American countries to block trade against one of their own (Venezuela). Option C is the answer.
Option D: The author mentions that the Latin American countries are hesitant when it comes to taking the hard steps against one of their own. Turning a blind eye is completely ignoring something. Now, this option is an example of a circular fallacy since it repeats what the question mentions without giving us the reason as to why these countries are turning a blind eye, whereas the question asks for a reason the countries are reluctant to act against Latin America. Option D is not the answer.

Choice (C)

Q18. The author's opinion about Costa Rica's candidacy as understood from the first para is that

a) **it was an expected event owing to Costa Rica's record as a defender of human rights internationally.**

b) **it was surprising to see a Latin American country betray the regional solidarity.**

c) **it was necessary to call out Venezuela's autocratic regime on an international platform.**

d) **it was necessary to make Venezuela pay for its human rights infringements.**

Number of words and Explanatory notes for RC:

Number of words: 558

Option A: While the author says that Costa Rica does take its role as a defender of human rights internationally very seriously, we cannot really infer that '***it was expected'***. 'It is not surprising' is not the same as 'it was expected'. Hence, Option A is not the answer.
Option B: This is apt since the author mentions that '*What is surprising is that, in* ***a region that has long prided itself on regional solidarity****, the country is mounting a direct and explicit challenge to Venezuela.*' So, the author finds it surprising that a Latin American country is betraying (not in the true sense of the word but rather weaken whatever spirit held the countries together) regional solidarity by going against one of its own. Hence, Option B is the answer.
Option C: 'Calling out' or pointing out that Venezuela's autocratic regime is flourishing is not required since it is already acknowledged as can be understood from the passage. That has got nothing to do with Costa Rica's candidacy, since we are not sure if Costa Rica is really going to talk about Venezuela's human rights violations. Option C is not the answer.
Option D: The author didn't really bring vindictiveness into the picture simply pointing out to what is surprising and what isn't, neither of which encompasses the need to ***make Venezuela pay***, which are strong words. Hence, Option D is not the answer.

Choice (B)

Q19. The main purpose of the passage is to emphasise that

a) Costa Rica deserves a seat on the UNHRC more than Venezuela does because of the former's immaculate human rights record.

b) **Venezuela's autocratic regime needs to be pushed out of the UNHRC owing to its scant regard for human rights.**

c) the Latin American regional solidarity is fraying because of Venezuela's humanitarian crisis.

d) Costa Rica is taking a firm stand against Venezuela despite the reluctance of other Latin American governments to do so.

Number of words and Explanatory notes for RC:

Number of words: 558

Option A: While the author does talk about how it is unsurprising (owing to its past record) that Costa Rica has thrown its hat in the ring to contest against Venezuela, the discussion doesn't veer towards whether Costa Rica deserves a seat on the UNHRC or not. In fact, the passage doesn't discuss what qualifies any country for a seat on the UNHRC except for the contest between three countries for two seats, of which Brazil is sure to be re-elected. Option A is not the answer.
Option B: While the author describes at length the human rights abuses Venezuela is perpetrating, the passage doesn't really recommend that the regime should be thrown out. It stops at saying that it will be interesting to note what happens going forward. Hence, Option B is not the main idea the author is trying to emphasize upon. Option B is not the answer.
Option C: This has both the ideas the passage predominantly revolves around: that the Latin American regional solidarity is disappearing and that the cause for that is the humanitarian crisis in Venezuela, owing to which the other Latin American countries are running out of faith. Option C is the answer.
Option D: While there is a break from the Latin American tradition of acting like a bloc, the passage doesn't really argue that Costa Rica alone is taking a stand. This is because all the 18 governments are planning to take action against Venezuela and were in on the Rio Treaty sanctions. So, Costa Rica is probably amply supported. Hence, this is not the main idea of the passage. Option D is not the answer.

Choice (C)

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.

After eight difficult years doing whatever it took to support Europe's economies, Mario Draghi is about to step down as the president of the European Central Bank. In taking up this challenge, his successor, Christine Lagarde, faces the same underlying problem: The currency union at the centre of the European project is unfinished work.

From the beginning, the euro has been incomplete by design. Its creators knew that to share a currency, countries must also share risks – as, for example, states in the United States do through federal institutions such as a common budget, social safety net and financial backstops. Otherwise, the centrifugal forces of divergent economies would threaten to tear the union apart. These essential mechanisms were left out, because member nations [of the European Union] weren't ready for the loss of sovereignty they would entail.

Visionaries […] thought that the resulting crises would push Europe in the right political direction. To some extent, this has happened. The sovereign-debt debacle that began earlier this decade – and that brought Greece to the brink of abandoning the common currency – compelled Europe's leaders to take steps toward deeper integration. They established elements of a banking union, for example, including centralized entities with the power to supervise, take over and shore up the region's financial institutions.

What remains to be done, though, dwarfs the progress that's been made so far. Efforts to create a euro-area budget to mitigate recessions […] have gone nowhere. And the banking union has stopped short of real risk-sharing: It won't spend joint public funds on recapitalizations, and its "third pillar" – a mutual deposit-insurance system – is still only a proposal. As a result, measured by cross-border lending, financial integration in Europe has stalled.

The flaws in the euro's structure have taken a heavy human, economic and political toll. Greece endured a depression and untold suffering that, in a proper risk-sharing union, would have been largely unnecessary. Draghi's extraordinary efforts to hold the currency together depleted the ECB's resources, leaving it ill-prepared to fight the next recession. Europe's dysfunction shattered faith in the political establishment, contributing to the populist and right-wing resurgence that has swept across the Western world.

… This leaves Europe's leaders with just one safe course: Find the will to act in relatively benign times, so that the next crisis won't happen in the first place or won't be quite so painful if it does. Now would be a good moment. ... Here are the main elements, borrowed from a recent proposal by a group of French and German economists: Complete the banking union. Institute mutual deposit insurance and jointly pledge ample public funds to recapitalize banks when necessary, so that people will perceive a euro deposited in Germany as equivalent to a euro deposited in, say, Greece or Italy. To ensure that such backstops aren't abused, require banks to operate with ample loss-absorbing capital and limit their investments in the bonds of their own governments. Grant more power and independence to the entities responsible for the financial system – such as the Single Resolution Board – so Europe's leaders won't have to convene an emergency summit every time a bank gets into trouble... No doubt, this is a tall order…Better that governments overcome this inertia now than during a new emergency that might just test the European project to destruction.

Q20. The euro has been called 'incomplete by design' because

a) member nations aren't bound together the way states in the United States are.

b) **tools to alleviate risks haven't been included in the design.**

c) member nations want decisional autonomy.

d) divergent economies are always a risk to their union.

Number of words and Explanatory notes for RC:

Number of words: 552

Consider the sentences: '*From the beginning, the euro has been incomplete by design. Its creators knew that to share a currency,* ***countries must also share risks*** *— as, for example, states in the United States do through federal institutions such as a common budget, social safety net and financial backstops. Otherwise, the centrifugal forces of divergent economies would threaten to tear the union apart.* ***These essential mechanisms were left out****, because member nations [of the European Union] weren't ready for the loss of sovereignty they would entail.' (*Second para of the passage)

Option A: While this is true, this doesn't explain why the euro is incomplete by design. That incompleteness is more because of the absence of risk-sharing mechanisms than because of the tightness with which the countries are bound, which is too generic a way of explaining that they don't share everything. Also, being 'bound together' isn't a guarantee that there is risk-sharing. Hence, Option A is not the answer.

Option B: This explains the reason as the para mentions two things: that the member nations must also share risks to share a currency, but the member nations don't because that would entail loss of sovereignty – their autonomy, submitting to those mechanisms.

Option C: It has been mentioned in the passage that the risk-sharing and managing mechanisms haven't been put in place because member nations do not want to give up on their sovereignty (which they have to because mechanisms that bind the member nations together will give them less elbow room or autonomy). However, member nations wanting decisional autonomy isn't accurately depicting the right answer that member nations do not want to give up sovereignty loss by installing risk-sharing mechanisms. Hence, Option C is close but not the answer.

Option D: The divergent economies are a risk, true. But that is not the reason for why the euro is incomplete by design. The reason the euro is incomplete by design is because there aren't enough mechanisms to share the risk caused by divergent economies. Hence, Option D is not the answer. Choice (B)

Q21. In the sentence 'To ensure that such backstops aren't abused … of their own governments' (sixth para), the author implies that

a) banks never operate with enough capital to absorb losses.

b) **the value of a euro isn't the same across different member countries of the union.**

c) **banks investing in the bonds of their own countries beyond a limit undermines the purpose of recapitalising the banks.**

d) sudden drop in value of bonds issued by a country could cause the banking system to collapse.

Number of words and Explanatory notes for RC:

Number of words: 552

Option A: It has been mentioned as a backstop (that banks should operate with sufficient capital to absorb losses), as a mechanism to make sure the recapitalising is not abused. But just because the author recommends enough capital, doesn't mean none of the banks do it currently. The author could just be reiterating a fundamental precaution.
Option A is not the answer.
Option B: The mechanism of recapitalising is so that the euro is perceived equally across all the countries. From '*recapitalize banks when necessary, so that people will perceive a euro deposited in Germany as equivalent to a euro deposited in, say, Greece or Italy*' we can understand that the author suggests recapitalising banks (when necessary) will ensure the euro has the same status across. Does it necessarily affect the value? We cannot say. All we can understand is that to maintain the status of the euro, banks need to be recapitalized ***when necessary.*** Option B is not the answer.
Option C: The author clearly states that banks should be recapitalised and the backstops are necessary to prevent abuse of the system. One of these backstops is preventing banks from investing beyond a limit in the bonds of their own countries. So, we can understand that investing in those bonds ***beyond a limit*** undermines the purpose of recapitalising as it is an abuse of the system. Option C is the answer.
Option D: While it is implied that the bonds issued by a country need not be trustworthy all the time (which is why banks shouldn't invest too much into the bonds of their country) we cannot really understand that drop in value of the bonds will pull down the whole structure/banking system. Hence, Option D is not the answer.

Choice (C)

Q22. The author ends the passage

a) on a cautionary note that the European project is on its last legs.

b) **with an advice note stating that the European project will survive only if its governments come out of their stupor immediately.**

c) **with the caveat that the centrifugal forces of divergent economies will tear the Union apart.**

d) **with the warning that procrastinating action will leave the European Union in dire straits come the next crisis.**

Number of words and Explanatory notes for RC:

Number of words: 552

Consider the sentences: '*Better that governments overcome this inertia now than during a new emergency that might just test the European project to destruction.*' What the author is trying to say is that the governments need to act immediately now, when there is no crisis, to ensure that when there is a crisis/emergency they are not tested to the brink of destruction.
Option A: Saying that the European project is on its last legs (close to the end) is extreme extrapolation. We are simply warned that the union needs to take action quickly, and if that happens, it could restore its stability. Such a scenario wouldn't be compatible with the expression 'last legs'. Hence, Option A is not the answer.
Option B: This option takes the author's cautionary note to the extreme. The author states that the governments are better off taking action now (come out of inertia) rather than wait for a crisis that could destroy them. That means there is a possibility that even a crisis may not really destroy them, just that the chances are high. So, it is not correct to say that the author means unless action is taken immediately the European project is destroyed. Hence, Option C is not the answer.
Option C: This is highly irrelevant to the last line of the passage where the destruction/crisis the author is talking about is not necessarily a consequence of the divergent economies. Right now, there aren't enough risk mechanisms because of those divergent economies not willing to give up a part of their sovereignty. But, the author doesn't really indicate that these forces are the reason why the union will be destroyed. It is an impending crisis and the lack of proper mechanisms. Hence, Option C is not the answer.
Option D: This rightly focuses on the tone (caution/warning as opposed to advice) and also on the content of the warning – that action needs to be taken now rather than later during an actual crisis which will push the union into a difficult place or dire straits. Option D is the answer. Choice (D)

Q23. All the following are indicators of the 'flaws in the euro's structure' mentioned in the penultimate para EXCEPT that:

a) **cross border lending has stalled.**

b) **there is absence of proper risk-sharing mechanisms.**

c) **there aren't enough resources to deal with yet another recession.**

d) **a loss of faith in political establishments has paved the way for right-wing resurgence.**

Number of words and Explanatory notes for RC:

Number of words: 552

Consider the sentences: '*The flaws in the euro's structure have taken a heavy human, economic and political toll. Greece endured a depression and untold suffering* ***that, in a proper risk-sharing union, would have been largely unnecessary****. Draghi's extraordinary efforts to hold the currency together depleted the ECB's resources, leaving it ill-prepared to fight the next recession. Europe's dysfunction shattered faith in the political establishment, contributing to the populist and right-wing resurgence that has swept across the Western world.*'

Option A: This is clearly a distortion of information. From '*As a result, measured by cross-border lending, financial integration in Europe has stalled*', we can understand that cross-border lending is an indicator of stalling financial integration. It cannot be inferred that cross-border lending itself has stalled. Hence, Option A is the answer.

Option B: From the underlined portions, we can clearly understand that this isn't a risk-sharing union according to the author. From '*Efforts to create a euro-area budget to mitigate recessions […] have gone nowhere*', we can understand that there isn't much in place to handle recessions or their negative consequences. So, Option B can be understood to be pointing to the flaw in the system, that there are no risk-sharing mechanisms that are fully functional and in place. Option B is not the answer.

Option C: This can directly be understood from '*Draghi's extraordinary efforts to hold the currency together depleted the ECB's resources,* ***leaving it ill-prepared to fight the next recession***'. Option C is not the answer.

Option D: This can be understood from '*Europe's dysfunction* ***shattered faith in the political establishment***, ***contributing to the populist and right-wing resurgence*** *that has swept across the Western world.*' Hence, Option D is not the answer.

Choice (A)

Q24. Which of the following will most likely help in the implementation of the author's suggestions to improve the current situation?

a) **A study showing the current capital held by various banks across European Union member nations**

b) **A study of how the Euro is behaving with respect to other strong currencies of the world**

c) **A study of the possibilities of a recession in the next decade**

d) **A study of the feasibility of granting more power and independence to the entities responsible for the financial system such as the Single Resolution Board**

Number of words and Explanatory notes for RC:

Number of words: 552

Option A: This will not help in implementing the author's suggestions. It is true that this will help assess the gravity of the situation as one of the solutions suggested by the author for the current situation is the recapitalising of banks when necessary so that they have enough loss absorbing capitals. Resources have been depleted too which means that an estimate of what the banks hold will indicate whether the author is justified in worrying about the preparedness of the union for another recession. But eventually, it doesn't matter whether or not banks have sufficient capital. Option A is not the answer.
Option B: Since the passage doesn't talk about the perception of euro in comparison to the perception of other stronger currencies and doesn't tell us how comparative performance of one currency over the others can indicate the financial state, this study will not prove to be of much help in implementation of suggestions. Option B is not the answer.
Option C: The timeline of the recession has not been a part of the author's argument. The author simply reiterates and also warns that the union isn't amply prepared, and it should start taking steps immediately. So, the chances of an imminent recession don't, in any way, change the argument, and neither does the absence of chances. Option C is not the answer.
Option D: Granting power to entities that can steer the ship during tough times has been offered as a solution. The feasibility of implementing such a step will help in the effective implementation of the suggestions made by the author. Hence, Option D is the answer. Choice (D)

Q25. DIRECTIONS *for question 25:* The sentences given in the following 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. In fact, it is very common for people to work very hard up to the 90 percent or 95 percent level and then slack off and delay the final completion of the task.
2. Completion is the second ingredient in peak performance.
3. You must continually force and discipline yourself, to resist this natural tendency and push to completion.
4. There is an enormous difference between doing 95% of the task and doing 100% of the task.

Sentence 1: Sentence 1 begins with "In fact" and mentions a common observation.
Sentence 2: Sentence 2 is a general sentence that can introduce the paragraph.
Sentence 3: Sentence 3 has the clue "this natural tendency".
Sentence 4: Sentence 4 establishes that a difference exists between doing a whole task and a substantial percentage of the task. It repeats the percentages mentioned in sentence 1.
On a careful reading of the sentences, it can be observed that sentence 2 establishes the background of the paragraph. It mentions the second ingredient in peak performance viz completion.
It can be observed that sentences 4 and 1 form a mandatory pair. "work very hard up to the 90 percent or 95 percent level" in sentence 1 points to "doing 95% of the task" in sentence 4 and "then slack off and delay the final completion of the task" in sentence 1 points to "doing 100% of the task" in sentence 4.
Sentence 3 is the moral of the story and serves as a concluding sentence of the paragraph. "resist this natural tendency" in sentence 3 points to "common for people to work very hard up to the 90 percent or 95 percent level and then slack off and delay the final completion of the task" in sentence 1. Also, "push to completion" in sentence 3 mirrors the introduction "Completion is the second ingredient in peak performance".
Sentence 4 can only be placed after sentence 2. So, 2413. Ans: (2413)

Q26. DIRECTIONS *for question 26*: The paragraph given below is followed by four summaries. Choose the option that captures the essence of the text.

Authoritarianism should be understood as an attribute of degree, unlike democracy which we understand only as a consolidated democratic system. For the sake of the current inquiry, authoritarianism, therefore, does not always imply a closed and entrenched authoritarian system like North Korea even though the highest degree of authoritarianism would indeed denote such a system. In this sense, an 'authoritarian wave' is essentially a deepening of non-democratic attributes such as disrespect for the Rule of Law or limitation of Free Speech. Every political system, including democracy, can therefore acquire authoritarian attributes. The crucial question is, however, to

identify that level of authoritarian depth after which a consolidated democracy ceases to be a democracy.

a) **North Korea is a closed and entrenched authoritarian system because of the deepening of non-democratic attributes beyond the usual limit.**

b) **The degree of authoritarianism increases with the propagation of non-democratic attributes in a democracy till a point where the consolidated system stops being a democracy.**

c) **Disrespect for the Rule of Law or limitation of Free Speech are what turn a democratic country into an authoritarian one.**

d) **Authoritarianism is not a consolidated system like a democracy, but a wave whose degree varies from one democratic system to another.**

Option A: The author's main position is not about North Korea and why it is an authoritarian country. It is just an example of how an extreme authoritarian country operates. Option A is not the answer.
Option B: This is apt since it highlights the main idea of the para: which is that authoritarianism has a degree and when it deepens, there comes a point in a democracy when it cannot be called a democracy anymore. In other words, a degree of authoritarianism could exist in a consolidated democratic system, but when that degree/wave of authoritarianism deepens, there is a point when it is not justified to call the system a democracy anymore. Option B is the answer.
Option C: These are just examples for what happens in an authoritarian wave. These are not the only attributes of authoritarianism. Also, this is not the author's position since the para focuses on how the authoritarianism degree of a democracy deepens, and how it is important to identify the depth at which it is not a democracy anymore. Option C is not the answer.
Option D: The para doesn't draw a distinction between different democratic systems and how the degree of authoritarianism varies in them. The para is about how the degree of authoritarianism in a particular democracy could deepen until a point that we need to identify as one where it cannot be called a democracy anymore.

Choice (B)

Q27. DIRECTIONS *for question 27:* The sentences given in the following 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. Even the lowest ranking civil servant is required to pass tests proving competence.
2. Obviously, we wouldn't let "just anyone" perform brain surgery or, for that matter, sell stocks and bonds.
3. Yet, we allow virtually anyone, almost without regard for mental and moral qualification, to try his or her hand at raising young human beings, so long as these humans are biological offspring.
4. Raising children requires skills that are by no means universal.

Sentence 1: Sentence 1 starts with the clue 'even' which means that this can only follow another sentence. It provides an example.
Sentence 2: Sentence 2 provides examples and has the clue "wouldn't let just anyone…."
Sentence 3: Sentence 3 has the contrast conjunction 'yet'. It mentions 'raising young human beings'.
Sentence 4: Sentence 4 is a general sentence that can begin the paragraph. It points to the skills required in raising children.
So sentence 4 is a general sentence that begins the paragraph. It is the topic sentence of the paragraph. Sentences 4 and 2 form a logical block. "skills that are by no means universal" in sentence 4 links with "wouldn't let "just anyone" perform brain surgery" in sentence 2. So 2 follows 4.
Sentences 2 and 1 form another logical block. "wouldn't let "just anyone" perform brain surgery or, for that matter, sell stocks and bonds" in sentence 2 is further strengthened by "even the lowest ranking civil servant is required to pass tests proving competence" in sentence 1. So sentence 1 is followed by sentence 2.
Sentence 3 concludes the para. "we allow virtually anyone …. to try his or her hand at raising young human beings" in sentence 3 contrasts the examples given in sentences 2 and 1. "to try his or her hand at raising young human beings" in sentence 3 mirrors the introduction "Raising children, requires skills.." in the introduction sentence 4.
So, 4231. Ans: (4213)

Q28. DIRECTIONS *for question 28:* The paragraph given below is followed by four summaries. Choose the option that captures the essence of the text.

Can photographers directly influence politics? The answer is a qualified 'yes'. This qualification depends, in part, on the ability of photographers to harness the power of bureaucracies, advocacy networks and epistemic communities to which they sometimes belong. It also depends on the extent to which photographers can manage the contradictions inherent in the political process, be it those created by bureaucratic constraints, concerns over the legitimacy of activists and the credibility of experts. None of this suggests that photographers will not find their work 'blown by the whims and loyalties of diverse communities'. But it encourages scholars engaged in the emerging field of global

visual politics to think of the diverse and sometimes influential roles that photographers can and do play in these policy communities.

a) **Photographers cannot directly influence politics unless scholars find a way of involving them in policy communities.**

b) **Photographers can influence a positive change in society subject to how influential they are in the communities they are a part of.**

c) **While a photographer's may not always relate to original intentions it can embolden scholars to identify the former's diverse influence in a political process that could be suboptimal, at times.**

d) **Photographers risk their photos not being used as intended at times, but that shouldn't stop them from trying to improve the political process bogged down by bureaucracy and lack of experts.**

Can photographers directly influence politics? The answer is a qualified 'yes'.
[This qualification depends, in part, on the ability of photographers to harness the power of bureaucracies, advocacy networks and epistemic communities to which they sometimes belong.]
[It also depends on the extent to which photographers can manage the contradictions inherent in the political process, be it those created by bureaucratic constraints, concerns over the legitimacy of activists and the credibility of experts.]
[None of this suggests that photographers will not find their work 'blown by the whims and loyalties of diverse communities'.]
[But it encourages scholars engaged in the emerging field of global visual politics to think of the diverse and sometimes influential roles that photographers can and do play in these policy communities.]
The para as noted above can be divided into four parts.
Option A: This option indicates a negative opinion about the influence of photographers whereas the para is more about how photographers can influence the society. The para is on the lines of – Photographers can indeed influence politics when their work encourages scholars to find a distinct role for them. Hence, Option A is not the answer.
Option B: 'How influential they are in the communities they are a part of' is not what the para tries to convey. What it tries to convey is that photographers should try to harness the power of the groups (metaphorical) they are a part of bureaucracies, advocacy networks and epistemic communities to which they sometimes belong. Also, the author doesn't quite emphatically separate out positive and negative influence. Option B is not the answer.
Option C: This option conveys the central idea of the para – (While photos may not be used as intended), ***photographers' work can embolden scholars*** to identify the former's diverse influence in a political process that could be inefficient, at times. So, this option conveys two caveats – that photographers' work may not be used as intended, and the process could be inefficient (inherent contradictions). But, it also conveys that the work can encourage or embolden scholars to identify the role of photographers. Option C is the answer.
Option D: *Photographers risk their photos not being used as intended at times, but that shouldn't stop them from trying to improve the political process bogged down by bureaucracy and lack of experts.* The author's position is not that they should *try to improve the political process*. The author's position is that despite the possible misuse/inherent contradictions, photographers can influence the political process. Hence, Option D is not the answer. Choice (C)

Q30. DIRECTIONS *for question 30:* The sentences given in the following 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. Now largely a relic of a different time, the player piano stirred many of the same kinds of questions and debates that AI art does now.
2. Anyone who has seen a player piano in action can attest to its uncanny nature.
3. Piano keys seem to play themselves in cheerful ragtime.
4. Once it's in motion, one can almost imagine an invisible player sitting at the instrument.

Sentence 1 is an independent sentence that talks about how the player piano is a thing of the past.
Sentence 2 talks about the uncanny nature of a player piano. This sentence offers two things: we don't know what that uncanniness is, and it starts with 'Anyone who has seen' both indicating this is the introduction of the player piano.
Sentence 3 talks about piano keys seemingly playing themselves. (We do understand the para is about a player piano).
Sentence 4 talks about how the player is invisible, the precursor to what Sentence 3 mentions that it is almost like the keys playing themselves. Also, the 'it' in 4 can refer only to the player piano (and not the ***piano keys***). So, 4 comes before 3, but 4 has to follow 2. So, 243. We, cannot put Sentence 1 anywhere in the beginning or the middle because it starts a comparison with AI art which the rest of the para doesn't talk about. So, 2431. Ans: (2431)

Q31. DIRECTIONS *for questions 31 and 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. For urbanists, unaffordable housing can be solved by increasing the amount and density of housing units through "up-zoning," while a more structural analysis would focus on rent control or building more public housing.
2. Now a dominant tendency among city-planners and many municipal politicians, "urbanism," a bland quasi-progressive ideology that typically lacks any coherent class or power analysis, treats procedural changes like tweaks to zoning laws as key to solving the problems of the modern city.
3. Because urbanism dominates discussions about cities – about what ails them and how to fix them – structural analyses have been sorely lacking.
4. When the change in zoning does not advance a general public purpose in land use, courts may rule certain instances of spot zoning as illegal.
5. The discourse around gentrification still focuses too much on fancy coffee shops and not enough on systematic disinvestment in areas inhabited by the poor working class.

Sentence 1 talks about solving unaffordable housing and about structural analysis that can focus on rent control.
Sentence 2 explains what urbanism is, in a negative tone (bland and quasi are words that indicate negative connotation). It lacks coherent class the sentence says and indicates that tweaks to zoning laws is considered to be the key (implying that it isn't).
Sentence 3 talks about why structural analysis is not done as much as required.
Sentence 4 talks about how change in zoning could be dubbed illegal by courts when it is not beneficial to the public.
Sentence 5 talks about focusing on 'fancy' coffee shops and bemoans the absence of focus on disinvestment in areas inhabited by the poorer and working class.
It can be understood that 2 and 3 which talk about urbanism are definitely part of the para (because 3 is dependent on 2 for the definition of urbanism and 3 for introducing the absence of structural analysis). 1 explains the benefits of the structural analysis and 5, like 3, talks about the disadvantage of not discussing enough about the right issues.
Only Sentence 4 stands out because of the discussing on what kind of zoning is illegal which is something not relevant even to Sentence 2 (which implies tweaks to zoning laws is what urbanism focuses on). So, 4 in a way is the solution to 2 but then renders irrelevant the author's concerns in the other three sentences. Also, spot zoning hasn't been elaborated. Ans: (4)

Q32. DIRECTIONS *for questions 31 and 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. They are thus easily jammed and for obvious reasons, details of the capabilities of jammers are hard to come by.
2. It is easy to forget, given the ubiquity of satellite-navigation devices in cars and mobile phones, that the Global Positioning System (GPS) of orbiting satellites on which they rely was originally a military technology.
3. But JDAM and similar systems work only when they can receive signals from GPS satellites and such signals are very weak.
4. The world's armed forces are looking again at giving their bombs and missiles map-reading capabilities.
5. The system is, for instance, relied upon by the JDAM (joint direct-attack munition) kits that America's air force attaches to its freefall bombs to turn them into smart weapons that can be guided with precision to their targets.

Sentence 1: Sentence 1 has the pronoun 'they' and some specific details.
Sentence 2: Sentence 2 is a lengthy sentence, but its essence is captured in the segment "the GPS of orbiting satellites was a military technology". Sentence 2 mentions the full form of GPS.
Sentence 3: Sentence 3 begins with the contrast conjunction 'but'. This sentence mentions the abbreviated form GPS.
Sentence 4: Sentence 4 talks about the world's armed forces giving their ammunition map-reading capabilities.
Sentence 5: Sentence 5 mentions an instance. It also has a number of nouns: the system, the JDAM, America's air force, smart weapons and their targets. Sentence 5 has the full form of JDAM.
So sentence 2 is a general sentence that can begin the paragraph. It is the topic sentence of the para and gives us general information such as "ubiquity of satellite-navigation devices" and "GPS of orbiting satellites on which they rely was originally a military technology". Sentences 2 and 5 form a mandatory pair. "The system" in sentence 5 points to "Global Positioning System (GPS) of orbiting satellites" in sentence 2. "the JDAM (joint direct-attack munition) kits that America's air force attaches to its freefall bombs to turn them into smart weapons" in sentence 5 links with "originally a military technology" in sentence 2. So 2 is followed by 5.
Sentence 5 is connected to sentence 3 through the contrast conjunction 'but'. The limitation of JDAM in sentence 3 contrasts "smart weapons that can be guided with precision to their targets" in sentence 5.
Sentence 3 is followed by sentence 1. The pronoun 'they' in sentence 1 points to "JDAM and similar systems" in sentence 3. "They are thus easily jammed" in sentence 1 adds to "JDAM and similar systems work only when …" in sentence 3. So, 2531.
Sentence 4 is the odd sentence out. "map-reading capabilities" is a new idea and this can be a part of another para. Ans: (4)

Q33. DIRECTIONS *for question 33*: The paragraph given below is followed by four summaries. Choose the option that captures the essence of the text.

Skeletal muscle is a highly specialized tissue composed of non-dividing, multi-nucleated muscle fibres that contract to generate force in a controlled and directed manner. Skeletal muscle is formed during embryogenesis from a subset of muscle precursor cells, which generate both differentiated muscle fibres and specialized muscle-forming stem cells known as satellite cells. Satellite cells remain associated with muscle fibres after birth and are responsible for muscle growth and repair throughout life. Failure in satellite cell function can lead to delayed, impaired or failed recovery after muscle injury, and such failures become increasingly prominent in cases of progressive muscle disease and in old age. Recent progress in the isolation of muscle satellite cells and elucidation of the cellular and molecular mediators controlling their activity indicate that satellite cell-based therapies may involve either direct cell replacement or development of drugs that enhance endogenous muscle repair mechanisms.

a) The multinucleated, differentiated, skeletal muscle fibre cells formed from a lineage of muscle precursor cells during embryogenesis do not have as much therapeutic promise as the muscle repairing satellite cells emerging from the same source.

b) **Skeletal muscle cells are formed during embryogenesis while satellite stem cells are formed soon after birth with the latter holding therapeutic promise.**

c) Satellite cells, the muscle forming stem cells known to play a role in muscle growth and repair, hold a lot of therapeutic promise for drug development targeting muscle repair.

d) Satellite cells are derived from the skeletal muscle formed after embryogenesis and recent breakthroughs suggest promising paths forward to realizing their full therapeutic potential.

Option A: The paragraph highlights the therapeutic potential of specialized muscle-forming stem cells known as satellite cells. We cannot infer that skeletal muscle fiber cells formed from a lineage of muscle precursor cells during embryogenesis do not have as much therapeutic promise as the muscle repairing satellite cells. So option A is not the answer.
Option B: "satellite stem cells are formed soon after birth" as given in option B distorts the information provided in the paragraph. It has been mentioned in the paragraph that skeletal muscle is formed during embryogenesis from a subset of muscle precursor cells, which **generate both differentiated muscle fibres and** specialized muscle-forming stem cells known as **satellite cells**. So option B is incorrect and also incomplete.
Option C: Option C correctly sums up the information in the paragraph and is the correct answer.
Option D: Skeletal muscle is formed during embryogenesis, not after it. Further, both differentiated muscle fibres and specialized muscle-forming stem cells known as satellite cells, are formed from a subset of muscle precursor cells. So, satellite cells and muscle fibres help form the skeletal muscle. Satellite cells are not formed from the skeletal muscle. Hence option D is not the answer. Choice (C)

Q34. DIRECTIONS *for question 34:* The sentences given in the following 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. Or rather, they'll probably say 'webtoon' artist, that being the term of art for the form of comics now seen on screens all around the country.
2. Though digital, the format also harks back, if inadvertently, to the progenitor of all modern Korean comics: Old Man Gobau, whose four vertical panels appeared in national newspapers daily for 45 years, from not long after the Korean war until the final year of the 20th century, and whose creator Kim Seong-hwan died last month at the age of 86.

3. Start asking Korean high-school students, what career they want, and it won't be long before someone says they want to be a comic artist.
4. Unlike the horizontal newspaper comic strips, webtoons read vertically, from top to bottom, not for any reason to do with the now horizontally written Korean language but for better scrolling on a mobile phone.

Sentence 1 starts with a connector 'or rather' with a personal pronoun 'they' pointing to a group of people.
Sentence 2 talks about 'the format' probably discussing some previously defined format. (Please note that words like 'though' and 'despite' do not count as connectors).
Sentence 3 is an independent sentence that starts a discussion, about how some Korean high-school students would want to be a comic artist.
Sentence 4 is an independent sentence that describes webtoons and their format. From this we can understand that webtoons are the format being discussed in 2.
Being a comic artist in Sentence 3 is the biggest of all ideas and is also a precursor to the first sentence where 'they' are probably Korean high-school students. So, 31 is a block.
Similarly, 'also' in Sentence 2 is the other clue. The format is for cell phones. The format is ***also*** a connector to the past. So, 42 is a block. 4 is a continuation of the 31 block in explaining the webtoon format. So, 3142. Ans: (3142)

DILR

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

Consider the 3 × 3 grid of numbers given below. In this grid, an *operation* is defined as the interchanging of the positions of any two of the numbers. A *configuration* is defined as any unique arrangement of the numbers in the grid.

1	2	3
4	5	6
7	8	9

A 3 × 3 grid with the *configuration* given above is called a standard 3 × 3 grid.

Q1. DIRECTIONS *for question 1:* Select the correct alternative from the given choices.
What is the least number of *operations* required to rearrange the above given *configuration* into another *configuration* such that, the sum of the numbers in the rightmost column is nine more than that of the middle column and 18 more than that of the leftmost column, while the sum of the numbers in the top row is three more than that of the middle row and six more than that of the last row?

a) 8

b) **4**

c) **6**

d) 3

The required configuration is as given below

3	6	9
2	5	8
1	4	7

This can be obtained from the given configuration by first interchanging.

①	②	3
④	5	⑥
7	⑧	⑨

(i) 1 and 9
(ii) 2 and 6
(iii) 4 and 8
i.e. a total of 3 operations.
to get

9	6	3
8	5	2
7	4	1

Here, each number in the left most column needs to be interchanged with the corresponding number in the rightmost column to arrive at the final configuration. Hence, another three operations.
∴ A total of 3 + 3 = 6 operations. Choice (C)

Q2. DIRECTIONS *for question 2:* Type in your answer in the input box provided below the question. What is the least number of *operations* required to rearrange the above given *configuration* into another *configuration* such that the sum of the numbers in any column is the same, and the sum of the numbers in any row is the same, while the number 1 is in the grid in the topmost row and leftmost column and the number 7 is in the grid in the middle row and middle column?

Since the sum of the numbers in any column and any row is the same, the sum of the numbers in any row and any column must be 15 (as the sum of numbers from 1 to 9 is 45, which must be distributed across three rows or three columns).
It is given that 1 is in the topmost row and the leftmost column. The other numbers in this row and column must be (5, 9) and (6, 8) in any order.
7 must be in the middle row and middle column. Only 2 sets of numbers, along with 7, add up to 15 – (2, 6, 7) and (3, 5, 7)
Similarly filling out the other cells in the grid, we get two possible configurations which satisfy the given conditions.

1	5	9
6	7	2
8	3	4

1	6	8
5	7	3
9	2	4

The first configuration can be obtained by performing 7 operations on the original configuration, one example of which is given below:
(2, 5), (3, 9) , (4, 6), (7, 8), (7, 2), (2, 4) and (3, 4)
The second configuration can be obtained by performing 6 operations on the original configuration, as shown below:
(2, 6) (2, 3) (2, 8) (5, 4) (4, 7) and (4, 9)
Hence, the minimum number of operations required is 6. Ans: (6)

Q3. DIRECTIONS *for question 3:* Select the correct alternative from the given choices.
If the grid of numbers were to be a 4 × 4 grid (containing the numbers from 1 to 16), then what is the least possible number of *operations* that will always be sufficient to rearrange the grid of numbers into any given *configuration*?

a) 8

b) **7**

c) **15**

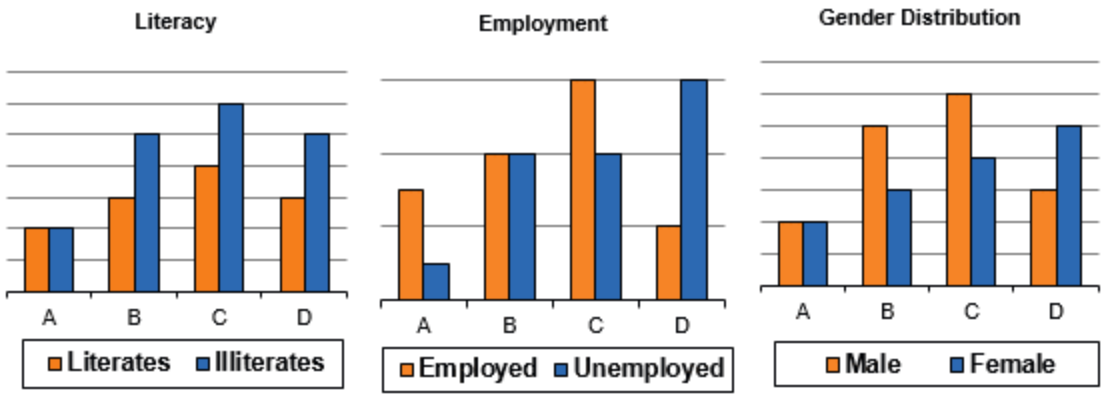
d) 16

First consider a 2 × 2 grid. From any initial configuration, any other configuration can be obtained in a maximum of 3 steps.
Now, consider the 3 × 3 grid itself. To obtain any configuration we have to arrange 8 of the given numbers in correct position, which will automatically make the 9th number to move into correct position. To get each of these numbers into their correct positions, we need at most one interchange. Hence, 8 operations will be sufficient to obtain any configuration. In general, for an $n \times n$ grid, at most $n^2 - 1$ steps (i.e., 1 less than the number of numbers in the grid) are required. If there are a total of 16 numbers, the required answer, as per the above explanation, will be 15. Choice (C)

Q4. DIRECTIONS *for question 4:* Type in your answer in the input box provided below the question. There is a 4 × 4 grid of numbers. Rohan, a smart kid, could re-arrange this 4 × 4 grid of numbers such that the top-leftmost 3 × 3 grid becomes a standard 3 × 3 grid, in *x* operations. If it is known that the numbers in each row of the 4 × 4 grid were initially in descending order, from left to right, what is the minimum value of *x*?

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

A survey conducted across four countries – A, B, C, and D – collected information about the entire adult population (age ≥ 18 years) in these countries across three parameters, Literacy, Employment Status, and Gender Distribution. For each of the three parameters, the entire adult population of each country is divided into exactly two categories – as given in the respective bar-charts below. The three charts plot the number of adults in each country belonging to each of the two categories under each parameter. However, the respective scales along the y-axis have (intentionally) not been mentioned in any of the charts.



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

Considering the adult population of Country B, the number of people employed is approximately what percentage of the number of literates?

a) 66.67%.

b) **100%.**

c) **133.33%.**

d) Cannot be determined

The total represented by the bars for each country is the same. Let each gridline in Literacy chart be x and each gridline from Employment chart be y.
For Country B, 3x+5x = 2y+2y
Therefore, y = 2x
Number of people employed in Country B = 2y = 4x
Number of Literates in Country B = 3x
Required Percentage = 4x/3x = 133.33% Choice (C)

6. DIRECTIONS *for question 6:* Type in your answer in the input box provided below the question.
If the total number of adult literates across all the countries is 600 mn, what is the total adult population (in mn) of Country C

Total number of literates = 600
Therefore, 2x + 3x + 4x + 3x = 600
x = 50
Total Population of Country C = 4x + 6x = 10x = 500 Ans: (500)

Q7. DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.
Which country can have the maximum number of adult females who are literate and also employed?

a) A

b) **B**

c) **C**

d) D

In Country A, females = 2x and literates = 2x and Employed = 3x. Therefore there can be a maximum of 2x female literate employees. (Minimum of 2x, 2x, and 3x)
Similarly, in Country B, Females = 3x and Literates = 3x and Employed = 4x. Therefore there can be a maximum of 3x female literate employees.
In Country C, Females = 4x and Literates = 4x and Employed =6x. Therefore there can be a maximum of 4x female literate employees.
In Country D, Females = 5x and Literates = 3x and Employed = 2x. Therefore there can be a maximum of 2x Female Literate Employees.
Hence, Country C can have the maximum number of female literate employees.
Choice (C)

Q8. DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.
If the unemployed adult population in each country comprises an equal number of males and females, which of the following countries has the maximum number of adult males who are employed?

a) C

b) **A**

c) **B**

d) Cannot be determined

In Country A, unemployed population = x
Number of unemployed males = unemployed females = x/2
Number of males = 2x
Number of employed males = 2x-x/2 = 3x/2
Similarly in Country B, employed males = 5x-2x = 3x
In Country C, employed males = 6x-2x = 4x
In Country D, employed males = 3x-3x =0
Hence, Country C has the maximum number of employed males. Choice (A)

DIRECTIONS for questions 9 to 12: Answer the questions on the basis of the information given below.
The following table gives the cumulative runs scored by eight batsmen in a series of five matches. In each of the matches, the batsman who scored the highest runs among the given eight batsmen was chosen as the ‘Man of the Match’. No batsman scored more than 200 runs in any match and no

batsman won more than one ‘Man of the Match’ award. Also, in any match, not more than one batsman won the ‘Man of the Match’ award.

Q9. DIRECTIONS for questions 9 to 12: Select the correct alternative from the given choices.
In which of the following matches can Dhawan win a ‘Man of the Match’ award?

a) 1st Match

b) 2nd Match

c) 3rd Match

d) 4th Match

In the first match, Dhawan could have scored a maximum of 28 runs ⇒ He is not the Man of the Match.
Similarly the maximum runs Dhawan can score in the second match is 28. Paine can score minimum of 268 – 39 – 200 = 29 runs in the second match ⇒ Dhawan is not the man of the match.
In the third match, Dhawan scored 86 – 28 = 58 runs. Every other batsman can score less runs than Dhawan in this match ⇒ Dhawan can be the Man of the Match in the third match.
In the fourth and fifth matches put together Dhawan scored 195 – 86 = 109 runs whereas Kohli scored 160 runs in the 4^{th} match and 112 runs in the 5^{th} match. Hence Dhawan cannot be the Man of the Match in these matches. Choice (C)

Q10. DIRECTIONS for questions 9 to 12: Select the correct alternative from the given choices.
If Smith won the ‘Man of the Match’ award in the first match and Paine in the third match, then who won the ‘Man of the Match’ award in the second match?

a) Warner

b) Dhoni

c) Rohit

d) Cannot be determined

In the second match, Rohit can score a maximum of 52 runs, Dhawan can score a maximum of 28 runs, Kohli can score a maximum of 58 runs.
As Smith is the Man of the Match in the 1st match, Dhoni must have scored a maximum of 63 runs in the first match
⇒ Dhoni must have scored a minimum of 124 – 63 = 61 runs in the second match.
Warner can score a maximum of 60 runs and Labuschagne can score a maximum of 56 runs in the second match.
From above, Dhoni must be the Man of the Match in the second match.

Choice (B)

Q11. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
Which of the following statements is definitely false?

a) Dhoni won the 'Man of the Match' award in the first match

b) **Paine won the 'Man of the Match' award in the third match**

c) **Dhawan won the 'Man of the Match' award in the third match**

d) Rohit won the 'Man of the Match' award in the fourth match

Either Dhoni or Smith can win the Man of the Match award in the first match. Hence, option (A) is not false. Paine can score 200 runs in the second match and in such a case, he cannot win Man of the Match in the third match. However, he can score 200 runs in third match and win Man of the Match. (Alternatively, from question 10, it can be inferred that Paine can possibly win the Man of the Match in the third match.) Hence, option (B) is not definitely false.
From the solution to question 9, Dhawan can win Man of the Match in third match. Hence option (C) is not definitely false.
In the fourth match, Kohli scored 160 runs.
If Rohit wins Man of the Match in the fourth match, he could have scored a maximum of 200 runs in that match
⇒ He scored 138 runs in the fifth match. From the table, no player can score those many runs in the fifth match
⇒ Rohit must be the Man of the Match in the fifth match also. But no batsman won more than one Man of the Match award.
Thus option (D) is definitely false. Choice (D)

Q11. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
Which of the following statements is definitely false?

a) Dhoni won the 'Man of the Match' award in the first match

b) **Paine won the 'Man of the Match' award in the third match**

c) **Dhawan won the 'Man of the Match' award in the third match**

d) Rohit won the 'Man of the Match' award in the fourth match

Rohit must have scored 338 runs in the last two matches combined. In each match, he must have scored 138-200 runs. In the fifth match, no one else could have scored at least 138 runs. Hence, he would have won the Man of the Match award for the fifth match.
In the fourth match, Rohit could not have won the award and no one else could have scored more than Kohli, who scored 160. Hence, Kohli would have won the Man of the Match award in the fourth match. Choice (D)

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

Eight persons, Amit, Harshit, Karun, Murali, Naman, Pragyan, Rohan and Sanju, went to a restaurant for dinner. They arrived at different times and sat around a circular table. Each of them sat around the table in such a way that none of them sat adjacent to the person who arrived immediately before him.

Further, it is also known that

i. Pragyan arrived immediately before Murali and was sitting opposite Harshit, who was not the last to arrive.
ii. Rohan was sitting adjacent to both Karun and Sanju and none of the three was the first to arrive.
iii. Naman arrived immediately after Murali.
iv. Sanju arrived after Amit but immediately before Harshit.
v. Amit was not the first to arrive, while Rohan was sitting two places to the right of Harshit.

Q13. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.
Who among the following was sitting opposite Naman?

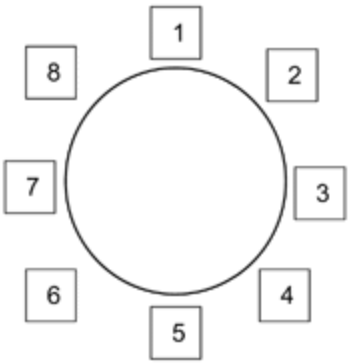
a) **Karun** ✓ **Your answer is correct**

b) **Rohan**

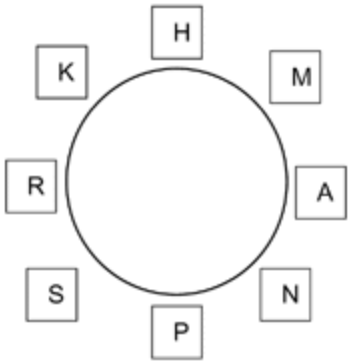
c) **Sanju**

d) Cannot be determined

From (i), Pragyan was sitting opposite Harshit. From (ii), Rohan was sitting between Karun and Sanju. Hence, all three of them could be to the left of Harshit or to his right. The other three consecutive seats must have been occupied by Murali, Naman, and Amit. Let the following diagram represent the seat numbers of the seats occupied by the eight friends.



Let Pragyan be sitting at 5. Harshit must have been at 1. Sanju cannot be at 8 or 2 since he arrived immediately before Harshit. Hence, from (ii), Sanju must be at 6 or 4.
If Sanju is at 4, Amit must be at 2 or 3. This is not possible from (ii).
Hence, Sanju is at 6, Rohan at 7 and Karun at 8.
Murali, Naman and Amit can be in 2,3,4 in any order. But from (iii), Murali and Naman cannot be next to each other. Hence, Amit must be between them at 3. From (i), Murali cannot be next to Pragyan as well. Hence, Murali must be at 2 and Naman must be at 4.
The following diagram gives the seating arrangement (the friends denoted by the first letters of their names).



The order in which they arrived can be found as follows.
From (ii), (iii), (iv) and (v), Rohan, Karun, Sanju, Naman, Murali, Harshit and Amit could not have arrived first. Hence, Pragyan must have been the first to arrive. From (i) and (iii), Murali and Naman must have been the second and third to arrive respectively.
After Naman, Amit could not have arrived next (since he is sitting adjacent to Naman). Sanju and Harshit could not have arrived next (from (iv)). Rohan or Karun could have arrived next.
If Rohan was the fourth to arrive, the fifth could not have been Karun or Sanju. Since Amit arrived before Sanju and Harshit, Amit must have been the fifth to arrive. Sanju and Harshit arrived one after the other and Harshit was not the last to arrive. Hence, Sanju and Harshit must have been sixth and seventh. Karun must have been the last. This is not possible as it violates condition (i). Hence, Karun could not have been the fourth to arrive.
If Karun was the fourth to arrive, fifth could not have been Harshit or Rohan (from the arrangement). Amit must have been the fifth from (iv). Sanju and Harshit arrived one after the other. Since Harshit cannot be the last, Sanju and Harshit must be 6^{th} and 7^{th}. Rohan must have been the last to arrive. Hence the order in which they arrived is:

Pragyan	Murali	Naman	Karun	Amit	Sanju	Harshit	Rohan

Q14. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.
Who was the first person to arrive at the restaurant?

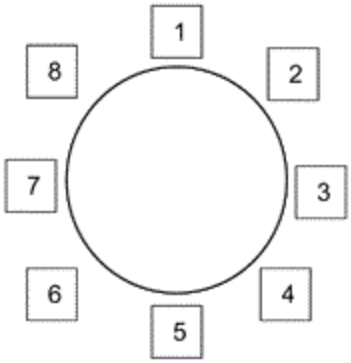
a) **Naman**

b) **Pragyan** ✓ **Your answer is correct**

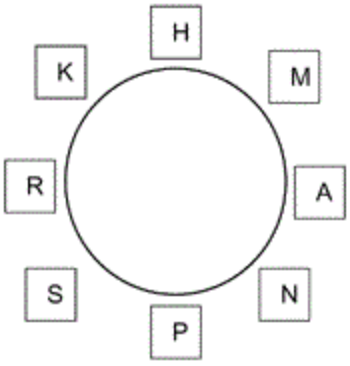
c) **Harshit**

d) Amit

From (i), Pragyan was sitting opposite Harshit. From (ii), Rohan was sitting between Karun and Sanju. Hence, all three of them could be to the left of Harshit or to his right. The other three consecutive seats must have been occupied by Murali, Naman, and Amit. Let the following diagram represent the seat numbers of the seats occupied by the eight friends.



Let Pragyan be sitting at 5. Harshit must have been at 1. Sanju cannot be at 8 or 2 since he arrived immediately before Harshit. Hence, from (ii), Sanju must be at 6 or 4.
If Sanju is at 4, Amit must be at 2 or 3. This is not possible from (ii).
Hence, Sanju is at 6, Rohan at 7 and Karun at 8.
Murali, Naman and Amit can be in 2,3,4 in any order. But from (iii), Murali and Naman cannot be next to each other. Hence, Amit must be between them at 3. From (i), Murali cannot be next to Pragyan as well. Hence, Murali must be at 2 and Naman must be at 4.
The following diagram gives the seating arrangement (the friends denoted by the first letters of their names).



The order in which they arrived can be found as follows.
From (ii), (iii), (iv) and (v), Rohan, Karun, Sanju, Naman, Murali, Harshit and Amit could not have arrived first. Hence, Pragyan must have been the first to arrive. From (i) and (iii), Murali and Naman must have been the second and third to arrive respectively.
After Naman, Amit could not have arrived next (since he is sitting adjacent to Naman). Sanju and Harshit could not have arrived next (from (iv)). Rohan or Karun could have arrived next.
If Rohan was the fourth to arrive, the fifth could not have been Karun or Sanju. Since Amit arrived before Sanju and Harshit, Amit must have been the fifth to arrive. Sanju and Harshit arrived one after the other and Harshit was not the last to arrive. Hence, Sanju and Harshit must have been sixth and seventh. Karun must have been the last. This is not possible as it violates condition (i). Hence, Karun could not have been the fourth to arrive.
If Karun was the fourth to arrive, fifth could not have been Harshit or Rohan (from the arrangement). Amit must have been the fifth from (iv). Sanju and Harshit arrived one after the other. Since Harshit cannot be the last, Sanju and Harshit must be 6^{th} and 7^{th}. Rohan must have been the last to arrive. Hence the order in which they arrived is:

Pragyan	Murali	Naman	Karun	Amit	Sanju	Harshit	Rohan

15. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.
Who arrived immediately before Rohan?

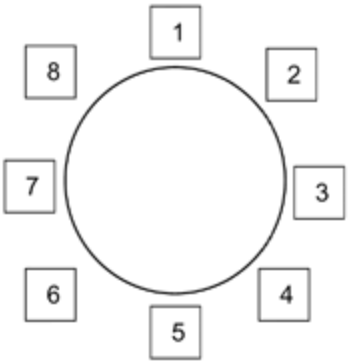
a) **Harshit** ✓ **Your answer is correct**

b) **Murali**

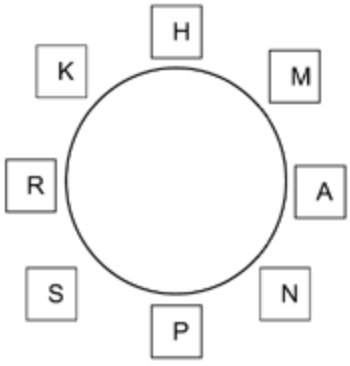
c) **Amit**

d) Naman

From (i), Pragyan was sitting opposite Harshit. From (ii), Rohan was sitting between Karun and Sanju. Hence, all three of them could be to the left of Harshit or to his right. The other three consecutive seats must have been occupied by Murali, Naman, and Amit. Let the following diagram represent the seat numbers of the seats occupied by the eight friends.



Let Pragyan be sitting at 5. Harshit must have been at 1. Sanju cannot be at 8 or 2 since he arrived immediately before Harshit. Hence, from (ii), Sanju must be at 6 or 4.
If Sanju is at 4, Amit must be at 2 or 3. This is not possible from (ii).
Hence, Sanju is at 6, Rohan at 7 and Karun at 8.
Murali, Naman and Amit can be in 2,3,4 in any order. But from (iii), Murali and Naman cannot be next to each other. Hence, Amit must be between them at 3. From (i), Murali cannot be next to Pragyan as well. Hence, Murali must be at 2 and Naman must be at 4.
The following diagram gives the seating arrangement (the friends denoted by the first letters of their names).



The order in which they arrived can be found as follows.
From (ii), (iii), (iv) and (v), Rohan, Karun, Sanju, Naman, Murali, Harshit and Amit could not have arrived first. Hence, Pragyan must have been the first to arrive. From (i) and (iii), Murali and Naman must have been the second and third to arrive respectively.
After Naman, Amit could not have arrived next (since he is sitting adjacent to Naman). Sanju and Harshit could not have arrived next (from (iv)). Rohan or Karun could have arrived next.
If Rohan was the fourth to arrive, the fifth could not have been Karun or Sanju. Since Amit arrived before Sanju and Harshit, Amit must have been the fifth to arrive. Sanju and Harshit arrived one after the other and Harshit was not the last to arrive. Hence, Sanju and Harshit must have been sixth and seventh. Karun must have been the last. This is not possible as it violates condition (i). Hence, Karun could not have been the fourth to arrive.
If Karun was the fourth to arrive, fifth could not have been Harshit or Rohan (from the arrangement). Amit must have been the fifth from (iv). Sanju and Harshit arrived one after the other. Since Harshit cannot be the last, Sanju and Harshit must be 6^{th} and 7^{th}. Rohan must have been the last to arrive. Hence the order in which they arrived is:

Pragyan	Murali	Naman	Karun	Amit	Sanju	Harshit	Rohan

Q16. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices. Which of the following statements is definitely true?

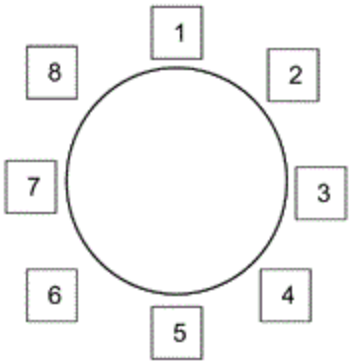
a) **Naman arrived immediately before Amit.** ✗ **Your answer is incorrect**

b) **Murali was sitting opposite Rohan.**

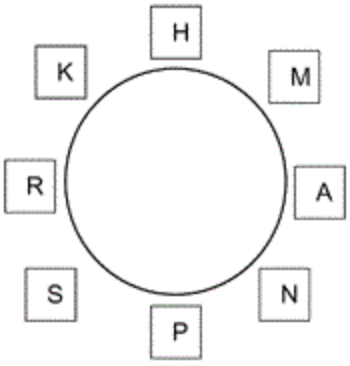
c) **Karun arrived immediately before Amit.**

d) Harshit arrived after Rohan.

From (i), Pragyan was sitting opposite Harshit. From (ii), Rohan was sitting between Karun and Sanju. Hence, all three of them could be to the left of Harshit or to his right. The other three consecutive seats must have been occupied by Murali, Naman, and Amit. Let the following diagram represent the seat numbers of the seats occupied by the eight friends.



Let Pragyan be sitting at 5. Harshit must have been at 1. Sanju cannot be at 8 or 2 since he arrived immediately before Harshit. Hence, from (ii), Sanju must be at 6 or 4.
If Sanju is at 4, Amit must be at 2 or 3. This is not possible from (ii).
Hence, Sanju is at 6, Rohan at 7 and Karun at 8.
Murali, Naman and Amit can be in 2,3,4 in any order. But from (iii), Murali and Naman cannot be next to each other. Hence, Amit must be between them at 3. From (i), Murali cannot be next to Pragyan as well. Hence, Murali must be at 2 and Naman must be at 4.
The following diagram gives the seating arrangement (the friends denoted by the first letters of their names).



The order in which they arrived can be found as follows.
From (ii), (iii), (iv) and (v), Rohan, Karun, Sanju, Naman, Murali, Harshit and Amit could not have arrived first. Hence, Pragyan must have been the first to arrive. From (i) and (iii), Murali and Naman must have been the second and third to arrive respectively.
After Naman, Amit could not have arrived next (since he is sitting adjacent to Naman). Sanju and Harshit could not have arrived next (from (iv)). Rohan or Karun could have arrived next.
If Rohan was the fourth to arrive, the fifth could not have been Karun or Sanju. Since Amit arrived before Sanju and Harshit, Amit must have been the fifth to arrive. Sanju and Harshit arrived one after the other and Harshit was not the last to arrive. Hence, Sanju and Harshit must have been sixth and seventh. Karun must have been the last. This is not possible as it violates condition (i). Hence, Karun could not have been the fourth to arrive.
If Karun was the fourth to arrive, fifth could not have been Harshit or Rohan (from the arrangement). Amit must have been the fifth from (iv). Sanju and Harshit arrived one after the other. Since Harshit cannot be the last, Sanju and Harshit must be 6^{th} and 7^{th}. Rohan must have been the last to arrive. Hence the order in which they arrived is:

Pragyan	Murali	Naman	Karun	Amit	Sanju	Harshit	Rohan

Among the given statements, only the statement given in option C is definitely correct.

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

A string of three English letters is formed as per the following rules.

i. The third letter is any vowel.
ii. The first letter is *x* or *y* or *z*.
iii. If the first letter is *z*, the second letter is *a* or *e*.
iv. If the first letter is *y*, the second letter is the same as the third.
v. If the first letter is *x*, the second letter is a vowel different from the third letter.

Q17. DIRECTIONS *for question 17:* Select the correct alternative from the given choices.
Find the number of strings which can be formed using the rules given above.

a) **30**

b) **35** ✓ **Your answer is correct**

c) **40**

d) 45

The third letter has 5 possibilities.
If the first letter is z, the second letter has 2 possibilities.
If the first letter is y, the second letter has 1 possibility.
If the first letter is x, the second letter has 4 possibilities.
∴ Total number of possibilities
= (5) (2) + (5) (1) + 5 (4) = 35. Choice (B)

Q18. DIRECTIONS *for questions 18 and 19:* Type in your answer in the input box provided below the question.
Find the number of strings which can be formed such that the second letter of the string is *e*.

The second letter can be e if the third letter is not e and the first letter is x or the third letter is e and the first letter is y or the first letter is z and the second letter is not a.
∴ Total number of possibilities = 4 + 1 + 5 = 10. Ans: (10)

Q19. DIRECTIONS *for questions 18 and 19:* Type in your answer in the input box provided below the question.
What is the number of strings that can be formed which have three distinct letters?

If the first letter is x, 20 strings are possible.
If first letter is y, no string is possible
If first letter is z, 8 strings are possible
Total number of strings = 28 Ans: (28)

Q20. DIRECTIONS *for question 20:* Select the correct alternative from the given choices.
For two strings, S_1 and S_2, the second letter of S_1 is the same as the third letter of S_2 and the third letter of S_1 is the same as the second letter of S_2. If the first letter of S_1 is *z* and the first letter of S_2 is *x*, how many distinct possibilities exist for (S_1, S_2)?

a) **6**

b) **10**

c) **8** ✓ **Your answer is correct**

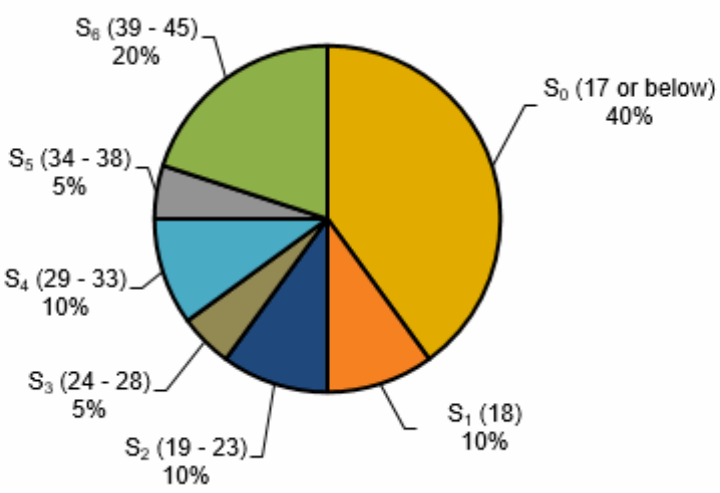
d) 12

Since the first letter of S_2 is x, the second and third letters of S_2 must be distinct.
From the given information, the second and third letters of S_1 must also be distinct.
If the second letter of S_1 is a, the third letter has 4 possibilities (all the vowels except a).
If the second letter of S_1 is e, the third letter has 4 possibilities (all the vowels except e).
In each of the above cases, S_2 can be formed without violating any conditions.
Hence, a total of 8 possibilities exist for (S_1, S_2) Choice (C)

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

Electronics Shoppy, a leading white goods retailer, was running a special sales promotion at its outlet in which, for every 1,000 rupees that a customer spent on buying electronic items at the shop, the customer would get 1 credit. The total number of customers were classified into seven different sections − S_0, S_1, S_2, S_3, S_4, S_5, S_6 − according to their respective number of credits. The following pie chart gives the percentage wise break up of the number of customers classified into each of

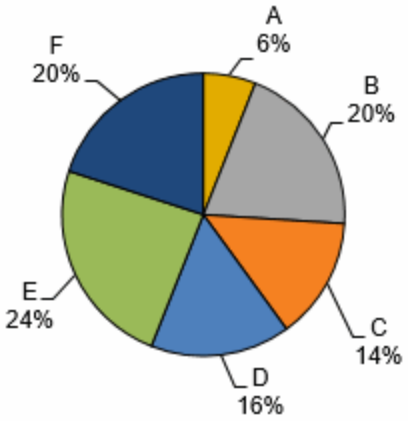
these seven sections. In the pie chart, the values given in the brackets alongside each section give the minimum and maximum number of credits got by any customer classified into that section.



The management decided to give cash-backs to some of the customers from among those who had at least 18 credits. While deciding the cash-backs the management decided to classify the customers with different credits into different groups − A to F − according to their number of credits, as given in the table below. Within each group, the management selected an equal number of customers with each of the different number of credits classified into that group.

The percentage wise distribution of the total value of the cash-backs offered by the management to the customers belonging to the different groups is given in the pie chart below.

Group	No. of credits	Cash-back (₹)
A	18, 19, 20	500
B	21, 22, 23, 24, 25	600
C	26, 27, 28, 29, 30	700
D	31, 32, 33, 34, 35	800
E	36, 37, 38, 39, 40	900
F	41, 42, 43, 44, 45	1000



Total amount paid as cash-back: ₹1,50,000

Q21. DIRECTIONS *for question 21:* Type in your answer in the input box provided below the question.
How many customers with 25 credits were paid a cash-back?

It is given that in each group, as classified by the management, an equal number of people with each of the different credits in that group was selected.
As the total cash-back for the people in group A is 6% of 1,50,000 = 9,000, and since that group consists of people with credits 18, 19 and 20 and each person receives a cash-back of ₹500, the total number of people who were paid a cash-back = $\frac{9000}{500}$ = 18 and there were 6 people each with credits 18, 19 and 20.
Similarly, the total number of persons in groups B, C, D, E and F are as follows.

B: $\frac{20\% \text{ of } 1{,}50{,}000}{600} = 50$

C: $\frac{14\% \text{ of } 1{,}50{,}000}{700} = 30$

D: $\frac{16\% \text{ of } 1{,}50{,}000}{800} = 30$

E: $\frac{24\% \text{ of } 1{,}50{,}000}{900} = 40$

F: $\frac{20\% \text{ of } 1{,}50{,}000}{1000} = 30$

Now the number of persons who received a cash-back for different credits is as follows.
10 each with credits 21, 22, 23, 24, and 25;
6 each with credits 26, 27, 28, 29 and 30;
6 each with credits 31, 32, 33, 34, and 35;
8 each with credits 36, 37, 38, 39 and 40 and
6 each with credits 41, 42, 43, 44 and 45.

10 people with 25 credits were paid a cash-back. Ans: (10)

Q22. DIRECTIONS *for question 22:* Select the correct alternative from the given choices.
For which section of customers is the number of customers selected for receiving a cash-back the highest, when expressed as a percentage of the total number of customers in that section?

a) **S_2**

b) **S_3**

c) **S_4**

d) S_5

It is given that in each group, as classified by the management, an equal number of people with each of the different credits in that group was selected.
As the total cash-back for the people in group A is 6% of 1,50,000 = 9,000, and since that group consists of people with credits 18, 19 and 20 and each person receives a cash-back of ₹500, the total number of people who were paid a cash-back = $\frac{9000}{500}$ = 18 and there were 6 people each with credits 18, 19 and 20.
Similarly, the total number of persons in groups B, C, D, E and F are as follows.

B: $\frac{20\% \text{ of } 1{,}50{,}000}{600} = 50$

C: $\frac{14\% \text{ of } 1{,}50{,}000}{700} = 30$

D: $\frac{16\% \text{ of } 1{,}50{,}000}{800} = 30$

E: $\frac{24\% \text{ of } 1{,}50{,}000}{900} = 40$

F: $\frac{20\% \text{ of } 1{,}50{,}000}{1000} = 30$

Now the number of persons who received a cash-back for different credits is as follows.
10 each with credits 21, 22, 23, 24, and 25;
6 each with credits 26, 27, 28, 29 and 30;
6 each with credits 31, 32, 33, 34, and 35;
8 each with credits 36, 37, 38, 39 and 40 and
6 each with credits 41, 42, 43, 44 and 45.

Though we do not know the actual number of customers in each section, it can be deduced that the people of section S_3 had the highest percentage of people receiving a cash-back, i.e., of total customers $\frac{38}{5\% \text{ of total customers}}$.
The above value is more than that for any other section. Choice (B)

Q23. DIRECTIONS *for question 23:* Type in your answer in the input box provided below the question.
What was the total amount (in Rs.) paid as cash-back to customers with 39 credits or more?

It is given that in each group, as classified by the management, an equal number of people with each of the different credits in that group was selected.
As the total cash-back for the people in group A is 6% of 1,50,000 = 9,000, and since that group consists of people with credits 18, 19 and 20 and each person receives a cash-back of ₹500, the total number of people who were paid a cash-back = $\frac{9000}{500}$ = 18 and there were 6 people each with credits 18, 19 and 20.
Similarly, the total number of persons in groups B, C, D, E and F are as follows.

B: $\frac{20\% \text{ of } 1{,}50{,}000}{600} = 50$

C: $\frac{14\% \text{ of } 1{,}50{,}000}{700} = 30$

D: $\frac{16\% \text{ of } 1{,}50{,}000}{800} = 30$

E: $\frac{24\% \text{ of } 1{,}50{,}000}{900} = 40$

F: $\frac{20\% \text{ of } 1{,}50{,}000}{1000} = 30$

Now the number of persons who received a cash-back for different credits is as follows.
10 each with credits 21, 22, 23, 24, and 25;
6 each with credits 26, 27, 28, 29 and 30;
6 each with credits 31, 32, 33, 34, and 35;
8 each with credits 36, 37, 38, 39 and 40 and
6 each with credits 41, 42, 43, 44 and 45.

The total amount paid as cash-back to people with credits 39 and above was
$900 \times 8 \times 2 + 1000 \times 6 \times 5$
$= 14{,}400 + 30{,}000 = 44{,}400$ Ans: (44400)

Q24. DIRECTIONS *for question 24:* Select the correct alternative from the given choices.
What percentage of the total amount paid as cash-back was to customers with at least 29 and at most 33 credits?

a) 7.5%

b) **13.8%**

c) **15.2%**

d) 17.3%

It is given that in each group, as classified by the management, an equal number of people with each of the different credits in that group was selected.
As the total cash-back for the people in group A is 6% of 1,50,000 = 9,000, and since that group consists of people with credits 18, 19 and 20 and each person receives a cash-back of ₹500, the total number of people who were paid a cash-back = $\frac{9000}{500}$ = 18 and there were 6 people each with credits 18, 19 and 20.
Similarly, the total number of persons in groups B, C, D, E and F are as follows.

B: $\frac{20\% \text{ of } 1{,}50{,}000}{600} = 50$

C: $\frac{14\% \text{ of } 1{,}50{,}000}{700} = 30$

D: $\frac{16\% \text{ of } 1{,}50{,}000}{800} = 30$

E: $\frac{24\% \text{ of } 1{,}50{,}000}{900} = 40$

F: $\frac{20\% \text{ of } 1{,}50{,}000}{1000} = 30$

Now the number of persons who received a cash-back for different credits is as follows.
10 each with credits 21, 22, 23, 24, and 25;
6 each with credits 26, 27, 28, 29 and 30;
6 each with credits 31, 32, 33, 34, and 35;
8 each with credits 36, 37, 38, 39 and 40 and
6 each with credits 41, 42, 43, 44 and 45.

Total amount paid as cash-back = 1,50,000
Amount paid as cash-back to people with credits 29 to 33
$= 700 \times 6 \times 2 + 800 \times 6 \times 3 = 8{,}400 + 14{,}400$
Total = 22,800

Required percentage = $\frac{22{,}800}{1{,}50{,}000} \times 100 = 15.2\%$ Choice (C)

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

Tennisnext, a website, conducted a survey among 400 of its users in which each user had to choose the best player among Federer, Sampras, McEnroe, Laver and Nadal. Each user can select any number of players as the best among the five, but must select at least one player. Further, it is known that

i. all those who chose Laver also chose at least one other player but not Federer.
ii. 200 users chose Nadal.

iii. the users who chose McEnroe also chose Sampras.
iv. the number of users who chose Nadal and at most one other player is 70.
v. 90 users chose Sampras but not Nadal.
vi. the number of users who chose exactly three players is 130 and those who chose exactly four, is 90.
vii. the number of users who chose Laver but not Nadal is twice the number of users who chose Sampras, McEnroe and Federer but not Laver or Nadal.

Q25. DIRECTIONS *for question 25:* Select the correct alternative from the given choices.
What percentage of users chose McEnroe and Sampras but not Nadal?

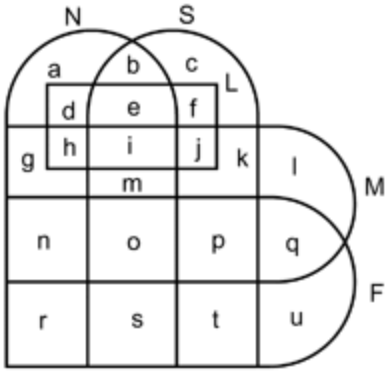
a) 7.5%

b) **22.5%**

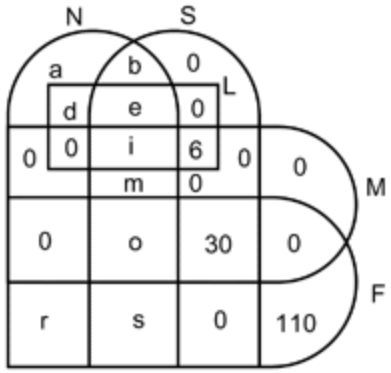
c) **15%**

d) 25%

Given that the users have to choose at least one of the five batsmen and all those who chose Laver also chose at least one more batsman but not Federer. The Venn diagram below represents this scenario.
Given Nadal (N) = 200
l = q = g = h = n = 0 (As all those who chose McEnroe also chose Sampras)



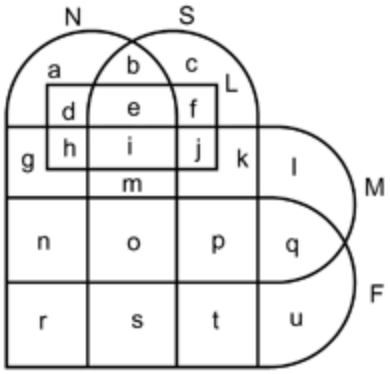
As 70 users chose Nadal and at most one other player,
a + b + d + r = 70……..(1)
90 users chose Sampras but not Nadal.
⇒ c + f + j + k + p + t = 90 ……(2)
From condition (vi),
e + j + m + n + p + s = 130 ……(3)
and, i + o = 90 ……(4)
As the number of users who chose Laver but not Nadal is twice that of the users who chose only Sampras, McEnroe and Federer.
⇒ f + j = 2p……(5)
Now N = 200 and c + f + j + k + p + t = 90
Also, l = q = 0.
∴ u = 400 – N – (c + f + j + k + p + t) – l – q
⇒ u = 400 – 200 – 90 – 0 = 110
Hence, the number of users who chose only Federer = 110.
As g = h = n = 0 and a + b + d + r = 70,
e + i + m + o + s = 200 – 70 = 130
We also know that i + o = 90.
∴ e + m + s = 40
Substituting the above equation in (3), we get,
j + p = 90 (since n = 0)
Now let us substitute j + p = 90 in (2).
⇒ c = f= k = t = 0
As f + j = 2p and f = 0, j + p = 90, j = 60 and p = 30.
The final Venn diagram looks as follows.



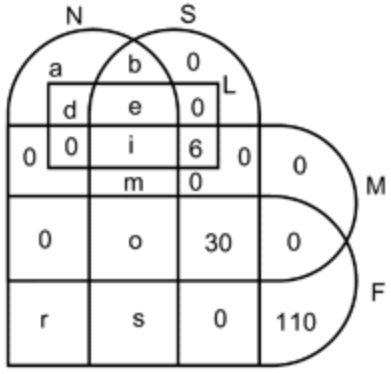
The required percentage = $\frac{60+30}{400} \times 100$ = 22.5% Choice (B)

Q26. DIRECTIONS for questions 26 and 27: Type in your answer in the input box provided below the question.
How many users chose only Federer?

Given that the users have to choose at least one of the five batsmen and all those who chose Laver also chose at least one more batsman but not Federer. The Venn diagram below represents this scenario.
Given Nadal (N) = 200
l = q = g = h = n = 0 (As all those who chose McEnroe also chose Sampras)



As 70 users chose Nadal and at most one other player,
a + b + d + r = 70……..(1)
90 users chose Sampras but not Nadal.
⇒ c + f + j + k + p + t = 90 ……(2)
From condition (vi),
e + j + m + n + p + s = 130 ……(3)
and, i + o = 90 ……(4)
As the number of users who chose Laver but not Nadal is twice that of the users who chose only Sampras, McEnroe and Federer.
⇒ f + j = 2p……(5)
Now N = 200 and c + f + j + k + p + t = 90
Also, l = q = 0.
∴ u = 400 – N – (c + f + j + k + p + t) – l – q
⇒ u = 400 – 200 – 90 – 0 = 110
Hence, the number of users who chose only Federer = 110.
As g = h = n = 0 and a + b + d + r = 70,
e + i + m + o + s = 200 – 70 = 130
We also know that i + o = 90.
∴ e + m + s = 40
Substituting the above equation in (3), we get,
j + p = 90 (since n = 0)
Now let us substitute j + p = 90 in (2).
⇒ c = f= k = t = 0
As f + j = 2p and f = 0, j + p = 90, j = 60 and p = 30.
The final Venn diagram looks as follows.

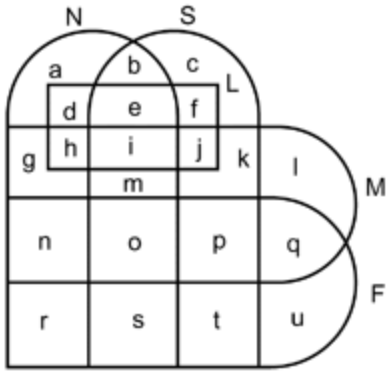


The number of users who chose only Federer = 110 Ans: (110)

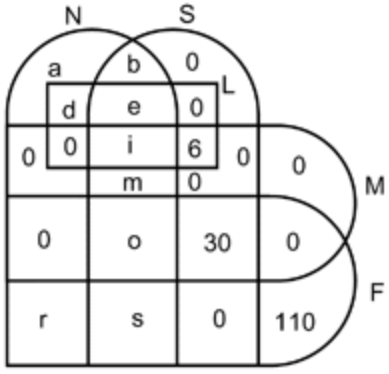
Q27. DIRECTIONS *for questions 26 and 27:* Type in your answer in the input box provided below the question.

If the number of users who chose exactly two players is 25% of those who chose exactly one player, how many users chose only Nadal?

Given that the users have to choose at least one of the five batsmen and all those who chose Laver also chose at least one more batsman but not Federer. The Venn diagram below represents this scenario.
Given Nadal (N) = 200
l = q = g = h = n = 0 (As all those who chose McEnroe also chose Sampras)



As 70 users chose Nadal and at most one other player,
a + b + d + r = 70……..(1)
90 users chose Sampras but not Nadal.
⇒ c + f + j + k + p + t = 90 ……(2)
From condition (vi),
e + j + m + n + p + s = 130 ……(3)
and, i + o = 90 ……(4)
As the number of users who chose Laver but not Nadal is twice that of the users who chose only Sampras, McEnroe and Federer.
⇒ f + j = 2p……(5)
Now N = 200 and c + f + j + k + p + t = 90
Also, l = q = 0.
∴ u = 400 – N – (c + f + j + k + p + t) – l – q
⇒ u = 400 – 200 – 90 – 0 = 110
Hence, the number of users who chose only Federer = 110.
As g = h = n = 0 and a + b + d + r = 70,
e + i + m + o + s = 200 – 70 = 130
We also know that i + o = 90.
∴ e + m + s = 40
Substituting the above equation in (3), we get,
j + p = 90 (since n = 0)
Now let us substitute j + p = 90 in (2).
⇒ c = f= k = t = 0
As f + j = 2p and f = 0, j + p = 90, j = 60 and p = 30.
The final Venn diagram looks as follows.



. Given b + d + r = $\frac{1}{4}(a+110)$

$\Rightarrow 70 - a = \frac{1}{4}(a+110)$

⇒5a = 170⇒ a = 34 Ans: (34)

Q28. DIRECTIONS *for question 28:* Select the correct alternative from the given choices.
If 20 users chose only Nadal and Sampras, then how many chose at least one more player in addition to Nadal?

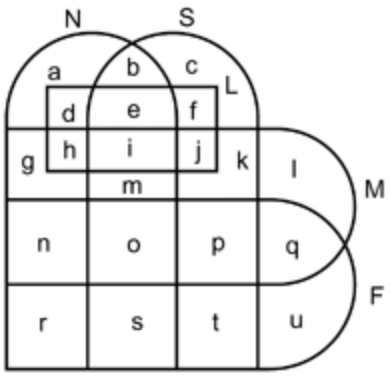
a) 120

b) **160**

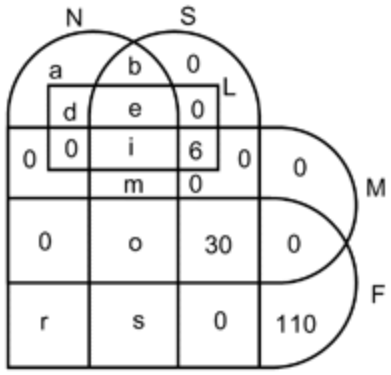
c) **166**

d) Cannot be determined

Given that the users have to choose at least one of the five batsmen and all those who chose Laver also chose at least one more batsman but not Federer. The Venn diagram below represents this scenario.
Given Nadal (N) = 200
l = q = g = h = n = 0 (As all those who chose McEnroe also chose Sampras)



As 70 users chose Nadal and at most one other player,
a + b + d + r = 70……..(1)
90 users chose Sampras but not Nadal.
⇒ c + f + j + k + p + t = 90 ……(2)
From condition (vi),
e + j + m + n + p + s = 130 ……(3)
and, i + o = 90 ……(4)
As the number of users who chose Laver but not Nadal is twice that of the users who chose only Sampras, McEnroe and Federer.
⇒ f + j = 2p……(5)
Now N = 200 and c + f + j + k + p + t = 90
Also, l = q = 0.
∴ u = 400 – N – (c + f + j + k + p + t) – l – q
⇒ u = 400 – 200 – 90 – 0 = 110
Hence, the number of users who chose only Federer = 110.
As g = h = n = 0 and a + b + d + r = 70,
e + i + m + o + s = 200 – 70 = 130
We also know that i + o = 90.
∴ e + m + s = 40
Substituting the above equation in (3), we get,
j + p = 90 (since n = 0)
Now let us substitute j + p = 90 in (2).
⇒ c = f= k = t = 0
As f + j = 2p and f = 0, j + p = 90, j = 60 and p = 30.
The final Venn diagram looks as follows.



Given b = 20.
Number of users who chose at least one more batsman other than Nadal
= d + b + e + i + m + o + s + r
Since we do not know the value of d and r, the answer cannot be determined.

Choice (D)

Q1. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
There are five positive integers. When any four of these integers are considered and their average is added to the fifth integer, we get the following numbers: 41, 44, 50, 56 and 65. Which of the following gives the value of one of these five integers?

a) 28

b) **44**

c) 36

d) 18

Let the five integers be denoted by a, b, c and e respectively.

It is given that $\frac{a+b+c+d}{4}+e=41$ ----- (1)

$\frac{a+b+c+e}{4}+d=44$ ----- (2)

$\frac{a+b+d+e}{4}+c=50$ ----- (3)

$\frac{a+c+d+e}{4}+b=56$ ----- (4)

$\frac{b+c+d+e}{4}+a=65$ ----- (5)

Adding the five equations given above, we get

$2(a + b + c + d + e) = 256$

$\Rightarrow a + b + c + d + e = 128$

Substituting $128 - e$ for $a + b + c + d$ in equation (1), we get $\frac{(128-e)}{4}+e = 41$

$\Rightarrow e=\frac{(41)\times 4-128}{3}$

$\Rightarrow e = 12$

Similarly, we get $d=\frac{(44)\times 4-128}{3}=16$

and $c=\frac{(50)\times 4-128}{3}=24$

and $d=\frac{(56)\times 4-128}{3}=32$

and $a=\frac{(65)\times 4-128}{3}=44$

Among the choices given, one of the integers is 44. Choice (B)

A piece of work can be done by 11 men and 16 boys in 2 days. If the same work can be done by 5 men and 11 boys in 4 days, in how many days can 1 man and 4 boys complete the same work?

a) $16\frac{2}{5}$ ✓ **Your answer is correct**

b) $20\frac{1}{2}$

c) $41\frac{1}{4}$

d) $14\frac{3}{5}$

As (11 men + 16 boys) take 2 days
$\Rightarrow$ (22 men + 32 boys) take 1 day $\rightarrow$ (1)
Also, as (5 men + 11 boys) take 4 days
$\Rightarrow$ (20 men + 44 boys) take 1 day $\rightarrow$ (2)
$\therefore$ 22 men + 32 boys $\equiv$ 20 men + 44 boys $\Rightarrow 1m = 6b$.
Hence, 11 men and 16 boys work = 82 boys work and 1 man and 4 boys work = 10 boys work.
$\therefore$ Time taken by 1 man and 4 boys to complete the work

$= \frac{82 \times 2}{10} = 16\frac{2}{5}$ Choice (A)

A piece of work can be done by 11 men and 16 boys in 2 days. If the same work can be done by 5 men and 11 boys in 4 days, in how many days can 1 man and 4 boys complete the same work?

a) $16\frac{2}{5}$ ✓ **Your answer is correct**

b) $20\frac{1}{2}$

c) $41\frac{1}{4}$

d) $14\frac{3}{5}$

$(x + y + z)^2 \geq 0$

$\Rightarrow x^2 + y^2 + z^2 + 2(xy + yz + zx) \geq 0$

$$\Rightarrow xy + yz + zx \geq \frac{-\left(x^2 + y^2 + z^2\right)}{2}$$

$\therefore xy + yz + zx \geq -2$

Again $(x - y)^2 + (y - z)^2 + (z - x)^2 \geq 0$

$2(x^2 + y^2 + z^2) - 2(xy + yz + zx) \geq 0$

$\Rightarrow xy + yz + zx \leq x^2 + y^2 + z^2$

$\Rightarrow xy + yz + zx \leq 4$

Therefore the range for $xy + yz + zx$ is $[-2, 4]$

Alternative Solution:

Let $x = y = z = k$.

Then $3k^2 = 4 \Rightarrow xy + yz + zx = 3k^2 = 4$.

This eliminates choices (A) and (B).

Now let $x = 0$, $y = \sqrt{2}$ and $z = -\sqrt{2}$, then $xy + yz + zx = -2$.

This eliminates choice (C). Hence, choice (D) must be the answer.

Choice (D)

Q4. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

A certain sum lent at a certain rate of interest per annum, under simple interest, becomes 1.375 times itself in three years. After how many years will the total interest accrued be equal to twice the sum?

a) **14**

b) **16**

c) 17

d) 19

Interest accrued in three years = (1.375 – 1) = 0.375

$= \frac{3}{8}^{th}$ of the sum.

Hence, interest per annum = $\frac{1}{8}$ of sum for interest to equal twice the sum, number of years required

$= \frac{2}{\left(\frac{1}{8}\right)} = 16.$ Choice (B)

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

If the sum of all the odd factors of a number is 16 $\frac{2}{3}\%$ of the sum of all its even factors, then find the remainder when the number is divided by 8.

Any number of the form $2^2(3^x5^y \ldots n^z)$ will have the sum of its odd factors as $(3^0 + 3^1 + \ldots 3^x)(5^0 + 5^1 + \ldots 5^y)\ldots(n^0 + n^1 + \ldots n^z)$, where n is an odd number.
The sum of its even factors will be
$(2^1 + 2^2)(3^0 + 3^1 + \ldots 3^x)(5^0 + 5^1 + \ldots 5^y)\ldots(n^0 + n^1 + \ldots n^z)$
i.e. 6(sum of its odd factors)
So the number is of the form 4(odd). The remainder when such a number is divided by 8 is 4.

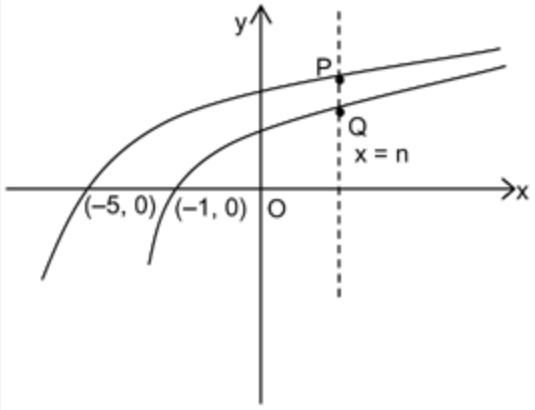
Alternative Solution:

It can be inferred from the question that the number is even. Hence, the remainder when an even number is divided by 8 can only be one of 0, 2, 4 and 6. Now, these remainders themselves can be taken, one at a time, to be the given number and checked if the other condition that the sum of all the odd factors is one-sixth of the sum of all the even factors) is satisfied.
If the remainder is 0, the number can be 8. The only odd factor is 1 and the even factors are 2, 4, 8. The condition is not satisfied.
If the number is 2, the only odd factor is 1 and even factor is 2. The condition is not satisfied.
If the number is 4, the only odd factor is 1 and the even factors are 2, 4. The condition is satisfied.
If the number is 6, the odd factors are 1, 3 and even factors are 2, 6. The condition is not satisfied.
Hence, the number can be 4, i.e., the remainder when the number is divided by 8 must be 4. Ans: (4)

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

If the distance between the points at which the straight line $x = n$ $(n > 0)$ intersects the curves $f(x) = \log_9(x + 6)$ and $g(x) = \log_9(x + 2)$ is $\frac{1}{4}$, find the value of $\frac{n}{\sqrt{3}}$.

The graph of the curves will look as given below:
The given distance between points P and Q is simply the difference between the y-coordinates at $x = n$.



It is given that $\log_9(n + 6) - \log_9(n + 2) = \frac{1}{4}$

$\Rightarrow \log_9 \frac{(n+6)}{(n+2)} = \frac{1}{4}$

$\Rightarrow \frac{n+6}{n+2} = (9)^{\left(\frac{1}{4}\right)}$

$\Rightarrow x + 6 = \sqrt{3}\,(n + 2)$

$\Rightarrow (\sqrt{3} - 1)\, n = 6 - 2\sqrt{3}$

$\Rightarrow n = 2\sqrt{3}$

$\therefore \frac{n}{\sqrt{3}} = 2$

Ans: (2)

Q7. DIRECTIONS *for question 7:* Select the correct alternative from the given choices.
If it takes 50% more time to row a boat upstream over a certain distance than what it takes to row the boat downstream over the same distance, then how many times the speed of the stream is the speed of the boat upstream?

a) **4**

b) **3**

c) $\frac{3}{2}$

d) 5

Let the distance under consideration, the speed of the boat in still water and the speed of the stream be d, u and v respectively.

Time taken to travel upstream = $\frac{d}{u-v}$

Time taken to travel downstream = $\frac{d}{u+v}$

It is given that = $\frac{d}{u-v} = \frac{3}{2}\left(\frac{d}{u+v}\right)$

$2(u + v) = 3(u - v)$

$u = 5v$.

Speed of the boat upstream = $u - v = 5v - v = 4v$

Therefore the speed of the boat upstream is four times the speed of the stream.

Choice (A)

.

Q8. DIRECTIONS for question 8: Type in your answer in the input box provided below the question. f (x) is a quadratic function, the roots of which are α and β. If f (4) = 4 f (1) and β = 3, find the value of 12α.

Let $f(x) = ax^2 + bx + c$
It is given that $f(4) = 4f(1)$
$\Rightarrow 16a + 4b + c = 4(a + b + c)$
$\Rightarrow c = 4a$ ----- (1)
Further, since 3 is one of the roots,
$f(3) = 0$
$\Rightarrow 9a + 3b + c = 0$
Putting $c = 4a$, (from (1)),
we get $9a + 3b + 4a = 0$

$$b = -\frac{13}{3}a$$

The quadratic equation is therefore
$ax^2 + bx + c = 0$

$$\text{i.e., } ax^2 - \frac{13}{3}ax + 4a = 0$$

$\Rightarrow a(3x^2 - 13x + 12) = 0$
$\Rightarrow a(3x - 4)(x - 3) = 0.$

Hence, the other root $\alpha = \frac{4}{3}$, and $12\alpha = 12 \times \frac{4}{3} = 16.$

Alternative Solution 1:

Once we arrive at $c = 4a$ (i.e., eq (1) in above solution), we can see that $\frac{c}{a} = 4$ (i.e., product of roots $(\alpha \times \beta) = 4$). Hence, $3\alpha = 4 \Rightarrow 12\alpha = 16$.

Alternative Solution 2:

Let the function be expressed as $f(x) = k(x - \alpha)(x - 3)$.
Since $f(4) = 4f(1)$, $k(4 - \alpha)(4 - 3) = 4k(1 - \alpha)(1 - 3)$
$\Rightarrow 4k - k\alpha = 8k\alpha - 8k$
$\Rightarrow 9\alpha = 12$, i.e., $12\alpha = 16$. Ans: (16)

Q9. DIRECTIONS *for question 9:* Select the correct alternative from the given choices.
Bag A contains four red and three black balls and bag B contains three red and four black balls. One ball is drawn at random from A and placed in B. Then, one ball is drawn at random from B and placed in A. What is the probability that the composition of the balls in the two bags remains unaltered?

a) $\frac{29}{56}$

b)

c) $\frac{31}{56}$

d) $\frac{33}{56}$

The following are the two cases in which the composition remains unaltered after transferring one ball from A to B and then from B to A.

(i) Drawing a red ball from A and placing it in B and then drawing a red ball from B and placing it in A.
The probability of this event is

$$\left(\frac{4}{4+3}\right)\left(\frac{4}{4+4}\right)=\left(\frac{4}{7}\right)\left(\frac{4}{8}\right)=\frac{16}{56}$$

(ii) Drawing a black ball from A and placing it in B and then drawing a black ball from B and placing it in A. The probability of this event is

$$\left(\frac{3}{3+4}\right)\left(\frac{5}{5+3}\right)=\left(\frac{3}{7}\right)\left(\frac{5}{8}\right)=\frac{15}{56}$$

$\therefore$ Total probability is $\frac{16}{56}+\frac{15}{56}=\frac{31}{56}$ Choice (C)

Q10. DIRECTIONS *for question 10:* Type in your answer in the input box provided below the question.

The area of a rectangle is 675 sq.cm. If both the length and the breadth (in cm) of the rectangle are integers, how many such rectangles are there, for which at least one of the dimensions is not a multiple of 3 and at least one of the dimensions is not a multiple of 5?

$675 = 3^3\ 5^2$. There are 12 factors and 6 ways of expressing 675 as a product of 2 factors. One of the factors is not a multiple of 3, i.e., it is $3^0\ 5^x$.
One of the factors in not a multiple of 5. There are 2 cases. The non-multiple of 5 is the same as the non-multiple of 3, i.e., the factor is $3^0 5^0$ (The other factor would be $3^3 5^2$). Alternately, the non-multiple of 5 can be different from the non-multiple of 3, i.e., the factors are 5^2 (the non-multiple of 3) and 3^3 (the non-multiple of 5). Thus, there are only two rectangles which satisfy the given conditions. Ans: (2)

Q11. DIRECTIONS *for questions 11 to 14:* Select the correct alternative from the given choices.

A function *f* is defined on integers in the following manner:

$f(x) = 2x$, if x is odd.

$f(x) = x - 3$, if x is even.

If $A_0 = 13$ and $A_{n+1} = 2[f(A_n)]$, find A_6.

a) **1484**

b) **1478**

c) 1490

d) None of the above

We have to evaluate A_i for successive values of i, for which we need to evaluate $f(A_{i-1})$. The first value of n (i.e., 0), the corresponding value of A (i.e., A_0) the subsequent values of i and the corresponding values of A_i are tabulated below.

i	$f(A_{i-1})$	A_i
0	–	13
1	26	52
2	49	98
3	95	190
4	187	374
5	371	742
6	739	1478

$\therefore A_6 = 1478$ Choice (B)

Q12. DIRECTIONS *for questions 11 to 14:* Select the correct alternative from the given choices.
If $51 + 52 + 53 + \ldots + N = 5985$, then find the value of $N^2 + N$.

a) **13110**

b) **14520**

c) 14762

d) 15500

$51 + 52 + \ldots + N = 5985.$
No. of terms in the above series is $N - 50$.
$\therefore (N - 50)\ \frac{(51 + N)}{2} = 5985$
$\Rightarrow (N - 50)(N + 51) = 11970$
$\Rightarrow N^2 + N = 14520.$ Choice (B)

Q12. DIRECTIONS *for questions 11 to 14:* Select the correct alternative from the given choices.
If $51 + 52 + 53 + \ldots + N = 5985$, then find the value of $N_2 + N$.

a) **13110**

b) **14520**

c) 14762

d) 15500

If a zero is appended to the extreme right of an octal number, the number gets multiplied by 8
$\therefore$ If N was the original number
The present value of the number is $\frac{N \times 8}{25}$
Therefore the percentage reduction in the value of the number is $\frac{17}{25} \times 100 = 68\%$
Choice (C)

Q14. DIRECTIONS *for questions 11 to 14:* Select the correct alternative from the given choices.
Two trains started simultaneously, at 11:00 am, from Delhi and Jaipur, moving towards Jaipur and Delhi respectively, and crossed each other at 3:00 pm. If the train starting from Jaipur reached its destination 88 minutes before the other train, when did the train starting form Delhi reach Jaipur?

a) **7:20 pm**

b) **7:30 pm**

c) 7:48 pm

d) 8:00 pm

Let the speeds of the trains starting from Delhi and Jaipur be υ_A and υ_P respectively. Let us denote Delhi, Jaipur and their meeting points by A, P and X respectively.
Considering the train starting from Jaipur take t hours more to reach its destination after crossing the other train

Before meeting	After meeting
$AX = \upsilon_A \times 4$	$XP = \upsilon_A (t + \frac{88}{60})$
$PX = \upsilon_P \times 4$	$XA = \upsilon_P (t)$
$(AX)(PX) = \upsilon_A \upsilon_P 16$	$(XP)(XA) = \upsilon_A \upsilon_P t (t + \frac{88}{60})$

$\therefore \upsilon_A \upsilon_P 16 = \upsilon_A \upsilon_P t(t + \frac{88}{60})$

$t(t + \frac{88}{60}) = 16$

$t^2 + \frac{22}{15} t = 16$

$15t^2 + 22t - 240 = 0$
$15t^2 + 72t - 50t - 240 = 0$
$3t(5t + 24) - 19(5t + 24) = 0$
$(3t - 10)(5t + 24) = 0$
$\therefore t = 10/3$
$\therefore t + \frac{88}{60} = \frac{10}{3} + \frac{22}{15} = \frac{72}{15} = \frac{24}{5}$ hrs.

Thus the train reaches Jaipur $\frac{24}{5}$ hrs after 3 pm.

i.e., at 7:48 pm

Alternative Solution 1:

After the two trains met, the time taken by the train from Delhi to reach Jaipur = $4\frac{v_p}{v_a}$ and the time taken by the train from Jaipur to reach Delhi = $4\frac{v_a}{v_p}$

The difference of the above times is given as 88 minutes i.e., $4 \times 60\left(\frac{v_p}{v_a} - \frac{v_a}{v_p}\right) = 88.$

Let $\frac{v_p}{v_a} = x.$

$\therefore 240\left(x - \frac{1}{x}\right) = 88$

i.e., $x - \frac{1}{x} = \frac{11}{30}$

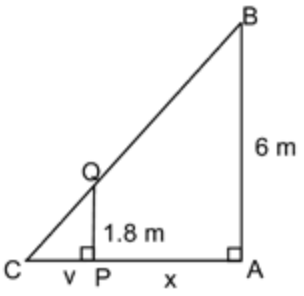
Now, the above equation will have roots that are reciprocals of each other. Further, neither x nor $\frac{1}{x}$ can be greater than 2 (since the difference of reciprocals would then exceed 1 and we need the difference to be $\frac{11}{30}$).

Also, the LCM of the denominators is 30 (or a multiple of 30)

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

A man of height 1.8 m walks, at a uniform speed of 14 m/min, away from a lamp post of height 6 m. The rate (in m/min) at which the length of his shadow (due to the lamp at the top of the lamp post) increases is

Let AB be the lamp post and PQ be the man. Let CP be the shadow.



Let x be the distance between man and the lamppost.
and y be the length of the shadow PC.

Δ ABC and Δ PQC are similar. AB is $\frac{6}{1.8}$ or $\frac{10}{3}$ times PQ.

$\therefore$ $x + y$ is $\frac{10}{3}$ times y or x is $\frac{7}{3}$ times y, irrespective matter what x is (i.e. even if x continuously changes)

$\Rightarrow$ rate at which CP changes = $\frac{3}{7}$ $\times$ rate at which x increases.

$\Rightarrow$ The rate at which the length of the shadow increases

$= \frac{3}{7} \times$ speed of man $= \frac{3}{7} \times 14 = 6$ m/min

Alternative Solution:

Since the man's initial position is not specified, we can take him to initially be at the bottom of the lamp post, in which case, the length of his shadow would be zero. Now, let the man walk for one minute, i.e., 14 m away from the lamp post. Now, the length of his shadow can be shown to be 6 m (using the similar triangles approach, as given above). Hence, in one minute the length of the shadow increased by 6 m. That is, the rate of increase is 6 m/min. Ans: (6)

Q16. DIRECTIONS *for questions 16 to 18:* Select the correct alternative from the given choices.

Harshita went to the local market at a certain time when the angle between the minute hand and the hour hand of the wall clock in her room was 55°. She returned home and observed that the angle

between the two hands of the clock was once again 55°. If she returned home in less than 45 minutes, for how long was she outside her home?

a) **16 $\frac{3}{11}$ minutes**

b) **24 minutes**

c) 22 $\frac{3}{11}$ minutes

d) 20 minutes

The minute hand covers 360° in one hour, whereas the hour hand covers 30° in one hour. Hence, minute hand moves at a relative (angular) speed of $\frac{360°}{60} - \frac{30°}{60} = 5.5°$ per minute faster than the hour hand. (This result may be committed to memory for convenience).
Given the angle between the minute hand and hour hand was 55° when Harshita left and also when she returned.
Now, the minute hand could have been 55° behind the hour hand when she left and then travelled (overtaken) to exactly 55° ahead of it by the time she returned. In which case, the time elapsed would be $\frac{55° + 55°}{5.5°} = 20$ min.
However, it is possible that the minutes hand was already 55° ahead (when she left) and then moved through 360° – (55° + 55°), i.e., 250°, to arrive at a position that was 55° behind the hour hand (when she returned). The time elapsed for this case would be $\frac{250°}{5.5°} = 45.45$ min.
Any other possible configuration of initial and final positions would take more time than 45.45 min. For example, the minute hand could move through exactly 360°, (i.e., from being 55° behind to again being exactly 55° behind) taking $\frac{360}{5.5} = 65.45$ minutes.
Since it is given that she returned in less than 45 minutes, she must have spent 20 minutes outside. Choice (D)

Q17. DIRECTIONS for questions 16 to 18: Select the correct alternative from the given choices.
If the percentage of discount offered on an article is equal in magnitude to the percentage of profit realized on selling the article, then which of the following is true regarding the Marked Price (MP) the Selling Price (SP) and the Cost Price (CP) of the article?

a) The SP is the arithmetic mean of the MP and the CP.

b) The SP is the geometric mean of the MP and the CP.

c) The SP is the harmonic mean of the MP and the CP.

d) None of the above

It is given that,

$$\frac{MP-SP}{MP}\times 100=\frac{SP-CP}{CP}\times 100$$

$$CP\,(MP-SP)=MP\,(SP-CP)$$

$$2CP\times MP=SP\times MP+SP\times CP$$

$$\therefore SP=\frac{2CP\times MP}{CP+MP}=\frac{2}{\frac{1}{CP}+\frac{1}{MP}}$$

∴ SP is the harmonic mean of CP and MP

Alternative Solution:

Let the CP, SP and MP be 100, 120 and 150. Clearly choices (A) and (B) are not correct checking for the HM of 100 and 150, we see that option (C) is correct.

Choice (C)

Q18. DIRECTIONS *for questions 16 to 18:* Select the correct alternative from the given choices. How many points on the line $2x + 3y = 6$ are equidistant from the coordinate axes?

a) 0

b) **1**

c) 2

d) More than 2

Points which are equidistant from the coordinate axes must lie on the line $y = x$ or $y = -x$

Therefore, points on the line $2x + 3y = 6$ which are equidistant from the coordinate axes must be those points where $2x + 3y = 6$ intersects $y = x$ or $y = -x$

Points of intersection of $2x + 3y = 6$ and $y = x$ is $\left(\frac{6}{5}, \frac{6}{5}\right)$, whereas the lines $2x + 3y = 6$ and $y = -x$ intersects at $(-6, 6)$

Therefore two points on the given line are equidistant from the coordinate axes.

Choice (C)

Q19. DIRECTIONS *for questions 19 and 20:* Type in your answer in the input box provided below the question.

In the front-office of a bank, there are four cash dispensing counters with a teller sitting at each of them. In how many ways can five customers stand in front of these counters, if they choose the counters at random ?

Let us denote the number of persons standing in front of the four counters by a, b, c and d respectively.
Now $a + b + c + d = 5$ where $a, b, c, d \geq 0$.
[Since there are a total of five persons standing in front of the four counters].
The total number of non – negative integral solutions to the above equation is $5 + 4 - 1_{C_{4-1}} = 8_{C_3} = 56$
Again, the five persons can be arranged among themselves in 5! ways.
Therefore the total number of ways = $56 \times 5! = 6720$ ways.

Alternative solution:

The first person can stand in front of any of the four counters i.e in 4 ways
Now, wherever the first person stands, the second person has five places (options) available and so he can stand in 5 ways.

Counter 1	Counter 2	Counter 3	Counter 4
✓	✓	✓	✓
1st person			
✓			

[We are denoting the number of positions available to the second person by the tick marks]
So, the first two persons can stand in (4) (5) ways.
Similarly, the third person can (always, i.e., irrespective of where the 2nd person stood) stand in 6 ways.

Counter 1	Counter 2	Counter 3	Counter 4
✓	✓	✓	✓
1st	2nd		
✓	✓		

OR

Counter 1	Counter 2	Counter 3	Counter 4
✓	✓	✓	✓
1st			
✓			
2nd			
✓			

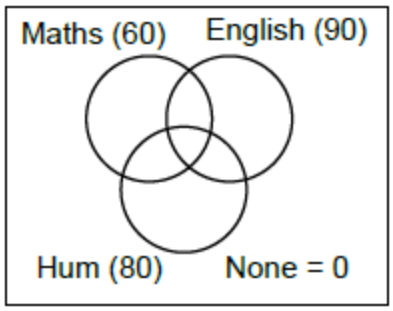
Proceeding similarly, the fourth person can stand in 7 ways and the fifth in 5 ways.
Therefore the total number of ways = (4) (5) (6) (7) (8)
= 6720 ways. Ans: (6720)

Q20.DIRECTIONS *for 19 and 20* .Type in your answer in the input box provided below the question

.In a class of 120 students, each student took three tests – Maths, English and Humanities. The number of students who passed in the three tests were 60, 90 and 80 respectively. If none of the students failed in all three subjects and the number of students who passed in at least one subject was 25% more than those who passed in at least two subjects, then how many students passed in all three subjects?

Let the number of students who passed in exactly one, exactly two and exactly three subjects be a, b and c respectively.

Total = 120



$a + b + c = 120$

$a + 2b + 3c = 60 + 90 + 80$

Subtracting $b + 2c = 110$ _____ (1)

It is given that, $a + b + c = \frac{5}{4}(b + c)$

$120 = \frac{5}{4}(b + c)$

$\therefore b + c = 96$ _____ (2)

Solving (1) and (2), we get $c = 14$ Ans: (14)

Q21. DIRECTIONS *for question 21:* Select the correct alternative from the given choices.

Mohan subtracted a certain quantity x from each of 50, 80 and 130. If he found that the resulting numbers formed a geometric progression, find the common ratio of the geometric progression.

a)

$\frac{3}{2}$

b)

$\frac{5}{3}$

c) 2

d)

$\frac{8}{5}$

It is given that $50 - x$, $80 - x$ and $(130 - x)$ are in geometric progression.
$\therefore (80 - x)^2 = (50 - x)(130 - x)$
$6400 - 160x + x^2 = 6500 - 180x + x^2$
$\Rightarrow 20x = 100$
$\therefore x = 5$
Therefore, the numbers in geometric progression are 45, 75 and 125 and the common ratio is $\frac{75}{45} = \frac{5}{3}$

Alternative Solution:

Let the common ratio $r = \frac{(80 - x)}{(50 - x)} = \frac{(130 - x)}{(80 - x)}$.

By subtracting 1 from both sides of the equation (i.e., performing componendo) we get

$\frac{(80-x)-(50-x)}{(50-x)} = \frac{(130-x)-(80-x)}{(80-x)}$, i.e., $\frac{80-x}{50-x} = \frac{5}{3}$. Hence, $r = \frac{5}{3}$. Choice (B)

Q22. DIRECTIONS *for question 22:* Type in your answer in the input box provided below the question.

Find the remainder when 81^{82} is divided by 17.

$\text{Rem}\left(\frac{81^{82}}{17}\right) = \text{Rem}\left(\frac{-4^{82}}{17}\right)$, since $\text{Rem}\left(\frac{81}{17}\right) = -4$

$= \text{Rem}\left(\frac{(-4^2)^{41}}{17}\right) = \text{Rem}\left(\frac{16^{41}}{17}\right) = -1$

Hence, required remainder = 16

Alternative Solution:

$\text{Rem}\left(\frac{81^{82}}{17}\right) = \text{Rem}\left(\frac{81^2.81^{80}}{17}\right)$

$= \text{Rem}\left(\frac{81^2}{17}\right) \times \text{Rem}\left(\frac{81^{80}}{17}\right) = 16 \times 1$

$\left[\because \text{Rem}\left(\frac{81^{80}}{17}\right) = \text{Rem}\left[\frac{81^{(17-1)5}}{17}\right] = 1\right]$

By Fermat's theorem $\text{Rem}\left(\frac{a^{(p-1)k}}{p}\right) = 1$, where p is a prime number and a is not a multiple of p.

So, the required remainder is 16. Ans : (16)

Q23. DIRECTIONS *for questions 23 and 24:* Select the correct alternative from the given choices.

If $\left(\sqrt[3]{\frac{16}{81}}\right)^{2x-5} = \left(\frac{27}{8}\right)^{x-11}$, then the value of x is equal to

a) 3.

b) **7.**

c) 5.

d) 6

.

$$\left(\sqrt[3]{\frac{16}{81}}\right)^{2x-5} = \left(\frac{27}{8}\right)^{x-11}$$

$$\left[\left(\frac{2}{3}\right)^{\frac{4}{3}}\right]^{2x-5} = \left[\left(\frac{3}{2}\right)^{3}\right]^{x-11}$$

$$\left[\frac{2}{3}\right]^{\frac{4}{3}(2x-5)} = \left[\frac{2}{3}\right]^{3(11-x)}$$

Comparing the powers, we get,

$$\frac{4}{3}(2x-5) = 3(11-x)$$

$\Rightarrow 8x - 20 = 99 - 9x$

$\Rightarrow x = 7$ Choice (B)

Q24. DIRECTIONS *for questions 23 and 24:* Select the correct alternative from the given choices.

Raghu wants to construct a circular swimming pool in his plot which is in the shape of a trapezium. The lengths of the oblique sides of the plot are 26 m and 30 m. If the radius of the biggest circle that can be marked for the pool is 12 m, what must be the minimum area (in sq.m) of the plot?

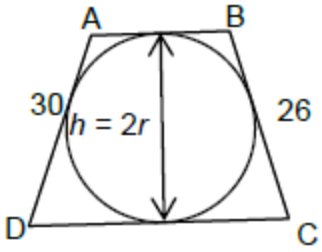
a) 336

b) 672

c) 728

d) 1344

The size of the plot will be the minimum when all the four sides of the plot (i.e. trapezium) touch the pool.



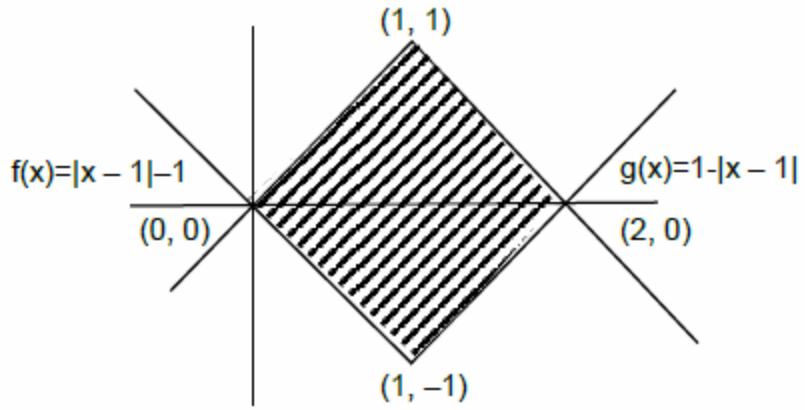
Let the oblique sides be AD and BC. Since the circle is inscribed in ABCD, the sum of the lengths of opposite sides will be equal.
Hence, AB + DC = AD + BC = 30 + 26 = 56 cm
Also, height of the trapezium = $h = 2r$ = diameter of circle
= 12 × 2 = 24 m

Hence area of trapezium = $\frac{1}{2}(AB + DC) \times h = \frac{1}{2} \times 56 \times 24$

= 672 sq.m Choice (B)

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

Find the area (in sq. units) enclosed by the curves $f(x) = |x - 1| - 1$ and $g(x) = 1 - |x - 1|$.



The two curves have been plotted above. Their points of intersection is (0, 0) and (2, 0). The area enclosed between the two curves is the shaded area shown above

$= 2\left[\frac{1}{2} \times 2 \times 1\right] = 2$ sq. units. Ans: (2)

Q26. DIRECTIONS *for questions 26 and 27:* Select the correct alternative from the given choices.

A number when divided by 31 leaves a remainder of 3. If the same number when divided by 93 leaves a remainder of *r*, how many possible values can *r* assume?

a) **1**

b) **2**

c) 3

d) 5

Let us denote the number as N
N = 31K + 3
K can be of the form 3*a* or 3*a* + 1 or 3*a* + 2.
∴ N = 31(3*a*) + 3 or 31(3*a* + 1) + 3 or 31(3*a* + 2) + 3.
∴ N = 93*a* + 3 or N = 93*a* + 34 or N = 93*a* + 65.
Therefore, when N is divided by 93, the remainder can be 3 or 34 or 65
Thus, three possible values exist for *r* Choice (C)

Q27. DIRECTIONS *for questions 26 and 27:* Select the correct alternative from the given choices.

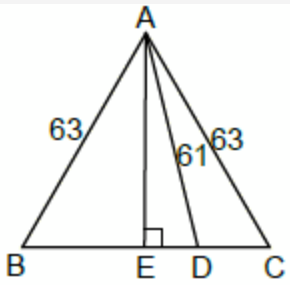
In an isosceles triangle, sides AB and AC each measure 63 cm. If D is a point on side BC, such that AD measures 61 cm, find the measure of the product BD × DC (in sq.cm).

a) **244**

b) **252**

c) 248

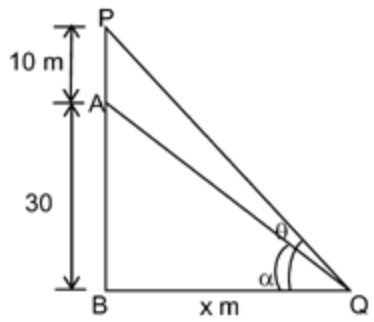
d) Cannot be determined



We drop a perpendicular from A to BC which meets BC at E where BE = EC (Since ΔABC is an isosceles triangle)
Now $AE^2 = AC^2 - EC^2$ and $AE^2 = AD^2 - ED^2$
Equating AE^2, we get
$AC^2 - EC^2 = AD^2 - ED^2$
$AC^2 - AD^2 = EC^2 - ED^2$
$63^2 - 61^2 = (EC - ED)(EC + ED)$
(2)(124) = (DC)(BD) (Since EC = BE)
= 248. Choice (C)

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

A communication tower of height 10 m is erected on the top of a building of height 30 m. If the distance from the base of the building to the point on the ground, at which the tower subtends the greatest angle is x, find $\sqrt{3}x$. Given $\tan(A - B) = \frac{\tan A - \tan B}{1 + \tan A \tan B}$.



Let AB be the building and AP be the tower.
Let Q be a point on the ground at a distance of x m.
The angles of elevation of points P and A are θ and α respectively.
$\Rightarrow$ Angle subtended by tower = $\theta - \alpha$

$\tan\theta = \frac{10+30}{x} = \frac{40}{x}$ and $\tan\alpha = \frac{30}{x}$

Now $(\theta - \alpha)$ is maximum when $\tan(\theta - \alpha)$ is maximum.

For $\tan(\theta - \alpha)$ to be maximum, $\frac{\tan\theta - \tan\alpha}{1+\tan\theta\tan\alpha}$ must be maximum.

That is $\frac{\left(\frac{40}{x} - \frac{30}{x}\right)}{\left(1+\frac{40}{x}.\frac{30}{x}\right)}$ is maximum.

$\Rightarrow \frac{10}{x} \times \frac{x^2}{x^2+1200}$ is maximum.

$\Rightarrow \frac{10x}{x^2+1200}$ is maximum

$\Rightarrow \frac{x^2+1200}{10x}$ is minimum

$\Rightarrow \frac{x}{10} + \frac{1200}{10x}$ is a minimum.

Now, since, product of $\left(\frac{x}{10}\right)$ and $\left(\frac{1200}{10x}\right)$ is constant, the minimum is achieved when

$\frac{x}{10} = \frac{1200}{10x} \Rightarrow x^2 = 1200$ or $x = \sqrt{1200} = 20\sqrt{3}$

$\therefore \sqrt{3}x = 60$ Ans: (60)

Q29. DIRECTIONS *for questions 29 and 30:* Select the correct alternative from the given choices.

Find the difference between the maximum and the minimum possible values of a, for which the equation $3x^2 + ax - 3x + 12 = 0$ has real and equal roots.

a) **9**

b) **15**

c) 6

d) **24**

If $3x^2 + ax - 3x + 12 = 0$ has real and equal roots,
$(a - 3)^2 - 4\,(3)\,(12) = 0$
$\Rightarrow a - 3 = \pm 12$
$\therefore a = 15$ or $a = -9$.
Therefore the difference between the maximum and minimum possible values of $a = 15 - (-9) = 24$ Choice (D)

Q30. DIRECTIONS ***for questions 29 and 30:*** **Select the correct alternative from the given choices.**

In a certain race, A beats B by 20 m and C by 40 m. If the speed of B is 25% more than the speed of C, then find the length (in m) of the track.

a) 100

b) 200

c) 120

d) 160

Let the length of the track be ℓ.
In the time B covers $(\ell - 20)$, C covers $(\ell - 40)$
Let the speed of C be 4v.
Therefore, speed of B is 25% more than C, i.e., 5v.

Hence, $\frac{\ell-20}{\ell-40} = \frac{5}{4}$

$\Rightarrow 4(\ell - 20) = 5(\ell - 40)$

$\therefore \ell = 120.$ Choice (C)

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

Find the number of trailing zeroes in ${}^{100}C_{50}$.

${}^{100}C_{50} = \frac{100!}{50!\ 50!}$

To find the number of trailing zeroes in ${}^{100}C_{50}$, we need to find the number of trailing zeroes in 100! and those in 50!

Highest power of 5 in 50! $= \left[\frac{50}{5}\right] + \left[\frac{50}{5^2}\right] = 10 + 2 = 12$

The highest power of 2 in 50! will be definitely greater than that of 5.
Thus 50! has 12 trailing zeroes
$\therefore$ (50!)(50!) will have 24 trailing zeroes.
Proceeding similarly, we find 100! will also have 24 trialing zeroes.

$\therefore \frac{100!}{(50!)(50!)}$ will have no trailing zeroes.

Alternative Solution:

The number of trailing zeroes in any factorial depends on the number of 5s appearing in that factorial.
It can be observed that the number of times 5 appears in $1 \times 2 \times 3 \times 4 \times \ldots\ldots \times 49 \times 50$ is same as that in $51 \times 52 \times \ldots\ldots \times 100$ (both products containing 10 multiples of 5, 2 of which are also multiples of 25).
Hence, the number of 5s in 100! will be equal to the number of 5s in 50! 50!

$\Rightarrow \frac{100!}{50!\ 50!}$ will have zero trailing zeroes. Ans: (0)

Q32. DIRECTIONS *for questions 32 and 33:* Select the correct alternative from the given choices.

The ratio of milk and water in a mixture of the two is 3 : 1. First, the volume of the mixture is increased by 50% by adding water. Next, 25 litres of the mixture is replaced with water. If the final ratio of milk and water in the resultant mixture is 1 : 3, find the initial quantity of mixture present (in litres).

a) $16\frac{2}{3}$

b) $33\frac{1}{3}$

c) **40**

d) **80**

Let the initial quantities of milk and water be $3x$ and x.

The volume of water added to increase the total volume by 50% will be $\frac{(3x+x)}{2} = 2x$.

Now, quantities of milk and water will be $3x$ and $(x + 2x)$, i.e., the ratio = $3x : 3x$, i.e., 1 : 1. Hence, any volume of mixture removed will have equal quantities of milk and water. That is, 25 litres of mixture that was removed must have had 12.5 litres each of milk and water.

$\therefore$ Ratio of Final quantities after replacing 25 litres with water

$= \frac{3x - 12.5}{(3x - 12.5) + 25} = \frac{3x-12.5}{3x+12.5} = \frac{1}{3}$ (given)

$\Rightarrow 3x = 25$

Now initial quantity of mixture was $3x + x = 4x$

$= \frac{25\times4}{3} = 33\frac{1}{3}$ litres. Choice (B)

Q33. DIRECTIONS *for questions 32 and 33:* Select the correct alternative from the given choices.

One can go from city A to city C either directly or via city B. If one can go from A to C in a total of 32 ways, from A to B in eight ways and from A to C directly in eight ways, then in how many ways can one go from B to C?

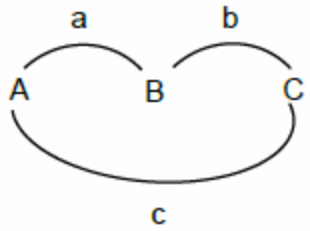
a) **2**

b) **3**

c) **4**

d) **6**

Let the number of ways in which one can go from A to B, B to C and A to C directly be denoted by *a*, *b* and *c* respectively.



It is given that, $a = c = 8$ and
$\therefore ab + c = 32$
$\Rightarrow 8b + 8 = 32$
$\Rightarrow b = 3$
Therefore one can go from B to C in 3 ways. Choice (B)

Q34. DIRECTIONS *for question 34:* Type in your answer in the input box provided below the question. If two sides of a triangle measure 6 cm and 10 cm, how many integral values are possible for the length (in cm) of the third side?

Let the measure of the third side be x, where x is a natural number.
From the triangle inequality, sum of any two sides must be greater than the third side.
The three sides are 6, 10 and x
We have two cases:

Case I: x is the longest side
$\therefore 6 + 10 > x \Rightarrow x < 16$
Case II: 10 is the longest side
$\therefore 6 + x > 10 \Rightarrow x > 4$

Therefore, the possible values of x are $4 < x < 16$, i.e., there are 11 possible values for the third side (x = 5, 6, 7....14, 15). Ans: (11)

Q35. DIRECTIONS *for question 35:* Select the correct alternative from the given choices.

In which of the following regular polygons, is the number of points of intersection of the diagonals two less than the sum of the number of sides and the number of diagonals of the polygon?

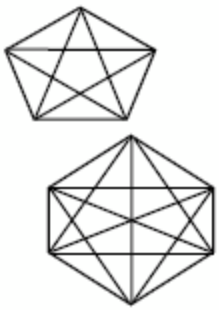
a) **Pentagon**

b) **Hexagon**

c) **Heptagon**

d) **Octagon**

Since there is no formula to find the number of points of intersection of diagonals, this problem has to be worked out by physical counting.



In a pentagon, the number of diagonals is 5 and the number of points of intersection is 5, which does not satisfy the given relation.

In a hexagon, the number of diagonals is 9 and the number of points of intersection is 13, which is 2 less than (9 + 6).
Hence, the given condition is satisfied in the case of a hexagon. In case of a heptagon or Octagon it can be seen that the number of intersections will be more than the sum of sides and diagonals. Choice (B)

Q36. DIRECTIONS ***for question 36:*** **Type in your answer in the input box provided below the question. Danny forgot the seven-digit telephone number of his friend but he remembers the following information: the first three digits from the left are either 242 or 472, the digit 7 appears once and the number is an even number. If Danny were to use a trial and error method to reach his friend, what is the minimum number of trials that he has to make so that he can be certain of succeeding ?**

$\underline{1}\ \underline{2}\ \underline{3}\ \underline{4}\ \underline{5}\ \underline{6}\ \underline{7}$

The first 3 positions can be filled in 2 ways.
Since the number is even, position seven can be filled with 0, 2, 4, 6 or 8 (in 5 ways.)
Since, the digit 7 has to appear only once, we consider the following cases.

Case (i): If the first three digits are 242 then one out of the positions 4^{th}, 5^{th} and 6^{th} should be 7 and the remaining two positions can be filled in (9) (9) ways (i.e., with the digits except 7).
$\therefore$ Number of trials in this case
= 3 (9) (9) (5)
Case (ii): If the first three digits are 472, then the 4^{th}, 5^{th} and 6^{th} positions can be filled in (9) (9) (9) ways (i.e., with the digits except 7).
$\therefore$ Number of trials in this case
= (9) (9) (9) (5)
Hence, the required number of trials = (12) (9) (9) (5)
= 4860 Ans: (4860)

Q37. DIRECTIONS ***for question 37:*** **Select the correct alternative from the given choices.**

Let Q be a recurring decimal of the form Q = 0.$P_1P_2P_3P_1P_2P_3$ …..,where P_1, P_2, P_3 are single digits, out of which atmost one is zero. Which of the following numbers when multiplied by Q, necessarily gives an integer?

a) 1998

b) 198

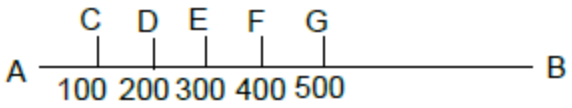
c) 1728

d) 1988

$Q = 0.\ P_1\ P_2\ P_3\ P_1\ P_2\ P_3\ \ldots$
$1000Q = P_1\ P_2\ P_3\ .\ P_1\ P_2\ P_3\ P_1\ P_2\ P_3\ \ldots$
$999\ Q = P_1\ P_2\ P_3.$
$\Rightarrow$ whenever Q is multiplied by 999 or multiples of 999, we get an integer among the choices, only 1998 is a multiple of 999. Choice (A)

Q38. DIRECTIONS ***for question 38:*** **Type in your answer in the input box provided in the question.**

On a highway, the distance between two points *A* and *B* is 1 kilometre. There are 5 milestones located at points 100 m, 200 m, 300 m, 400 m, 500 m respectively, starting from *A*, between *A* and *B*. A man starting at *A* has to transport all the milestones to *B*, by carrying only one milestone at a time. The distance (in m) he has to travel is



Total distance to be travelled = AC + CB + BD + DB + BE + EB + BF +FB + BG + GB
= AB + 2BD + 2BE + 2BF + 2BG
= 1000 + 2 [800 + 700 + 600 + 500]
= 1000 + 2 (2600) = 6200 m Ans: (6200)