AIMCAT 1705
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DIRECTIONS *for questions 1 to 6:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

A bicycle is surprisingly stable for an upright, two-wheeled vehicle that needs to be propped against a wall when it's not moving. But perhaps a bigger surprise is that no consensus exists on why the bike is as stable as it is. For such a simple design, which almost anyone can understand, this seems crazy. After all, we live in a world of self-driving cars and safe passenger airplanes. Surely the bike can't still hold any physics or engineering mysteries?

At the heart of the puzzle is something we've all observed. If you push a riderless bicycle, it balances itself, steering automatically to correct for any wobbles, until it slows down and finally falls flat on its side.

There are two theories as to how the bike keeps itself upright. One is the gyroscopic theory, where the spinning wheel provides enough stability to stop the bike from falling. You can try this for yourself if you have a bike handy. Remove a wheel (the front is easier and probably cleaner) and – holding the axle – give it a spin. Now, try to twist the wheel by moving the axle. You'll see it resists you. Now, with the wheel still spinning, crook a finger under one side of that axle, and let go of the other side. Magically, it stays there, like somebody invisible is holding the other side up.

Striking as this effect is, it doesn't account for the bike's self-balancing ability. By mounting a second wheel that spins counter to the first, the gyroscopic effect can be canceled out. Way back in 1970, science writer David Jones did exactly this. "One bike that Jones built had a counter-rotating wheel on its front end," says *Scientific American*, "that would effectively cancel out the gyroscopic effect. But he had little problem riding it hands-free."

Jones proposed an alternate theory, which came to be the second major explanation for the bike's self-balancing ability. The "caster theory" considers the bike wheel to be like the caster on a shopping cart. On a shopping cart, the caster touches the floor behind the steering axis. In this case, the steering axis is the spindle that connects it to the rest of the cart. This, as you know, lets the caster automatically align itself to the direction of travel.

On a bike, the steering axis runs down the fork. If you imagine a line that continues out the end of the slanted fork, it actually hits the ground ahead of where the tire touches the ground. That is, the steering axis is ahead of the contact point, just like on a shopping cart. The distance between these two points is called the "trail." Jones, says *Scientific American*, found that a long trail makes a bike more stable, whereas a short trail makes it harder to ride.

Jones was so pleased with his discovery that he was still crowing about it 40 years later. In his memoir, he wrote: "I am now hailed as the father of modern bicycle theory."

The problem is, he was wrong. While caster trail does determine how easy a bike is to ride, and the gyroscopic effect does help stability, neither is responsible for the self-balancing effect of the bike. Engineer Jim Papadopoulos, the subject of *Scientific American*'s feature, demonstrated that a bike with significant negative

trail can be ridden, as long as it has a weight jutting out front. That weight could, in theory, come from cargo on a front rack.

Q1. What does the author imply when he says that “After all, we live… any physics or engineering mysteries?”

- a) We know everything that we need to know about the science behind the functioning of a bicycle.
- b) Even though our technology has advanced, we still are not able to answer questions about something as simple as the science behind the functioning of a bicycle.
- c) The advances in technology are based on scientific principles which we are unable to explain completely.
- d) As our technology is so advanced, there is no need to understand the science behind the functioning of a bicycle.

Q2. Which of the following do the two theories mentioned in the passage set out to explain?

- a) How is it possible for a person to balance a bicycle while riding it?
- b) What makes it so easy to ride a bicycle?
- c) How does a moving bicycle balance itself even when there is no person riding it?
- d) What roles do the gyroscopic effect and the trail play when riding a bicycle?

Q3. The author would most probably describe David Jones as

- a) imprudent.
- b) reticent.
- c) unassuming
- d) vainglorious.

Q4. According to the passage, the caster theory is considered a possible explanation of

- a) how the front wheel of a bicycle aligns itself along the direction of its travel.
- b) how a bicycle can be turned by leaning it towards one side without turning its handle.
- c) how a bicycle when pushed can travel along a straight line for some distance before falling.
- d) why a heavier person will find it easier to ride a bicycle as compared to someone lighter.

Q5. According to the passage, Jim Papadopoulos

- a) was able to determine how a bicycle in motion can balance even without a rider.
- b) proved that the caster theory does not completely explain how a rider-less bicycle can balance itself.
- c) proved that neither the caster theory nor the gyroscopic theory completely explains the stability of a bicycle.
- d) proved that the David Jones’ study was based on inaccurate assumptions.

Q6. Which of the following statements is definitely false, according to the passage?

a) A bicycle can be ridden even in the absence of gyroscopic effect.

b) A bicycle with a positive trail can be ridden even with a weight jutting out in the front of the bicycle.

c) A bicycle with a negative trail cannot be ridden.

d) A bicycle with a negative trail can be ridden when there is a weight jutting out in the front of the bicycle.

DIRECTIONS *for questions 7 to 12:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

All maps are biased toward their creator's subjective view of the world. As Lewis Carroll famously pointed out, a perfectly objective and faithful representation of the world would literally have to be the same size as the place it depicted. Therefore, mapmakers must make sensible design decisions in order to compress the physical world into a much smaller, flatter depiction. Those decisions inevitably introduce personal biases, however, such as our tendency to place ourselves at the centre of the world. "We always want to put ourselves on the map," says Jerry Brotton, a professor of renaissance studies at Queen Mary University London. "Maps address an existential question as much as one that's about orientation and coordinates.

"We want to find ourselves on the map, but at the same time, we are also outside of the map, rising above the world and looking down as if we were god," he continues. "It's a transcendental experience."

Which is why, he says, the first thing most new Google Earth users do is to look up their own address. Modern technology enables this exercise in ego, but the tendency itself is nothing new. It dates back to the oldest known world map, a 2,500-year-old cuneiform tablet discovered near Baghdad that puts Babylon at its centre. Mapmakers throughout history adopted a similar bias toward their own homeland, and little seems to have changed since then. Today, American maps still tend to centre on America and Japanese maps on Japan. It's such an ego-centric approach that the United Nations sought to avoid it when they created their emblem – a map of the world neutrally centred on the North Pole.

Similarly, maps can overestimate their creators' geographic worth, or reveal bias against certain places. Africa's true size, for example, has been chronically downplayed throughout the history of mapmaking, and even now, non-Africans tend to underestimate the size of that truly massive continent – which is large enough to cover China, the US and much of Europe.

Religious, political and economic agendas also come into play, adulterating a map's objectivity. The maps of World War II, for example, were incredibly propagandist, depicting "dreadful red bears and red perils," Brotton says. "The maps were distorted to tell a political message.

"A map," he continues, "will always have an agenda, an argument, a proposal about what the world looks like from a particular perspective."

Even digital maps skew toward the things that their users deem most important. Those areas that the majority sees as unworthy of attention – poor neighbourhoods like the Orangi shanty town in Karachi, Pakistan, or the Neza-Chalco-Itza slum in Mexico City – as well as those places that mapmakers do not often go – war-torn regions, North Korea – remain grossly undermapped.

This neglect means maps of remote regions can contain errors that go unnoticed for years. Scientists paying a visit toSandy Island, a speck of land in the Coral Sea near New Caledonia, recently discovered that the island simply did not exist. The “phantom island” had found its way onto Australian maps and Google Earth at least a decade ago, probably due to human error.

Q7. According to the author, why should a faithful representation of the world “be the same size as the place it depicted”?

- a) Because it makes it easier to peruse the map.
- b) Because the compression that goes into a map is usually reflective of the mapmaker's subjectivity.
- c) Because mapmakers are prone to make absurd design decisions to compress the map.
- d) Because mapmakers tend to place their homes at the centre of the map.

Q8. Why, according to the author, do a majority of the new Google Earth users look up their own address?

- a) To determine whether their place has been accurately represented in Google Earth.
- b) To view the place that they live in from the skies, and feel like God.
- c) To feel that they are the centre of the world
- d) To know about the places surrounding their address.

Q9. When the author states that “the tendency itself is nothing new”, the tendency refers to

- a) new Google Earth users looking up their own address.
- b) the mapmakers distorting the maps because of personal biases.
- c) the mapmakers placing their homeland at the centre of the world map
- d) people using modern technology to feel important.

Q10. Which of the following statements is true according to Brotton?

- a) Maps of remote regions will always contain errors.
- b) Maps will never be objective and will always carry the personal biases of the mapmaker
- c) Most modern maps do not incorporate any biases of the mapmaker.
- d) Only during times of war, maps were distorted to convey political messages.

Q11. According to the passage, which of the following is not a distortion in a digital map?

- a) Only the places which are deemed important by the mapmakers are properly mapped
- b) The places that the mapmakers do not visit often remain inadequately mapped.
- c) Digital maps always carry the subjectivity of the mapmakers.

d) Correcting the errors that creep into digital maps will usually take a long time.

Q12. Which of the following factors does not contribute to the introduction of biases in a map?

a) The importance of an area according to the mapmaker

b) Religious agenda of the mapmaker.

c) Political agenda of the mapmaker.

d) Difficulty in verifying the veracity of a map.

DIRECTIONS for questions 13 to 15: The passage given below is followed by a set of three questions. Choose the best answer to each question.

Why does it matter that the diaper got so small? It seems a trivial thing, chiefly a matter of convenience to the parent taking a bag of diapers home from the supermarket. But it turns out that size matters a great deal. Smallness is one of those changes that send ripples through the whole economy. The old disposable diapers, for example, created a transportation problem… The diaper was bulky and not very heavy, meaning that a diaper truck was full before it reached its weight limit. By cutting the size of a diaper in half, companies could fit twice as many diapers on a truck, and cut transportation expenses in half. And companies could begin to rethink their manufacturing operations. "Distribution costs used to force you to have plants in lots of places," Dudley Lehman, who heads the Kimberly-Clark diaper business, says. "In the United States, it used to take eight. Now it takes five." And, because using five plants to make diapers is more efficient than using eight, it became possible to improve diapers without raising diaper prices – which is important, because the sheer number of diapers parents have to buy makes it a price-sensitive product. Until recently, diapers were fastened with little pieces of tape, and if the person changing the diapers got lotion or powder on her fingers the tape wouldn't work. A hook-and-loop, Velcro-like fastener doesn't have this problem. But it was years before the hook-and-loop fastener was incorporated into the diaper chassis: until over-all manufacturing costs were reduced, it was just too expensive.

Most important, though, is how size affects the way diapers are sold. The shelves along the aisles of a supermarket are divided into increments of four feet, and the space devoted to a given product category is almost always a multiple of that… But when diapers were at their bulkiest the space reserved for them was never enough… Out-of-stock rates are already a huge problem in the retail business. But, for a fast-moving, bulky item like diapers, the problem of restocking was much worse. Supermarkets could have allocated more shelf space to diapers, of course, but diapers aren't a particularly profitable category for retailers. So retailers would much rather give more shelf space to a growing and lucrative category like bottled water… The only way diaper-makers could insure that their products would actually be on the shelves was to make the products smaller, so they could fit twelve bags into the space of six. And if you can fit twelve bags on a shelf, you can introduce different kinds of diapers.

Q13. According to the passage, hook-and-loop fasteners were not introduced in diapers earlier than they actually were because

a) it would have increased the complexity of manufacturing diapers.

b) the technology for manufacturing hook-and-loop fasteners was not available earlier.

c) there was no perceived need for its introduction.

d) it was not possible to introduce them without making the diapers too expensive to manufacture.

Q14. Which of the following is definitely true according to the passage?

a) Companies that manufacture diapers can improve the diapers without incurring additional production costs because of the reduction in the size of the diapers.

b) The reduction in distribution costs due to the decrease in the size of the diapers facilitated the introduction of improvements in diapers.

c) Companies that manufacture diapers reduced their prices after the reduction in the size of the diapers as it was a price-sensitive product.

d) The profitability of the companies increased because of the reduction in the cost of manufacturing diapers after the size of the diapers reduced.

Q15. Which of the following cannot be inferred to be a benefit of reduction in diaper size that can be reaped by parents who purchase diapers?

a) Parents do not need to carry bulky bags of diapers from the supermarkets to their homes.

b) Parents can buy diapers from a greater number of stores.

c) Parents will find it easier to use diapers because of the new design elements.

d) Parents will have a choice of diapers with different features.

DIRECTIONS *for questions 16 to 21:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

It's a question as common as brown dogs: **will alien life be carbon-based?**

I'm asked this frequently, although I'm not sure why the public is so hung up on the elemental basis of extraterrestrial life. In my experience, folks seldom inquire whether the Krebs cycle could be prevalent on other worlds, or if adenosine triphosphate might underpin the energy production of active aliens. Probably the fascination with vital soot is just a consequence of carbon's high profile on *Star Trek.* The plot of this popular TV series gets viscous whenever the Enterprise detects "carbon-based life forms" on some God-forsaken planet deep in the Galaxy's nether regions. If they're carbon-based, well, they must be like us (and possibly edible, too).

Hype aside, as most astrobiologists or any one of a thousand books will tell you, carbon-based life is not simply a provincial conceit. There's good reason why this element is the basis for life on Earth, and probably on most other worlds that shelter biology.

If you remember your high school chemistry, you'll recall that carbon has half of its outer electron shell filled. In other words, each carbon atom is able (and eager) to bond with up to four other electron-sharing atoms (most atoms prefer to have a filled outer shell of eight electrons). As a common example, a single carbon atom will eagerly take on four hydrogen atoms to make methane (CH_4). And because carbon's outer shell is both half filled and half empty, it can handily hook up with other carbon atoms, creating the sort of elaborate molecular chains and rings that fuel companies love to pump.

Carbon, in other words, is adept at making complex structures. And complex structures are the bricks of life.

Are there other contenders? Is carbon really so special, or did it just get lucky here on Earth? If you have a periodic table handy, you'll note that the element situated under carbon is silicon, which also has four electrons in its outer shell. Ergo, silicon might also seem to be an obvious basis for life, a point that was first made at the end of the nineteenth century by the German astrophysicist, Julius Scheiner. The optimistic Scheiner was certain that other planets in our solar system (including roasty toasty Mercury) sported life. But his sunny attitude was misplaced when it comes to silicon-based beings.

Silicon may be carbon's chemical cousin, but it's a poor relation. Because the silicon atom is larger, its bonds with other elements are weaker. While carbon hooks up with two oxygen atoms to make carbon dioxide, a nice waste product for both humans and SUVs, the silicon equivalent, silicon dioxide, quickly assembles itself into a crystalline lattice. It is better known as sand, and would make exhaling a gritty experience. The weaker bonds of silicon also preclude the easy formation of those long, same-atom molecular chains that underlie many biological compounds. A slew of complex carbon-based molecules are easily produced in comets, interstellar dust, and university glassware. But if you check out nature's chemistry lab for silicon (consider volcanic lava), the products are far less interesting.

If that's not enough to dissuade you from silicon, consider this: there's just a lot more carbon around. Cooked up in the searing interiors of stars, the cosmic abundance of carbon is more than ten times that of silicon. And by the way, if silicon is a distant second in the biology sweepstakes, the elements under it in the periodic table i.e. germanium, tin, and lead are worse. They're less abundant, and less inclined to make biologically interesting compounds. The sole known example of tin-based life occurred in *The Wizard of Oz*, and it suffered from lack of lubricant.

Of course, one must always beware of hubris in speculating on the properties of extraterrestrial life. Earth is just one planet among many billions in our galaxy. Life, after all, is about organization, function, and accurate reproduction. At its heart is information processing, and there may be other ways to accomplish this beyond mundane chemistry -- based, as it is, on the social behavior of electrons.

But when the Enterprise boldly goes in search of life among the stars, there's good reason its scanners perk up at any sign of carbon-based chemistry. **It's more than likely that overweight aliens will be watching their carbs and not their sils.**

Q16. When the author says, "Is carbon really so special or did it just get lucky here on earth?" (para 6), what specific feature of carbon is s/he primarily referring to?

- a) The atomicity of carbon and its ability to form complex structures
- b) Its abundance not only on earth but on other galaxies.
- c) The Krebs cycle not being prevalent on planets other than earth.
- d) Carbon's inability to form a crystalline lattice when it binds with two oxygen atoms.

Q17. What does the author imply when he says "But his sunny attitude was misplaced when it comes to silicon-based beings." (para 6)?

- a) Though Julius Scheiner was optimistic about other planets in the solar system sporting life, current research has actually proved otherwise.

b) Though Julius Scheiner was optimistic about life on other planets in the solar system, other planets were not found to have silicon-based life.

c) Carbon, not silicon, is more likely responsible for life, whether on earth or on other worlds that shelter biology.

d) The Enterprise has detected carbon-based life forms on many other planets but is yet to encounter silicon-based life.

Q18. According to the passage, what are the reasons for the author to say "Silicon may be carbon's chemical cousin, but it's a poor relation." (para 7)?

[Identify all that apply and enter the corresponding number(s) of the correct statement(s) in the input box given below. You must enter your answer in increasing order only. For example, if you think that statements (1) and (2) apply, then enter 12 (but not 21) in the input box].

(1) In the solar system, silicon is less prevalent when compared to carbon.

(2) Though silicon may seem similar to carbon on the basis of its position in the periodic table, the two elements do not share any chemical properties.

(3) Silicon forms weaker bonds with other elements as compared to carbon.

(4) Carbon forms weaker bonds with other elements as compared to silicon.

(5) Silicon is not as efficient as carbon in forming complex, same-atom molecular chains.

(6) Nature's chemistry labs for carbon, tin, lead and germanium are far more interesting as compared to nature's chemistry lab for silicon.

Q19. All of the following sentences from the passage support the last statement of the passage "It's more than likely that overweight aliens will be watching their carbs and not their sils." EXCEPT?

a) A slew of complex carbon-based molecules are easily produced in comets, interstellar dust, and university glassware but if you check out nature's chemistry lab for silicon (consider volcanic lava), the products are far less interesting.

b) Silicon is a distant second in the biology sweepstakes and the cosmic abundance of carbon is more than ten times that of silicon.

c) The weaker bonds of silicon preclude the easy formation of long, same-atom molecular chains that underlie many biological compounds.

d) At the heart of life is information processing, and there may be other ways to accomplish this beyond mundane chemistry -- based, as it is, on the social behavior of electrons.

Q20. All of the following statements can be understood from the passage EXCEPT?

a) The author uses the term "provincial conceit" in para 3 to imply that it would be foolhardy to think that carbon is a basis for life only on earth.

b) The author of the passage is a detached evaluator who believes in keeping an open mind even though s/he is convinced that a carbon-based life is far more likely on other planets.

c) The author scoffs at, and refutes, the finding of Julius Scheiner and thinks that a silicon-based life is impossible on other planets

d) The first boldfaced portion of the text poses a pertinent question while the second boldfaced part of the text provides a likely answer to that question.

Q21. The style of the passage is _____ while the tone of the author is _____.

a) Analytical ..... patronising

b) Factual ..... humorous

c) Descriptive ..... skeptical

d) Narrative ..... sarcastic

DIRECTIONS for questions 22 to 24: The passage given below is followed by a set of three questions. Choose the best answer to each question.

In its original sense, the term 'Hacker' refers to a person in any one of the communities and hacker subcultures:

- Hacker culture, an idea derived from a community of enthusiast computer programmers, in the 1960s around MIT's Tech Model Railroad Club (TMRC) and MIT Artificial Intelligence Laboratory. It also refers to the hobbyist home computing community, focusing on hardware in the late 1970s (e.g. the Homebrew Computer Club) and on software (video games, software cracking, the demoscene) in the 1980s/1990s.
- Hacker (computer security). People involved with circumvention of computer security. This primarily concerns unauthorized remote computer break-ins via communication networks such as the Internet (*Black hats*), but also includes those who debug or fix security problems (*White hats*), and the morally ambiguous Grey hats.

Grey hats are hackers who are neither good or bad. They do both, sell fixes and exploit. They mostly do it for personal gain and are usually associated with black hat hackers.

Black hats are hackers who use their knowledge for bad use. They intrude into people’s computers with malicious intent for exploiting or stealing data.

White hats are great hackers employed with the efforts of keeping data safe from other hackers by looking for loopholes and hackable area. These type of hackers get a lot of money and no jail time due to contracts with the company which hired them and the police.

Crackers (or vinnies) don't use the internet for gaining any extensive knowledge and are professionals in what they do but they are not the white collar heroes as security hackers are. Crackers use their skills to earn themselves profits or to benefit from criminal gain. Crackers find exploits to systems securities and vulnerabilities but often use them to their advantage by either selling the fix to the company themselves or keeping the exploit and selling it to other black hat hackers to steal information or gain royalties.

Today, mainstream usage of "hacker" mostly refers to computer criminals or criminal “crackers”, due to the mass media usage of the word since the 1980s. This includes what hacker slang calls "script kiddies," people breaking into computers using programs written by others, with very little knowledge about the way they work.

Currently, *"hacker"* is used in two main conflicting ways:

(1) As someone who is able to subvert computer security; if doing so for malicious purposes, the person can also be called a cracker (analogous to a safecracker).

(2) An adherent of the technology and programming subculture.

Hackers from the programming subculture work openly and use their real name, while computer security hackers prefer secretive groups and identity-concealing aliases. Also, their activities in practice are largely distinct. The former focus on creating new and improving existing infrastructure (especially the software environment they work with), while the latter primarily emphasize the general act of circumvention of security measures, with the effective use of the knowledge (to report and help fixing the security bugs, or exploitation possibilities) being only rather secondary. Historically, members of the programmer subculture of hackers were working at academic institutions and used the computing environment there. In contrast, the prototypical computer security hacker had access exclusively to a home computer and a modem.

There are some subtle overlaps, however, since basic knowledge about computer security is also common within the programmer subculture of hackers. For example, Ken Thompson noted during his 1983 Turing Award lecture that it is possible to add code to the UNIX "login" command that would accept either the intended encrypted password or a particular known password, allowing a back door into the system with the latter password. He named his invention the "Trojan horse".

Today, the Trojan is recognized as any computer program which is used to hack into a computer by misleading users of its true intent. Trojans are generally spread by some form of social engineering, for example where a user is duped into executing an e-mail attachment disguised to be unsuspicious, (e.g., a routine form to be filled in), or by drive-by download. Although their payload can be anything, many modern forms act as a backdoor, contacting a controller which can then have unauthorized access to the affected computer. This infection allows an attacker to access users' personal information such as banking information, passwords, or personal identity (IP address).

Q22. According to the passage, the term ‘hacker’ refers to all but one of the following. Pick the exception.

a) A person who does not necessarily write his own programs nor understands the inner working of the computer he gains access to.

b) A person who outflanks computer security without authorization for capitalizing on data or purloining it.

c) A person who writes software that protects technology and communication networks against terrorism, vandalism, credit card fraud, identity theft and intellectual property theft.

d) A cyber-security personnel who breaks into a system to make owners of the system aware of security flaws.

Q23. Who among the following can be classified as a cracker, on the basis of the passage?

a) A person who indulges in unauthorized remote computer break-in via communication networks in order to hijack state government security systems

b) A person who plays the role of a locksmith and picks locks when the owner loses the key.

c) A brilliant programmer who indulges in ethical hacking.

d) A person who retrieves a customer's financial or banking information on request from the bank.

Q24. According to the passage, which of the following correctly highlights a point of difference between a computer security hacker and a hacker belonging to the programming subculture?

a) A computer security hacker works in an overt fashion while a hacker belonging to the programming subculture works in a covert environment. The latter is not a white collar hero as the security hacker is.

b) A computer security hacker fixes bugs or circumvents security measures while a hacker from the programming subculture improves upon the existing software infrastructure.

c) A computer security hacker improves upon the existing infrastructure even as he hacks while a hacker from the programming subculture fixes bugs and is more altruistic in his approach.

d) A computer security hacker is not a group person while a hacker belonging to the programming subculture loves working in a group. The former is also more brilliant and more unconventional than the latter.

DIRECTIONS *for questions 25 to 28:* Each of the following questions consists of a highlighted sentence and a paragraph from which it may have been taken. Each paragraph has four numbered blanks, indicating the possible locations from which the highlighted sentence could have been taken. Choose the number of the blank where the highlighted sentence can best be reinserted and key in that number in the input box provided below the question paragraph. If you think that the highlighted sentence is contextually unrelated or does not belong to the given paragraph, then key in the number 0 as your answer in the input box.

Q25. This taciturn tendency has long bemused people trying to understand the direction of China's monetary policy.

Alan Greenspan was a master of abstruse language as chairman of the Federal Reserve. "If you understood what I said, I must have misspoken," he once joked. At least Mr Greenspan spoke. In China, the central bank has made a habit of silence. Policy announcements are rare and, if they are offered, come at unpredictable hours, often over the weekend. _____(1)_____ Sudden shifts in the value of the yuan always bear the central bank's fingerprints, but are infrequently explained. The motto for the People's Bank of China (PBOC) should be: "If you know what we did, we must have done it wrong". _____ (2) _____ But recently it has reached new and dangerous extremes. Since June the central bank is widely reported to have injected as much

as 1.8 trillion yuan ($294 billion) to prop up the slowing economy through a mix of targeted liquidity facilities. _____(3)_____ That is a lot of money, equivalent to more than three months of quantitative easing at the peak of the Fed's bond-buying programme. But only in early November, half a year after rumours started, did the central bank provide some confirmation of its actions, and even then it was only partial.

_____(4)_____

Q26. More generally, years of kleptocracy have had a corrosive effect on Russia.

_____(1)_____ Vladimir Putin is not short of problems, many of his own creation. There is the carnage in eastern Ukraine, where he is continuing to stir things up. There are his fraught relations with the West, with even Germany turning against him now. There is an Islamist insurgency on his borders and at home there is grumbling among the growing numbers who doubt the wisdom of his Ukraine policy. But one problem could yet eclipse all these: Russia's wounded economy could fall into a crisis. _____(2)_____ Some of Russia's ailments are well known. Its oil-fired economy surged upward on rising energy prices; now that oil has tumbled, from an average of almost $110 a barrel in the first half of the year to below $80, Russia is hurting. More than two-thirds of exports come from energy. _____(3)_____ The rouble has fallen by 23% in three months. Western sanctions have also caused pain, as bankers have applied the restrictions not just to Mr Putin's cronies, but to a much longer tally of Russian businesses. _____(4)_____ Much of the country's wealth has been divided among Mr Putin's friends.

Q27. They were not the solid masses, all clogs and snap tins.

"Common People" is an extraordinary piece of research. "Every life deserves telling," says Ms Light, an English literature professor at Newcastle University. "None is without drama and change." But few of her family left any trace beyond census returns and registrations of baptism, marriage and death. _____(1)_____ Hunting through the records, she longs for something more: "I wanted some distinguishing features," she confesses, "some sign of an inner life." But the point of her book lies not so much in its individual characters as in the patterns they make. _____(2)_____ They were constantly on the move, tramping the roads, in and out of employment, sliding around the social scale. A telephone clerk becomes a railway porter; a bricklayer becomes a navy cook's mate; a schoolmaster's daughter sews shirts; a master-baker becomes a grocer and dies in the workhouse. _____(3) _____ These people are blown about by private and political circumstance–figures "in the carpet woven by events, by chance and accident, and by the play of forces larger than us." _____(4)_____

Q28. This is not merely rhetoric.

The sheep in "Animal Farm" repeat the slogan, "Four legs good, two legs bad". In the management world these days, the chant is "Long-termism good, short-termism bad". _____ (1) _____ The Harvard Business Review constantly thunders against the evils of short-termism. Bosses of listed companies give off-the-record briefings to journalists bemoaning shareholders' inability to see beyond the ends of their noses. _____ (2) _____ In the continental European model of capitalism, long-termism means that businesses will prosper by pursuing the enduring interests of all their "stakeholders", workers and suppliers included. More recently, supporters of Anglo-Saxon capitalism have produced a variant of this argument: firms will enjoy sustained growth if they favour the interests of long-term shareholders over traders who hold stock for briefer periods. _____ (3) _____ Policymakers in France and America are actually drawing up plans to

give long-term investors or share-holders more shares, extra voting power/ rights and huge tax incentives. _____ (4) _____

DIRECTIONS *for questions 29 to 32:* Five sentences (labelled 1, 2, 3, 4, 5) are given in each of the following questions. Four of them can be put together to form a meaningful and coherent short paragraph and **one sentence is the odd one out**. Decide on the proper logical order for the sentences and key in the sequence of **four** numbers as your answer, even as you **omit the contextually unrelated sentence**.

Q29. (1) My painting won the competition and went on tour – I have never seen it again.

(2) Painting is pleasurable and mysterious and satisfies metaphysical questions about life.

(3) We went to the top of Portsdown Hill in Portsmouth, and each of us did a painting of the view.

(4) When I was ten, there was an art competition at school.

(5) You could see Portsmouth's little terraced houses, Portchester Castle, the boats in the harbor, the islands in the distance.

Q30. (1) Von Behring found he could transfer them from infected horses to sick people by injecting those people with horse-blood serum.

(2) Using antibodies to treat infections is not a new idea.

(3) In the wake of this discovery, serum therapy became, until the invention of antibiotics, the main way of treating not only diphtheria but also tetanus, scarlet fever and meningitis.

(4) The first Nobel prize in medicine, awarded in 1901, went to Emil von Behring for discovering how to employ antitoxins to treat diphtheria.

(5) Evolution being what it is, bacteria will no doubt find ways around antibodies, as they have with antibiotics.

Q31. (1) Few things have been more important to that historical insight than fossil foraminifera.

(2) When their owners die, these shells often sink to the seabed, where they accumulate in sedimentary ooze that often gets transformed into rock.

(3) In particular, though the shells of living forams are translucent, those fossilized in rocks are often chalkily opaque.

(4) Understanding past climates is crucial to understanding future ones.

(5) Forams, as they are known, are single-celled marine creatures which grow shells made of calcium carbonate.

Q32. (1) They campaigned to Leave, and they were as good as their word.

(2) The job of steering Britain towards the EU's exit doors has thus fallen to the only candidate left in the race: Theresa May, who campaigned to Remain.

(3) This week the last of the prominent Leavers, Andrea Leadsom, withdrew her candidacy after a few days' media scrutiny revealed her to be fantastically ill-prepared.

(4) Her effortless victory presents a tactical problem.

(5) Three weeks on from their referendum triumph, the politicians who led the charge for Britain to quit the European Union have fallen by the wayside in the race to replace David Cameron as prime minister.

DIRECTIONS *for questions 33 to 36:* Five sentences each with a blank are given in each of the following questions. Four words are also given below the sentences. The blank in each sentence can be filled by one or more of the four words given. Each word can go into any number of sentences. Note that the sentence can change contexts depending on the use of different words which can be appropriate. **Identify the number of sentences each word can go into and enter, in the input box given below the question, the maximum number of sentences that any word can fit in**. For example, if you think that a word goes into a maximum of two sentences, then enter 2 in the input box given below the question.

Q33. (i) If you plan to take up hiking seriously, I suggest you _____ a pair of sturdy canvas shoes.

(ii) Mrs. Roy used to be a spendthrift; but, after the recent stock market crash, she has been forced to _____ her resources.

(iii) The shoes will offer _____ on even the most slippery surfaces.

(iv) I think you need to _____ the red curry further with a bit of garlic.

(v) The CEO was forced to watch his company _____ during the Great Depression.

(A) founder

(B) husband

(C) purchase

(D) season

Q34. (i) For a real understanding of the rocks on the _____, though, it is necessary to get close to them.

(ii) The joy and mirth is all on the _____; dig deeper, and the rot starts showing.

(iii) Paint gleamed on the _____; she had done a good job.

(iv) The _____ indicate that carbon life did exist.

(v) The _____ between gloomy rhetoric and recent performance is greatest in the American

economy.

(A) history

(B) dissonance

(C) surface

(D) facts

Q35. (i) Her mood was just the _____ of mine.

(ii) "We have a spy _____", he whispered conspiratorially.

(iii) Most produce _____ X-ray fingerprints.

(iv) Successful business people never share _____ information.

(v) I wanted to _____ while she wished to remain silent.

(A) failed

(B) inside

(C) unique

(D) converse

Q36. (i) Only four people are willing to come for a picnic this Sunday; the others would rather _____ over the weekend.

(ii) The bargain store offers _____ for money.

(iii) Speed with _____ is the goal.

(iv) Reducing the cost of capital will require huge _____ in saving habits.

(v) _____ makes for efficiency.

(A) accuracy

(B) value

(C) changes

(D) rest

DIRECTIONS *for questions 37 to 39:* Read each of the following paragraphs and answer the question given below it.

Q37. The nature of the Indian identity is significant for those who live in India. But it is also important for the very large Indian Diaspora across the world – estimated to be 20 million or more in number. They see, rightly, no contradiction between being loyal citizens of the country in which they are settled and where they are socially and politically integrated (Britain or the US or Malaysia or wherever), and still retaining a sense of affiliation and companionship with India and Indians. As is frequently the case with emigrants in general, the Indian diaspora is also keen on taking pride – some self-respect and dignity – in the culture and tradition of their original homeland. This frequently takes the form of some kind of 'national' or 'civilizational' appreciation of being Indian in general.

Which of the following statements can be inferred about the Indian diaspora?

a) Most of the Westerners have a strong sense of kinship with India and Indians.

b) The number of Indians across the world interested in their Indian roots and cultural identity is far greater than the number of Indians living in India.

c) It is obligatory for Indians in India and abroad to preserve their national identity.

d) Indians living abroad need not relinquish their sense of identification with India in order to be good citizens of the countries they are settled in.

Q38. James Wright "Jim" Foley was an American journalist and video reporter. While working as a freelance war correspondent during the Syrian Civil War, he was abducted by loyalists of the ISIS on November 22, 2012, in northwestern Syria. While in captivity, he believed that his government would soon negotiate his release. What appeared to be a turning point was in fact the start of a downward spiral for Mr. Foley that ended in August when he was forced to his knees somewhere in the bald hills of Syria and beheaded as a camera rolled. His videotaped death was a very public end to a largely hidden ordeal. The videotape shows that his beard had not grown much since our last glimpse of him, in the emailed pictures with his hands in chains and the gun to his head. So for nearly six weeks, we have been living on faint hope and false promises.

Which of the following can be concluded from the above paragraph?

a) Mr. Foley had been murdered on the very day the pictures were taken while he was in captivity.

b) Mr. Foley had been murdered shortly after the world saw his emailed pictures taken while he was in captivity.

c) Mr. Foley was not allowed to shave while in captivity.

d) The media gave false hope to the viewers about Mr. Foley.

Q39. To be able to know yourself or to judge your actions, you need to understand tarka, vitarka and kutarka. Kutarka is wrong logic. Most people use this logic and get caught up in ignorance. For example, The door is half open means the door is half closed. Therefore, the door is fully open means the door is fully closed! Or: God is love. Love is blind. Therefore God is blind. Tarka is sequential logical understanding which increases scientific knowledge. When sequential logical understanding changes, the scientific conclusions change. For example, pesticides and antibiotics were considered very useful and harmless, but they are now proven to be more harmful. In tarka, the paradigm changes. Vitarka is asking questions such as "Who am I?", "Where am I?", "What do I really want?" to which there are no evident answers. These philosophically appealing questions bring forth spiritual knowledge, increase your awareness and bring about the blossoming of Consciousness, i.e., Atma Gyan increases. The wise know to distinguish between the three. They will not apply kutarka or tarka for vitarka, and vitarka for tarka.

Which of the following best represents the thoughtflow of the paragraph?

a) The author enumerates certain concepts, defines them and then elaborates on some of the definitions through relevant examples.

b) First a problem statement is mentioned and then three probable solutions are presented.

c) The author defines three concepts and then provides a comparative analysis of the three.

d) The author presents certain concepts and then describes them in descending order.

DIRECTIONS *for question 40:* Given below is a sentence with three blanks. For each blank choose one numbered word from the corresponding column of choices that will best complete the text. Key in the appropriate numbers of the words for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words labelled 1, 4 and 7 can fill the blanks, then enter your answer as 147 in the input box.

Q40. Even as the priest wants ardently to believe in the _____(i)_____ of the river, he meets pilgrims who are _____(ii)_____ to bathe in the river and ask him if there is another _____(iii)_____ spot, but sadly there is no dirt-free ghat anywhere in the holy city.

Blank (i)	Blank (ii)	Blank (iii)
1) absoluteness	4) reluctant	7) uncluttered
2) untaintedness	5) hustled	8) eviscerating
3) irreproachableness	6) fastidious	9) undefiled

DIRECTIONS *for questions 41to 44:* In each of the following questions, there are sentences or fragments of sentences that form a paragraph. Identify the sentence(s) or fragments of sentence(s) that is/are correct in terms of grammar and usage, including spelling, punctuation and logical consistency. Then, choose the most appropriate option.

Q41. (1) Scattered into rural Peru are the ruins of thousands of casas hacienda (estate houses), reduced to broken porticos and crumbled walls.

(2) These decayed structures recall one of the radical land reforms ever undertaken in a noncommunist country.

(3) In the 1970s, a leftist military government expropriated 15,286 rural properties and 9m hectares (22m acres) of land.

(4) It was a heavy-handed response to gross inequality in landholding and near-servile labour relations that stemmed in the Spanish conquest.

(5) The bureaucrats turned the estates into top down co-operatives, which soon failed.

a) Only 4

b) 1 and 5

c) 2 and 3

d) Only 3

Q42. (1) When the Berlin Wall fell in November 1989 it became clear quickly that the cold war was over. The reunification of Germany,

(2) however, was not a foregone conclusion. West German government's priority was freedom for East Germans,

(3) with no timetable for reunification, says Horst Teltschik, who was advising the then chancellor, Helmut Kohl.

(4) "Internally, we thought, at the end of '89, that it would take five to ten years."

(5) Even the East Germans at first could not conceive of reunification; they proposed vaguely "confederative structures".

a) 2 and 4

b) 1 and 5

c) 3 and 4

d) Only 3

Q43. (1) Nowy Styl, a Polish company that is Europe's fourth-largest maker of office furniture, recently brought two small German rivals.

(2) The firm's boss, Adam Krzanowski, was asked by a German friend if he were pleased with his purchase.

(3) "I told him that I was not happy with the quality of the workers. His jaw dropped," says Mr Krzanowski,

(4) with a grin. He had to send team from his factory in Poland to bring his new German

(5) workers to speed on the latest manufacturing methods.

a) Only 3

b) 2 and 5

c) 1 and 3

d) Only 4

Q44. (1) As news spread that security forces killed Burhan Wani and two other guerrillas, admirers from across the Kashmir Valley

(2) headed off his village. Over 20,000 gathered for Mr Wani's funeral on July 9th. The crowd was

(3) so dense to hold prayers; armed militants in its midst fired their guns in salute with no fear of arrest.

(4) Over the next few days, throughout the valley angry protests spread.

(5) At least 36 people were killed and 2,000 wounded, nearly all by police gunfire.

a) Only 3

b) Only 5

c) 1 and 4

d) 2 and 5

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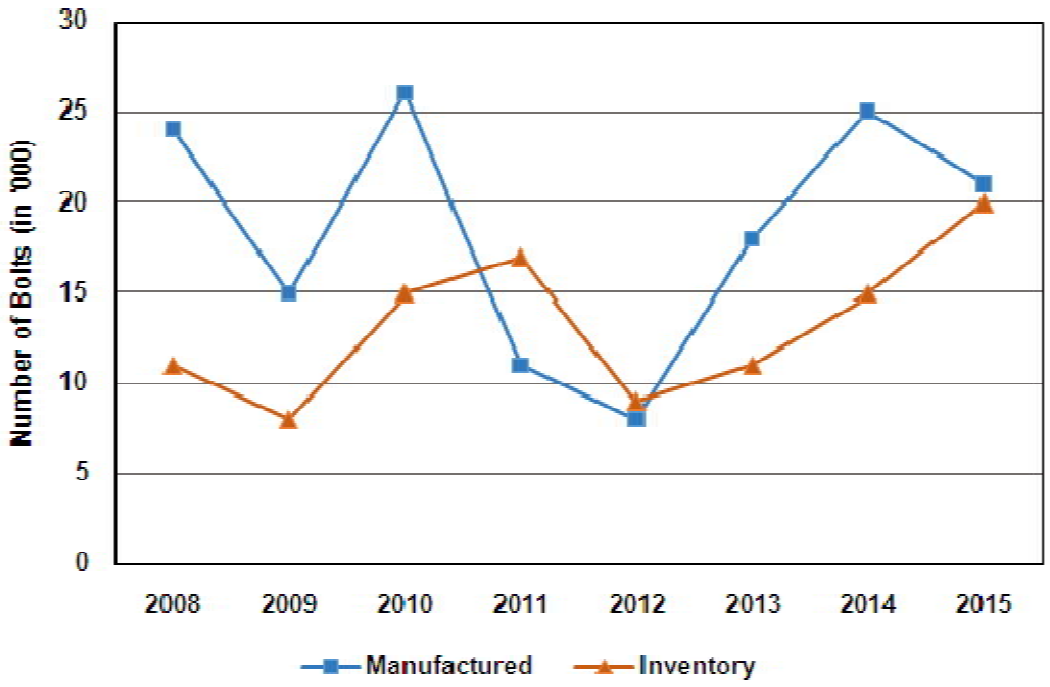
DIRECTIONS *for questions 1 to 4:* Answer these questions on the basis of the information given below.

Bolt Inc., a company which manufactures and sells bolts, started its operations at the beginning of 2008. The bolts which are manufactured during any year but remain unsold during the year are transferred to the inventory at the end of the year and remain in the inventory until they are sold. As the company started its operations in 2008, there were no bolts in the inventory at the beginning of 2008. Further, the number of bolts manufactured and the number of bolts sold during any year are both multiples of 1000. The following line graph provides the number of bolts manufactured (in '000) during each year and the number of bolts in the inventory (in '000) at the end of each year, from 2008-15:



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

In which year were the maximum number of bolts sold by Bolt Inc.?

a) **2009**

b) **2010**

c) **2013**

d) **2014**

Q2. DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.
What is the maximum difference between the number of bolts manufactured during any year and the number of bolts sold during that year (approximately)?

a) **11000**

b) **8000**

c) **7000**

d) **6000**

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

What is the approximate total number of bolts sold by Bolt Inc. from 2008 to 2015?

a) **148000**

b) **128000**

c) **78000**

d) **42000**

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

In how many years were the number of bolts sold greater than the number of bolts manufactured?

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

Ravi, a school teacher, was making a stack of the answer sheets of students of a test. He intended to stack the answer sheets in the descending order of the marks scored by the respective students, such that the answer sheet at the top of the stack belonged to the student who scored the highest marks and the answer sheet at the bottom of the stack belonged to the student who scored the lowest marks. While stacking the answer sheets, for each answer sheet that he inserted in the stack, he noted down the number of answer sheets already in the stack that were on top of that answer sheet. For example, for the first answer sheet, there will be no answer sheets on top. The second answer sheet can be below or above the first answer sheet (depending on the marks). If he places the second answer sheet below the first answer sheet (i.e., if the second answer sheet had less marks than the first answer sheet), Ravi will note down the number of answer sheets on top of the second answer sheet as one. Similarly, the third answer sheet can have zero, one or two answer sheets on top of it in the stack.

The table below provides the order in which he stacked each answer sheet, the name of the student to whom the answer sheet belongs and the number of answer sheets already in the stack that were on top of the answer sheet. Further, it is also known that no two students scored the same marks.

Order	Student Name	Number of Answer Sheets on top
1	A	0
2	B	0
3	C	1
4	D	2
5	E	0
6	F	5
7	G	1
8	H	2
9	I	5
10	J	4
11	K	0
12	L	4
13	M	9
14	N	5
15	O	6
16	P	4

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

Which student scored the seventh highest marks?

a) **P**

b) **N**

c) **O**

d) **I**

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

After Ravi stacked the first ten answer sheets, the answer sheet which is fifth from the bottom of the stack belonged to which student?

a) **C** b) **I**

c) **F**

d) **J**

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

The answer sheet of which of the following students would never have been the fourth from the bottom of the stack at any point of time?

a) **C**

b) **I**

c) **M**

d) **None of the above**

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

The answer sheets of how many students were inserted into the sixth position from the bottom of the stack when they were inserted into the stack?

a) **1**

b) **2**

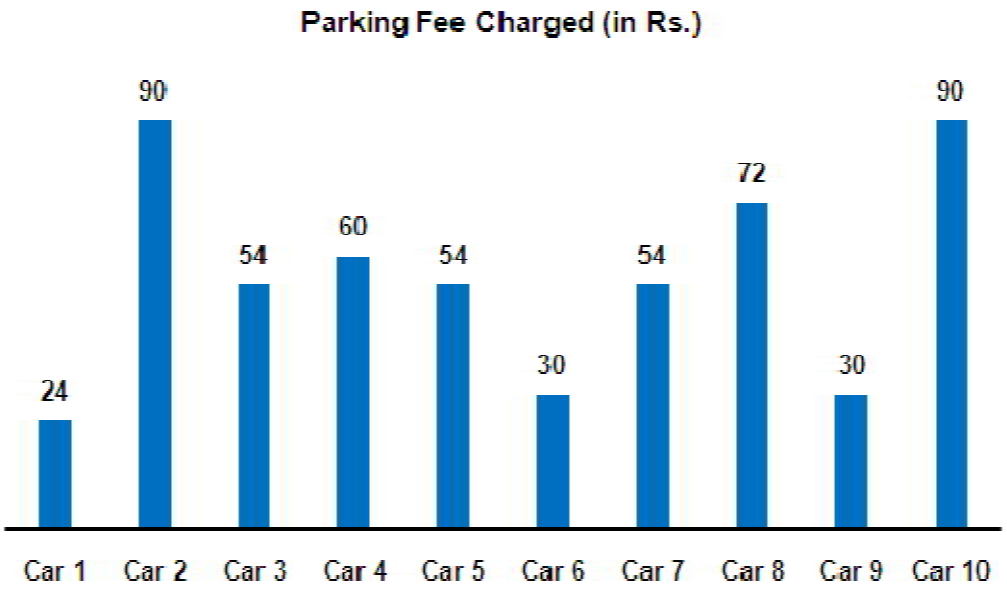
c) **3**

d) **4**

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

The parking fee charged for any car parked in a parking lot depends on the number of hours for which the car was parked and on the type of the car. The parking fee per hour for three types of cars – Hatchback, Sedan and SUV – is Rs.12, Rs.15 and Rs.18 respectively. On a particular day, ten cars, Car 1 through Car 10, of which three

were Hatchbacks, three were Sedans and four were SUVs, were parked in the parking lot. Further, it is also known that the number of hours for which each car was parked was a whole number. The following graph provides the parking fees (in Rs.) charged for each of the ten cars:



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

What is the duration (in hours) for which Car 4 was parked?

Q10. DIRECTIONS *for questions 10 and 11:* Select the correct alternative from the given choices.

Which of the following cars was parked for the longest duration?

a) **Car 3**

b) **Car 5**

c) **Car 7**

d) **Car 4**

Q11. DIRECTIONS for *questions 10 and 11:* Select the correct alternative from the given choices.

If x, y and z represents the sum of the durations for which all the Hatchbacks, Sedans and SUVs were parked in the parking lot respectively, then which of the following is definitely true?

a) **x > z > y**

b) **z > x > y**

c) **z > x = y**

d) **x = y > z**

Q12. DIRECTIONS *for question 12:* Type in your answer in the input box provided below the question.

If the sum of the durations for which all the cars were parked in the parking lot was 37 hours, then for how many of the ten cars can their type be determined uniquely?

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

Ramesh categorised the e-mails that he received during the month of May 2016 into six types – Finance, Promos, Purchases, Social, Trips and Updates. The following table provides for each e-mail, the name of the sender, the type of e-mail, the e-mail size (in MB) and the date on which he received it:

Sender Name	Type	Mail Size (in MB)	Date Sent
Abhay	Trips	15	21-05-2016
Abhijeet	Promos	20	01-05-2016
Abhinav	Finance	20	27-05-2016
Abhiroop	Social	10	10-05-2016
Achyut	Updates	2	08-05-2016
Akanksh	Purchases	14	12-05-2016
Akash	Updates	18	13-05-2016
Amar	Trips	30	22-05-2016
Anurag	Trips	15	29-05-2016
Ashish	Finance	25	30-05-2016
Ashok	Social	5	23-05-2016
Ashwin	Social	14	23-05-2016
Balu	Trips	10	04-05-2016
Chintu	Finance	12	15-05-2016
Farhan	Purchases	5	06-05-2016
Gaurav	Updates	29	22-05-2016
Hari	Promos	24	17-05-2016
Imran	Updates	20	19-05-2016
Kalyan	Social	15	02-05-2016
Kumar	Finance	36	31-05-2016
Lalit	Purchases	23	27-05-2016
Naren	Purchases	12	30-05-2016
Naveen	Purchases	11	16-05-2016
Satish	Trips	8	26-05-2016
Tarak	Social	21	28-05-2016
Tarun	Promos	16	13-05-2016

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

What is the total size (in MB) of e-mails categorized as 'Purchases' or 'Updates' that Ramesh received before 15th May?

Q14. DIRECTIONS *for questions 14 to 16:* Select the correct alternative from the given choices.

For which type is the total size of e-mails of that type the highest?

a) **Trips**

b) **Purchases**

c) **Updates**

d) **Finance**

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

For which of the following days was the total size of all the e-mails received by Ramesh from May 1st to the end of that day greater than 100 MB but less than 150 MB?

a) **11-05-2016**

b) **12-05-2016**

c) **15-05-2016**

d) **18-05-2016**

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

If a pie chart is drawn such that each sector of the pie chart represents the total size of e-mails of each type, what will be the angle subtended by the sector which represents the total size of e-mails of type 'Social' at the center of the pie chart (approximately)?

a) **45.6°**

b) **54.4°**

c) **64.6°**

d) **49.8°**

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

Hari was learning to drive a car and, on a particular day, while driving around in his car, he bumped into five

different vehicles – a Bicycle, a Bike, a Truck, a Bus and a Tractor – at different times, not necessarily in the same order. Further, each time that he bumped into a vehicle, he damaged a different part of his car among – Front Bumper, Rear Bumper, Side Mirror, Door and Headlight. The following information is known about the order in which he bumped each vehicle and the part of his car that was damaged in each case:

(i) He bumped into the Bicycle before he bumped into the Bus and the Front Bumper was not damaged by bumping into either of these vehicles.

(ii) He did not damage the Door by bumping into the first vehicle, which was not the Tractor.

(iii) He did not damage the Side Mirror by bumping into the Bus.

(iv) He damaged the Rear Bumper by bumping into the Truck and he bumped into the Truck immediately before he bumped into the Bicycle.

(v) He damaged the Side Mirror by bumping into the last vehicle.

(vi) The first part to be damaged was not the Rear Bumper.

Q17. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

What is the first vehicle that he bumped into?

a) **Bicycle**

b) **Bike**

c) **Truck**

d) **Cannot be determined**

Q18. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

Which part of the car did he damage when he bumped into the Tractor?

a) **Front Bumper**

b) **Door**

c) **Headlight**

d) **Side Mirror**

Q19. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

If he damaged the Door by bumping into the third vehicle, which part of the car would he have damaged when he bumped into the Bus?

a) **Door**

b) **Side Mirror**

c) **Headlight**

d) **Front Bumper**

Q20. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

How many parts of the car did he damage before he damaged the Rear Bumper?

a) **0**

b) **1**

c) **2**

d) **3**

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

Exactly 100 players participated in a tournament, comprising four rounds. All the 100 players participated in the first round and 80 players went through to the second round. Of the 100 people that participated in the tournament, each player had a sponsorship deal with at least one brand among Yonex and Monster. The following information is known about the number of players who had sponsorship deals with the two brands:

(i) In the first round, the number of players who had a sponsorship deal only with Yonex was twice the number of players who had a sponsorship deal only with Monster.

(ii) Among the players who had a sponsorship deal with both Yonex and Monster, exactly thirteen players did not go through to the second round.

(iii) The number of players in the first round who had a sponsorship deal only with Monster was the same as the number of players in the second round who had a sponsorship deal with Monster.

(iv) Among the players who had a sponsorship deal only with Yonex, exactly four players did not go through to the second round.

Q21. DIRECTIONS *for questions 5 and 6:* Type in your answer in the input box provided below the question.

In the second round, how many players had a sponsorship deal only with Monster?

Q22. DIRECTIONS *for questions 5 and 6:* Type in your answer in the input box provided below the question.

What is the difference between the number of players in the first round who had a sponsorship deal with both Yonex and Monster and the number of players in the second round who had a sponsorship deal with Monster?

Q23. DIRECTIONS *for question 7:* Select the correct alternative from the given choices.

Which of the following values is the highest?

a) **The number of people in the second round who had a sponsorship deal with Monster.**

b) **The number of people in the first round who had a sponsorship deal only with Monster.**

c) **The number of people in the second round who had a sponsorship deal with both Yonex and Monster.**

d) **The number of people in the second round who had a sponsorship deal only with Yonex.**

Q24. DIRECTIONS *for question 8:* Type in your answer in the input box provided below the question.

In the second round, the number of players who had a sponsorship deal with Yonex was

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

A family spread across three generations comprises seven persons, A through G. The seven persons live in three different cities among Mumbai, Delhi and Kolkata. There are exactly two married couples in the family. Any two persons married to each other live in the same city. Further, not more than two people from the family live in any city in which a married couple lives. It is also known that

(i) no person is a widow or a widower and no person has more than two children.

(ii) E's daughter lives in Delhi,while the uncle of F, who is not B, lives in the same city as B.

(iii) G, who is married, does not live in Mumbai and the son-in-law of D does not live in Delhi.

(iv) A is the father of two children of the same gender.

(v) none of the grandparents have any siblings.

Q25. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

How many persons in the family are females?

a) **2**

b) **3**

c) **4**

d) **5**

Q26. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

The persons given in which of the following options are siblings?

a) **C, F**

b) **A, B**

c) **D, E**

d) **C, E**

Q27. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

Who among the following is a grandfather?

a) **D**

b) **E**

c) **G**

d) **Cannot be determined**

Q28. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.

What is the relation between A and C?

a) **Brothers**

b) **Brothers-in-law**

c) **Father and Son**

d) **Father and Daughter**

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

A cube of dimensions 7 × 7 × 7 units is formed using 343 unit cubes. All the faces of the large cube, thus formed, are painted blue.

Q29. DIRECTIONS *for questions 13 and 14:* Type in your answer in the input box provided below the question.

How many unit cubes will have exactly two faces painted?

Q30. DIRECTIONS *for questions 13 and 14:* Type in your answer in the input box provided below the question.

How many unit cubes will have exactly three faces painted?

Q31. DIRECTIONS *for questions 15 and 16:* Select the correct alternative from the given choices.

If the large cube is cut into two symmetrical halves by making a cut along the diagonal of one of its faces, such that the cut passes exactly through two diagonally opposite edges, how many unit cubes which are not painted on any face will be cut?

- a) **25**
- b) **35**
- c) **63**
- d) **7**

Q32. DIRECTIONS *for questions 15 and 16:* Select the correct alternative from the given choices.

If the large cube is cut into two symmetrical halves by making a cut along the diagonal of one of its faces, such that the cut passes exactly through two diagonally opposite edges, how many uncut cubes will have at least two faces painted blue?

- a) **35**
- b) **49**
- c) **64**
- d) **54**

QA

Q1. Find the value of $\sqrt{11-\sqrt{72}}+\sqrt{11+\sqrt{72}}$.

a) **2** $\sqrt{3}$

b) **4** $\sqrt{3}$

c) **6**

d) **4** $\sqrt{2}$

Q2. P and Q are two points in a plane, separated by a distance of 10 cm. How many lines in the plane are at a distance of 7 cm from P and 3 cm from Q?

Q3. If 51 + 52 + 53 + ... + N = 5985, then find the value of N^2 + N.

a) **13110**

b) **14520**

c) **14762**

d) **15500**

Q4. If *n* years ago, Raghu's age was thrice the age of his son, and *n* years hence, Raghu's age will be twice the age of his son, find the ratio of the present ages of Raghu and his son.

a) **5 : 2**

b) **4 : 1**

c) **7 : 3**

d) **9 : 2**

Q5. The area of a triangle of base 6 cm is divided into six equal parts by drawing five lines parallel to the base. If L_1, L_2, L_3, L_4 and L_5 are the lengths, in increasing order, of the line segments formed when each these five parallel lines is intercepted between the remaining two sides of the triangle, find the value (in cm^2) of $L_1^2 + L_2^2 + L_3^2 + L_4^2 + L_5^2$.

Q6. From the year 2013 to 2014, the population of a village increased by 600 and then, from the year 2014 to 2015, it decreased by 5%. If the population of the village in 2015 is 150 less than that in 2013, then the population of the village in 2013 is what percent of that in 2014?

a) **92%**

b) **94%**

c) **96%**

d) **None of the above**

Q7. If *abcd* is a four-digit number, how many such numbers exist such that $a > b > c > d$?

Q8. In a box, there are ten tickets, numbered from 1 to 10. In how many ways can three tickets be selected from the box, such that the number on at least one of the three tickets is either odd or prime?

Q9. For which of the following values of x will the expression

$E = |x - 1| + |2x - 1| + |3x - 1| + |4x - 1| + \ldots + |19x - 1| + |20x - 1|$ attain a minimum value?

a) $\frac{1}{10}$

b) $\frac{1}{12}$

c) $\frac{1}{14}$

d) $\frac{1}{16}$

Q10. Amina prepared a fruit salad by taking some blueberries, some strawberries, some cherries and some grapes. If she used double the number of blueberries as strawberries and triple the number of grapes as cherries, find the number of strawberries used by her, given that she used a total of 20 fruits.

a) **2**

b) **4**

c) **3**

d) **1**

Q11. 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**

Q12. If the number of even factors of a number is equal to the number of odd factors, and the sum of all its odd factors is *x*% of the sum of all its even factors, find the value of *x*.

Q13. If '57' in the number system to the base *x* is equal to '75' in the number system to the base y, then find the minimum difference between *x* and *y*.

a) **2**

b) **4**

c) **6**

d) **8**

Q14. If a is positive, find the value of a, given that $a^{a^{a^{\cdot\cdot\cdot}}}$ = 4.

a) $\sqrt{2}$

b) $2\sqrt{2}$

c) $2^{\frac{1}{3}}$

d) $2^{\frac{1}{4}}$

Q15. If $(4 + x + x^2)^8 = a_0 + a_1x + a_2x^2 + a_3x^3 + a_4x^4 + \ldots\ldots + a_{16}x^{16}$, find the value of $a_1 + a_3 + a_5 + \ldots + a_{15}$.

Q16. Kamlesh was standing on the bank of a river and observed that angle of elevation of the top of a tower on the opposite bank was 60°. He further observed that if he moved away from the bank of the river by 180 m, the angle of elevation of the top of the tower changed to 30°. Find the width of the river (in m).

a) **90**

b) **120**

c) **180**

d) **240**

Q17. *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 12 α.

Q18. If an unbiased die is rolled four times, what is the probability that the four numbers so obtained, when arranged in ascending order, form an increasing arithmetic progression?

a) $\frac{1}{18}$

b) $\frac{1}{9}$

c) $\frac{1}{54}$

d) $\frac{1}{12}$

Q19. 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**

Q20. If *f (x)* = $\frac{1}{x-1}$ and *h (x)* = $\frac{x}{x-1}$, find the value of *f* (*h* (2)).

a) **1**

b) **−1**

c) **2**

d) **3**

Q22. $1-\frac{1}{2}+\frac{1}{3}-\frac{1}{4}+....+\frac{1}{101}-\frac{1}{102}$ is equal to which of the following?

a) $1+\frac{1}{2}+\frac{1}{3}+.....+\frac{1}{51}$

b) $\frac{1}{52}+\frac{1}{53}+\frac{1}{54}.....+\frac{1}{102}$

c) $\frac{1}{33}+\frac{1}{34}+\frac{1}{35}.....+\frac{1}{71}$

d) **None of the above**

Q23. If the difference between the total compound interest and the total simple interest accrued on a certain sum at a certain rate of interest at the end of two years is 6.25% of the principal, find the number of years in which the sum will quadruple under simple interest.

a) **12**

b) **16**

c) **20**

d) **24**

Q24. 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?

Q25. If $f(x) + f(y) = f(x + y)$, where $f(t) > 0$ for any $t > 0$, find the value of $f(1) + f(3) + f(5) + f(7) + \ldots + f(19)$, given $f(10) = \frac{1}{8}$.

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

b) $\frac{5}{4}$

c) **20**

d) **200**

Q26. Find the number of trailing zeroes in $^{100}C_{50}$.

Q27. A boat started from a point in a river and traveled a certain distance upstream, after which it turned back and returned to its starting point. If the boat covered the round trip journey in two hours and the net speed of the boat upstream was 25% of that downstream, how much more time (in minutes) did the boat take to travel upstream than what it took to travel downstream?

a) **48**

b) **54**

c) **60**

d) **72**

Q28. A binary operator (*) is defined such that (a * b) = a^b, if $a \leq b$ and = b^a, if $b < a$.

Find the value of ((2* 3) *3) + ((3 * 2) *2).

Q29. If the average of nine consecutive even natural numbers, the greatest of which is y, is x, find the average of 17 consecutive natural numbers, the least of which is x?

a) ***y* – 2**

b) ***y***

c) ***y* – 1**

d) ***y* + 4**

Q30. Among the first year students in a girls college, each girl was either a blonde or a brunette. Also, each girl was either blue-eyed or dark-eyed. The number of dark-eyed blondes was equal to the number of blue-eyed brunettes. The number of dark-eyed brunettes was 30 more than the number of blue-eyed blondes, which, in turn, was one-third the total number of brunettes. If among the brunettes, there were more dark-eyed girls than blue-eyed girls, then the total number of first year students in that college can be at most

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Q31. If the height 'h' above the ground of an object thrown vertically upwards from the ground, at a speed of 60 m/s, t seconds after it is thrown, is given by the equation $h = 60t - 5t^2$, find the total distance (in m) covered by the object before it again reaches the ground.

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Q32. A microbiologist studied two types of bacteria – Type I and Type II – and observed that the number of Type I bacteria doubled every four minutes, whereas the number of Type II bacteria tripled every five minutes. If at the end of 20 minutes there were a total of 2000 bacteria, then what was difference between the number of bacteria of the two types initially?

a) **4**

b) **6**

c) **8**

d) **9**

Q33. Linga Reddy had six grandsons and five granddaughters. On the eve of Dusshera, he bought a certain number of Dairy Milk chocolates to give as gifts to his grandchildren. He observed that if he distributed all the chocolates equally among only his grandsons or only his granddaughters, he would be left with 5 and 4 chocolates respectively, but if he distributed them equally among all his grandchildren, he will not be left with any chocolates. Find the minimum number of chocolates he could have bought.

Q34. Which of the following points does not lie on the graph of $y = \frac{x+1}{x-1}$?

a) **(2, 3)**

b) $\left(\frac{1}{2}, 3\right)$

c) **(3, 4)**

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