

# 1702

## VARC

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.

Once upon a time, in the smoky, violent neverland of crime fiction, there were seductive creatures we called femmes fatales, hard women who lured sad men to their doom. Now there are girls. It started, of course, with Gillian Flynn, whose 2012 suburban thriller, *Gone Girl*, told a cruel tale of marriage and murder and sold a zillion copies. The most striking thing about Flynn's cool, clever mystery is the childishness of its main characters, Nick and Amy Dunne, the sheer pettiness of the deadly games they play with each other. And the prize for winning is something like a gold star from the teacher: *Gone Girl* takes place in a world in which grown-up girls – and boys – will kill for no better reason than self-validation. This is not a world Raymond Chandler would have recognized. On the streets his people walked, motives were more basic – money, sex – and means were more direct. “When in doubt,” he once told his genre brethren, “have a man come through a door with a gun in his hand.” When today's crime writers are in doubt, they have a woman come through the door with a passive-aggressive zinger on her lips.

For those of us who choose to entertain ourselves, from time to time, with made-up stories of murder, mayhem, and deceit, this is actually a welcome development, because the men with guns don't do their job nearly as well as they used to. They're old, they're getting tired of walking through those doors, and the heroes they used to threaten – lone-wolf private eyes like Chandler's Philip Marlowe – have practically disappeared from the genre. Like the cowboy, the private eye once embodied male fantasies of rugged individualism. As individualism itself became a less sustainable concept, the popular imagination began to relocate its mythic figures to places farther and farther away from the real-world settings of the old West and the modern city (to, say, the Marvel universe).

That's not to say the guys are gone, or even going away anytime soon. Elmore Leonard has now left the building, but the lowlifes and criminal idiots who peopled his stories haven't altogether vanished; George Pelecanos keeps an eye on them for us. And the aging police detectives of Ian Rankin, Peter Robinson, and Michael Connelly are still, at their stately pace, finding ways to make their grim investigations pretty interesting. It's a struggle, though. Male crime writers seem never to have fully recovered from the loss of the private eye as a viable protagonist, and men, for whatever reason, appear to need a hero of some kind to organize their stories around. Cops and lawyers and the odd freelance avenger (Lee Child's Jack Reacher) are about all that's left.

The female writers, for whatever reason, don't much believe in heroes, which makes their kind of storytelling perhaps a better fit for these cynical times. Their books are light on gunplay, heavy on emotional violence. Murder is de rigueur in the genre, so people die at the hands of others – lovers, neighbours, obsessive strangers – but the body counts tend to be on the low side. Sometimes, in the work of French and others, the lethal blow comes so quietly that it seems almost inadvertent, a thing that in the course of daily life just *happens*. Death, in these women's books, is often chillingly casual, and unnervingly intimate. As a character in Alex Marwood's brilliant new novel, *The Darkest Secret*, muses: “They're not always creeping around with knives in dark alleyways. Most of them kill you from the inside out.”

The awareness of that inside-out sort of violence sets the women writers apart, these days, from even the best of the men. Women's murder tales have always been at least a little more psychologically acute than the guys'. Even in the so-called golden age of detective stories, the 1920s and '30s, when the emphasis was on elaborate puzzles, the motivations of the culprits in Christie and Dorothy L. Sayers were usually more plausible – and nastier – than they were in Carr or Rex Stout or Ellery Queen. Later, while male pulp writers were

playing with guns and fighting off those wily femmes fatales, women like Highsmith and Dorothy B. Hughes and Margaret Millar were burrowing into the enigmas of identity and the killing stresses of everyday life.

Q1. Which of the following is not mentioned in the passage as a difference between crime fiction written by women and those written by men?

- ☐ a) Guns are less used in the former as compared to the latter.
- ☐ b) The former usually feature female protagonists while the latter usually feature male protagonists.
- ☐ c) The former are psychologically more involved than the latter.
- ☐ d) The means of murders in the latter are usually more direct than those in the former.

Q2. What does “a welcome development” mentioned in the second paragraph of the passage signify?

- ☐ a) The change in the nature of murder mysteries
- ☐ b) The novel *Gone Girl* by Gillian Flynn.
- ☐ c) Women walking in through a door and making a caustic remark.
- ☐ d) Men walking in through a door, gun in hand.

Q3. Which of the following can be inferred about Elmore Leonard and George Pelecanos from the passage?

- ☐ a) Elmore Leonard and George Pelecanos are both crime fiction writers and feature the same protagonist.
- ☐ b) Elmore Leonard and George Pelecanos both use aging police detectives as their protagonists.
- ☐ c) Elmore Leonard is no longer writing novels but both George Pelecanos and Elmore Leonard present individualistic men as protagonists.
- ☐ d) George Pelecanos is the protagonist in Elmore Leonard’s novels who keeps an eye on lowlifes and criminal idiots.

Q4. According to the passage, what is the reason that the private investigator has all but disappeared from the genre of crime fiction?

- ☐ a) The readers of crime fiction prefer, as characters, cops and lawyers to private investigators.
- ☐ b) The heroes in crime fiction have become more and more removed from real world settings.
- ☐ c) Individualism is not as valued as it was in the past.
- ☐ d) Readers have lost interest in stories featuring private investigators.

Q5. Which of the following is true about murder tales in the golden age of detective stories?

- ☐ a) The murder tales written by women comprised more elaborate puzzles than in those written by men.

- ☐ b) The murder tales written by women dealt with the killing stresses of everyday life while the murder tales written by men contained gun play and femmes fatales.
- ☐ c) The murder tales written by men focused on elaborate puzzles while those written by women did not.
- ☐ d) The plots of murder tales written by women were more credible than the plots of those written by men.

Q6. The “men with guns” mentioned by Raymond Chandler and the author at the beginning of the passage most probably

- ☐ a) support the protagonist of the stories.
- ☐ b) are villains
- ☐ c) are murderers.
- ☐ d) are criminal idiots.

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.

It is easy to see why long-termism has become very fashionable. Repeated financial-market crises, including the one in 2007-08, have reinforced a view that short-term traders are nothing but trouble. Germany’s relatively strong performance over the past decade seems to be an affirmation of its stolid corporate virtues. But there is a danger in going too far.

Long-termism is no guarantee of success. In the 1980s fans of Japan’s economic model argued that it would pull ahead of America because its firms preferred slow consensus-building and could rely on their core shareholders, the banks, to stand by them for the long term. But between 1990 and 2013 the American economy grew by 75% in real terms, whereas Japan’s only managed 24%.

In 1994 Jim Collins and Jerry Porras, two management pundits, published a hymn to long-termism in “Built to Last”. The book describes 18 companies whose shares had consistently outperformed stockmarket indices over decades, in large part because they invested heavily in such things as research and training, and set goals that were also measured in decades, not quarters. But a follow-up study five years later discovered that only eight of them had kept on outperforming the market. Today many of their exemplars are struggling. IBM is treading water, Motorola is a shadow of its former self and Procter & Gamble has been forced to bring back a retired boss, A.G. Lafley, to sort it out.

Long-termism can be an excuse for failing to grasp the nettle. Nokia, a Finnish mobile-phone giant, left a floundering boss, Olli-Pekka Kallasvuo, in place for four years despite growing protests from investors. By the time it got around to replacing him in 2010 the company was damaged almost beyond repair. Short-term demands such as quarterly reporting schedules can force problems out in the open, the quicker to get them fixed. We might still be in the dark about Tesco’s accounting fiasco if the British grocer did not have to update investors on its performance every few months. More important, short-termism can allow “creative destruction” to work its magic. The United States has been better than other countries at producing world-beating startups because it is better at shifting capital quickly to new opportunities.

Perhaps the strongest argument for rewarding long-term investors is that they think more about sustained

growth, whereas short-term ones will sacrifice this for a quick buck. This is true if companies do not trade in their own shares, says Jesse Fried of Harvard Law School. However, he argues that this argument breaks down when firms become enthusiastic repurchasers of their own shares, as American companies have: last year those in the S&P 500 index bought back \$500 billion of their own stock.

His explanation is as follows: companies repurchase their shares when they think they are cheap, as a way of benefiting their long-term holders at the expense of those who sell. As it happens, their timing is often poor. However, what is more important is that the cash they spend on repurchases could often have been used on expanding into new markets, or on research and development, to generate long-term growth. One study found that a doubling of repurchases leads to an 8% fall in spending on R&D.

All this is not to say that we should start chanting: “Short-term good, long-term bad”. Rather, it is an argument for nuance. Long-termism and short-termism both have their virtues and vices – and these depend on context. Long-termism works well in stable industries that reward incremental innovation. But it is a recipe for failure in such businesses as social media, where firms are constantly forced to abandon their plans and “pivot” to a new strategy, in markets that can change in the blink of an eye.

Nor are long-termism and short-termism mutually exclusive. General Electric, often praised for its long-term perspective, is trying to run itself more like a startup, to combat bureaucratic bloat. In recent years activist investors have repeatedly bought stakes in big firms, from Yahoo to Fortune Brands, and agitated for a shake-up. Long-term institutional investors, seeing the merits of their arguments, have often backed them.

Making sweeping statements about the virtues of long-termism and the vices of short-termism is a satisfying pastime: it confers a sense of moral seriousness and intellectual depth. But it is a poor way of analysing the dynamics of wealth creation – and it is an even worse way of designing corporate policies.

Q7. How has the United States of America been better than other countries at producing world beating startups?

- ☐ a) By providing required funds and incentives for growth.
- ☐ b) By favouring the interests of long term shareholders over traders who hold stock for briefer periods.
- ☐ c) By redirecting capital to new opportunities
- ☐ d) American companies enthusiastically repurchase their own shares.

Q8. Which of the following is associated with Germany’s strong financial success over the past decade?

- ☐ a) Its companies thundered against the vices of long-terminism and constantly pivoted to new strategies in changing markets.
- ☐ b) Its companies and businesses adhered to sensible corporate virtues
- ☐ c) Its companies bemoaned shareholders’ inability to see beyond the ends of their noses and they preferred slow consensus-building and reliance on the banks.
- ☐ d) Its businesses prospered because they pursued the enduring interests of all their stakeholders, workers and suppliers included.

Q9. According to the passage, what is the net effect of a system of quarterly reporting schedules?

- ☐ a) It brings the companies' problems to the knowledge of stakeholders.
- ☐ b) The quarterly reporting helps prove that long-terminism is no guarantee of success but it actually prevents one from attaining a complete understanding of the business scenario at hand.
- ☐ c) It negatively affects the reputation of the company beyond repair.
- ☐ d) It makes possible quicker problem-resolution and mid-course correction.

Q10. Which of the following would weaken the view of Jim Collins and Jerry Porras as understood from the passage?

- ☐ a) Companies following long-terminism outperformed the market.
- ☐ b) Companies with more investment in R & D succeeded well.
- ☐ c) Only a few companies that rewarded incremental innovation were successful
- ☐ d) Companies who kept the same management in place for years succeeded.

Q11. According to the passage, Jesse Fried would agree with which of the following viewpoints?

- ☐ a) Long terminism is the best as short terminism often results in failure.
- ☐ b) Expansion of a company into new markets and spending on R & D should be sacrificed at the cost of rewarding long-term investors.
- ☐ c) Long terminism is valid until the firm doesn't repurchase its shares.
- ☐ d) Timing of repurchase of company shares is important in determining the benefits that a long-term share holder can have.

Q12. The author of the passage would agree with all of the following statements except?

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

(1) Long terminism works in all industries.

(2) Short-terminism reveals problems in the firm but helps it get quick solutions.

(3) Social media firms should follow short terminism.

(4) It would be good for a stable business to also have a long-term perspective.

(5) "Short-term good, long-term bad" is a more important management chant today than "Long-terminism good, short-terminism bad".

**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.

BASHING economists is scarcely out of fashion. They are accused of being blinkered by mathematical models, of overestimating their predictive powers and churning out narrow-minded graduates.

John Maynard Keynes once said that “if economists could manage to get themselves thought of as humble, competent people on a level with dentists, that would be splendid.” How could they achieve that? Through a strong dose of what they (and this newspaper) often prescribe for others: structural reforms.

To start with, that means tackling what Paul Romer, an economist at the Stern School of Business in New York, calls the profession’s “mathiness”. The mountain of algebra in economic research is supposedly meant for clarification and rigour, but is too often deployed for obfuscation. Used responsibly, maths lends useful structure to economists’ thinking, and weeds out sloppiness. But there needs to be a purge of maths-for-maths’-sake.

Related to mathiness is model-mania. Economists are good at reducing a complicated world to a few assumptions, then adding bells and whistles to make their models more realistic. But problems arise when they mistake the map for the territory. In 2008, on the eve of the financial crisis, Olivier Blanchard, then chief economist of the IMF, published a paper celebrating the convergence of thought within macroeconomics. Unfortunately, some key assumptions behind that consensus turned out to be wrong. It is now clear that different models of asset bubbles and banking crises would have better prepared policymakers for the Armageddon that ensued.

So economists should treat consensus with suspicion, and remain open to the idea that there might be more than one explanation of what they can see. Financial stability could represent policy success, for example, or it could mean that regulators are becoming complacent and hidden pressures are building. In future, big data and new “machine-learning” techniques could help test the relative power of competing theories. With a better sense of what is influencing behaviour in the economy, economists might become less blinkered by their own theory, and better able to foresee the next crisis. Meanwhile, they would be wise to repeat (daily) the words: “My model is a model, not the model.”

New technology points to another desirable reform: the need for better numbers to work with. The main gauge used to measure the size and progress of the economy, GDP, was designed for a different era, and looks increasingly flawed for a modern world of services, apps and bots. Economists have work to do to improve these basic tools of their trade.

Their tendency to look down on other social sciences is ripe for change, too (one study showed that articles in the American Economic Review cite the top 25 political-science journals one-fifth as often as articles in the American Political Science Review cite the top 25 economics journals). Some of their most influential research – in behavioural economics, for example, which fuses psychology and economics – has come about when they are willing to mix with others. Economists should get out more and mingle with historians and sociologists.

All this needs to start with the way economists are trained – a final area for reform. Today, graduate economists undergo “maths camp” before being bombarded with lectures. Too little focus is on getting real-world experience: visiting job centres, meeting entrepreneurs, spending time at a central bank or the national statistical agencies. Such work experience would increase the chances of theory being tied to practice. Exams would test critical reflection (for example, awareness of where the results a student is “proving” might not hold true) as much as algebraic prowess.

Q13. Which of the following is the most accurate summary of the author's view regarding the training of economists?

- ☐ a) Economists should be trained in pure theoretical or mathematical boot camps.
- ☐ b) Economists should be encouraged to gain work experience at the cost of honing their algebraic skills and they should also be trained to reach out to historians and sociologists.
- ☐ c) Economists should be given practical experience to support theoretical analysis and design of theories
- ☐ d) Economists should abandon mathematical models and gain valuable real-world experience.

Q14. What does the author imply when he quotes "if economists could manage to get themselves thought of as humble, competent people on a level with dentists, that would be splendid." (para 2)?

- ☐ a) Economists should become as efficient as dentists who depend on facts and not assumptions.
- ☐ b) Economists should not make unjustifiable assumptions and, in their research, should use mathematical models with discretion.
- ☐ c) Economists should link their theories with maths but should refrain from using too many mathematical models for clarification of their theories.
- ☐ d) Economists should not make wrong assumptions and should use maths-for-maths' sake.

Q15. What does the author imply when he says "My model is a model. Not the model" (para 5)?

- ☐ a) Economists should not stubbornly defend their analyses as exclusive.
- ☐ b) Economists should consider that other theories or models are also correct
- ☐ c) Economists should be skeptical about mathematical theories in economics research.
- ☐ d) Economists should not think of following other economists' theories.

**DIRECTIONS for questions 16 to 18:** The passage given below is followed by a set of three questions. Choose the best answer to each question.

In the desert of northwest Australia, about 10 miles east of the small mining town of Newman, lies a natural wonder. If you fly overhead, you'll see vast carpets of green spinifex grass, pockmarked by barren red circles, as if some deity had repeatedly stubbed out a cosmic cigar on the parched landscape.

These disks of bare soil are called "fairy circles," and they're not unique to Australia – they also exist 6,000 miles away in Namibia. There, the circles number in the millions, and extend over some 1,500 miles of desert. They comprise different grasses but their patterns are the same: low-lying vegetation freckled by circles of empty soil. They almost seem alive, growing and shrinking with a lifespan of 30 to 60 years.

Over the last century, two main hypotheses for the cause of these circles have fought their way to the top of the scrum. The first is from Norbert Juergens of the University of Hamburg, who says that the circles are the work of sand termites. To store water, he argues, these insects eat the roots of grasses within a circular patch, allowing the underlying grains of sand to catch and absorb the falling rain. And according to Juergens, the fierce competition between neighboring termite colonies causes the regular spacing of the circles.

Many other researchers, including entomologists and botanists, aren't convinced. They think the circles occur because plants engage in a tug-of-war for water and other scarce nutrients. Due to their battles, the landscape "self-organizes" into rings of deep-rooted grasses, draining water from a central reservoir where no other plants can thrive. This explains why, as the researchers Michael Cramer and Nichole Barger found in 2013, the fairy circles are restricted to places with low rainfall, and why they grow after dry years and shrink after wet ones.

Stephan Getzin from the University of Goettingen started off as a fan of the termite hypothesis but he defected to the self-organization camp after studying aerial images of the fairy circles, and seeing just how regular they are. "They have an extremely regular hexagonal spacing, like a honeycomb," he says. "That pattern persists throughout the landscape for hundreds of thousands of meters. Termites and ants are not known to cause such strictly ordered patterns."

Q16. Which of the following statements, taken from the passage, most weakens the termite hypothesis?

- ☐ a) the circles occur because plants engage in a tug-of-war for water and other scarce nutrients."
- ☐ b) "They have an extremely regular hexagonal spacing, like a honeycomb"
- ☐ c) "Termites and ants are not known to cause such strictly ordered patterns"
- ☐ d) "they're not unique to Australia – they also exist 6,000 miles away in Namibia."

Q17. According to the passage, fairy circles are always

- ☐ a) only in deserts.
- ☐ b) only in places with low precipitation.
- ☐ c) only in places with termite colonies.
- ☐ d) only in Australia and Namibia.

Q18. Which of the following is not explained by the self-organization hypothesis, as mentioned in the passage?

- ☐ a) Why do the fairy circles form?
- ☐ b) Why do the fairy circles change in size?
- ☐ c) What is the relation between the environment and the formation of fairy circles?
- ☐ d) Why do fairy circles have a lifespan of 30 to 60 years?

**DIRECTIONS for questions 19 to 24:** The passage given below is followed by a set of six questions. Choose the best answer to each question.

After several great revolutions in modern physics, a large and expanding community of scientists believes that the basic stuff of our universe is 'strings'. These are no ordinary strings. The physicists envisage tiny, vibrating, folding and elongating coils of energy, each 100 billion billion times smaller than the protons at the nucleus of



an atom; so small, indeed, that they can be understood only in terms of extremely sophisticated mathematics impenetrable to all but an elite of specialists.

String theory, which nowadays dominates the research programmes and main funding of theoretical physics in many Western universities, was not so much discovered as invented in order to solve a vexing explanatory deficit. In the early 1970s, physicists announced the so-called 'standard model' – a theory that seeks agreement between the contrasting realms of super-huge objects, such as stars and planets, (known as relativity) and the super-small realms of the subatomic (known as quantum). The standard model, however, failed to explain gravity. Enter string theory to rectify the problem. In its simplest terms, this complex set of notions claims 10 or 11 space dimensions (as opposed to the three of everyday human perception), and assumes a 'landscape' of myriad elementary bundles of energy (strings) that interface not only with the universe we inhabit but a multiplicity of unseen and unknowable parallel universes.

But is string theory true? Peter Woit, a mathematician at Columbia University, has challenged the entire string-theory discipline by proclaiming that its topic is not a genuine theory at all and that many of its exponents do not understand the complex mathematics it employs. String theory, he avers, has become a form of science fiction. Hence his book's title, *Not Even Wrong*: an epithet created by Wolfgang Pauli, an irascible early 20th-century German physicist. Pauli had three escalating levels of insult for colleagues he deemed to be talking nonsense: 'Wrong!', 'Completely wrong!' and finally 'Not even wrong!' By which he meant that a proposal was so completely outside the scientific ballpark as not to merit the least consideration.

Woit's book is designed to give a short history of recent particle and theoretical physics. Ultimately, he seeks not only to rattle but to dismantle the cage of the string theorists. He grants that an explanation for gravity is usefully embedded in string theory, but he challenges its authenticity as proper science. In his view, string theory offers no foreseeable prospect of making predictions due to a large number of available choices, a crucial criterion for any theory worthy of the name.

Woit's most compelling accusation, however, is that the domination of string theory in universities has stifled progress in alternative research programmes within theoretical physics. As long as the leadership of the physics community refuses to accept that string theory is a 'failed project', he writes, 'there is little likelihood of new ideas finding fertile ground in which to grow'.

Now that Woit has thrown a wild cat among the theoreticians, we can be sure that the ruffled string-theory advocates will be preparing a rebuttal. Woit, a humble math instructor, has nothing to lose in terms of academic standing, but physics might have much to gain from his boldness. While his book tends to be negative, it may well shake up a community of scientists that has evidently become complacent if not entirely ossified in its thinking. If he can encourage string theorists to acknowledge the true difficulties of their discipline, and encourage young researchers to try neglected but promising alternatives, he will have succeeded in an important task.

Q19. What does the author most likely have in mind when he mentions that Woit has thrown a wild cat among the theoreticians (para 6)?

- ☐ a) Woit arouses anger when he says that new discoveries can never be made if string theory is studied.
- ☐ b) Woit opposes the predominance of String Theory in universities and he feels that it has repressed other courses in the field.
- ☐ c) Unlike the theoreticians, Woit is very provocative in his statements and unconventional in his thinking and this has led to two opposing camps on university campus.

- ☐ d) It will shake up a community of scientists who do not like to take the road less travelled.

Q20. What is the implication of the author's statement "Physics might have much to gain from his boldness" (para 6)?

- ☐ a) String theorists will realize that they are incapable of ever converging on the truth.
- ☐ b) Other Physics scientists will dare to express, cogently, their thoughts on controversial fields.
- ☐ c) Scientists will be able to decipher complex ideas in Physics and there will be more discoveries in Physics research.
- ☐ d) String Theory scientists will be challenged to think differently and other areas of research in Physics can also gain prominence.

Q21. According to the passage, why has Peter Woit named his book "Not even wrong"?

- ☐ a) He chanced upon the idea "Not even wrong" when reading about the life of Wolfgang Pauli, an irascible German Physicist, whom he identified with.
- ☐ b) He wishes to claim that string theory is too complex to be proved right or wrong by scientists.
- ☐ c) He strongly believes that string theory is so unscientific that it is not worth discussing
- ☐ d) He has taken it upon himself to dismantle the cage of the string theorists and stir up a controversy in universities where string theory enjoys a high fan following.

Q22. Which of the following has not been mentioned in the passage as a reason for Peter Woit to take issue with the theory of string fiction?

- ☐ a) String theory offers no possibility of producing experimental evidence
- ☐ b) The interminable number of choices available make prediction impossible in string theory.
- ☐ c) String theory has parasitically impeded the growth of other research programmes in the realm of theoretical physics and it dominates the research efforts in physics in Universities.
- ☐ d) Many of the propounders of the theory are out of their depth with reference to the mathematical components of the theory.

Q23. Which of the following statement(s) best describe(s) the author's opinion of Peter Woit's book?

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

(1) The author feels that the book has a searingly provocative edge because Woit, a mere mathematics teacher, has taken on a group of the smartest minds in the world and told them that their intellectually imperial pretensions are naked.

(2) The author finds the book controversial as Woit is hell bent on proving that, having reached their limit, some areas of science are in danger of becoming "ironic science."

(3) Though string theory has not yet been proved to be right, the author feels that further study may bring to light many interesting aspects of how the present theory came to being.

(4) The author is a little wary because of the confusion and contradictions in the field of string theory and is unwilling to take sides in a debatable issue.

(5) The author is of the hope that the book will bring about some positive change in thinking of young Physics researchers.

(6) The author feels that the book is a well researched but a biased piece of fiction that reveals all Peter Woit's prejudices and biases.

Q24. In the passage, the author says that string theory “was not so much discovered as invented”. Which of the following could be the most likely reason for this statement of his?

- ☐ a) String theory's validity is based on the assumption that the theories of relativity and quantum mechanics are valid and it embraced more complex concepts such as greater number of space dimensions and an interface of energy with unseen universes.
- ☐ b) Unlike other theories, String theory bridged the divide between the contrasting realms of super-huge objects, such as stars and planets, (known as relativity) and the super-small realms of the subatomic (known as quantum) and also explained the phenomenon of gravity.
- ☐ c) Rather than being suggested as a theory in terms of evidence or offering the possibility of making predictions, string theory was advanced in order to fill a gap in existing explications.
- ☐ d) In order for string theory to be proved to be true, a number of initial hypotheses such as the actual number of space dimensions or conjectures about gravity have to be proved to be correct.

DIRECTIONS for questions 1 to 4: In each question, there are five sentences, with each sentence having a pair of words, numbered (1) and (2), that are italicized and highlighted. In each sentence, from the pairs of italicized and highlighted words, select the appropriate word to form the correct sentence. Then enter (in the input box provided below the question) the correct sequence of numbers corresponding to the appropriate words in each of the sentences, in the same order that the sentences appear in the question. For example, if you think that the appropriate words for the sentences (i), (ii), (iii), (iv) and (v) are 1, 2, 1, 2 and 2 respectively, then enter your answer as 12122.

Q25. (i) The wall surrounding the fort is a very old but *substantial* (1) / *substantive* (2) structure.

(ii) "These autocracies are *non-apologetic* (1) / *unapologetic* (2) and increasingly assertive, at home and abroad," he writes.

(iii) Hitler's *authoritative* (1) / *authoritarian* (2) regime evoked strong opposition worldwide.

(iv) Entering visitors had to *clamber* (1) / *clamour* (2) over the pile of shoes in the hallway, between the elevator and the door.

(v) The petition has been rendered *infructuous* (1)/ *inoperative* (2) by lapse of time

Q26. (i) The political party suffered a/ an *reverse* (1)/ *obverse* (2) in the elections.

(ii) Despite being careful with every detail, Trevor could not paint a portrait *similar* (1)/ *identical* (2) to Da Vinci's.

(iii) Threat of military action has always served as a *credible* (1)/ *creditable* (2) deterrent.

(iv) The government's cash-for-clunkers program has lit up a *moribund* (1) / *morbid* (2) vehicle market.

(v) Though it was meant to be *railing* (1)/ *raillery* (2), it soon turned into a bitter argument.

Q27. (i) It will be difficult to find a *substitute* (1)/ *replacement* (2) for him, once he retires.

(ii) Robin *invoked* (1)/ *evoked* (2) Einstein's theory to support his statement.

(iii) The agitated zebras skittered back and forth in short, panicky dashes, then, terrified, *galloped* (1) / *trotted* (2) off into the absolute darkness.

(iv) Rakesh and Rohan *loath* (1) / *loathe* (2) the family gatherings at which their mother recounts their childhood pranks.

(v) The characters in this novel are *fictitious* (1)/ *fictional* (2) but inspiring.

Q28. (i) It is difficult for an *envoi* (1)/ *envoy* (2) to further the interests of his country without antagonising the host.

(ii) Replenishing the *mulch* (1) / *mulct* (2) around plants as it decomposes also aids in weed control.

(iii) A dominant state fosters a culture that is *complacent* (1)/ *complaisant* (2) as opposed to one that is open to debate.

(iv) Mr. James acted as an *intermediate* (1)/ *intermediary* (2) between the two groups.

(v) Rachel's *demure* (1) / *demur* (2) exterior hides a sharp and cunning personality.

DIRECTIONS for questions 5 to 7: In each question, there are five sentences or fragments of sentences labelled (a), (b), (c), (d) and (e), 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. Indicate a correct fragment or sentence with the number 1. Indicate an incorrect fragment or sentence with the number 0. Then enter, in the input box given below the question, the correct sequence of

0's and 1's, corresponding to the five fragments or sentences, in the order in which they appear in the question.

Q29. (a) A team at the Interdisciplinary Center in Herzliya, and at Bar Ilan University in Ramat Gan both in Israel, have developed a system that allows

(b) precise control of when a drug is active in the body. The group has built nanorobots out of DNA, forming shell-like shapes

(c) that drugs can be tethered. The bots also have a gate, which has a lock made from iron oxide nanoparticles.

(d) The lock opens when heated using electromagnetic energy, exposing the drug to the environment. Because the drug

(e) remains tethered to the DNA parcel, body's exposure to the drug can be controlled by closing and opening the gate.

Q30. (a) A religion is defined by a system of attitudes, beliefs,

(b) and practises related to the supernatural, but

(c) what actually is constituted of a religion is subject to

(d) much dispute in the fields of theology

(e) and among ordinary people.

31. (a) The shale gas billowing of American soil is

(b) both a source of concern as well as cheap energy. Environmentalists worry that fracking, the technique for dislodging gas from

(c) shale beds, may pollute the air and local water supplies. The glut of natural gas has a less likely set of victims, too.

(d) Instead of banking handsome profits many of the oil and gas firms that drill for

(e) shale gas are suffering for the boom.

DIRECTIONS for questions 8 to 10: Five sentences [(i), (ii), (iii), (iv) and (v)], each with a blank, are given in each of the following questions. Five words are also given below the sentences. The blank in each sentence can be filled by one or more of the five 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.

Q32. (i) A watered-down transparency law would certainly take the \_\_\_\_\_ off Canada's brand.

(ii) The \_\_\_\_\_ of this investigation was selected randomly.

(iii) The paper was rejected on \_\_\_\_\_ of its length.

(iv) Teachers should be well trained in their \_\_\_\_\_.

(v) He found an old \_\_\_\_\_ of the magazine in the dentist's waiting room.

(a) copy

(b) subject

(c) shine

(d) account

(e) topic

Q33. (i) Although a few Polish firms are gaining a \_\_\_\_\_ outside their home country, they are still the exceptions.

(ii) You have to be a good observer to \_\_\_\_\_ all the details.

(iii) I \_\_\_\_\_ him under a different name.

(iv) \_\_\_\_\_ for your luggage before boarding the flight.

(v) I just cannot \_\_\_\_\_ your point.

(a) accomplish

(b) know

(c) look

(d) profile

(e) see

Q34. (i) Despite an investment \_\_\_\_\_, Petrobas' production growth has been anaemic.

(ii) He came here to \_\_\_\_\_ a bank account.

(iii) The gift reached safe and \_\_\_\_\_ in time.

(iv) At the lab, we're very \_\_\_\_\_ about our work.

(v) She was \_\_\_\_\_ to tears when her best friend left to live abroad.

(a) close

(b) sound

(c) open

(d) safe

(e) binge

DIRECTIONS for questions 11 to 13: 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.

Q35. (1) But I also know that this isn't a quick fix; it involves a process and a tremendous commitment.

(2) I know they can be broken. Habits can be learned and unlearned. Restoration is sometimes possible.

(3) Horace Mann, the great educator once said, "Habits are like a cable. We weave a strand of it everyday and soon it cannot be broken."

(4) For our purposes, we will define a habit as the intersection of knowledge, skill and desire.

(5) I personally do not agree with the last part of the expression.

Q36. (1) Their importance is also a function of the kinds of people they know.

(2) The idea behind the game is to try to link any actor or actress, through the movies they have been in, to the actor Kevin Bacon in less than six steps.

(3) But in the case of Connectors, their ability to span many different worlds is a function of something intrinsic to their personality, some combination of curiosity, self-confidence, sociability and energy.

(4) Connectors are important for more than simply the number of people they know.

(5) Perhaps the best way to understand this point is through the popular parlour game “Six degrees of Kevin Bacon.”

Q37. (1) For anyone with a bias towards scientific rigour, pharmacies in continental Europe are liable to send blood pressure soaring.

(2) A European doctor offered Lexington a convincingly cynical explanation: because many clients are not very ill and “homeopathic” sugar pills are cheap to make, quack cures offer low risks and high profits.

(3) Worse, Euro-pharmacists often offer, unasked, remedies based on homeopathy: the bogus theory that some compounds, even toxins like arsenic, if so diluted that only a “memory” of their presence remains in a pill or potion, have magical curative powers.

(4) Too often, the response of mainstream leaders amounts to political homeopathy.

(5) Many are gleaming white, high-priced temples to hypochondria, peddling cures for maladies not found in other lands (the French are obsessed with “heavy leg syndrome”, for instance).

*DIRECTIONS for questions 14 to 16:* 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. 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 5 as your answer in the input box.

Q38. The ploy is not working.

China’s president, Xi Jinping, is unlikely to quote Thucydides when he meets his American counterpart, Barack Obama, at a summit in California in December 2016. But the spirit of the Greek historian will hover over the Sunnylands ranch. Chinese policy wonks are struck by his argument that it was the Spartans’ fear of the growing power of Athens that made war inevitable. \_\_\_\_\_ (1) \_\_\_\_\_. Their insistence that China wants a “peaceful rise” is intended to calm such worries in America. \_\_\_\_\_ (2) \_\_\_\_\_. China’s relations with America have deteriorated in recent years, raising the spectre of conflict in East Asia. Buoyed up by its own economic success and Western stagnation, China has been asserting its claims in the regions more aggressively, sending the neighbours scuttling back to the American security umbrella. \_\_\_\_\_ (3) \_\_\_\_\_. Barack Obama’s response has been a “pivot” towards Asia. In the absence of trust, both sides will build up their military strength and responsible defensive behaviour could spiral into conflict. \_\_\_\_\_ (4) \_\_\_\_\_.

Q39. There is, of course, a connection between the two.

“Onward, upward, and inward” is my favourite motto. And inward is my favourite escape. What makes it all the more special is that going inward is both an escape and the ultimate reality. I completely get the sense of wonder that has led men and women through the ages to explore outer space, but personally I have always been much more fascinated with exploring inner space. \_\_\_\_\_ (1) \_\_\_\_\_ Astronauts have



often reported transformational experiences when they have looked back at Earth, a phenomenon that has been called “the overview effect.” But, as Thomas Merton put it, “What can we gain by sailing to the Moon if we are not able to cross the abyss that separates us from ourselves? \_\_\_\_\_(2)\_\_\_\_\_ This is the most important of all voyages of discovery, and without it all the rest are not only useless but disastrous.” Marcus Aurelius called that place I love escaping to our “inner citadel”. And, being both the emperor of Rome and a stoic philosopher, he clearly demonstrated that you could escape into your inner citadel and rule an empire at the same time. \_\_\_\_\_(3)\_\_\_\_\_ You can be in the world, but not of the world” . \_\_\_\_\_(4)\_\_\_\_\_

Q40. Closer to home, the European Union finds it harder to exert influence – even over its neighbourhood.

All of Europe rejoiced when the European Space Agency deposited Philae, a probe the size of a kitchen appliance, on the surface of a comet 300 miles (480 m km) from the earth. It was like throwing a dart blindfolded across an ocean and hitting the bullseye. \_\_\_\_\_(1)\_\_\_\_\_ Philae fell silent soon afterwards, but not before dispatching reams of data and a shot of optimism to a continent that has had little to cheer. \_\_\_\_\_(2)\_\_\_\_\_ Russia’s intervention in Ukraine is providing an early test for the EU’s new high representative for foreign policy, Federica Mogherini, who previously served as Italy’s foreign minister. NATO is warning of a renewed build-up of Russian troops and kit in eastern Ukraine. \_\_\_\_\_(3)\_\_\_\_\_ The recent sham elections in two pro-Russian separatist regions in the Donbas were “respected” if not recognized by Moscow. Petro Poroshenko, Ukraine’s president, is preparing for “total war”. \_\_\_\_\_(4)\_\_\_\_\_

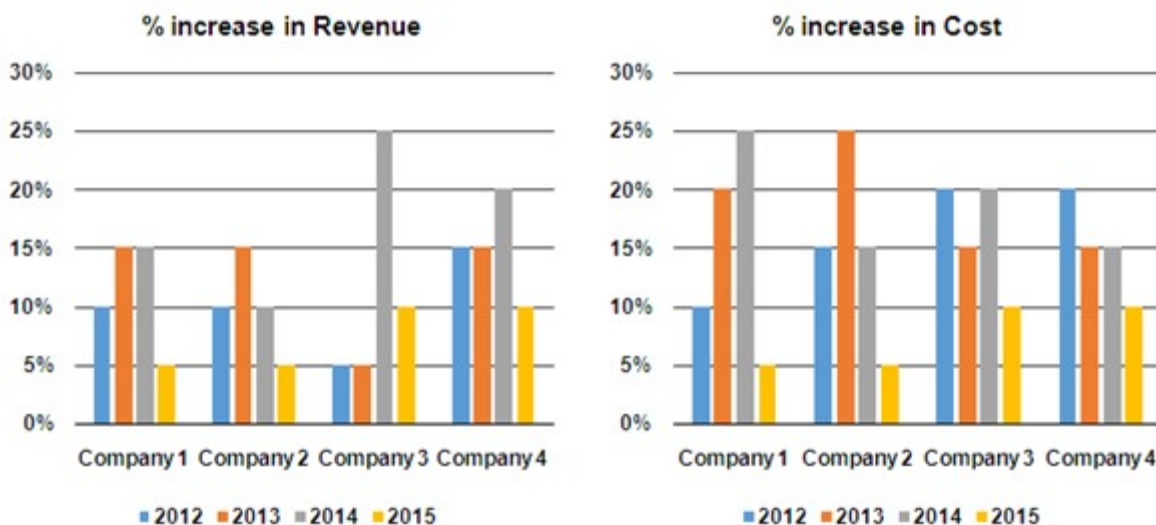
# DILR

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

Hari, a management consultant, was studying the revenues and costs of four companies – Image, Outline, Picture and Sketch. He calculated the percentage increase in the costs and revenues of the four companies in each year, from 2012 to 2015, as compared to the previous year. He prepared two bar graphs (given below), the first showing the year-on-year percentage increase in revenue of each company for the given period and the second, the year-on-year percentage increase in cost. However, in the bar graphs, instead of using the names of the companies, Hari labelled them as Company 1, Company 2, Company 3 and Company 4, in no particular order.

The table given below shows the revenues (in Rs.mn) and costs (in Rs.mn) of the four companies for the year 2011. Further, it is also known that no company incurred a loss during any of the years in the given period.

Company	2011	
	Revenues	Cost
Image	160	110
Outline	250	210
Picture	140	130
Sketch	220	190



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

Which of the following companies is represented in the bar graph as Company 1?

- ☐ a) Sketch
- ☐ b) Outline
- ☐ c) Image
- ☐ d) Picture

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

What is the approximate profit made by Outline in 2014?

- ☐ a) Rs.17.18 mn
- ☐ b) Rs.18.11 mn
- ☐ c) Rs.63.48 mn
- ☐ d) Rs.0.72 mn

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

Which company made the highest profit in 2015?

- ☐ a) Picture
- ☐ b) Outline
- ☐ c) Image
- ☐ d) Sketch

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

In how many years from 2011 to 2015 did Picture make a profit of more than Rs.10 mn?

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

Ramu, a data analyst, visited a vegetable market and purchased eight different types of vegetables. After returning home, he weighed each type of vegetable that he purchased and realized that for each type of vegetable, the weight of the vegetables which he paid for was not the same as the actual weight of the vegetables that he got. Being an analyst, he could not help but calculate various parameters for each type of vegetable that he purchased as mentioned below:

The Total Amount (in Rs.) paid by him for purchasing each type of vegetable.

The Effective Price (in Rs./kg) of each type of vegetable – which is the total amount that he paid for those vegetables divided by the actual weight of the vegetables that he got.

Monetary Loss (in Rs.) for each type of vegetable – which is the difference between the total amount that he paid for those vegetables and the total amount that he should have paid (at the same price per kg) for the actual weight of the vegetables that he got.

The following table presents these parameters for each type of vegetable that he purchased:

Vegetable	Total Amount paid	Effective Price	Monetary Loss
Onion	100.00	22.22	10.00
Tomato	64.00	20.00	12.80
Capsicum	56.00	44.80	21.00
Beans	87.50	43.75	17.50
Bitter gourd	105.00	26.25	21.00
Bottle gourd	20.00	8.00	7.50
Carrot	144.00	60.00	28.80
Potato	252.00	40.00	25.20

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

For which type of vegetable was the difference between the weight that he paid for and the actual weight he got the highest?

- ☐ a) Bitter Gourd
- ☐ b) Carrot
- ☐ c) Potato
- ☐ d) Bottle Gourd

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

What is the price (in Rs.) per kg that he paid for buying Capsicum?

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

What is the sum of the actual weights of all the types of vegetables that he purchased?

- ☐ a) 26.5 kg
- ☐ b) 26.15 kg
- ☐ c) 27.25 kg
- ☐ d) 29.45 kg

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

If *Forgone Weight* is defined as the difference between the actual weight of the vegetables that he purchased and the weight of the vegetables that he paid for, what is the sum of the *Forgone Weights* for all the types of vegetables?

- ☐ a) 6 kg
- ☐ b) 6.15 kg
- ☐ c) 6.35
- ☐ d) 6.45 kg

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

Exactly sixty persons participated in a sports meet. Each person who participated speaks at least one language among English and French and plays at least one sport among Hockey and Basketball.

The following table provides the number of persons, among the sixty, for any combination of language that they speak and sport that they play:

	English	French	Hockey	Basketball
English	33			
French	10	37		
Hockey	25	24	41	
Basketball	20	25	19	38

*In the table above, the value in the second column and second row (i.e., 37) indicates the number of people who speak French. The value in the second column and third row (i.e., 24) indicates the number of people who speak French and play Hockey.*

Q9. DIRECTIONS for questions 9 to 11: Type in your answer in the input box provided below the question.

How many persons speak both French and English and play both Hockey and Basketball?

10. DIRECTIONS for questions 9 to 11: Type in your answer in the input box provided below the question.

How many persons speak French but not English and play Hockey but not Basketball?

Q11. DIRECTIONS for questions 9 to 11: Type in your answer in the input box provided below the question.

Of the persons who speak exactly one language, how many persons play only Hockey?

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

The number of persons who play both Hockey and Basketball but speak only French is the same as the number of persons who

- ☐ a) speak both English and French and play only Hockey.
- ☐ b) play only Basketball and speak only English.

- ☐ c) play only Hockey and speak only French.
- ☐ d) play both Hockey and Basketball but speak only English.

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

At a technical symposium, each of six persons, Akbar, Bob, Chintu, David, Jeeves and Kiran, gave a presentation on a different subject among six subjects – Robotics, Animatronics, Animation, Electronics, Automation and Mechanics. Further, each presentation was given in a different conference room among Conference Room 1 through Conference Room 6.

The following information is known about the subject on which each person gave his presentation and the conference room in which each presentation was given:

- (i) David gave a presentation on Automation but he did not give it in an odd numbered conference room.
- (ii) The presentation on Electronics was given in Conference Room 2, while Chintu gave a presentation on Mechanics, but not in Conference Room 5.
- (iii) The numbers of the conference rooms in which Kiran and Bob gave their presentations are consecutive numbers.
- (iv) Kiran did not give a presentation in Conference Room 2, while the person who gave a presentation on Animatronics gave it in Conference Room 3.
- (v) Jeeves gave a presentation on Robotics in Conference Room 4.

Q13. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

Who gave the presentation on Animatronics?

- ☐ a) Akbar
- ☐ b) Bob
- ☐ c) Kiran
- ☐ d) Cannot be determined

Q14. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

In which conference room did Akbar give his presentation?

- ☐ a) Conference Room 2
- ☐ b) Conference Room 5
- ☐ c) Conference Room 3
- ☐ d) Conference Room 1

Q15. DIRECTIONS *for questions 1 to 4*: Select the correct alternative from the given choices.

Which of the following pairs of persons gave their presentations in consecutively numbered conference rooms?

- ☐ a) Akbar, Bob
- ☐ b) Bob, Jeeves
- ☐ c) Akbar, Chintu
- ☐ d) Jeeves, Kiran

Q16. DIRECTIONS *for questions 1 to 4*: Select the correct alternative from the given choices.

The presentation given in Conference Room 1 was on which subject?

- ☐ a) Animation
- ☐ b) Animatronics
- ☐ c) Mechanics
- ☐ d) Either (A) or (C)

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

Kiran had with him  $n$  different types of unit cubes, such that each unit cube of type  $i$  weighs  $i$  grams, for  $i = 1, 2, 3, \dots, n$ . He made a larger cube of side  $N$  units using these unit cubes in the following manner:

He built the larger cube one horizontal layer at a time. In each horizontal layer, starting from the front row, each row is laid from left to right. The bottom most horizontal layer is laid first and the cube is built upwards.

Further, when building the larger cube, he always picks a cube of type 1 first, and then picks a cube of type 2, and continues to pick cubes of consecutive types, one after the other. After picking a cube of type  $n$ , he again picks a cube of type 1 and continues the process, until the larger cube is built completely.

Q17. DIRECTIONS *for questions 5 to 8*: Type in your answer in the input box provided below the question.

If  $N = 8$  and  $n = 3$ , what is the total weight (in grams) of all the unit cubes forming the diagonal from the bottom left corner of the front face of the cube to the top right corner of the back face of the cube?

Q18. DIRECTIONS *for questions 5 to 8*: Type in your answer in the input box provided below the question.

If  $N = 10$  and  $n = 4$ , what is the total weight (in grams) of all the unit cubes forming the diagonal from the bottom right corner of the front face of the cube to the top right corner of the back face of the cube?

Q19. DIRECTIONS *for questions 5 to 8*: Type in your answer in the input box provided below the question.

If  $N = 11$  and  $n = 4$ , what is the total weight (in grams) of all the unit cubes forming the diagonal from the bottom right corner of the front face of the cube to the top left corner of the back face of the cube?

Q20. DIRECTIONS *for questions 5 to 8*: Type in your answer in the input box provided below the question.

If  $N = 4$  and  $n = 14$ , what is the total weight (in grams) of all the unit cubes forming the vertical column which has its base in the second cube from left, two rows behind the front row?

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

Five persons, Gautam, Kumar, Lalit, Naren and Raj, joined a company in 2015. Each of the five persons joined for a different monthly salary among Rs.20,000, Rs.30,000, Rs.40,000, Rs.60,000 and Rs.80,000, not necessarily in the same order. However, each person joined at the beginning of a different month of the year and received his monthly salary each month, starting from the month in which he joined. Further, none of the five persons received any salary in 2015 before joining the company.

The following information is known about the month in which they joined and the monthly salary and total salary received by each person in 2015:

(i) No two persons joined in the same month and no one joined the company in the months of February, July or October.

(ii) Raj joined at least four months before Gautam did, and the total salary that he received in 2015 was less than that received by Gautam.

(iii) Naren, whose monthly salary is not Rs.40,000, received a total salary of Rs.4,80,000 in 2015.

(iv) Both the monthly salary and the total salary of Kumar in 2015 are greater than those of Gautam and the total salary that Kumar received in 2015 is less than that received by Lalit.

Q21. DIRECTIONS for questions 9 and 10: Type in your answer in the input box provided below the question.

What is the total salary (in Rs.) received by Kumar in 2015?

Q22. DIRECTIONS for questions 9 and 10: Type in your answer in the input box provided below the question.

How many persons joined the company before the end of June?

Q23. DIRECTIONS for question 11: Select the correct alternative from the given choices.

In which month did Gautam join the company?

- ☐ a) August
- ☐ b) June
- ☐ c) September
- ☐ d) Cannot be determined

Q24. DIRECTIONS for question 12: Type in your answer in the input box provided below the question.  
What is the total salary (in Rs.000) received by Lalit in 2015?



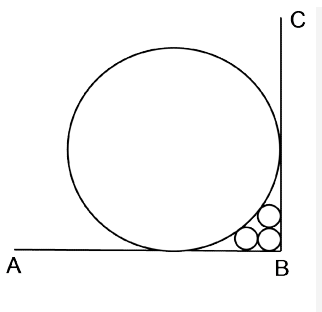
# QA

Q1. If  $t$  is a real number, such that  $81^{(t+1)}$  when divided by  $27^{(t-1)}$  equals  $243^{(t-1)}$ , find  $t$ .

- ☐ a) 2
- ☐ b) 3
- ☐ c)  $\frac{1}{2}$
- ☐ d)  $\frac{1}{3}$

Q2. If  $x \oplus y = \frac{xy}{x+y}$ , for how many natural numbers less than 100 will  $t \oplus (t \oplus t)$  be equal to an integer?

Q3. In the figure given below, if the radius of each of the three identical small circles measures  $\frac{2}{3}$  cm and  $AB \perp BC$ , find the radius (in cm) of the big circle.



Q4. A grandfather bought a certain number of chocolates as Diwali gift for his three grandsons. He called them and asked them to share the chocolates in the ratio of their ages, which happened to be 3 : 4 : 5, without mentioning the total number of chocolates that he bought. As the chocolates were kept in their grandfather's room, each child arrived there at a different time of the day and took his respective share, thinking that he was the first to arrive. What fraction of the chocolates remained unclaimed at the end of the day?

- ☐ a)  $\frac{7}{42}$  ✖ Your answer is incorrect
- ☐ b)  $\frac{7}{24}$
- ☐ c)  $\frac{5}{72}$

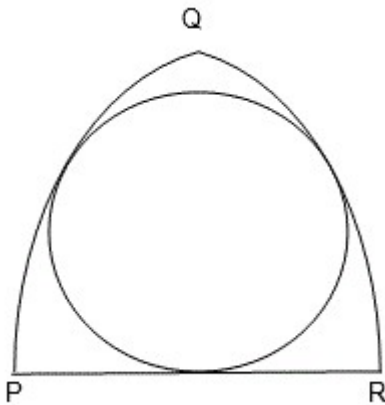
☐ d)  $\frac{5}{144}$

Q5. If the first four terms of an arithmetic progression are  $p$ ,  $p + 2q$ ,  $3p + q$  and 30, find the value of the 2016<sup>th</sup> term of the progression.

- ☐ a) 12344  
☐ b) 14532  
☐ c) 15130  
☐ d) 16126

Q6. The scores obtained by a student in five AIMCAT's were 104, 125, 133, 148 and 175, not necessarily in the same order. If the student observed that his average score per test, which he evaluated after each test, was always an integer, find the difference between his score in the third test and that in the fourth test.

Q7. In the figure given below, PQ and QR are equal arcs, drawn with centers at R and P respectively. If PR measures 40 cm, find the measure of the radius (in cm) of the circle inscribed as shown.



- ☐ a) 15  
☐ b) 16  
☐ c) 18  
☐ d) 20

Q8. If  $\log x^2 y^3 = \log x^3 y = 14$ , find the value of  $\log xy$ .

- ☐ a) 6  
☐ b) 8  
☐ c) 9

☐ d) 12

Q9. Raj started from his house towards his friend Brij's house, 24 km away. After sometime, Brij also started moving towards Raj's house, traveling at one and a half times the speed of Raj. If when they met, the duration for which Raj had traveled was three times that for which Brij had traveled, at what distance from Brij's house did they meet?

- ☐ a) 6 km
- ☐ b) 8 km
- ☐ c) 12 km
- ☐ d) 16 km

Q10. If the sum of  $n$  consecutive positive integers is 21, where  $n > 1$ , how many values can  $n$  assume?

- ☐ a) 1
- ☐ b) 2
- ☐ c) 3
- ☐ d) 5

Q11. If the average of 60 numbers is 40, whereas the average of 40 other numbers is 60, what is the average of all the 100 numbers taken together?

- ☐ a) 48
- ☐ b) 50
- ☐ c) 52
- ☐ d) None of the above

Q12.  $f(x)$  is a polynomial which when divided by  $(x - 36)$  leaves a remainder of 64 and when divided by  $(x - 64)$  leaves a remainder of 36. If the remainder when  $f(x)$  is divided by  $(x - 36)(x - 64)$  is  $ax + b$ , find  $(a + b)$ .

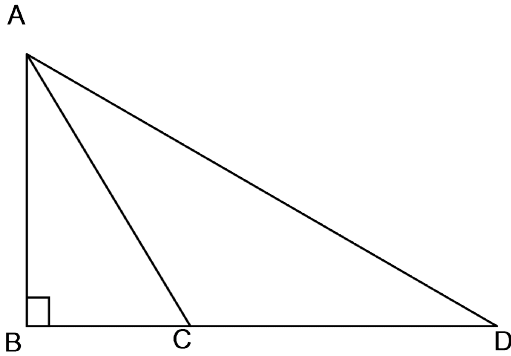
Q13. Find the difference between the sum of the first 2016 even whole numbers and the sum of the first 2016 odd natural numbers.

- ☐ a) 0
- ☐ b) 1
- ☐ c) 2016
- ☐ d) 4032

Q14. How many four-digit odd numbers have their digits, when read from left to right, in ascending order?

Q15. If  $(\sin \alpha + \cos \beta) = \sqrt{\frac{4}{3}}$  and  $(\cos \alpha + \sin \beta) = \sqrt{\frac{8}{3}}$ , find the value of  $6 \sin^2(\alpha + \beta)$ .

Q16. In the figure below, triangle ABC is right angled at B. If  $\angle ACB$  and  $\angle ADB$  are complementary angles, with BC and CD measuring 4 cm and 12 cm respectively, find the area (in sq. cm) of the triangle ABD.



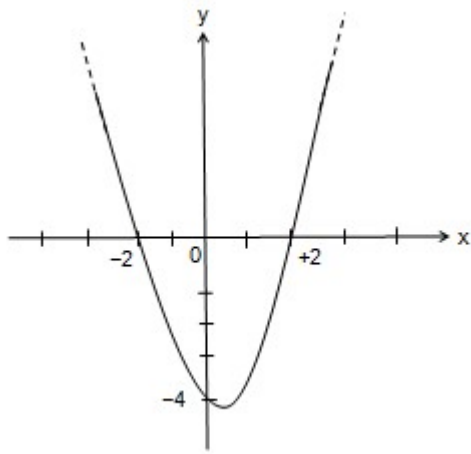
- ☐ a) 40
- ☐ b) 32
- ☐ c) 48
- ☐ d) 64

Q17. If  $S$  is the sum of all the possible values of  $t$  for which the line  $x = ty$  divides the triangle formed by joining the points  $(0, 0)$ ,  $(3, 2)$  and  $(0, 8t)$  into two triangles of equal area, find the value of  $12S$ .

Q18. If  $f(x) = ax^2 + bx + c$  and  $f(x + 5) = 2x^2 + 15x + 29$ , find the value of  $a + b + c$ .

Q19. In how many ways can three girls and four boys be seated in a row comprising seven chairs, such that both the extreme positions are occupied by boys and no two girls occupy adjacent positions?

Q20. The graph of  $f(x) = a_0x^3 + a_1x^2 + a_2x + a_3$  is represented partially in the following figure. Find the value of  $a_1$ .



Q21. A team of  $N$  persons can complete a certain job in 15 days. If there were six more persons in the team, it would take three days less to complete the job. Find  $N$ .

- ☐ a) 24
- ☐ b) 30
- ☐ c) 18
- ☐ d) 16

Q22. If  $|x + y| + |x - y| = 6$ , find the minimum value of  $x^2 + y^2 + 5xy$ .

Q23. If a function  $f(x)$  is defined such that  $y = f(x)$ , then  $f^{-1}(x)$ , i.e., the inverse of  $f(x)$ , is defined as  $f^{-1}(y) = x$ . If  $f(x) = mx + n$  and  $f^{-1}(x) = nx - 4$ , which of the following gives the value of the product  $(mn)$ ?

- ☐ a) 1
- ☐ b)  $\frac{1}{2}$
- ☐ c) 2
- ☐ d) 4

Q24. In a triangle  $PQR$ ,  $S$  and  $T$  are points on sides  $PR$  and  $PQ$  such that  $QS$  and  $RT$  are bisectors of angles  $PQR$  and  $PRQ$  respectively. If  $QS$  and  $RT$  intersect at  $U$ , and  $PQ$ ,  $QR$  and  $PR$  measure 9 cm, 6 cm and 5 cm respectively, find the ratio  $QU : US$ .

- ☐ a) 2 : 1
- ☐ b) 4 : 3
- ☐ c) 5 : 2
- ☐ d) 3 : 1

Q25. For how many integral values of 'a' will the graphs of  $x^2 + y^2 = 4x + 8y + 80$  and  $x^2 + y^2 = 10x + 16y + a^2 - 89$  meet each other at at least one point?

Q26. If  $x, y$  and  $z$  are positive real numbers such that  $x^2 = \sqrt{98} - \sqrt{96}$ ,  $y^2 = \sqrt{128} + \sqrt{120}$  and  $z^2 = \sqrt{338} - \sqrt{320}$ , find the value of  $(x + y + z)$ .

- ☐ a)  $2^{\frac{1}{4}}(\sqrt{2} + \sqrt{3})$
- ☐ b)  $2^{\frac{3}{2}}(\sqrt{2} + \sqrt{5})$
- ☐ c)  $2^{\frac{3}{2}}(2 + \sqrt{2})$
- ☐ d)  $2^{\frac{5}{4}}(\sqrt{2} + 1)$