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.

The Channel Tunnel has had an environmental and economical impact not just on Nord-Pas de Calais, France and Kent, Britain but also on other areas of Europe. … The history of proposals to build a fixed link through the 27 kms of sea separating the UK from France can be traced back to 1751. No matter how elaborate the arguments for or against the Channel Tunnel, the United Kingdom has always had to grapple with the more profound, psychological question of losing its 'island status'. This led historians to observe that for the UK, the Channel Tunnel amounted to more than a mere engineering project; it was a 'state of mind' describing the UK's traditional ideological insularity. In France, the attitude towards the Tunnel has always been pragmatic and supportive. It is this mixture of pragmatism and nationalism, coupled with the complexity and financial commitment needed to build a fixed link, that makes the Channel Tunnel a fascinating case-study of Anglo-French relations in modern times.

While, in the rest of this work, we shall seek to evaluate the major milestones in the history of the Tunnel and clarify some of the arguments for and against its construction, in this segment we look at a brief account of the historical evolution of the Tunnel, in order to understand why progress on the project had been so modest throughout much of the 19th and 20th centuries and explain how and why in 1986 the state of inertia was broken.

In 1751, a Frenchman named Nicholas Desmaret presented a report to Louis XV which claimed that Britain and France were at one time geographically linked by a spit of land. Desmaret's report suggested that a direct link between these two great European powers could be restored by building a bridge, a tunnel or a dike. However, Desmaret's ideas amounted to little more than an expression of interest. The first serious proposal to construct a fixed link between Britain and France was designed by Albert Mathieu-Favier in 1802. The Peace of Amiens, signed on March 25, 1802, temporarily ended Britain's conflict with revolutionary and Napoleonic France and enabled Mathieu-Favier to pursue his plans for a tunnel under the Channel. Mathieu-Favier, a mining engineer, proposed a tunnel for stagecoaches to be built in two 15 km sections on either side of an artificial island (where coaches could change horses) constructed on the Varne Sandbank, an area of shallow water halfway between England and France. He proposed illumination by oil lamps and ventilation by a series of chimneys projecting above the surface of the Channel.

Mathieu-Favier was successful in bringing his project to the attention of Napoleon Bonaparte, who in 1802 was the first Consul of France. Napoleon was impressed with the project and at the Peace of Amiens discussed the fixed link idea with the prescient Whig leader, Charles James Fox. Both Napoleon and Fox supported Mathieu-Favier's project to build a Channel

Tunnel. Notwithstanding this initial enthusiasm for a cross-Channel fixed-link, the project was abandoned following the resumption of war between England and France in 1803.

From Napoleon's time to the mid-19th century, more proposals for a fixed link appeared. Geotechnical investigations evidenced the presence of chalk strata adequate for tunnelling. In 1839, Aimé Thomé de Gamond, a Frenchman, performed the first hydrographical surveys on the Channel. In the 1880s, undersea tunnelling actually started at Shakespeare Cliff, England and Sangatte, France, but was stopped for political reasons. In 1974, a tunnel scheme was stopped for political reasons on the British side.

In 1979, the European Channel Tunnel Group initiated studies for various private railway tunnel schemes. A competition was organized by the French and British governments in 1985. Four main projects were submitted: Euroroute, a hybrid solution of a bridge-tunnel-bridge, Europont, a suspended bridge, Transmanche Express, four bored tunnels allowing both rail and road traffic, and Eurotunnel, a rail shuttle service for road vehicles with provision for through-trains, using three tunnels, two for rail and one for maintenance. The concession to build and operate the fixed link across the Channel was awarded on 20th January 1986 to France-Manche and Channel Tunnel Group subsequently to become Eurotunnel (ET) and Transmanche Link (TML) in March 1986.

Q1. What is this passage about?

 a) The need for the Channel Tunnel.
 b) A communications perspective on Anglo-French Relations.
 c) A historical overview of the Channel Tunnel project.
 d) The environmental and economical impact of the Channel Tunnel on Europe.

Q2. Which of the following best expresses the idea in the sentence "The Channel Tunnel amounted to more than a mere engineering project; it was a 'state of mind'." (para 1)?

 a) The English were not bothered by the overall planning, feasibility studies and conceptual design of the Channel Tunnel.
 b) The English felt there would be an increasing influence of the French if they were directly connected.
 c) The English were not pragmatic like the French; they were only nationalistic in their ideology.
 d) The English anticipated the possible loss of their singularity with the construction of the tunnel.

Q3. Where is the passage most likely taken from?

a) Encyclopedia
b) Thesis
c) Magazine
d) Newspaper

Q4. According to the passage, the first significant scheme to link France and England is credited to

a) The European Channel Tunnel Group.
b) Nicholas Desmaret.
c) Albert Mathieu-Favier.
d) The Peace of Amiens.

Q5. According to the passage, the Varne Sandbank figured in Mathieu-Favier's plan because

a) it was halfway between England and France; hence the Channel tunnel could geographically be seen to be owned by both countries.
b) it was the place where Britain and France were once joined by a piece of land, and a tunnel or a raised causeway could be built in the same location.
c) it was an area of shallow water, which facilitated the construction of the tunnel.
d) it would enable the construction of an artificial island midway across the tunnel.

Q6. Which of the following can be understood to be true from the passage?
1. The scheme of ventilation for the Channel Tunnel envisioned by Mathieu-Favier was large air blowers throughout the tunnel and on the Varne Sandbank.
2. In 1985, Transmanche Express proposed a Channel Tunnel with four bored tunnels allowing both rail and road traffic.
3. In 1974, the tunnel scheme was stopped following the resumption of war between England and France.
4. The scheme of illumination for the Channel Tunnel envisaged by Mathieu-Favier included fluorescent lighting in some areas and incandescent lamps in other places.
5. In 1985, Europont ideated a hybrid solution of a bridge-tunnel-bridge in the Channel Tunnel Competition.

a) Only b
b) a, c and e
c) b and e
d) c and d

DIRECTIONS *for questions 7 to 9:* The passage given below is followed by a set of three questions. Choose the best answer to each question.

World governments believe that only one statistic, the measure of gross domestic product (GDP) can really show whether things seem to be getting better or worse. GDP is an index of a country's entire economic output – a tally of manufacturers' shipments, farmers' harvests, retail sales and construction spending. It compresses the immensity of a national economy into a single data point of surpassing density. Many have depended on it for so long. "If you want to know why GDP matters, you can just put yourself back in the 1930 period, where we had no idea what was happening to our economy," said William Nordhaus, a Yale economist. "There were people then who said things were fine and others who said things weren't fine. But we had no comprehensive measures, so we looked at things like boxcar loadings."

But academics and gadflies have always been critical of the measure, suggesting that it is an inaccurate gauge of prosperity. It has failed to capture the well-being of a 20th-century society and has skewed global political objectives toward the single-minded pursuit of economic growth. …. Left unanswered, however, is the question of which indicators are suitable replacements for GDP. Should one measure educational attainment or employment; account for carbon emissions or happiness? However, a new panel of national measures won't necessarily settle such arguments. Criticisms of GDP go deeper than just its misuse by politicians. Consider, the lives of two people – let's call them High-GDP Man and Low-GDP Man. High-GDP Man has a long commute to work in an automobile that gets poor gas mileage (he spends more on fuel). The morning stress is not too good for his car or his cardiovascular health (which need expensive treatment). He works hard, spends hard. He loves going to restaurants, likes his flat-screen televisions and adores his big house. He pays for a baby sitter and a housekeeper because there is no time for housework. He has no time to cook, so he orders in.

But cooking, cleaning, home care are the activities that keep Low-GDP Man busy. By economic measures, there's no doubt High-GDP Man is superior to Low-GDP Man. His salary is higher, his expenditures are greater, his economic activity is more robust. He is a bigger boon to his country. What we can't really say is whether his life is any better. There seem to be subtle indications that various "goods" that High-GDP Man consumes should be characterized as "bads." His alarm system at home probably isn't such a good indicator of his personal security; given all the medical tests, his health care expenditures are excessive. Moreover, the pollution from the traffic jams, which signals that business is good at the local gas stations, is contributing to environmental ills. And we don't know if High-GDP Man is living beyond his means, so we can't predict his future quality of life.

Q7. Which of the following factors in the 1930s led to the adoption of GDP as a comprehensive economic measure?

a) It allowed countries to have control over the prices of many goods and services.
b) It became a benchmark for a country's success among the most developed economies, triggering a highly competitive race for global power.
c) It seemed to be the only way of measuring economic growth rates.
d) It helped countries develop national policy and was a comprehensive indicator of a nation's economic wellbeing.

Q8. Why does the author give the example of 'Low-GDP man" and "High-GDP man" in the passage?

a) examine crucial shortcomings of the GDP as an indicator of the economic well-being of a country.
b) examine the consequences of a popular misconception related to GDP of countries in the 1930s.
c) identify ways in which the GDP could be repackaged so that it would serve as a more accurate indicator of the economic wellbeing of a country.
d) discuss how the GDP came to be used as the primary indicator of the economic well-being of a country.

Q9. Why does the author give the example of 'Low-GDP man" and "High-GDP man" in the passage?

a) To suggest that the monolithic gross domestic product numbers should be superseded by other, more sophisticated economic indicators.
b) To illustrate the major flaws and limitations of GDP as a measure.
c) To illustrate that the GDP as a measure is prone to error because it underestimates relevant types of economic activity.
d) To signify that GDP figures are an approximation at best, while other more holistic and exact measures which are less likely to ignore human aspects exist.

DIRECTIONS *for questions 10 to 15:* The passage given below is followed by a set of six questions. Choose the best answer to each question.
Man has always shown an enigmatic urge for truth. The liar uses the valid designations, the words, to make the unreal appear as real; he says, for example, "I am rich," when the word "poor" would be the correct designation of his situation. He abuses the fixed conventions by arbitrary changes or

even by reversals of the names. In a similarly limited way, man wants the truth: he desires the agreeable life-preserving consequences of truth, but he is indifferent to pure knowledge, which has no consequences; he is even hostile to possibly damaging and destructive truths. And, moreover, what about these conventions of language? Are they really the products of knowledge, of the sense of truth? Do the designations and the things coincide? Is language the adequate expression of all realities?

Only through forgetfulness can man ever achieve the illusion of possessing a "truth" in the sense just designated. If he does not wish to be satisfied with truth in the form of a tautology – that is, with empty shells – then he will forever buy illusions for truths. What is a word? The image of a nerve stimulus in sounds. But to infer from the nerve stimulus a cause outside us, that is already the result of a false and unjustified application of the principle of reason. If truth alone had been the deciding factor in the genesis of language, and if the standpoint of certainty had been decisive for designations, then how could we still dare to say "the stone is hard," as if "hard" were something otherwise familiar to us, and not merely a totally subjective stimulation! We separate things according to gender, designating the tree as masculine and the plant as feminine. How far this oversteps the canons of certainty! We speak of a "snake": this designation touches only upon its ability to twist itself and could therefore also fit a worm. What one-sided preferences, first for this, then for that property of a thing! The different languages, set side by side, show that what matters with words is never the truth, never an adequate expression; else there would not be so many languages. The "thing in itself" is quite incomprehensible to the creators of language and, to them, not at all worth aiming for.

A nerve stimulus, first transposed into an image – first metaphor. The image, in turn, imitated by a sound – second metaphor. And each time there is a complete overleaping of one sphere, right into the middle of an entirely new and different one. One can imagine a man who is totally deaf and has never had a sensation of sound and music. Perhaps such a person will gaze with astonishment at Chladni's sound figures; perhaps he will discover their causes in the vibrations of the string and will now swear that he must know what men mean by "sound." It is this way with all of us concerning language; we believe that we know something about the things themselves when we speak of trees, colors, snow, and flowers; and yet we possess nothing but metaphors for things – metaphors which correspond in no way to the original entities. In the same way that the sound appears as a sand figure, so the mysterious X of the thing in itself first appears as a nerve stimulus, then as an image, and finally as a sound. Thus the genesis of language does not proceed logically in any case, and all the material within and with which the man of truth, the scientist, and the philosopher later work and build, if not derived from never-never land, is at least not derived from the essence of things.

Q10. According to the passage, what kind of truth does man yearn for?

 a) The thing in itself, the pure truth, which has no consequence.
 b) Truth that presents gratifying consequences.
 c) Truth which is nocent and prejudicial.
 d) Truth delivered in a periphrastic style.

Q11. In the author's opinion, our differentiation of a tree and a plant based on gender, among other examples cited, would be termed?

 a) purposeless
 b) unconventional
 c) impractical
 d) arbitrary

Q12. What is the primary reason for the author to make a mention of Chladni's sound figures in the passage?

 a) he answers the question in the affirmative.
 b) he answers the question in the negative.
 c) he does not dwell on this question but shifts focus to other important dimensions of language.
 d) he gives a separate set of examples and conditions as to when the answer to the question can be either affirmative or negative.

Q13. What is the primary reason for the author to make a mention of Chladni's sound figures in the passage?

 a) To indicate that it can be a source of learning and amazement to a person who has never had a sensation of sound and music.
 b) To prove that sound is an important agency in the genesis of language.
 c) To provide an example of how a nerve stimulus directly translates into a sound.
 d) To reiterate that designations only present the subjective perceptions of man, who calls upon allegories to express them.

Q14. Three of the following choices correctly represent the author's view on language in the passage. Pick the exception.

 a) Conventions of language are inadequate in expressing essential truth.
 b) Since language cannot represent the truth, the work of the scientist or the philosopher cannot be considered true.
 c) Many languages express the same truth using a plethora of sounds.
 d) Language uses our eye or nerve stimuli to convey perceptions or make them comprehensible to us.

Q15. Which of the following best describes essential truth as explained in the passage?

a) Truth is a regularly valid and obligatory designation of things, accepted in all instances.
b) Truth is a self-contradictory statement amounting to a near fallacy in linguistic terms.
c) Truth is limited and dependent on certain criteria.
d) Truth is controversial as it can be affirmed and negated at times.

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.

Traditional Chinese Medicine considers the repression of emotions such as anger, frustration and sorrow as contributing to many physical illnesses and ultimately more severe emotionally related disorders. When we suppress emotions with our conscious mind we are essentially training our sub-conscious mind to accept these negative emotional feelings as normal. If this is done continuously, the sub-conscious mind can become confused and polarised. Negative life events will often start to seem acceptable and normal to the individual.

A normal healthy emotional and physical state becomes almost abnormal and this makes it more difficult to break out of the spiral of negative emotion and ill health. Take, for example, an abusive relationship where the suffering party, rather than end the relationship, suppresses their emotions and convinces themselves that everything is fine. Even a physically and emotionally destructive relationship can continue for a long period of time, and when the relationship finally comes to an end, the injured party will often feel guilty and reject future nurturing relationships, gravitating instead towards an equally abusive relationship. The key to resolving such patterns is to re-train the sub-conscious mind to express negative emotions correctly. In the clinic, this process is often aided by the release of suppressed emotions. This explains the frequent occurrence where clients will often experience an emotional release during or shortly after an acupuncture treatment, often without knowing where this emotion came from.

In my clinic I regularly encounter clients who seem trapped in a chain of negative emotions. For example, if someone feels unreasonably frustrated or angry towards someone, whether they express or repress this emotion, they will often feel very upset afterwards. This will often lead to feelings of guilt and low self-worth where ultimately they redirect this anger towards themselves. If this chaining of negative emotions happens continuously over time it can often lead to severe anxiety or depression. So an initial negative emotion spirals into a whole series of lingering negative emotions – each one damaging to the person. The secret is to chain and spiral positive emotions

of confidence, self-worth and joy and in that process help the client to release and ultimately to collapse the negative emotional feelings. Acupuncture can be very helpful in achieving our goal. When it is supported by Chinese physical exercise and mind techniques, the results can be astounding.

Q16. Which of the following can be inferred to be true from the passage?
1. The repression of emotions is the main reason for our physical and mental illnesses.
2. An acupuncture treatment can help to release suppressed emotions.
3. Lingering negative emotions are temporary and occasional emotions that are experienced by a depressed person.
4. Positive emotions of self-worth cannot counteract the negative emotional feelings that people experience at times.

a) Only a
b) Only b
c) c and d
d) a and b

Q17. All of the following are possible consequences of repressing negative emotions 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 (1) and (4) apply, then enter 14 (but not 41) in the input box.
1. Self-directed anger.
2. Feelings of guilt and low self-worth.
3. Severe anxiety or depression.
4. Rejection of future nurturing relationships, and a gravitation towards abusive relationships.
5. The rejection of negative life events by the subconscious mind which will consider them to be abnormal.

Q18. What is the style of the passage?

a) Narrative
b) Analytical
c) Descriptive
d) Argumentative

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.

"Power Is Shifting from West to East." Dine on a steady diet of books these days and it's easy to think that the future belongs to Asia. As one prominent herald of the region's rise put it, "We are entering a new era of world history: the end of Western domination and the arrival of the Asian century."

Sustained, rapid economic growth since World War II has undeniably boosted the region's economic output and military capabilities. But it's a gross exaggeration to say that Asia will emerge as the world's predominant power player. At most, Asia's rise will lead to the arrival of a multi-polar world, not another unipolar one.

Asia is nowhere near closing its economic and military gap with the West. The region produces roughly 30 percent of global economic output, but because of its huge population, its per capita GDP is only $5,800, compared with $48,000 in the United States. Asian countries are furiously upgrading their militaries, but their combined military spending in 2008 was still only a third that of the United States. Even at current torrid rates of growth, it will take the average Asian 77 years to reach the income of the average American. The Chinese need 47 years. For Indians, the figure is 123 years. And Asia's combined military budget won't equal that of the United States for 72 years.

It is meaningless to talk about Asia as a single entity of power, now or in the future. The fast ascent of one regional player will be greeted with alarm by its closest neighbors. China and Japan have fought repeatedly over Korea; the Soviet Union teamed up with India and Vietnam to check China, while China supported Pakistan to counterbalance India. Already, China's recent rise has pushed Japan and India closer together. If Asia is becoming the world's center of geopolitical gravity, it's a murky middle indeed.

Those who think Asia's gains in hard power will inevitably lead to its geopolitical dominance might also want to look at another crucial ingredient of clout: ideas. Pax Americana was made possible not only by the overwhelming economic and military might of the United States but also by a set of visionary ideas: free trade, Wilsonian liberalism, and multilateral institutions. Although Asia today may have the world's most dynamic economies, it does not seem to play an equally inspiring role as a thought leader, when it actually should, given the circumstances. The big idea animating Asians now is empowerment; Asians rightly feel proud that they are making a new industrial revolution. But self-confidence is not an ideology, and the much-touted Asian model of development does not seem to be an exportable product.

"Asia's Rise Is Unstoppable." ...... Asia's recent track record might seem to guarantee its economic superpower status. Goldman Sachs, for instance, expects that China will surpass the United States in economic output in 2027 and India will catch up by 2050.

Given Asia's relatively low per capita income, its growth rate will indeed outpace the West's for the foreseeable future. But the region faces enormous demographic hurdles in the decades ahead. More than 20 percent of Asians will be elderly by 2050. Aging is a principal cause of Japan's stagnation. China's elderly population will soar in the middle of the next decade. Its savings rate will fall while healthcare and pension costs explode. India is a lone exception to these trends – any one of which could help stall the region's growth.

Environmental and natural resource constraints could also prove crippling. Pollution is worsening Asia's shortage of fresh water while air pollution exacts a terrible toll on health (it kills almost 400,000 people each year in China alone). Without revolutionary advances in alternative energy, Asia could face a severe energy crunch. Climate change could devastate the region's agriculture.

The current economic crisis, moreover, will lead to huge overcapacity as Western demand evaporates. Asian companies, facing anemic consumer demand at home, will not be able to sell their products in the region. The Asian export-dependent model of development will either disappear or cease to be a viable engine of growth.

Q19. The tone of the author towards the rise of Asia can be termed as one of

a) Great fascination.
b) Strong skepticism.
c) Pointed criticism.
d) Guarded appreciation.

Q20. What role do the two bold-faced portions play in the passage as a whole?

a) They present two explanations for a common phenomenon discussed in the passage.
b) They arrest the reader's attention, demonstrating that some of the conclusions reached by recent historians are correct
c) They provide instances of the viewpoint that, according to the passage's author, is being superceded.
d) They challenge the validity of a theory by exposing the inconsistencies and contradictions in it.

Q21. It can be inferred from the passage that the prime reason(s) for the rise of the United States as a global superpower was/were

1. its vision that manifested itself in free trade, Wilsonian liberalism and multilateral institutions.

     2.   its huge population responsible for intellectual wealth and its dynamic economy capable of rising to the occasion when needed.

     3.   its military mastery and economic domination in the post World War II era.

     4.   America being the first to harness nuclear power.

a) b and d
b) c and d
c) a and b
d) a and c

Q22. The author mentions some stumbling blocks in the course of the expected dawn of a new Asian age. Three of the following choices mention these blocks. Pick the exception.

a) Asia's lack of visionary ideas and its export-dependent model of development.
b) Competition for power among neighbours in the region.
c) Asia's relatively low per capita income.
d) Asia's environmental concerns and demographic hindrances.

Q23. How does the author develop the passage?

a) He uses statistics involving economic, social and military indicators to drive home his point.
b) He uses a scholarly approach to reveal a contradiction in an opposing viewpoint.
c) He assumes what he sets out to prove and argues in circles.
d) He makes a generalization and follows it up with supporting details.

Q24. Which of the following suggestions associated with 'thought leadership' would the author most likely advocate for Asia to enhance its superpower status?

a) It should continue to use the ideology of empowerment.
b) It should employ broad, visionary ideas that will shift the geopolitical lever in its favour.
c) It should use its intellectual capability in promoting a 'cohesive identity'.
d) It should use the concept of thought leadership in converting its export-dependent model of development into other suitable models.

Q25. DIRECTIONS *for question 25:* Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. 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 <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. But our character, our basic identity, does not have to be hurt at all.

2. It's not what happens to us, but our response to what happens to us that hurts us.

3. The ability to subordinate an impulse to a value is the essence of the proactive person.

4. Of course, things can hurt us physically or economically and can cause sorrow.

5. In fact, our most difficult experiences become the crucibles that forge our character and develop the internal powers, the freedom to handle difficult circumstances in the future and to inspire others to do so as well.

Q26. DIRECTIONS *for question 26:* The sentences given in this question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 and 5). Decide on the proper order for the sentences and key in the correct sequence of five numbers as your answer in the input box given below the question.

1. These days, they are also creating waves in the world of renewable energy.

2. No land stands between Antarctica and Australia's west coast – just a vast ocean, rippled and rocked by the Roaring Forties.

3. As a result, Australia's largest naval base now gets part of both its electricity and its fresh water courtesy of the 'Forties.

4. For centuries these Westerlies, which blow between latitudes 40° S and 50° S, powered ships sailing from Europe to Asia.

5. At the end of February 2017, a demonstration project designed to use the ocean swell they produce went live in Sydney.

Q27. DIRECTIONS *for question 27:* The following question consists of a highlighted sentence followed by a passage consisting of two paragraphs from which the sentence may have been taken. The passage has a total of four blanks numbered as (2), (3), (4) and (5). 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. (Note that blanks 2, 3, 4 and 5 are within the given passage.)
Further:

If you think that the highlighted statement can be part of ANOTHER PARA that logically precedes OR is upstream of the given passage, then key in the number 1 as your answer in the input box.

If you think that the statement can be part of ANOTHER PARA that logically succeeds OR is downstream of the given passage, then key in the number 6 as your answer in the input box.

These features are then used to search for other images with matching features.

Some face recognition algorithms identify facial attributes by extracting landmarks from an image of the subject's face. _____(2)_____ For example, an algorithm may analyze the relative position, size, and/or shape of the eyes, nose, cheekbones, and jaw. _____(3)_____ Other algorithms normalize a gallery of face images and then compress the face data, only saving the data in the image that is useful for face recognition. A probe image is then compared with the face data. One of the earliest successful systems is based on template matching techniques applied to a set of salient facial features, providing a sort of compressed face representation.

A newly emerging trend, claimed to achieve improved accuracy, is three-dimensional face recognition. This technique uses sophisticated 3D sensors to capture information about the shape of a face. _____(4)_____ This information is then used to identify distinctive features on the surface of a face, such as the contour of the eye sockets, nose, and chin. One advantage of 3D face recognition is that it is not affected by changes in lighting like other techniques. _____(5)_____ It can also identify a face from a range of viewing angles, including a profile view. Three-dimensional data points from a face vastly improve the precision of face recognition.

Q28. **DIRECTIONS** *for question 28:* Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. 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 <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1. Soon Albert Einstein quantified the newly discovered energy with his equation $E = MC2$, and he later asked rhetorically: If every gram of material contains this tremendous energy, why did it go so long unnoticed?

2. His answer: No one ever observed nuclear energy until Marie Curie systematically discovered radium.

3. Her systematic investigation of radium overturned the existing belief that atoms could not be broken into smaller components containing amazingly vast quantities of hidden energy.

4.   Sometimes even sharp minds refrain from applying systematic thinking to problem-solving and decision-making.

5.   Marie Curie surprised the scientific world by hypothesizing that what she called radioactivity originated from inside the atom, a property we now call atomic energy.

Q29. DIRECTIONS *for question 29:* The sentences given in this question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 and 5). Decide on the proper order for the sentences and key in the correct sequence of five numbers as your answer in the input box given below the question.

1.   As Mary Beard, a classical historian, explains in her history of Rome, the promise was enormously expensive.

2.   His bright idea was to offer a pension for those in the army who had served for 16 years, equivalent in cash or land to 12 times their annual salary.

3.   Emperor Augustus came to power in Rome with the help of a private army.

4.   All told, military wages and pensions absorbed half of all Rome's tax revenues.

5.   So he was understandably keen to ensure the loyalty of his soldiers to the Roman state.

Q30. DIRECTIONS *for question 30:* Five alternative summaries are given below the text. Choose the option that best captures the essence of the text. Enter the number of the correct answer choice in the input box given below the question.

Although there is growing pressure from some constituencies in the US to expand the use of polygraph testing in forensic and other public contexts, it would be far wiser for law enforcement and security agencies to minimize use of the tests and to find strategies for reducing threats to public safety and national security that rely as little as possible on the polygraphs. Polygraphs were used in post-conviction sex-offender maintenance programmes. As part of their probation programmes in a typical jurisdiction, released sex-offenders were required to submit to periodic polygraph examinations. But the courts have cast a skeptical eye on the relevance and suitability of polygraph test results as legal evidence. They are well justified in their attitude. Generalizing from the available scientific evidence of a particular polygraph examination is fraught with difficulty. The courts should extend their reluctance to rely on the polygraph for many quasi-forensic uses such as the sex-offender management programmes.

1.   While, in the US law enforcement and intelligence communities, the polygraph has become a desired method for identifying and pinning down suspects, it leaves a lot to be desired as an evidence gathering tool, not only in such settings but also in quasi-forensic applications such as the sex-offender management programmes.

2.   Polygraphs were used in post-conviction sex-offender maintenance programmes in the past. The legal standing of evidence gathered thereby has always, however, been suspect.

3.   The use of polygraph testing to generate legal evidence has proved to be problematic in a variety of settings and is recognized as such by the U.S. courts. Though used earlier in post-conviction sex-offender maintenance programmes, the polygraph should not be relied on for such purported forensic applications.

4.   In the US law enforcement and intelligence communities, the polygraph has become the most desired method for identifying perpetrators when direct evidence is lacking. But in quasi-forensic applications such as the sex-offender management programmes, it leaves a lot to be desired.

5.   Notwithstanding the faith of its proponents, US courts have been doubtful about the legal acceptability of evidence gathered through polygraph testing, a reason being the inadequacy of the scientific evidence from such a test. Courts should discount, overall, the use of such evidence, while security agencies would do well to minimise the use of such tests in pursuit of their objectives.

Q30. DIRECTIONS *for question 30:* Five alternative summaries are given below the text. Choose the option that best captures the essence of the text. Enter the number of the correct answer choice in the input box given below the question.

Although there is growing pressure from some constituencies in the US to expand the use of polygraph testing in forensic and other public contexts, it would be far wiser for law enforcement and security agencies to minimize use of the tests and to find strategies for reducing threats to public safety and national security that rely as little as possible on the polygraphs. Polygraphs were used in post-conviction sex-offender maintenance programmes. As part of their probation programmes in a typical jurisdiction, released sex-offenders were required to submit to periodic polygraph examinations. But the courts have cast a skeptical eye on the relevance and suitability of polygraph test results as legal evidence. They are well justified in their attitude. Generalizing from the available scientific evidence of a particular polygraph examination is fraught with difficulty. The courts should extend their reluctance to rely on the polygraph for many quasi-forensic uses such as the sex-offender management programmes.

1.	While, in the US law enforcement and intelligence communities, the polygraph has become a desired method for identifying and pinning down suspects, it leaves a lot to be desired as an evidence gathering tool, not only in such settings but also in quasi-forensic applications such as the sex-offender management programmes.

2.	Polygraphs were used in post-conviction sex-offender maintenance programmes in the past. The legal standing of evidence gathered thereby has always, however, been suspect.

3.	The use of polygraph testing to generate legal evidence has proved to be problematic in a variety of settings and is recognized as such by the U.S. courts. Though used earlier in post-conviction sex-offender maintenance programmes, the polygraph should not be relied on for such purported forensic applications.

4.	In the US law enforcement and intelligence communities, the polygraph has become the most desired method for identifying perpetrators when direct evidence is lacking. But in quasi-forensic applications such as the sex-offender management programmes, it leaves a lot to be desired.

5.	Notwithstanding the faith of its proponents, US courts have been doubtful about the legal acceptability of evidence gathered through polygraph testing, a reason being the inadequacy of the scientific evidence from such a test. Courts should discount, overall, the use of such evidence, while security agencies would do well to minimise the use of such tests in pursuit of their objectives.

**Q31.	DIRECTIONS** *for question 31:* Five sentences (labelled 1, 2, 3, 4, 5) are given in the following question. 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 <u>four</u> numbers as your answer, even as you omit the contextually unrelated sentence.

1.	Cannabis once grew in secret, traded by murderous cartels and smoked by consumers who risked jail.

2.	But when asked to say exactly how the cannabis trade should work – at what rate to set taxes or whether to place limits on consumption – they can find themselves at odds.

3.	Four American states have so far legalised its recreational use; little Uruguay will soon be joined by big, G7-member Canada in the legal-weed club.

4.	That's because 16 years ago, Portugal took a leap and decriminalized the possession of all drugs - everything from marijuana to heroin.

5.	Now countries all over the world have licensed the drug for medical purposes, and a few are going still further.

Q32. DIRECTIONS *for question 32:* The sentences given in this question, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 and 5). Decide on the proper order for the sentences and key in the correct sequence of five numbers as your answer in the input box given below the question.

  1. In Asia, they now also fret about Chinese rhinitis, which is proving just as contagious.
  2. It is to be expected that germs can spread from China, Asia's biggest economy, to others in the region but it is surprising quite how infectious they are proving.
  3. For financial epidemiologists, this is something of a puzzle.
  4. Unlike America, enmeshed in global markets, China's economy is in self-imposed quarantine, protected by capital controls that limit its interactions with others.
  5. Investors have long been wary of America's sneezes, knowing they can give the world a cold.

Q33. DIRECTIONS *for question 33:* The following question consists of a highlighted sentence followed by a passage consisting of two paragraphs from which the sentence may have been taken. The passage has a total of four blanks numbered as (2), (3), (4) and (5). 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. (Note that blanks 2, 3, 4 and 5 are within the given passage.)
Further:
If you think that the highlighted statement can be part of ANOTHER PARA that logically precedes OR is upstream of the given passage, then key in the number 1 as your answer in the input box.
If you think that the statement can be part of ANOTHER PARA that logically succeeds OR is downstream of the given passage, then key in the number 6 as your answer in the input box.
It is, however, a hole that is less than the sum of its parts.
Two black holes circle one another. One contains 36 times as much mass as the sun; the other, 29. _____(2)_____ They are locked in an orbital dance and finally their event horizons – the spheres defining their points-of-no-return – touch. _____(3)_____ There is a violent wobble as, for an instant, quintillions upon quintillions of kilograms redistribute themselves. Then there is calm. In under a second, a larger black hole has been born.

_____(4)_____ Three suns' worth of mass has been turned into energy, in the form of gravitational waves: travelling ripples that stretch and compress space, and thereby all in their path.
_____(5)_____During the merger's final fifth of a second, the coalescing holes pumped 50 times more energy into space this way than the whole of the rest of the universe emitted in light, radio waves, x-rays and gamma rays combined.

Q34. DIRECTIONS *for question 34:* Five alternative summaries are given below the text. Choose the option that best captures the essence of the text. Enter the number of the correct answer choice in the input box given below the question.

We all live in a prison house of self. We naturally see the world from our own perspective and see our own point of view as obvious and, if we are not careful, as the only possible one. I have never heard anyone say: "Yes, you only see things from *my* point of view. Why don't you consider your own for a change?" The more our culture presumes its own perspective, the more our academic disciplines presume their own rectitude, and the more professors restrict students to their own way of looking at things, the less students will be able to escape from habitual, self-centered, self-reinforcing judgments. We grow wiser, and we understand ourselves better, if we can put ourselves in the position of those who think differently. Literature, by teaching us to imagine the other's perspective, teaches the habits of mind that prevent the opposition of diverse opinion. Great literature allows one to think and feel from within how other cultures think and feel.

1. Everyone has absolute confidence in the accuracy of their own perspective, sometimes convinced that all others are erroneous. Allowing such an attitude to hold sway in our cultures, especially in academic pedagogy, would result in its perpetuation. It is necessary to be able to understand and accept the way others see things, and literature, with its presentation of diverse views and cultural thinking, would help in such an endeavour.

2. We are as deeply convinced of the obvious correctness of our perceptions as others are of theirs. The more our literature allows diversity of opinion, the it will help people understand other cultures.

3. We are as deeply convinced of the obvious correctness of our perceptions as others are of theirs. The problem of self exists in cultures and academic disciplines because we do not think beyond our own perspective and ignore the opinions of others. Literature helps us to understand other cultures by providing us with perspective other than our own.

4. The greater the tendency to consider ourselves correct, the more the study of literature matters. Literature helps us empathize with other

cultures and helps us escape from the prison house of self-centered, self-reinforcing judgments.

5.   Literature is the perfect way to understand not only another's perspective but also to explore the similarities and differences between the viewpoints of different persons.

DILR

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

In a particular year, a group of 300 people visited some of the countries among China, Sri Lanka, Bhutan, Bangladesh and Pakistan. Further, each person visited at least one country. Any person who visited China also visited Bhutan, while any person who visited Pakistan also visited Bangladesh. Any person who visited Sri Lanka also visited China, while no person who visited Bangladesh visited China.

It is also known that

1.   the number of persons who visited Sri Lanka was twice the number of persons who visited only Bangladesh.

2.   the number of persons who visited only Bhutan was twenty less than the number of persons who visited exactly one country.

3.   the number of persons who visited Pakistan was three more than the number of persons who visited China.

4.   the number of persons who visited at least three countries was 145.

5.   the number of persons who visited China was ninety more than the number of persons who visited only Bangladesh.

6.   the number of persons who visited Bhutan was hundred more than the number of persons who visited Bangladesh.

Q1. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
How many persons visited exactly one country?

Q2. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
How many persons visited Bhutan and exactly one other country?

Q3. DIRECTIONS *for questions 1 to 4:* Type in your answer in the input box provided below the question.
Among the persons who visited Bhutan, how many persons visited Bangladesh?

Q4. **DIRECTIONS** *for questions 1 to 4:* Type in your answer in the input box provided below the question.
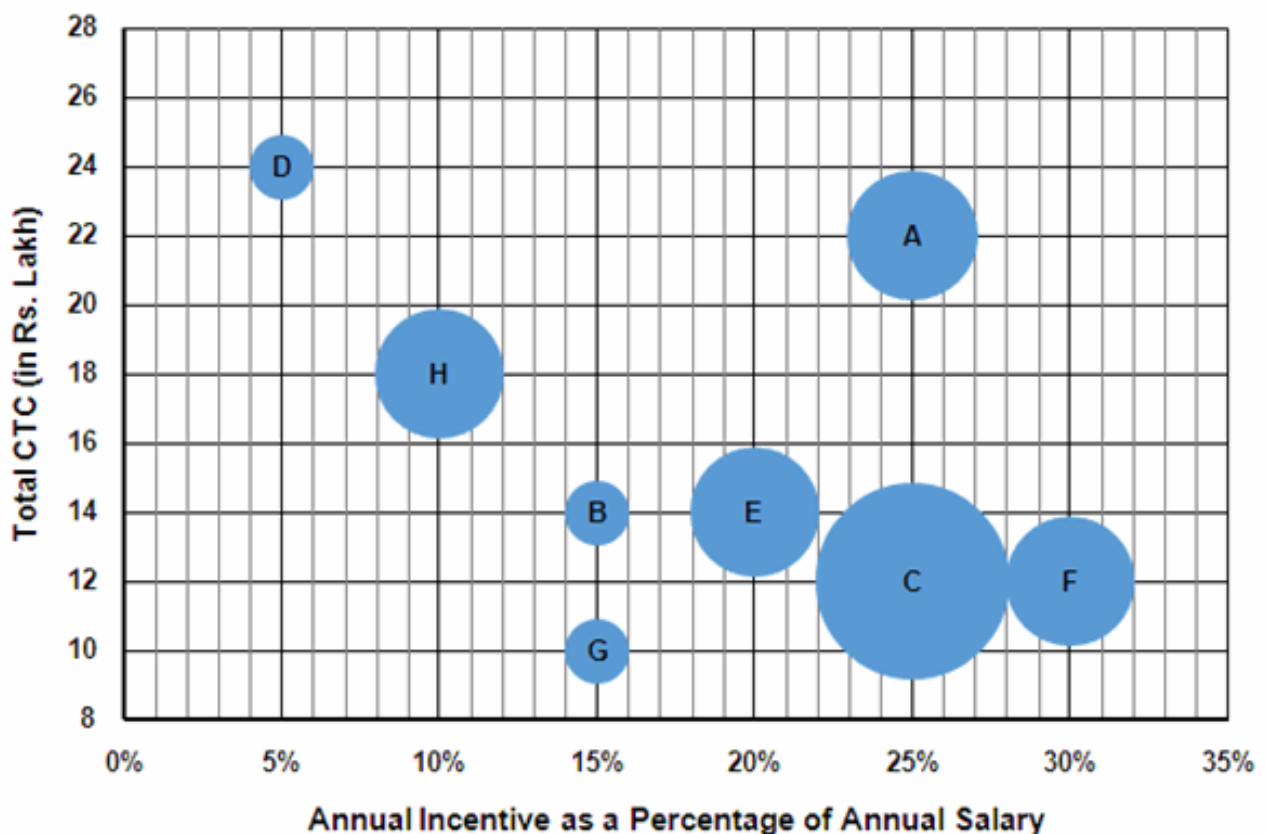How many persons visited both Pakistan and China?

DIRECTIONS *for questions 5 to 8:* Answer these questions on the basis of the information given below.
A certain number of sales persons work in a company. The CTC, i.e., the total salary paid, in terms of the cost to the company, for each employee comprises three components – Annual Salary, Annual Incentive and Year-end Bonus.
The Annual Incentive of each sales person is calculated as a certain predetermined percentage of his/her Annual Salary. The Year-end Bonus depends on the revenue that each sales person generated during the year. If a sales person generated a revenue of at least Rs.10 lakh during a year, he/she is paid 20% of the revenue he/she generated during the year as the Year-end Bonus. Else, he/she is paid a Year-end Bonus of Rs.1 lakh.
The bubble chart given below provides the total CTC (along the vertical axis) and the percentage of Annual Salary paid as Annual Incentive (along the horizontal axis) for each of eight sales persons, labelled A through H, for a particular year. The bubbles are drawn to scale, such that the area of each bubble represents the revenue that each person generated during the year.
It is known that C generated a revenue of Rs.36 lakh during the given year.

Q5. DIRECTIONS *for question 5:* Select the correct alternative from the given choices.
The Annual Salary of which of the following persons is the least?

a) **B**
b) **C**
c) **F**
d) **G**

Q6. DIRECTIONS *for question 6:* Type in your answer in the input box provided below the question.
For how many persons is their Annual Incentive more than their Year-end Bonus?

Q7. DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.
If the difference (in Rs.lakh) between the Annual Salary of two of the eight persons is x, what is the minimum possible value of x?

a) 1.06
b) 1.17
c) 1.59
d) 1.71

Q8. DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.
If the Annual Incentive given to any person as a percentage of the Revenue generated by that person is called his/her Cost Percentage, what is the minimum Cost Percentage of any of the eight persons?

a) 10.25%
b) 8.44%
c) 4.5%
d) 2.67%

DIRECTIONS *for questions 9 to 12:* Answer these questions on the basis of the information given below.
On a particular day, three persons, Pavan, Kiran and Lohit, visited their friend. Each person came in a different vehicle among Car, Bus and Bike. Further, each person brought a different gift among a Bouquet, a Photo Frame and a Dinner Set.
It is known that one of the three persons is a liar, who always lies, another person is an alternator, who always alternates between telling the truth and a

lie, in any order, and the third person speaks such that exactly one out of every three consecutive statements that he makes is a lie.
The three of them made the following statements:

Pavan: I came by Bus.
Lohit did not bring the Photo Frame.
Kiran is an alternator.

Kiran: Pavan did not come by Bike.
I brought the Bouquet.
Lohit is a liar.

Lohit: Pavan spoke exactly one lie.
I came by Bike.
Kiran did not bring the Dinner Set.

Q9. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
Who is the liar?

a) Pavan
b) Kiran
c) Lohit
d) Cannot be determined

Q10. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
In which vehicle did Lohit come?

a) **Bus**
b) Bike
c) **Car**
d) Either Bus or Car

Q11. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
Who brought the Dinner Set?

a) Lalit
b) Kiran
c) Pavan
d) Cannot be determined

Q12. DIRECTIONS *for questions 9 to 12:* Select the correct alternative from the given choices.
What did the alternator bring?

a) Photo Frame
b) Dinner Set
c) Bouquet
d) Cannot be determined

DIRECTIONS *for questions 13 to 16:* Answer these questions on the basis of the information given below.
Six persons, A through F, were sitting around a circular table, facing it, in six equally spaced chairs. Further, the six persons were ranked from 1 to 6 based on the descending order of their weights (i.e., the heaviest person was ranked first and the lightest, sixth).
It is also known that
     1.   the difference in the ranks of any two persons sitting adjacent to each other was not one.
     2.   F, who was ranked fourth, was sitting opposite the person who was ranked first.
     3.   B, who was ranked third, was sitting adjacent to D, who was heavier than F.
     4.   E, who was heavier than A, was sitting to the left of A.

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

a) **D**
b) C
c) **E**
d) **F**

Q14. **DIRECTIONS** *for questions 13 to 16:* Select the correct alternative from the given choices.
Who among the following was sitting opposite the person ranked sixth?

a) **D**
b) **C**
c) **B**
d) **A**

Q15. **DIRECTIONS** *for questions 13 to 16:* Select the correct alternative from the given choices.
Which of the following pairs of persons were sitting opposite each other?
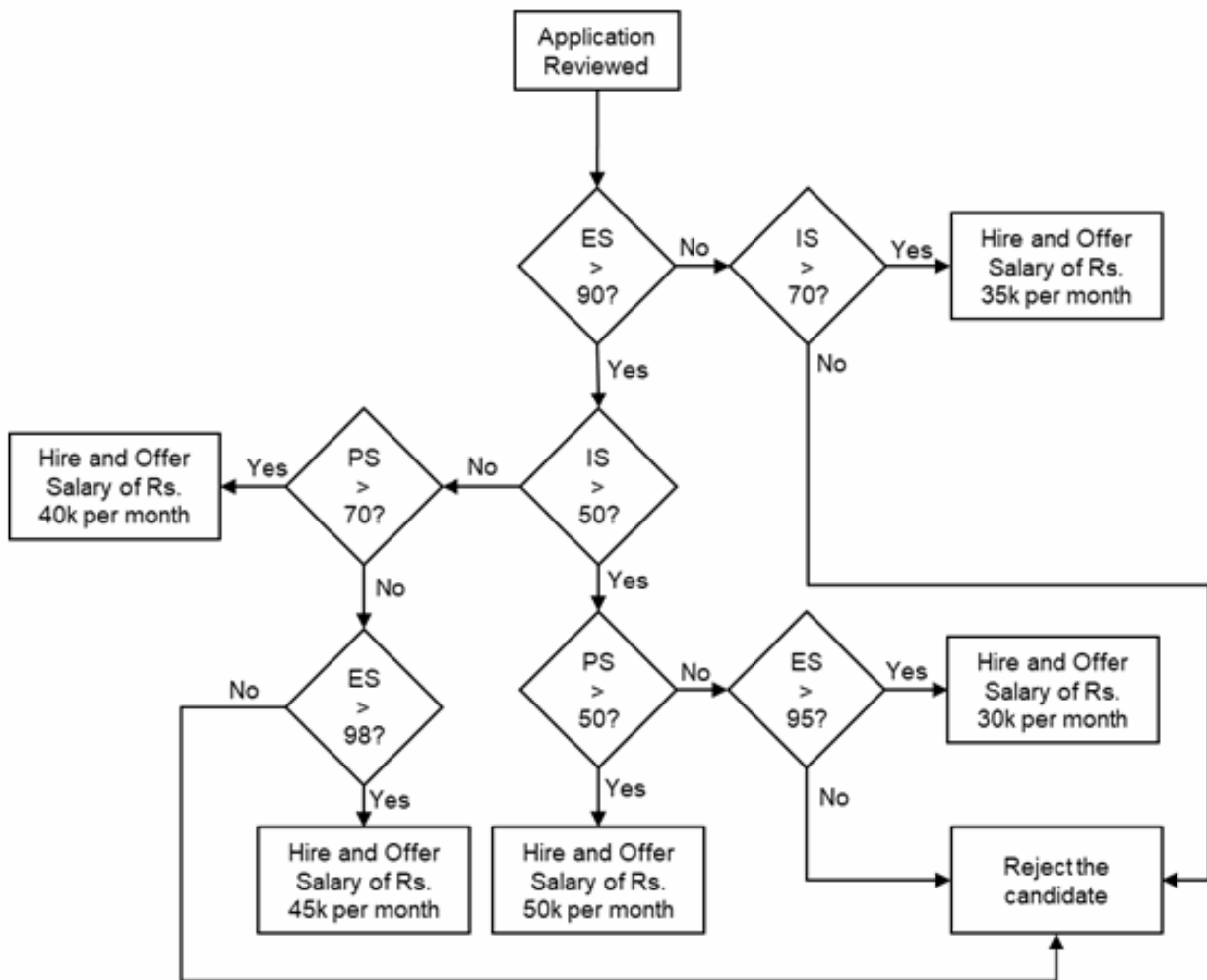
a) A, B

b) B, C
c) B, E
d) A, D

Q16. DIRECTIONS *for questions 13 to 16:* Select the correct alternative from the given choices.
The number of persons sitting between A and F counting in the clockwise direction from F to A is

a) **0.**
b) **1.**
c) 3.
d) **4.**

DIRECTIONS *for questions 17 to 20:* Answer these questions on the basis of the information given below.
The recruitment process of a certain company has three stages – Written exam, Interview and Psychometric Evaluation. Each candidate involved in the process is given a score in each of the three stages. The scores corresponding to the three stages are Exam Score (ES), Interview Score (IS) and Psychometric Score (PS) respectively. The score of any candidate in each stage is an integer from 1 to 100. The decision regarding whether to hire a candidate or not and the salary that he will be offered, if hired, is made based on the three scores mentioned above using the decision making flow chart given below.

Q17. **DIRECTIONS** *for question 17:* Select the correct alternative from the given choices.
If the ES, IS and PS of a candidate was 96, 55 and 48, which of the following would have been the decision taken regarding his candidature?

 a) Hired and offered a salary of Rs.45 k per month
 b) Hired and offered a salary of Rs.50 k per month
 c) Hired and offered a salary of Rs.30 k per month
 d) Rejected the candidate

Q18. **DIRECTIONS** *for questions 18 to 20:* Type in your answer in the input box provided below the question.
If the IS and PS of a candidate, who was rejected, were 75 and 48 respectively, what could be the maximum possible ES of this candidate?

Q19. **DIRECTIONS** *for questions 18 to 20:* Type in your answer in the input box provided below the question.

What is the maximum possible sum of the ES, IS and PS of a candidate who was hired and offered a salary of Rs.40k per month?

Q20. DIRECTIONS *for questions 18 to 20:* Type in your answer in the input box provided below the question.
What is the maximum possible difference in the IS of a candidate who was offered a salary of Rs.30k per month and that of a candidate who was offered Rs.40k per month?

DIRECTIONS *for questions 21 to 24:* Answer these questions on the basis of the information given below.
There are 10 cities– City A through City J – in two states, Upper Pradesh and South Nadu, such that exactly five cities are in Upper Pradesh and five cities are in South Nadu. Each city in each of the two states is connected to exactly three cities in the other state – one by Air, one by Sea and the other by Road. All routes (Air, Sea or Road) are two-way routes. No city in any state is connected to any other city in any way other than that mentioned above.
The following information is known about the routes connecting the ten cities:

     1.   City B has a Road route to City I, which, in turn, has an Air route to City D.
     2.   City F has a Sea route to J but it is not connected to City C, which is not in the same state as City F is in.
     3.   City A and City D are in the same state and from each of these two cities, there is no route to reach either City E or City J, both of which are present in a different state than the one in which City A is.
     4.   City B, which belongs to Upper Pradesh, is not connected to City C, which belongs to a different state.

Q21. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.
Which of the following pairs of cities are connected by a Road route?

 a) City F, City G
 b) City E, City F
 c) City A, City I
 d) City F, City I

Q22. DIRECTIONS *for questions 21 to 24:* Select the correct alternative from the given choices.

For which of the following pairs of cities is the number of ways of travelling between them the maximum, if exactly one city is visited in between?

a) City I, City J
b) City C, City D
c) City A, City F
d) City B, City F

Q23. **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
Which of the following sets of cities definitely belong to Upper Pradesh?

a) A, C, D, H
b) B, C, D, E
c) A, H, D, G
d) A, B, D, F

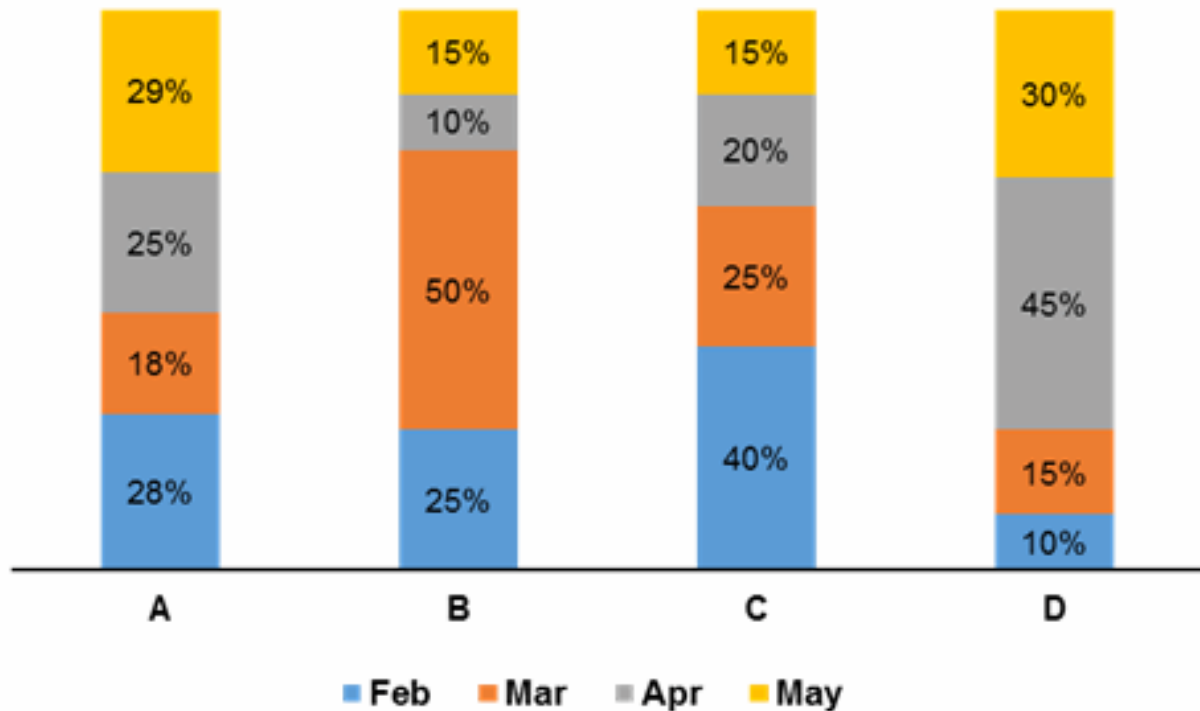**Q24.** **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
If City G and City F are connected, City H has a Sea route to which of the following cities?

a) City C
b) City B
c) City D
d) City E

DIRECTIONS *for questions 25 to 28:* Answer these questions on the basis of the information given below.
Four persons, A through D, work in the same office. The graph below provides the number of days that each person worked in each month from February 2017 to May 2017 as a percentage of the total number of days that he worked during that period. The number of days that any person worked in any month is not necessarily an integer.

■ Feb ■ Mar ■ Apr ■ May

Q25. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
During the given period, the number of days (approximately) that any person worked is not more than

a) 106.9.
b) 120.
c) 115.3.
d) 100.

Q26. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
What is the difference between the maximum number of days that A could have worked in March 2017 and the maximum number of days that B could have worked in February 2017?

a) 2.5
b) **5**
c) **10**
d) **3**

Q27. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
If in a particular month during the given period each person worked on exactly 10 days in that month, which of the following months can it be?

a) February
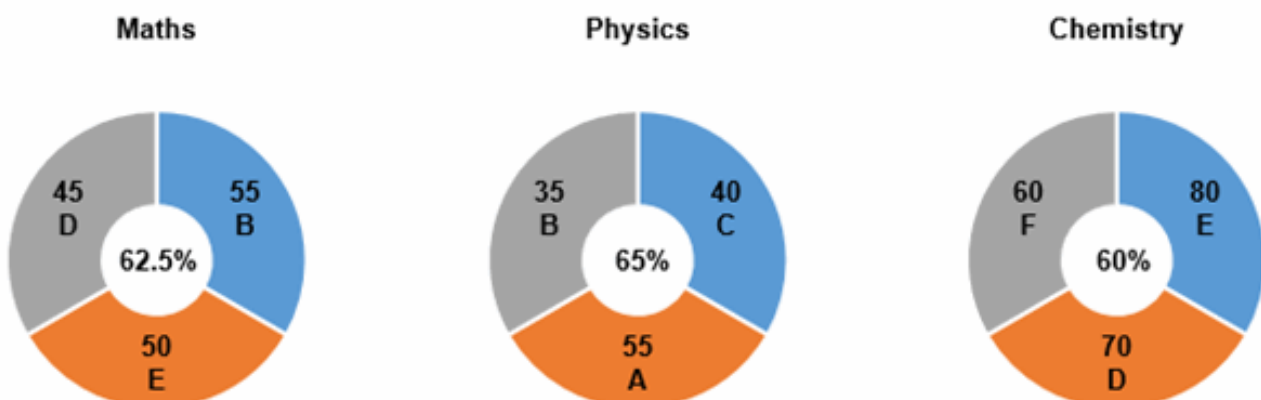b) March
c) **May**
d) More than one of the above

Q28. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
In at most how many of the four months given is it possible that at least one of the four persons could have worked on all the days of that month?

a) **1**
b) **2**
c) 3
d) **4**

DIRECTIONS *for questions 29 to 32:* Answer these questions on the basis of the information given below.
Six students, A through F, appeared for an exam, which comprised three sections, Mathematics, Physics and Chemistry. For each student, the marks scored in the three sections are distinct and in each section, the marks scored by the six students are distinct. Further, the marks scored by any student in any section is a positive integral multiple of five. The three circular graphs given below provide the marks scored by each of the top three students, along with their names (in the shaded sectors), in each section. Further, in each graph, the percentage value given at the centre provides the sum of the top three marks scored in that section (i.e., by the top three students) as a percentage of the sum of the marks scored by all the six students in that section:

Q29. DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.
Among B, E and F, the total marks scored by which student will be the highest?

a) **F**
b) E
c) **B**
d) Cannot be determined

Q30. DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.
How many marks did C score in Chemistry?

a) **35**
b) **40**
c) 55
d) Cannot be determined

Q31. DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.
If the marks scored by A in Mathematics were more than that scored by him in Chemistry, how many marks did B score in Chemistry?

a) **40**
b) 50
c) **45**
d) Cannot be determined

Q32. DIRECTIONS *for questions 29 to 32:* Select the correct alternative from the given choices.
If the least marks that any of the six students scored in Chemistry were scored by B, then the marks obtained by A in Chemistry will be

a) **50.**
b) **40.**
c) **35.**
d) 45.

QA

Q1. DIRECTIONS *for questions 1 to 5*: Select the correct alternative from the given choices.
What quantity of water should be mixed with 12 litres of 88% milk solution to obtain a 48% milk solution?

a) 10 litres

b) 13.6 litres
c) 14 litres
d) 8.4 litres

Q2. DIRECTIONS *for questions 1 to 5*: Select the correct alternative from the given choices.
The marked price and the cost price of a watch are in the ratio 4 : 3. The discount percentage offered before it was sold and the profit/loss percentage made on it are in the ratio 3 : 4. Find the profit/loss percentage.

a) $8\dfrac{1}{3}\%$ Loss

b) $8\dfrac{1}{3}\%$ Profit

c) $16\dfrac{2}{3}\%$ Profit

d) Cannot be determined

Q3. DIRECTIONS *for questions 1 to 5*: Select the correct alternative from the given choices.
There is a series in arithmetic progression, comprising 240 terms. The 47th term and 211th term of the progression are $23\dfrac{3}{43}$ and $177\dfrac{13}{43}$ respectively. To this series, P terms are added at the beginning and another (P + 17) terms are added at the end such that the entire series is still in arithmetic progression. If the total number of terms in the series finally is 473, what is the sum of all the 473 terms of the series?

a) 47432
b) 44388
c) 47344
d) 47388

Q4. DIRECTIONS *for questions 1 to 5*: Select the correct alternative from the given choices.
The hands of a strange clock move such that they would meet twice as frequently if they run in opposite directions than if they run in the same direction. How many times would the faster hand meet the slower hand in the time that the slower hand completes 20 rotations, given that the hands run in opposite directions?
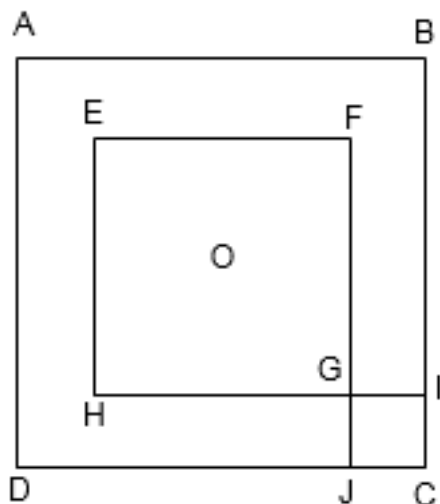
a) **80**
b) **60**
c) **40**
d) **120**

Q5. DIRECTIONS *for questions 1 to 5*: Select the correct alternative from the given choices.
What is the remainder when 25 × (1331)^2196 is divided by 13?

a) **11**
b) **1**
c) **12**
d) **0**

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

The figure above shows two concentric squares, ABCD and EFGH, with centre O. GICJ is a square, whose area is half of that of the square EFGH. If the length of the line segment AG is 6 cm, find the area (in sq. cm) of the square ABCD.

Q7. DIRECTIONS *for questions 7 to 10*: Select the correct alternative from the given choices.

If $p^3 + q^3 + r^3 = 48$ and $pqr = 16$, find the value of $\dfrac{p^2 + q^2 + r^2}{pq + qr + rp}$.

a) **1**
b) **–2**
c) 1 or –2

d) 2 or 1

Q8. DIRECTIONS *for questions 7 to 10*: Select the correct alternative from the given choices.

For which of the following ranges of *x* is it not possible to find any value of *x* that satisfies the inequality $\frac{(x-1)(x-3)}{(x-2)(x-4)} > 0?$

a) $(-1, 1)$

b) $\left(\frac{3}{2}, \frac{5}{2}\right)$

c) $\left(\frac{7}{2}, \infty\right)$

d) None of the above

Q9. DIRECTIONS *for questions 7 to 10*: Select the correct alternative from the given choices.

Arjun went to a market to buy apples, bananas and oranges. He bought an equal number of bananas and oranges and twice as many apples as oranges, thereby spending all the money he had with him. The sum of the prices of 1 apple, 1 banana and 1 orange is Rs.12. Instead, if the cost of each orange was equal to the actual price of an apple, the other prices remaining the same, he would have just been able to buy as many apples and oranges that he actually bought but would have had no money left over to buy any bananas. If he purchased 60 fruits on the whole, find the expenditure he incurred on apples.

a) Rs.180
b) Rs.240
c) Rs.60
d) Rs.120

Q10. DIRECTIONS *for questions 7 to 10*: Select the correct alternative from the given choices.

The least common multiple of N distinct natural numbers is 2520. Which of the following best describes N?

a) $1 \leq N \leq 10$
b) $1 \leq N < 50$
c) $1 < N < 24$
d) $1 < N \leq 40$

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

The following table gives the concentration of each of eight different samples of sugar solution - G through N.

Sample	Concentration of Sugar (as a percentage of volume)
G	10%
H	20%
I	15%
J	12%
K	8%
L	16%
M	4%
N	25%

If exactly three of the eight samples are to be mixed, in some ratio, to form a 15% sugar solution, how many such combinations of samples are possible?

Q12. DIRECTIONS *for questions 12 and 13*: Select the correct alternative from the given choices.

Two taps with emptying capacities in the ratio 1 : 2, empty a full tank in 2 hours when opened together. How much time does the first tap alone take to empty half the tank?

a) $1\frac{1}{2}$ hours
b) 2 hours
c) 3 hours
d) 6 hours

Q13. DIRECTIONS *for questions 12 and 13*: Select the correct alternative from the given choices.

A mathematics teacher wrote n positive numbers on the black board and asked the students in her class to find the product of all the n numbers. One of her students, Rajith, randomly chose one of the n numbers and increased it by a certain quantity and found that the original product increased by 9%. Two other students, Satish and Tarun, also carried out a similar calculation and found that the original product increased by 12% and 18% respectively. If all the three students increased the respective numbers that they chose by the same quantity, find the ratio of the respective numbers that they chose.

a) 3 : 4 : 6
b) 6 : 4 : 3
c) 4 : 3 : 2
d) 2 : 3 : 4

Q14. DIRECTIONS *for questions 14 to 16:* Type in your answer in the input box provided below the question.
Sunder works for a multinational company and earns a 4-digit monthly salary. However, Sunder prefers to disclose his salary to his friends in the number system to the base 6 or base 9, as then his salary would, in either case, correspond to a 5-digit number. Find the difference (as a decimal number) between the maximum and minimum possible values of his salary.

Q15. DIRECTIONS *for questions 14 to 16:* Type in your answer in the input box provided below the question.
X, Y and Z are positive numbers. [N] denotes the integral part of N and {N} denotes the fractional part of N. If the following equations are given,
[X] + {Y} + [Z] = 11.2
[Y] + {Z} + [X] = 10.3
[Z] + {X} + [Y] = 9.4
find the value of [X + Y − Z].

Q16. DIRECTIONS *for questions 14 to 16:* Type in your answer in the input box provided below the question.
What is the sum of all the numbers formed by taking the digits 3, 5, 6, 7 and 8, exactly once?

Q17. DIRECTIONS *for question 17*: Select the correct alternative from the given choices.
Two equal circles, C1 and C2, are drawn, touching each other externally. Another larger circle, C3, is drawn, enveloping both C1 and C2, with the least possible radius, R. If two distinct small circles, C4 and C5, of equal size, are now drawn such that each of them touches C1 and C2 externally and C3 internally, find the area of the region inside C3 which is not common to any of C1, C2, C4 or C5.

a) $\dfrac{2}{9}\pi R^2$

b) $\dfrac{7}{18}\pi R^2$

c) $\dfrac{\pi R^2}{6}$

d) $\dfrac{5}{18}\pi R^2$

Q18. DIRECTIONS *for question 18:* Type in your answer in the input box provided below the question.
A number when divided by 4, 5, 6 and 7 leaves a remainder of 2, 3, 4 and 5 respectively. What is the largest such number less than 3000?

Q19. DIRECTIONS *for questions 19 to 23*: Select the correct alternative from the given choices.
Alok and Bijoy start a business with their capitals in the ratio of 1 : 2. Alok manages the business for which he is paid a part of the gross annual profit as his annual salary. At the end of the year, Bijoy gets half of the gross annual profit as his share of the profit. What part of Alok's income is his annual salary?

a) $\dfrac{1}{4}$

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

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

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

Q20. DIRECTIONS *for questions 19 to 23*: Select the correct alternative from the given choices.
There are two alloys, A and B, of copper and zinc. The ratio (by weight) of copper and zinc in alloy A is 8 : 1 and that in alloy B is 2 : 7. It is found that, if alloy A and alloy B are mixed in a certain ratio, the weights of copper and zinc in the resultant alloy are also in that ratio. What is that ratio?

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

Q21. DIRECTIONS *for questions 19 to 23*: Select the correct alternative from the given choices.

Let S denote the sum of the squares of ten consecutive positive integers. Which of the following values represents a possible value of S?

a) 2785
b) 2485
c) 2685
d) 2585

Q22.   DIRECTIONS *for questions 19 to 23*: Select the correct alternative from the given choices.

Two men Sam and Jack, are initially standing at the two ends, P and Q, of a straight road, respectively. Both started running towards each other at the same time. Sam covered $\frac{2}{5}$ th of the distance PQ at a speed 2*a* and the remaining distance at a speed 3*b*, to reach Q. Jack ran at a speed 5*c* and by the time Sam reached from P to Q, Jack ran from Q to P and went back to Q, such that both of them reached Q simultaneously. Which of the following is true about a, b and c?

a) $\dfrac{1}{a}+\dfrac{1}{b}=\dfrac{1}{c}$

b) $a + b = c$

c) $2a + 3b = 5c$

d) $\dfrac{1}{a}+\dfrac{1}{b}=\dfrac{2}{c}$

Q23. DIRECTIONS *for questions 19 to 23*: Select the correct alternative from the given choices.

T is a right-angled triangle, whose perpendicular sides are a, b and hypotenuse is c. The minimum possible value of $\dfrac{c}{a}+\dfrac{c}{b}$ is

a) **2.5**
b) **2**
c) $\dfrac{35}{12}$
d) $2\sqrt{2}$

Q24.   DIRECTIONS *for question 24:* Type in your answer in the input box provided below the question.

Ram has four children whose nicknames are Honey, Sunny, Moni and Bunny. He had a total of 12 mangoes to distribute among them such that each child got at least one mango. Find the number of ways of distributing the mangoes such that Bunny receives exactly five mangoes.

Q25. **DIRECTIONS** *for questions 25 to 27*: Select the correct alternative from the given choices.
The cost (in Rs.) of a watermelon is proportional to the square root of its weight (in pounds). If a watermelon weighing 16 pounds costs Rs.50, how much will a watermelon costing Rs.37.5 weigh, in pounds?

a) **4**
b) **8**
c) 9
d) **12**

Q26. **DIRECTIONS** *for questions 25 to 27*: Select the correct alternative from the given choices.
One morning, Govind Lal, the owner of the local petrol bunk, was adulterating petrol that he sells with kerosene. He had two identical tanks – the first being full of pure petrol, and the second being empty. First, he transferred an arbitrary amount of petrol from the first tank into the second and then replaced the petrol removed from the first tank with kerosene. He then repeated this process one more time but this time he ensured that by the end of the process the second tank was exactly full.
Which of the following statements is/are not true regarding the concentration of petrol in the second tank?
I. It cannot be more than 75%
II. It cannot be less than 75%
III. It is at most 50%

a) Only I and III
b) Only I and II
c) Only II
d) Only III

Q27. **DIRECTIONS** *for questions 25 to 27*: Select the correct alternative from the given choices.
Two identical conical containers, C1 and C2, each of volume V litres, contain exactly v litres of water each. Initially both the containers are resting on their bases. If C2 is now inverted and made to rest on its vertex, the water level in

it becomes twice as high as that in C1. If $\dfrac{v}{V} = p$, then which of the following is true of p?

a) $\sqrt[3]{1-p} + \sqrt[3]{p} = 2$

b) $\sqrt[3]{1-p} + 2\sqrt[3]{p} = 2$

c) $2\sqrt[3]{1-p} + \sqrt[3]{p} = 2$

d) $p = \sqrt[3]{2} - 1$

Q28. DIRECTIONS *for question 28:* Type in your answer in the input box provided below the question.
An odd number of stones were lying all along a straight road, with any pair of adjacent stones being separated by a distance of 10 m. Ajay was assigned the task of removing all the stones, excluding the middle stone, and assembling them around it. He was allowed to carry only one stone at a time. He started the job with a stone at one end and carried the stones in succession. If he had to travel a total distance of 8.2 km before he could assemble all the stones, find the total number of stones on the road.

Q29. DIRECTIONS *for questions 29 to 34*: Select the correct alternative from the given choices.
There are two flagpoles, A and B, of
heights $15\sqrt{3}\,\text{m}$ and $30\sqrt{3}\,\text{m}$ respectively. If there is only one point on the ground from where both the flagpoles subtend an angle of 60° each, find the maximum possible distance between the tops of the two flagpoles.

a) $30\sqrt{3}\,\text{m}$

b) 15 m

c) $15\sqrt{3}\,\text{m}$

d) 45 m

Q30. DIRECTIONS *for questions 29 to 34*: Select the correct alternative from the given choices.
There are 51 coins in a bag. The coins are first divided into two separate bags, after which the coins in one of the two bags are taken and again divided into two separate bags and then from out of the three bags present, the coins in one of the bags are taken and divided into two separate bags, and so on until we are left with 51 bags containing one coin each. If after every division of the coins in a bag into two bags, the product of the number of coins in the two bags is written down, what is the sum of all the numbers written down?

a) 1020
b) 1275
c) 1551
d) 1525

Q31. DIRECTIONS *for questions 29 to 34*: Select the correct alternative from the given choices.
There are three drain pipes P1, P2 and P3, all of equal capacity, fitted to a cylindrical tank of height 6 metres. P1 is fitted at the bottom of the tank, while P3 is fitted at a height of 5 m above P1, and P2 is fitted in between P3 and P1. P1 alone can empty the full tank in T minutes and if all the three pipes are in operation, the full tank can be emptied in $\dfrac{2T}{3}$ minutes. What is the height (above P1) at which P2 is fitted to the tank?

a) $3\dfrac{1}{2}$ m

b) $2\dfrac{5}{6}$ m

c) $2\dfrac{1}{3}$ m

d) $2\dfrac{2}{3}$ m

Q32. DIRECTIONS *for questions 29 to 34*: Select the correct alternative from the given choices.
A sum was invested under compound interest, interest being compounded annually. If it fetches Rs.2880 as interest in the second year and Rs.3456 as interest in the third year, find the annual rate of interest.

a) **15%**
b) **20%**
c) **25%**
d) **30%**

Q33. DIRECTIONS *for questions 29 to 34*: Select the correct alternative from the given choices.

Find the value of $3+\cfrac{1}{3+\cfrac{3}{3+\cfrac{3}{3+\cfrac{3}{3+\cfrac{2}{3}}}}}$.

a) $\dfrac{2001}{613}$

b) $\dfrac{1002}{307}$

c) $\dfrac{1857}{569}$

d) $\dfrac{1968}{603}$

Q34. **DIRECTIONS** *for questions 29 to 34*: Select the correct alternative from the given choices.

If the difference between two positive numbers is 22 and the difference of their squares is 1100, find the difference between their cubes.

a) 38792
b) 42816
c) 44128
d) 43912