

Ref: AIMCAT1721

INSTRUCTIONS

1. Read the instructions given at the beginning/end of each section or at the beginning of a group of questions very carefully.
2. This test has a total of 100 questions in three sections: (i) Verbal Ability and Reading Comprehension – 34 Questions (ii) Data Interpretation and Logical Reasoning – 32 Questions and (iii) Quantitative Ability – 34 Questions. The total time available for the test is **180 minutes**. However, you will be allotted exactly 60 minutes for answering the questions in each section and you cannot switch from one section to another while answering the questions in a section.
3. All questions carry three marks each. Each wrong answer to any multiple-choice type question will attract a penalty of one mark. Wrong answers to any non multiple-choice type question will not attract any penalty.

SECTION – I
Number of Questions = 34

DIRECTIONS for questions 1 to 3: The passage given below is followed by a set of three questions. Choose the best answer to each question.

Scientists have long believed that comets and, or a type of very primitive meteorite called carbonaceous chondrites were the sources of early Earth's volatile elements – which include hydrogen, nitrogen, and carbon – and possibly organic material, too. Understanding where these volatiles came from is crucial for determining the origins of both water and life on the planet. New research led by *Carnegie Institution for Science's* Conel Alexander focuses on frozen water that was distributed throughout much of the early Solar System, but probably not in the materials that aggregated to initially form Earth.

The evidence for this ice is now preserved in objects like comets and water-bearing carbonaceous chondrites. The team's findings contradict prevailing theories about the relationship between these two types of bodies and suggest that meteorites, and their parent asteroids, are the most-likely sources of the Earth's water.

Looking at the ratio of hydrogen to its heavy isotope deuterium in frozen water (H_2O), scientists can get an idea of the relative distance from the Sun at which objects containing the water were formed. Objects that formed farther out should generally have higher deuterium content in their ice than objects that formed closer to the Sun, and objects that formed in the same regions should have similar hydrogen isotopic compositions. Therefore, by comparing the deuterium content of water in carbonaceous chondrites to the deuterium content of comets, it is possible to tell if they formed in similar reaches of the Solar System.

It has been suggested in previous studies that both comets and carbonaceous chondrites formed beyond the orbit of Jupiter, perhaps even at the edges of our Solar System, and then moved inward, eventually bringing their bounty of volatiles and organic material to Earth. If this were true, then the ice found in comets and the remnants of ice preserved in carbonaceous chondrites in the form of hydrated silicates, such as clays, would have similar isotopic compositions.

Alexander's team analysed samples from 85 carbonaceous chondrites, and were able to show that carbonaceous chondrites likely did not form in the same regions of the Solar System as comets because they have much lower deuterium content. If so, this result directly contradicts the two most-prominent models for how the Solar System developed its current architecture.

The team suggests that carbonaceous chondrites formed instead in the asteroid belt that exists between the orbits of Mars and Jupiter. What's more, they propose that most of the volatile elements on Earth arrived from a variety of chondrites, not from comets.

"Our results provide important new constraints for the origin of volatiles in the inner Solar System, including the Earth," Alexander said. "And they have important implications for the current models of the formation and orbital evolution of the planets and smaller objects in our Solar System."

- Which of the following has been contradicted by the findings of Conel Alexander's team at the *Carnegie Institution for Science*?
 - The belief that chondrites, not comets, are the likely source of hydrogen, nitrogen and carbon on earth.
 - The hypothesis that carbonaceous chondrites likely did not form in the same regions of the Solar System as comets.
 - Current theories about the relationship between a type of meteorite and comets
 - The theory that frozen water was distributed throughout the early Solar System, but not in the materials that aggregated to initially form Earth.
- As compared to objects that formed closer to the sun, the objects that formed farther out in the solar system will have
 - a higher hydrogen to deuterium ratio in their frozen water.
 - a lower hydrogen to deuterium ratio in their ice.

DIRECTIONS for questions 4 to 9: The passage given below is followed by a set of six questions. Choose the best answer to each question.

We've all seen the films. A man is caught in quicksand, begging onlookers for help, but the more he struggles, the further down into the sand he is sucked until eventually he disappears. All that's left is sinister sand, and maybe his hat. There are so many films featuring death by quicksand that Slate journalist Daniel Engbar has even tracked the peak quicksand years in film. In the 1960s, one in 35 films featured quick sands. They were in everything from Lawrence of Arabia to The Monkees.

Yet the evidence that the more you struggle, the further you sink until you drown, is rather lacking. Quicksand usually consists of sand or clay and salt that's become waterlogged, often in river deltas. The ground looks solid, but when you step on it the sand begins to liquefy. But then the water and sand separate, leaving a layer of densely packed wet sand which can trap it. The friction between the sand particles is much-reduced, meaning it can't support your weight anymore and at first you do sink. It is true that struggling can make you sink in further, but would you actually sink far enough to drown?

Daniel Bonn from the University of Amsterdam was in Iran when he saw signs by a lake warning visitors of the dangers of quicksand. He took a small sample back to his lab, analysed the proportions of clay, salt water and sand, and then recreated quicksand for his experiment. Instead of people, he used aluminium beads which have the same density as a human. He put them on top of the sand and then, to simulate the flailing of a panicking human, he shook the whole model human. He waited to see what happened. Would the aluminium beads "drown"?

The answer was no. At first they sunk a little, but as the sand gradually began to mix with water again, the buoyancy of the mixture increases and they floated back up to the top. Bonn and his team tried placing all sorts of objects on his lab-made quicksand. If they were of density equivalent to a human they did sink, but never completely, only half way.

Why then, if physics predicts that you don't endlessly sink further and further down, are there occasional tragic accidents where people do die, such as a mother of two who drowned in 2012 while on holiday in Antigua?

The reason is that although quicksand doesn't continue to pull you right under, if you can't get free in time, a high tide can sweep across you. This is really when quicksand can be dangerous.

So struggling alone won't drown you, but we do still need to be wary. If you want to free yourself without waiting for rescue or for the sand to liquefy again, then Bonn's research showed that just to release one foot, you would need to provide a force of 100,000 newtons – the equivalent of the strength to lift a medium-sized car.

In the lab, Bonn's team found that salt was an essential ingredient because it increased the instability of quicksand, leading to the formation of these dangerous areas of thick sediment. But then another team, this time from Switzerland and Brazil, discovered a kind of quicksand that doesn't need salt. They tested samples from the shores of a lagoon in north eastern Brazil. They found that bacteria formed a crust on the top of the soil, giving the impression of a stable surface, but when stepped on the surface collapsed. But even then the good news is that basins formed from this kind of soil are very rarely deeper than the height of a human, so even if someone did slip into the quicksand they wouldn't drown.

4. According to the Daniel Bonn's research, which of the following can be inferred about the way people sink in a quicksand?
- People will sink in a quicksand, if they do not struggle, but if they struggle, they can float to the top of the quicksand.
 - A person who has a higher density will sink completely into a quicksand but a person who has a lower density will not.
 - People will sink only half way into a quicksand and will eventually float to the surface of the quick sand.
 - People will endlessly sink in a quicksand only when they weigh more than a medium sized car.
5. Which of the following is a reason for the author to discuss the depiction of quicksand in films in the first paragraph of the passage?
- To emphasize that films in the 1960s educated the public about the dangers of quicksand.
 - To highlight the horrific appeal of the dangers erroneously associated with quicksand.
 - To draw attention to the fact that hats seldom sink in a quicksand.
 - To focus on the various dangers of a quicksand.
6. According to the passage, what can be inferred to be the correlation between struggling in quicksand and sinking in it?
- The more a person struggles the more he will sink, until he drowns.
 - Struggling in a quicksand increases the chances of a high tide because of which a person will drown.
- (C) Struggling in a quicksand can result in a person sinking further but he will not sink completely.
(D) Struggling in a quicksand helps a person to float up to the surface of the quicksand.
7. According to the passage, which of the following is a feature of quicksand?
- Quicksand appears similar to solid ground until someone steps on it.
 - The surface of a quicksand appears slightly moist because of the water present with the sand.
 - Quicksand is usually found in river deltas but never in deserts.
 - Quicksand is perceived to be much more dangerous than it actually is.
8. As mentioned in the passage, which of the following need not be an ingredient of quicksand?
- Water
 - Salt
 - Bacteria
 - Either (B) or (C)
9. Which of the following can be inferred about quicksand in north eastern Brazil?
- The bacteria present in the quicksand provide buoyancy which prevents people from drowning.
 - The quicksand in this region has more water content as compared to the quicksands found in Iran.
 - The bacteria present at the surface of the quicksand appear similar to the surrounding ground which makes it more difficult to avoid quicksand here as compared to that in Iran.
 - The quicksand basins in this region are usually too shallow to submerge persons.

DIRECTIONS for questions 10 to 12: The passage given below is followed by a set of three questions. Choose the best answer to each question.

Forests that harbour tigers are being lost but are still large enough to take double the world's tiger population in the next six years, according to a study using new satellite mapping technology.

But the internationally agreed goal can only be achieved if no further habitat across Asia is lost and if the "corridors" that connect tiger populations are protected, researchers warn in the paper, published on Friday in the journal *Science Advances*.

The tiger is the most endangered big cat, with as few as 3,200 left in the wild in the forests, swamps and jungles of 13 Asian countries. Logging, agricultural expansion and infrastructure development have all cut their habitat and they are also under severe pressure from hunting and poaching for their body parts, which are used in traditional Asian pseudo-medicine.

By 2010 the rate of loss was so great that a high-level summit was convened in Russia, where tiger nations agreed on a goal called Tx2 to double the world's wild tiger population by 2022.

Since the meeting, Nepal and India have reported an increase in tiger populations, Amur tiger numbers are rising in Russia and there are indications that tigers are settling and breeding in north-eastern China.

The new analysis, led by Anup Joshi at the University of Minnesota in St Paul, in the US, shows that despite an overall decline in habitat between 2001 and 2014, enough wild habitat remains to meet the goal.

The researchers used Google Earth Engine's cloud computing platform to process huge amounts of high-resolution, real-time satellite imagery and 14 years of forest loss data from Global Forest Watch. This allowed them to calculate changes in tiger habitat to the level of detail of 30m in a single wildlife corridor and at a wider scale across 76 landscapes that have been prioritised for the conservation of wild tigers.

Previously, Joshi said, monitoring tiger habitat could only be done once a decade because of limited access and expertise in satellite monitoring technology. Using the new technology, conservationists can pinpoint exactly where habitat loss is occurring and potentially curb future losses.

"The tiger countries have set the goal to double numbers – we are bringing them the tools to plan and meet their target," said Joshi. "We have developed a tool that anyone in those countries can use without having remote sensing expertise. Now we can monitor forests annually and provide this info directly over the web, making people more accountable."

10. Which of the following factors that endanger tiger population is not mentioned in the passage?
 - (A) Cutting down the forest trees for wood
 - (B) Building infrastructure projects by clearing the forests
 - (C) Killing tigers for their skins
 - (D) Uncontrolled expansion of human habitation
11. According to Joshi, how does the new technology improvement aid conservationists?
 - (A) The new technology allows monitoring tiger habitats every decade which was not possible earlier.
 - (B) The new technology pinpoints the location of all the tigers which makes it easier to monitor their population.
 - (C) The new technology makes it possible to find out exactly where habitat loss is occurring.
 - (D) The new technology uses remote sensing expertise which makes it easier to monitor tiger population.
12. What is the significance of doubling "the world's tiger population in the next six years" mentioned at the beginning of the passage?
 - (A) If the tiger population is doubled in the next six years, tigers will no longer be considered as an endangered species.
 - (B) The tiger population should be doubled in the next six years in order to achieve the goal that the tiger nations set for themselves.
 - (C) Doubling tiger population in six years will increase the number of tiger habitats reducing the chances of tigers becoming endangered again.
 - (D) The tiger population should be doubled in the next six years to achieve ecological balance between humans and tigers.

DIRECTIONS for questions 13 to 18: The passage given below is followed by a set of six questions. Choose the best answer to each question.

Many myths and misunderstandings about Soviet history persevere. As often as not, textbooks state quite inaccurately that the Soviet Union was founded in 1917 by the Bolshevik Revolution. They imply that Lenin's party had been the principal revolutionary force in the Russian Empire and overthrew the tsar, and that the Soviet Union was just a further stage in the seamless continuum of Russia and the Russians. The so-called 'Russian Civil War' is usually presented as a domestic affair, fought out between the Russian 'Whites' and Russian 'Reds'. In more recent times, the Russian Federation of Boris Yeltsin and Vladimir Putin is frequently presented not as one of the fifteen post-Soviet states, but rather as the product of a mere change of government, as just the latest variant on the unchanging Russian theme. Some may be surprised to learn, therefore, that the Soviet Union was created on 1 January 1924 and dissolved on 31 December 1991.

In formal terms, the Tsarist Empire of 'all the Russias' which reached its end in February 1917, had been created by Peter the Great in 1721. But Peter's empire prolonged and expanded the political and territorial complex that had been assembled earlier by the grand dukes or 'tsars' of Muscovy. 'The gathering of the lands', a long process whereby Moscow aimed to take control of all the East Slavs, had been proclaimed in the fifteenth century. Expansion across the Urals into Siberia and Central Asia, the largest demographic vacuum on the globe, was launched at the end of the sixteenth century; the conquest of lands in the west and north-west possessed by Sweden and Poland began in the mid-seventeenth. The pace of expansion was relentless. Between 1683 and 1914 it averaged 53 square miles per day and may be characterized as a case of *bulimia politica*. Despite some regurgitations, the result by the early twentieth century was an imperial domain of unparalleled dimensions in which ethnic Russians represented barely half of the population.

If the Russians constituted the largest of the seventy or so nationalities in the Tsarist empire, the Estonians were one of the smallest. Like the Finns, they had spent most of modern history within the political sphere of Sweden. Much of their homeland lay within the historic Swedish province of Ingria, or in Livonia; the Russian connection did not impinge until the Russo-Polish and Russo-Swedish wars of relatively recent times. Russia's imperial capital St. Petersburg, was founded in 1703 in a Swedish-Estonian-Finnish district without the slightest reference either to international law or to the local inhabitants. Russia's possession of Estonia was confirmed by the Treaty of Nystadt (1721) at the close of the great Northern War.

13. What is the author's contention in the opening sentence of the passage?
 - (A) Misunderstandings and myths about Soviet history are not being corrected and they still prevail.
 - (B) There used to be misunderstandings about Soviet history but they are cleared now.
- (C) The so-called misunderstandings about Soviet history are actually facts but the author considers them myths.
- (D) Whether Soviet historical details presented in the passage are myths or truths is still debatable.

14. Which of the following, according to the author, is an accurate statement about the history of the Soviet Union?
- Lenin's party was the principal revolutionary force in the Russian Empire and overthrew the tsar.
 - In the 20th century, ethnic Russians in the Soviet Union accounted for barely half of the population.
 - The recent Russian Federation of Yeltsin and Putin is a product of a mere change of government.
 - The Soviet Union was not dissolved on 31 December 1991.
15. Arrange the following events in chronological order and then select the correct option.
- Russia's imperial capital St. Petersburg was founded.
 - Soviet Union was dissolved.
 - End of the Tsarist Empire 'of all the Russians'.
 - Beginning of the Russian conquest of Swedish and Polish lands.
 - Confirmation of Russia's possession of Estonia through a treaty.
 - Proclamation of the gathering of the lands.
- V, VI, IV, I, II, III
 - VI, III, I, V, IV, II
 - VI, IV, I, V, III, II
 - IV, VI, II, III, V, I
16. Which of the following statements can be understood from the passage?
- Peter the Great initiated the process known as 'the gathering of the lands.'

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.

Poverty in India has been diminishing, though at an uncertain rate: data problems abound. The different definitions and different small sample surveys used to determine poverty in India, have resulted in widely different estimates of poverty from 1950s to 2010s. In 2012, the Indian government stated that 21.9% of its population was below its official poverty limit. The World Bank, in 2011 based on 2005's PPPs International Comparison Program, estimated 23.6% of Indian population, or about 276 million people, lived below \$1.25 per day on purchasing power parity. According to United Nation's Millennium Development Goal (MDG) programme 270 million or 21.9% people out of 1.2 billion of Indians lived below poverty line of \$1.25 per day in 2011-2012. In today's understanding, poverty is not just a lack of income but includes deprivation in health, in education, and other aspects of well-being. The country has a very mixed record.

Only two indicators have shown accelerated improvement in the last decade, fertility decline and education. However, nearly a third of the population is still illiterate. Nutrition has also improved modestly in recent years, but malnutrition is still widespread – despite slowly improving diets. It seems to be only partially a problem of income. Other aspects of health also show only modest improvements, with some worsening due to environmental factors and HIV/AIDS.

Numerous inequalities are present: most poverty is rural, and there are large discrepancies in wellbeing between different regions and social groups. The numbers in poverty are still projected to be 190 million in 2026, if the trends of the recent past continue. Again, these are mechanical projections – much can be done to improve this prospect. But the country shows divergent movement, with the better-off states making significant progress, and the worse off (and most populous) experiencing only slow improvement. Recent research suggests there is a link between high fertility and poverty, at the family level and even at the macroeconomic level. Unfortunately, the states where poverty is worst and economic growth slowest are also mostly those where population growth is fastest. But continuing fertility decline should contribute to the amelioration of poverty.

What of the country's food prospects? Population growth and increases in food production are intimately entwined. During 1951-2015, India's population grew by 285 per cent and cereal production by 441 percent – figures which suggest that over half of cereal production growth was attributable to rising demand from population growth. The data are often patchy and inconsistent. But by 2026 the level of total cereal demand is projected to be roughly 250 million tons – of which perhaps 30 million will be needed to cover feed, seed and wastage. There should be no insurmountable problems to producing this quantity of cereals, which will require an average cereal yield over twenty-five years of just over three metric tons per hectare.

People are diversifying their patterns of food consumption, however. Taste, lifestyle, income and other changes are contributing to particularly fast demand growth for non-cereal foods – like vegetables, fruits and milk – while consumption of coarse cereals and pulses is either constant or declining. This trend towards diversification in food consumption will continue.

19. According to the passage, why is it difficult to present a clear picture of the poverty situation in India?
 - (A) Manifold aspects in the definition of poverty makes it difficult in collecting the data required for estimating poverty.
 - (B) Using small sample sizes to estimate poverty in India makes it difficult to understand the poverty situation in India.
 - (C) The mixed record of India pertaining to various aspects that define poverty makes it difficult to estimate the poverty situation.
 - (D) Poverty and economic development are so closely connected that it is difficult to present a comprehensive picture.

20. According to the context of the passage, all of the following statements regarding malnutrition are false EXCEPT?
 - (A) In recent years, while nutrition has modestly improved, malnutrition has also increased in the country.
 - (B) Malnutrition is still rampant in the country primarily because a significant fraction of the population is not able to afford a proper meal.
 - (C) Nutrition has improved in recent years in India and malnutrition is common only among low-income groups.
 - (D) The improvement in diets, in recent years, have not translated to any significant reduction in malnutrition.

21. On the basis of your reading of the passage, which of the following options would most probably be true?
 - (A) People nowadays consume more non-cereal foods than coarse cereals and pulses because of changes in lifestyle.
 - (B) The most populous states have the worst poverty and the slowest economic growth.
 - (C) Decrease in fertility rate will result in improved economic status for the people.
 - (D) Economic growth is dependent only on population and is independent of the fertility rate.

22. Which of the following factors has NOT been mentioned as a factor that has brought about a change in the pattern of food consumption in India?
 - (A) The taste of people
 - (B) The slow economic growth
 - (C) The incomes of people
 - (D) The lifestyle of people

23. Which of the following statements, if true, would explain the relationship, mentioned in the passage, between high fertility and poverty?
 - (A) Families below the poverty line tend to have more children in the hope that it will increase the earning capacity of the family.
 - (B) Historically, the average number of children in a family below poverty line is five as opposed to two children for a family above poverty line.

24. Which of the following could serve as the most suitable title to the passage?
 - (A) The Conditions of People in India
 - (B) Poverty in India and Pattern of Food Consumption
 - (C) Poverty and economic development in India
 - (D) Population, Food and the Environment in India

DIRECTIONS for questions 25 to 27: Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key in it.

25. (1) It should also be noted that the limerick appeared in England in the early years of the 18th century.
- (2) David Abercrombie, a phonetician, takes a different view of the limerick, and one which seems to accord better with the form.
- (3) A limerick is a form of poetry, especially one in five-line, predominantly anapestic meter with a strict rhyme scheme (AABBA).
- (4) It was popularized by Edward Lear in the 19th century, although he did not use the term.
- (5) The third and fourth lines are usually shorter than the other three.

26. (1) This gene encodes a transcription factor (p53) that normally regulates the cell cycle and prevents genomic mutations.
- (2) It was named after two American physicians, Frederick Pei Li and Joseph F. Fraumeni, Jr.
- (3) These physicians recognized that the syndrome is linked to germline mutations of the p53 tumor suppressor gene.
- (4) Li–Fraumeni syndrome is a rare cancer predisposition hereditary disorder characterized as autosomal dominant.
- (5) Another variant of Li–Fraumeni that remains somewhat controversial, is a mutation of the CHEK2 gene.

27. (1) As the maps are based on the perception of the buyer, they are sometimes called perceptual maps.
- (2) The term 'positioning' refers to the consumer's perception of a product or service in relation to its competitors.
- (3) Firms can either position their product so that it fills a gap in the market or if they would like to compete against their competitors they can position it where existing products have been placed.

- (4) Positioning maps show where existing products and services are positioned in the market so that the firm can decide where they would like to place (position) their product.
- (5) Firms use positioning maps to help them develop a market positioning strategy for their product or service.

DIRECTIONS for questions 28 to 32: The five sentences (labelled 1, 2, 3, 4 and 5) given in the following question, when properly sequenced, form a coherent paragraph. Decide on the proper order for the sentences and key in this sequence of five numbers as your answer.

28. (1) The anthem is written in the first person, as if quoting William of Orange himself.
 (2) Like many anthems, the Wilhelmus originated in the nation's struggle to achieve independence.
 (3) Wilhelmus is the national anthem of the Kingdom of the Netherlands.
 (4) It tells of William of Orange, his life, and why he is fighting against the King of Spain.
 (5) It is the oldest national anthem in the world.

29. (1) Instead he instructed him and brought him to repentance.
 (2) When St. Dionysius asked him why he was being pursued, the man told him that he had killed a man.
 (3) St. Dionysius was very grieved but hid the man and did not surrender him to the law.
 (4) A man came to St. Dionysius's cell and begged the saint to hide him from his pursuers.
 (5) The murderer did not know that he had killed the saint's own beloved brother Constantine.

30. (1) An underground nuclear test was carried out at the Punggye-ri Nuclear Test Site, 30 miles northwest of Kilju City.
 (2) North Korean media announced on 7 January 2016 that the regime had successfully tested a hydrogen bomb.
 (3) The United States Geological Service reported a 5.1 magnitude earthquake from the location.
 (4) However, third-party experts doubted North Korea's claims and contended that the device was probably a less destructive fission bomb.
 (5) North Korea conducted its fourth nuclear detonation on 6 January 2016.

31. (1) Therefore, if God wants to strike any one, said they, Benjamin Franklin [and his lightning-rod] ought not to defeat His design.
 (2) When Benjamin Franklin invented the lightning-rod, the clergy condemned it as an impious attempt to defeat God's will.
 (3) But, the virtuous are never struck by lightning.
 (4) Indeed, to do so is helping criminals to escape.

- (5) For, as all right-thinking people were aware, lightning is sent by God to punish impiety or some other grave sin.

32. (1) It involves the search for creatures whose existence has not been proven due to lack of evidence.
 (2) Animals whose existence lacks physical evidence but which appear in folklore, such as Bigfoot and chupacabras are also included.
 (3) These include wild animals outside their normal geographic ranges (phantom cats), and creatures that are otherwise considered extinct (non-avian dinosaurs).
 (4) Cryptozoology is not a recognized branch of zoology but a pseudoscience because it relies heavily upon anecdotal evidence, stories, and alleged sightings.
 (5) The animals cryptozoologists study are referred to as *cryptids* by cryptozoologists.

DIRECTIONS for questions 33 and 34: The following question has a paragraph from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

33. In March 2001, futurist Ray Kurzweil had published an essay arguing that humans found it hard to comprehend their own future. It was clear from history, he had argued, that technological change is exponential – even though most of us are unable to see it – and that in a few decades, the world would be unrecognizably different. Fifteen years on, Kurzweil is a director of engineering at Google and his essay has acquired a cult following among futurists. Some of its predictions are outlandish or over-hyped – but technology experts say that its basic tenets often hold. The evidence, they say, lies in the exponential advances in a suite of enabling technologies ranging from computing power to data storage, to the scale and performance of the Internet.

- (A) If the pace of change is exponentially speeding up, all those advances could begin to look trivial within a few years.
 (B) Yet predicting the future is a fool's game; not everyone is convinced that technological change will hit humanity quite so fast.
 (C) "We won't experience 100 years of progress in the 21st century – it will be more like 20,000 years of progress (at today's rate)," he wrote, in '*The Law of Accelerating Returns*'.
 (D) These advances are creating tipping points – moments where technologies like robotics, artificial intelligence (AI), nanotechnology, 3D printing cross a threshold and trigger significant changes.

34. The Delphi method is a structured communication technique or method, originally developed as a systematic, interactive forecasting method which relies on a panel of experts. The experts answer questionnaires in two or more rounds. After each round, a facilitator or change agent provides an anonymous summary of the experts' forecasts from the previous round as well as the reasons they provided for their judgments. Thus, experts are encouraged to revise their earlier answers in light of the replies of other members of their panel. It is believed that during this process the range of the answers will decrease and the group will converge towards the "correct" answer.

- (A) Delphi is based on the principle that forecasts (or decisions) from a structured group of individuals are more accurate than those from unstructured groups.
- (B) Finally, the process is stopped after a predefined stop criterion (e.g. number of rounds, achievement of consensus, stability of results) and the mean or median scores of the final rounds determine the results.
- (C) The person coordinating the Delphi method is usually known as a facilitator or leader.
- (D) In short, participants comment on their own forecasts, the responses of others and on the progress of the panel as a whole.

SECTION – II

Number of Questions = 32

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

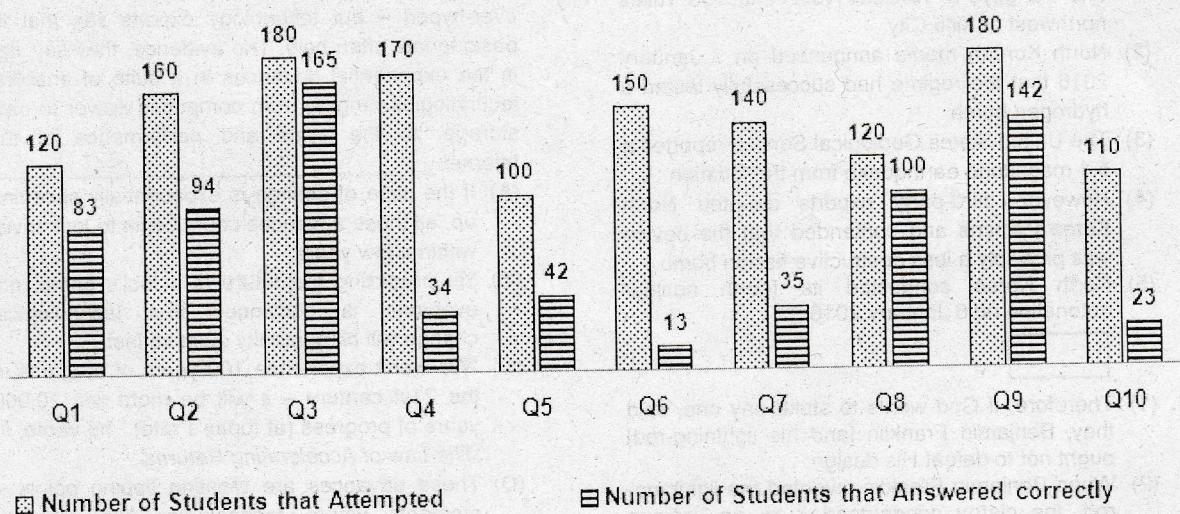
A professor in a management institute wanted to form the question paper for the final examination of the Operations Management course. The examination had a total of four questions and he had to choose these questions from a set of ten questions – Q1 to Q10 – that had appeared in previous examinations. For each of these questions, he had information regarding the number of students that had attempted the question in the previous examinations and the number of students that were able to correctly answer the question. Using this information, he first decided to categorize each of the ten questions into one of five possible levels of difficulty –Very Difficult (VD), Difficult (D), Medium (M), Easy (E), Very Easy (VE) – based on the percentage of students who had attempted the question but were NOT able to answer the question correctly.

Further, the overall difficulty level of any set of questions is determined based on the following percentage:

$$\frac{\text{Sum of the number of students that had correctly answered each question}}{\text{Sum of the number of students that had attempted each question}} * 100$$

The bar-chart given below, shows for each of the ten questions, the information about the number of students that had attempted the question and the number of students who were able to answer it correctly. The table below the chart shows the criteria based on which the questions were classified into different levels of difficulty.

Distribution of Students who Attempted and Answered Questions



Difficulty Level	Very Difficult	Difficult	Medium	Easy	Very Easy
Percentage (range) of Students who were not able to answer correctly	80% - 100%	60% - 79.99%	40% - 59.99%	20% - 39.99%	0% - 19.99%

DIRECTIONS for question 1: Select the correct alternative from the given choices.

1. Among the following sets of questions, which set of questions has the maximum overall difficulty level?
 - (A) Q6, Q7, and Q8
 - (B) Q1, Q2, and Q6
 - (C) Q2, Q4, and Q5
 - (D) Q5, Q7, and Q10

DIRECTIONS for question 2: Type in your answer in the input box provided below the question.

2. In how many ways can the professor select the four questions such that the overall difficulty level of the examination is Very Difficult?

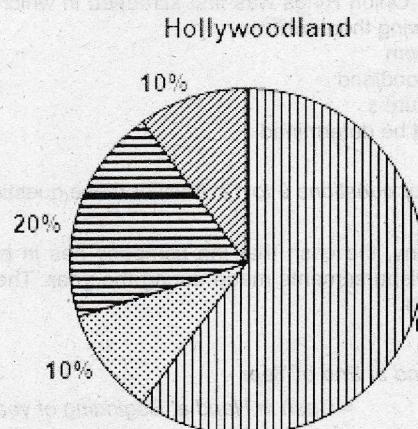
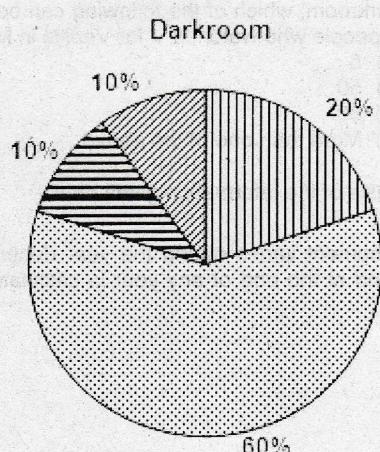
DIRECTIONS for questions 3 and 4: Select the correct alternative from the given choices.

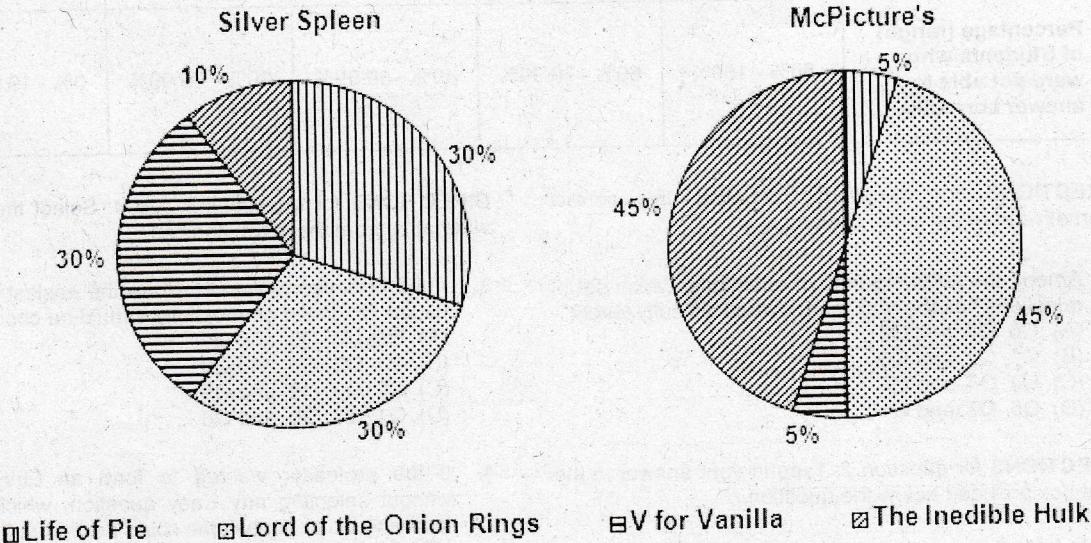
3. If the professor wanted to form the easiest possible paper, which set of questions should he choose?
 - (A) Q1, Q3, Q8, and Q9
 - (B) Q1, Q3, Q5, and Q9
 - (C) Q2, Q3, Q8, and Q9
 - (D) Q1, Q3, Q5, and Q8
4. If the professor wanted to form an Easy paper without selecting any Easy question, which of the following sets of questions could he choose?
 - (A) Q2, Q3, Q5, and Q8
 - (B) Q2, Q3, Q8, and Q10
 - (C) Q3, Q5, Q7, and Q8
 - (D) Any of the above

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

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

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





Further, it is also known that

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

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

5. Which movie was first screened in Silver Spleen?
 - (A) Life of Pie
 - (B) Lord of the Onion Rings
 - (C) V for Vanilla
 - (D) The Inedible Hulk
6. Lord of the Onion Rings was first screened in which of the following theaters?
 - (A) Darkroom
 - (B) Hollywoodland
 - (C) McPicture's
 - (D) Cannot be determined

7. If Darkroom, Hollywoodland and Silver Spleen charged the same price per ticket for all the movies, which of the three theaters would have had the highest revenue from the four movies put together?
 - (A) Darkroom
 - (B) Hollywoodland
 - (C) Silver Spleen
 - (D) Data Insufficient

8. If 540 people watched Lord of the Onion Rings in Darkroom, which of the following can be the number of people who watched V for Vanilla in McPicture's?
 - (A) 5
 - (B) 50
 - (C) 80
 - (D) More than one of the above

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

For any company, the cash that the company has in hand at any moment varies during the year depending on the Receipts and Disbursements made during the year. The Cash in Hand at the end of any year is calculated using the following formula:

Cash in Hand at End of Year

$$\begin{aligned}
 &= \text{Cash in Hand at Beginning of year} \\
 &+ \text{Total Receipts during the year} \\
 &- \text{Total Disbursements during the year}
 \end{aligned}$$

Further, the cash at the end of any year is the same as the cash at the beginning of the next year.

The following table presents all the Receipts and Disbursements (specified by (R) and (D) respectively) for XYZ Inc. for five years, from 2010 to 2014. It is known that at the beginning of 2010, the company had a cash of \$28,790 in hand.

Receipts (R) / Disbursements (D)	2010	2011	2012	2013	2014
(R) - Sales	\$12,400	\$13,500	\$18,700	\$21,500	\$25,470
(R) - Changes in Accounts Payable	\$9,450	\$8,470	\$4,580	\$1,780	\$1,680
(D) - Salaries	\$19,550	\$21,000	\$21,450	\$21,890	\$22,100
(R) - Changes in Taxes Payable	\$1,430	\$2,140	\$3,540	\$2,140	\$1,100
(D) - Rent	\$1,200	\$1,250	\$1,240	\$1,600	\$1,800
(D) - Debt Repayment	\$3,580	\$1,800	\$2,000	\$1,470	\$1,980
(R) - Changes in Inventory	\$2,450	\$1,470	\$870	\$1,040	\$190
(R) - Other Operating Activities	\$0	\$12,000	\$0	\$8,000	\$0
(D) - Capital Purchase	\$0	\$20,000	\$0	\$5,000	\$0
(D) - Utilities	\$1,580	\$940	\$850	\$670	\$1,040

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

9. What is the value of the Cash in Hand for XYZ Inc., at the end of 2011?

1

DIRECTIONS for question 10: Select the correct alternative from the given choices.

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

Kiran, a cricketer who is part of his college cricket team, participated in five tournaments, each of which comprised five matches. The following bar graph gives the runs scored by him in each match across the five tournaments:

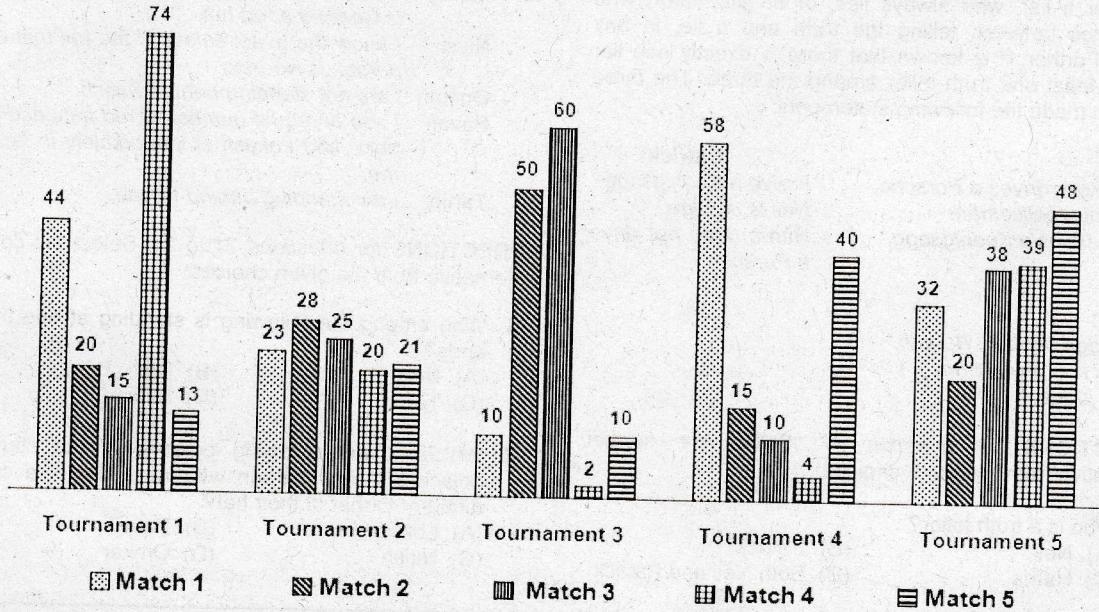
DIRECTIONS for question 11: Type in your answer in the input box provided below the question.

- 11.** For how many of the five years was the Cash in Hand at the end of the year greater than the Cash in Hand at the beginning of that year?

1

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

12. The percentage increase in Total Receipts in 2013 as compared to the previous year was
(A) 24.45%. (B) 21.34%.
(C) 25.68%. (D) 28.74%.



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

13. What is the maximum total number of runs scored by Kiran in a single tournament?

1

DIRECTIONS for question 14: Select the correct alternative from the given choices.

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

- 15.** If Kiran's team won only those tournaments in which the average runs scored per match by Kiran was greater than 26, how many of the five tournaments did Kiran's team win?

1

DIRECTIONS for question 16: Select the correct alternative from the given choices.

16. The highest percentage increase in the total number of runs scored by Kiran in any tournament as compared to that in the previous tournament was in
(A) Tournament 2. (B) Tournament 3.
(C) Tournament 4. (D) Tournament 5.

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

Three people Neil, Patrick and Harris, are each of a different profession among Policeman, Lawyer and Judge. Further, each person drives a different brand of car among Bugatti, Porsche and Koenigsegg. Each of the three persons is a truth teller, who always tells the truth, or a liar, who always lies, or an alternator, who alternates between telling the truth and a lie, in any order. Further, it is known that there is exactly one liar and at least one truth teller among the three. The three of them made the following statements:

Neil:
*The lawyer drives a Porsche.
I am not a policeman.
Harris drives a Koenigsegg.*

Patrick:
*I drive a Koenigsegg.
Neil is a judge.
Harris does not drive
a Porsche.*

Harris:
The judge drives a Bugatti.
Patrick is a policeman.
I am a judge.

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

DIRECTIONS for question 18: Type in your answer in the input box provided below the question.

18. How many statements made by the three persons are true?

1

DIRECTIONS for questions 19 and 20: Select the correct alternative from the given choices.

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

Eight persons, Lokesh, Manoj, Nitish, Omkar, Pavan, Ravi, Satish and Tarun, are standing in a line, from North to South, such that everyone is facing North. A red hat or a blue hat was placed on the head of each person such that each person in the line can see the colours of the hats of all the persons (and, of course, also identify the persons) standing in front of him but cannot see the colour of his own hat or the colours of the hats of the persons standing behind him. Also, they know that, between the eight of them, exactly three persons are wearing red hats and the rest are wearing blue hats. Further, all the eight persons can deduce the colour of their hats, if possible, based solely on the colours of the hats that they can observe. Some of them made the following statements, independent of each other, i.e., none of them were aware of the statements made by any of the others. It is known that all of the statements made by them were true.

Iokesh: I see three red hats.

Manoj: Satish is the only person in front of me who is wearing a red hat.

Nitish: *I know the exact colour of the hat that each person is wearing.*

Omkar: I am not standing behind Satish.

Pavan: I see an equal number of red hats and blue hats, and Lokesh is immediately in front of me.

Tarun: *I am standing behind Pavan.*

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

23. Who among the following is adjacent to Manoj and wearing the same coloured hat as him?

 - (A) Satish
 - (B) Nitish
 - (C) Ravi
 - (D) More than one of the above

24. Who among the following will be able to see an equal number of red hats and blue hats?

 - (A) Satish
 - (B) Manoj
 - (C) Nitish
 - (D) Lokesh

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

Each of five persons, Mani, Viswa, Uday, Rahul and Sathish, knows exactly two software languages among C, Java, PHP, Python and Ruby. Each of them now wants to learn a language different from the ones that he already knows, from any of the other persons who already knows that language. The languages that the five persons want to learn are all distinct and each person can teach only one other person. Further, it is also known that

- (i) at least one person knows each language and no two persons know the same set of languages.
 - (ii) three people know Java and at most two people know any of the other four languages.
 - (iii) both Uday and Satish know Python and one of them teaches Mani.
 - (iv) Rahul wants to learn Ruby and only one person knows that language.
 - (v) Mani does not know C but wants to learn Java.

DIRECTIONS for questions 25 to 28: Select the correct alternative from the given choices.

SECTION – III

DIRECTIONS for question 1: Type in your answer in the input box provided below the question.

$$1. \text{ If } p : q = q : r = r : s = 6, \text{ then } \frac{pq + qr + rs}{q^2 + r^2 + s^2} =$$

1

DIRECTIONS for questions 29 to 32: Answer these questions on the basis of the information given below.

Six persons – Gita, Hira, Lalitha, Pavani, Rekha and Surekha – live in neighbouring houses, adjacent to each other, in a row, from left to right. Each house is facing North and is painted with exactly one colour among Red, Blue, Yellow and Green. Further, it is also known that

- (i) no person painted their house in the same colour as that of their immediate neighbours'.
 - (ii) Hira's house and Lalitha's house are of the same colour and neither of their houses is present at any of the ends.
 - (iii) no house painted blue is next to a house painted green.
 - (iv) Rekha's house, which is not at any of the ends, is to the left of Surekha's house, while Gita's house is to the immediate right of Pavani's house.
 - (v) at most two houses were painted with the same colour and at least one house was painted with each colour.
 - (vi) The colour of Gita's house is green, if and only if the house of any of Gita's immediate neighbours is painted red.
 - (vii) Rekha's house is of the same colour as Surekha's house, if and only if Hira's house is red.
 - (viii) Rekha's house is of a different colour from Surekha's house, if and only if Hira's house is green.
 - (ix) Lalitha's house is to the left of Hira's house and Gita's house is painted the same colour as Rekha's house.

DIRECTIONS for questions 29 to 32: Select the correct alternative from the given choices.

DIRECTIONS for question 2: Select the correct alternative from the given choices.

2. If x , y and z are odd integers, which of the following statements is not true?

(A) $(x^2y + y^2z + z^2x)xyz$ is odd
 (B) $(xy + yz + zx)(x + 2y + 3z)$ is even
 (C) $(xy + yz + zx)(2x + y)^2$ is odd
 (D) $(2x + 3y + 4z)(xyz + 6)$ is even

DIRECTIONS for question 3: Type in your answer in the input box provided below the question.

3. If $x + y + z = 0$ and $x^2 + y^2 + z^2 = 26$, find $x^4 + y^4 + z^4$.

1

DIRECTIONS for questions 4 and 5: Select the correct alternative from the given choices.

4. Each of four girls, A, B, C and D, had a few chocolates with her. A first gave $\frac{1}{3}$ rd of the chocolates with her to B, B gave $\frac{1}{4}$ th of what she then had to C and C gave $\frac{1}{5}$ th of what she then had to D. Finally, all the four girls had an equal number of chocolates. If A initially had 80 chocolates more than the number of chocolates that B had initially, find the difference between the number of chocolates that C and D initially had.

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

6. A right-angled triangle is cut along a line parallel to the hypotenuse of the triangle, such that the length of the hypotenuse of the smaller triangle is 35% less than that of the initial triangle. If the area of the smaller triangle is x percent of the area of the initial triangle, then find the value of x , rounded off to the nearest whole number.

1

DIRECTIONS for questions 7 to 9: Select the correct alternative from the given choices.

7. Find the ratio of the L.C.M and the H.C.F of the fractions $\frac{10}{21}, \frac{15}{28}, \frac{20}{63}$ and $\frac{55}{42}$.
 (A) 3742 (B) 4752

9. If an arithmetic progression has the sum of its first n terms as zero but none of the terms is zero, then ' n '
(A) is always even.
(B) is always odd.
(C) is always a multiple of 4 or 5.
(D) More than one of the above.

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

10. A man deposited ₹9600 in each of two different schemes, both paying $r\%$ interest per annum, one under simple interest and the other under compound interest, compounded annually. If the difference between the two amounts receivable at the end of two years from the start of the two schemes was ₹150, then find r .

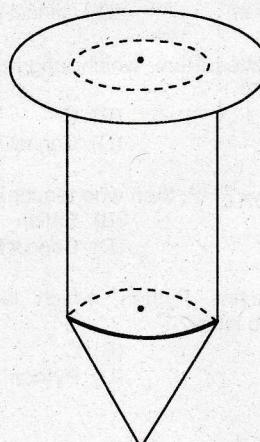
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DIRECTIONS for questions 11 to 19: Select the correct alternative from the given choices.

11. If $\log_a 12 = x$, $\log_a 75 = y$ and $\log_a 40 = z$, what is the value of $\log_a 120$, in terms of x , y and z ?

(A) $\frac{3x + y + 2z}{4}$ (B) $\frac{x + 3y + 2z}{4}$
 (C) $\frac{2x + 3y + z}{4}$ (D) $\frac{3x + y + z}{4}$

13. A top has a right circular cone as its base; a cylindrical trunk on top of the cone and a circular disc (of negligible thickness) on top of that, as shown in the figure. The semi-vertical angle of the conical base is 30° and its base radius is 3 cm. The circular disc has a radius twice that of the base of the cone. The trunk of the top is a right cylinder of radius equal to that of the base of the cone and a height that is equal to the diameter of the circular disc. Find the total surface area of the top.



- (A) 135π sq.cm (B) 153π sq.cm
 (C) 144π sq.cm (D) None of these

- 14.** A flag-post is placed on the top of a building of height 200 m. The angles of elevation of the top of the flag-post observed from the foot and the top of another nearby building of height 150 m, are 60° and 30° respectively. Find the height of the flag-post.

- (A) 75 m (B) 25 m
 (C) 37.5 m (D) 100 m

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

- 20.** A plane is divided into 79 regions by drawing several straight lines. What is the minimum number of lines required for the division?

1

DIRECTIONS for questions 21 and 22: Select the correct alternative from the given choices.

DIRECTIONS for question 23: Type in your answer in the input box provided below the question.

23. How many natural numbers less than one lakh can be formed using the digits 0, 6 and 9?

1

DIRECTIONS for question 24: Select the correct alternative from the given choices.

24. When a sphere moves in a liquid, the force of drag experienced by the sphere is proportional to each of the density of the liquid, the square of the speed of the sphere relative to the liquid, and the surface area of the sphere. If the force of drag experienced by a sphere of radius 5 cm, moving at a speed of 3 cm/sec in a liquid of density 1.3 gm/cu.cm is 1.4 N, what will be the force of drag experienced by a sphere of radius 10 cm, moving at a speed of 9 cm/sec in a liquid of density 0.91 gm/cu.cm?

DIRECTIONS for questions 25 and 26: Type in your answer in the input box provided below the question.

25. A's present age is $\frac{7}{5}$ times of what B's age was when A was as old as B is today. If the sum of their present ages is 65, how many years ago was A's age twice that of B?

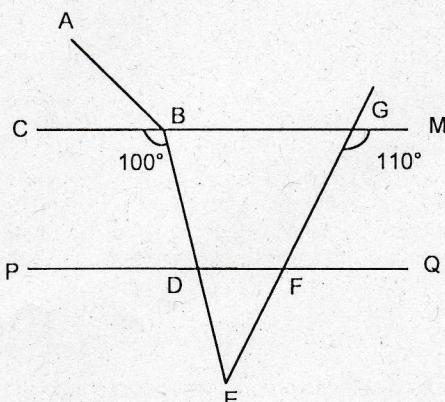
1

26. The average age of a group of persons is 16 years. A person of age 36 years leaves the group and another person joins the group, thereby reducing the average age by two years. Find the age of the newly joined person, if there are eight persons in the group.

1

DIRECTIONS for question 27: Select the correct alternative from the given choices.

27.



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

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

28. A certain club decides to organise a summer camp for children. The entry fee per participant is ₹2400. The camp will be organized only if a minimum of 60 children enroll and for every additional enrollment above that, a discount/refund of ₹15 is given to each of the children taking part in the camp. Find the number of enrollments that will maximize the revenue earned by the club.

1

DIRECTIONS for question 29: Select the correct alternative from the given choices.

29. If $\sqrt{x + \sqrt{x + \sqrt{x + \sqrt{x + \sqrt{x + \dots}}}}} = 4$, what is the value of x ? (A) 4 (B) 9 (C) 6 (D) 12

$$\text{If } \sqrt{x + \sqrt{x + \sqrt{x + \sqrt{x + \sqrt{\dots}}}}} =$$

DIRECTIONS for question 30: Type in your answer in the input box provided below the question.

30. Chris and his wife invited a total of ten families on their marriage anniversary. While the host family had just the two members, each family invited consisted of four members. If every person in the party shook hands exactly once with every other person belonging to a different family, then find the total number of handshakes that took place in the party.

1

DIRECTIONS for questions 31 and 32: Select the correct alternative from the given choices.

31. Two sisters, Aparna and Sushma, were born on the same day of the week in two different years and they celebrate their birthdays on the same day of the

week every year. If Aparna was born on 7th February 2005, then which of the following can be the date of birth of Sushma?

- (A) 10th January, 2011 (B) 7th March, 2006
 (C) 13th March, 2012 (D) 24th January, 2009.

32. A tap fills an empty tank in 8 hours, but due to a leak at the bottom of the tank it took 13 hours instead. If the tap is opened at 6:00 a.m. into the empty tank and then closed at 2:00 p.m., at what time would the tank be empty again?

(A) 7:00 p.m.
(B) 3:00 a.m. next day
(C) 10:48 p.m.
(D) 02:48 a.m. next day

DIRECTIONS for question 33: Type in your answer in the input box provided below the question.

33. How many three-digit numbers satisfy all the following conditions?

 - I. When divided by 11 or 12, they leave a remainder of 7 and 8 respectively.
 - II. When divided by 33 or 24, they leave a remainder of 29 and 20 respectively.
 - III. When divided by 7 or 8, they leave a remainder 4 in each case.

1

DIRECTIONS for question 34: Select the correct alternative from the given choices.

34. How many pairs of integers are there such that twice the sum of the integers is equal to their product?

(A) 4
(B) 3
(C) 2
(D) more than 4.