

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

BRTAIN has the widest gender pay gaps in Europe. For every pound that men earn, women make 80p... In 2018, organizations were required to annually publish the hourly pay gap between men and women. ... The 10,000 employers that filed results revealed an average median pay gap of 12%. Some reported a 29.5% gap. ...

The data doesn't adjust for employees' different roles. CEOs are compared directly with secretaries. Mean gaps are skewed by a few high-earners – nine of ten organizations with the greatest differences between median and mean pay-gaps are football clubs – leaving room for spin and counterproductive responses.

Two narratives have emerged: 1) The gaps prove how sexist the workplace still is. 2) They're explained by men's greater share of senior jobs, and not "discrimination". Neither is quite right.

Gender pay gap doesn't reveal pay discrimination. The new reporting exercise is not about that. Airlines with wide pay gaps are unlikely to have unequal pay, because collective bargaining tends to determine salaries. Of easyJet's pilots, 94% are men (average salary: £92,400) whereas 69% of cabin crew are women (average salary: £24,800). The airline industry does not have a "equal work, unequal pay" problem so much as a recruitment problem.

Other industries fail to promote enough women. A study by SKEMA Business School shows that whereas half of graduate entrants in American law firms were women, only one in five equity partners was. Women constituted 52% of banking employees globally but only 38% of middle managers and 16% of executive committee members were women.

Companies have accompanied their data with plans to fix things. Many firms' aim to improve the figures for 2019, hoping to achieve gender balance across all ranks by 2030. They should beware quick fixes...

"Sensible solutions take time. One must diagnose what lies behind the numbers. I'm concerned that this British reporting is ostensibly focused on pay, but in reality it's just about representation," says Brian Levine of Mercer, a consultancy. "Companies need to check whether they are hiring equitably, paying equitably and offering equitable opportunities to advance."

Men's and women's salaries start diverging from the childbearing years. This "motherhood penalty" is often followed by the "good-daughter penalty", when elderly parents require care and daughters prove more conscientious than sons. The median pay gap is only 2% among full-time workers in their 30s, yet jumps to 14% in their 40s and 16% in their 50s.

It may be tempting to blame women's lack of progression on their wombs. This is only part of the explanation. The other is structural discrimination. One in nine new mothers is dismissed, made redundant or treated so poorly that she leaves. Subtler biases favour men in hiring, performance reviews, pay and promotions. A 2016 study by Warwick University found that, among workers who asked for pay rises, men were 25% more likely than women to get the nod.

Unlike Britain, many European countries tackling pay gaps have focused on discrimination between people with similar jobs, rather than gaps across whole companies. Nevertheless, Britain's blunter exercise is having an impact. The data have got everyone talking about pay. Now that the numbers are out, executives are keen to improve women's positions.

It will be hard to say whether this improvement is caused by the companies' mandatory reporting of data on pay equality (under pressure from shareholders) or broader winds of change The pay gap would endure as long as more women than men worked part-time and in industries that pay poorly. So, what pay gap size should be tolerated?

1. Which of the following has been cited as a problem that plagues the airline industry, as can be deduced from the passage?
 - (A) Pay-discrimination problem
 - (B) Recruitment problem
 - (C) Collective bargaining
 - (D) Structural discrimination
2. Which of the following best describes the purpose of the example of the study conducted by SKEMA Business School?
 - (A) To demonstrate that the difference in the probability of a female employee at an entry level position and at a top level position is highest in the banking sector as compared to other sectors.
 - (B) To indicate that more women than men are employed in management roles that do not fall under the classical definitions of "equity partners" and "executive committee members".
 - (C) To highlight that there are leaky pipelines in some sectors where the share of women drops at several levels of promotion.
 - (D) To reiterate that it is high time that the banking sector reduced the pay gap between male and female employees by providing female employees with opportunities to gain new skills.
3. Which of the following statements best reflects the main argument of the author in the passage?
 - (A) Despite its flaws, a new obligation to report the differences between men's and women's pay could spark a change in employment practices.
 - (B) Income gaps exist because men are favored in hiring, performance reviews, pay and promotions to senior positions.
 - (C) Companies should not remain in the bottom quartile for gender and ethnic diversity in leadership.
 - (D) A woman's lack of progression in the workplace can be solely attributed to the sexist workplace and not to the "womb" or the "good daughter-penalty".
4. Which of the following interventions would the author of the passage support?
 - (A) The impact of the "motherhood penalty" and "good-daughter penalty" needs to be studied.
 - (B) Companies should hire equitably, pay equitably and offer equitable opportunities for women to advance.
 - (C) Shareholders should pressurize firms to publish data on pay equality.
 - (D) The pay-reporting exercise in Britain should focus on income gaps across whole industries and not just discrimination.
5. How is the second para related to the first para of the passage?
 - (A) It provides an example to support the finding presented in the first para.
 - (B) It introduces evidence that undermines the argument presented in the first para.
 - (C) It anticipates possible objections to the methodology presented in the first para.
 - (D) It demonstrates the potential dangers of a commonly used strategy.

DIRECTIONS for questions 6 to 10: The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

What has happened to our profession, and our art, to cause the supposed end of our most powerful means of conceptualizing and representing architecture – drawing?

The computer, of course. With its tremendous ability to organize and present data, the computer is transforming every aspect of how architects work, from sketching their first impressions of an idea to creating complex construction documents for contractors. Are our hands becoming obsolete as creative tools, replaced by machines? And where does that leave the architectural creative process?

Today, architects typically use computer-aided design software ... [B]uildings are no longer just designed visually and spatially; they are "computed" via interconnected databases... There's nothing inherently problematic about that, as long as it's not just that. Architecture cannot divorce itself from drawing, no matter how impressive the technology gets. Drawings are not just end products: they are part of the thought process of architectural design. Drawings express the interaction of our minds, eyes and hands. This last statement is absolutely crucial to the difference between those who draw to conceptualize architecture and those who use the computer...

For decades I have argued that architectural drawing can be divided into three types, which I call the "referential sketch," the "preparatory study" and the "definitive drawing." The definitive drawing, the final and most developed of the three, is almost universally produced on the computer nowadays, and that is appropriate. But what about the other two? What is their value in the creative process?

The referential sketch serves as a visual diary, a record of an architect's discovery. It can be as simple as a shorthand notation of a design concept or can describe details of a larger composition. It might not even be a drawing that relates to a building or any time in history. It's not likely to represent "reality," but rather to capture an idea.

The second type of drawing, the preparatory study, is typically part of a progression of drawings that elaborate a design. Like the referential sketch, it may not reflect a linear process. I personally like to draw on translucent yellow tracing

paper, which allows me to layer one drawing on top of another, building on what I've drawn before and, again, creating a personal, emotional connection with the work.

With both of these types of drawings, there is a certain joy in their creation, which comes from the interaction between the mind and the hand. Our physical and mental interactions with drawings are formative acts. In a handmade drawing, whether on an electronic tablet or on paper, there are intonations, traces of intentions and speculation. This is not unlike the way a musician might intone a note or how a riff in jazz would be understood subliminally and put a smile on your face.

I find this quite different from today's "parametric design," which allows the computer to generate form from a set of instructions, sometimes resulting in so-called blob architecture. The designs are complex and interesting in their own way, but they lack the emotional content of a design derived from hand; [on the other hand] drawing by hand stimulates the imagination and allows us to speculate about ideas, a good sign that we're truly alive.

6. A musician intoning a note, as mentioned in the passage, is:
- (A) an accurate way of depicting the role of sketching by hand.
 - (B) an analogy demonstrating the importance of human connect in architectural drawing.
 - (C) an example to highlight how music uses the same principles as drawing.
 - (D) an example to show how the way music is produced is unlike how drawings are made.
7. Referential sketch and preparatory study are different from each other in that:
- (A) the former represents the idea whereas the latter represents further elaboration.
 - (B) the latter represents the original idea whereas the former represents progressions.
 - (C) the latter represents a primitive form whereas the former represents an advanced form.
 - (D) the former represents an incomplete idea whereas the latter represents the complete one.
8. The author believes that definitive drawing:
- (A) can be produced faster by computers than humans.
 - (B) is more developed because of the impressiveness of technology.
 - (C) lacks the emotional connection brought by human drawing.
 - (D) is the final phase of the conceptualisation of an idea.
9. The author feels that architecture cannot divorce itself from drawing because:
- (A) drawing with a machine doesn't bring out the concept accurately.
 - (B) only drawing can enable the interaction of mind, eyes and hands.
 - (C) a design derived by hand is emotionally richer.
 - (D) drawing is integral to the formative stage of conceptualisation.
10. The author's argument about the process of drawing in architecture is refuted if:
- (A) architects prefer to use computers instead of sketching themselves.
 - (B) hand drawings are more emotionally satisfying than using computers.
 - (C) drawing by hand does not help architects explore the idea as deeply as the computer does.
 - (D) architects skip referential sketch and preparatory study to create a parametric design.

DIRECTIONS for questions 11 to 15: The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

At the very centre of Teesside [an industrial landscape in England] is a vast empty area dotted with enormous rusting buildings ... But now there is a plan to transform and revitalise this area by turning it into a free port. A free port, sometimes called a free trade zone or special economic zone, is an area of a country where its taxes and tariffs do not apply. So you can import goods, store them and re-export them without bothering the tax collectors.

[T]hese days they...allow firms to import raw materials, make finished goods and then export them, with none of the border taxes that the rest of the country has to pay. Within the EU's customs union, large industrial free zones have limited use; after all, you still have to pay customs taxes when bringing the goods into the EU from the free zone.

But after Brexit it could be a huge boost for areas like Teesside. For the mayor of the Tees Valley, Ben Houchen, the man behind the idea, turning Teesside into a free port is just common sense.

To see how well free ports can work, you have to travel back to the 1960s. Shannon Airport, on the Republic of Ireland's west coast, started as a flying boat base where planes could refuel just before attempting the long Atlantic crossing – a journey so perilous and tough that the local hotel barkeeper invented Irish coffee to revive passengers. But by the 1960s, planes could easily make it across the pond in one go. Shannon was facing a bleak future.

But then Shannon Airport's boss had the idea of making the airport an industrial free port, not just one with warehousing and depots for storing goods tax-free before they were exported again, but one with factories making pianos, textiles and electronic components. It was a triumph. The whole area is now one massive industrial estate, full of high-tech...and locally grown companies employing thousands.

But that does raise a problem for Teesside – free ports work best by rapidly turning an agrarian, closed economy into an open and industrialised one, just as happened in Ireland and to a far larger extent in China.

The UK, on the other hand, has been an open and industrialised economy at least since Victorian times. Free ports can also just encourage firms and investment to move into the free port where they pay no tax, away from other parts of the country where they do pay tax.

Jerry Hopkinson is the chief operations officer at PD Ports, owner of Teesport, the main port on Teesside... "By 2040 there will be a £600m benefit. By 2040, 40,000 new jobs will be created," he says. "What we need to do is demonstrate that the upside benefits are proportionally greater than the loss of revenues in terms of taxes. We are doing the calculations that will demonstrate that to HM Treasury."

Even if that is true, a Teesside free port is not necessarily a good idea. It would be far more effective to cut tariffs for the whole country rather than abolish them for one small corner. After all, this is what has happened in Shannon – free port status was not really necessary after Ireland joined the EU and slashed business taxes, and the breaks were whittled away until they finally disappeared in 2016.

11. All of the following are features of free ports EXCEPT?
- (A) They allow ships and planes to refuel before long journeys.
 - (B) They are no-tax zones.
 - (C) They allow free importing and exporting of goods.
 - (D) They allow manufacture and export of finished products.
12. The problem of turning Teesside into a free port is that:
- (A) free ports turn agrarian economies into industrialised ones.
 - (B) free ports turn closed economies into open ones.
 - (C) a Teesside free port will encourage firms to invest more money in Teesside.
 - (D) a Teesside free port will provide an avenue for firms in the country to shirk taxes.
13. The author's conclusion about the Teesside free port can be weakened if a study proves that:
- (A) many firms will move to free ports to save on taxes.
 - (B) the revenue loss from tariff cuts, if implemented across the country, will irreversibly cripple the economy.
 - (C) only a small number of firms will shift base to free ports to save on tariffs.
 - (D) free ports can lead to burgeoning industrial growth only in one part of the country.
14. The concept of free ports, according to the author, worked better for China than it would in the UK because:
- (A) free ports work better for open economies than for closed ones.
 - (B) free ports need special economic zones to thrive.
 - (C) free ports need abandonment of taxes that the UK cannot afford.
 - (D) free ports are more effective for agrarian, closed economies.
15. Jerry Hopkinson's stand on free ports is that:
- (A) jobs and not tax revenues should be given higher priority.
 - (B) a free port accrues loss of revenues in terms of taxes.
 - (C) the benefits of free ports trump the loss in revenue.
 - (D) the calculations to prove the benefits of a free port are not done yet.

DIRECTIONS for questions 16 to 19: The passage given below is accompanied by a set of four questions. Choose the best answer to each question.

Savour that cup of coffee while you can. New research shows 60% of coffee species found in the wild could soon go extinct. Researchers at Kew Royal Botanic Gardens in the UK warn that climate change, deforestation, droughts and plant diseases are putting the future of coffee at risk.

"The important thing to remember is that coffee requires a forest habitat for its survival," senior researcher Aaron P. Davis told CNN. "With so much deforestation going on around the world, wild coffee species are being impacted at an alarming rate."

Davis added that coffee plants grow in very specific natural habitats, so rising temperatures and increased rainfall brought by climate change can make coffee impossible to grow in places the plants once thrived.

"Considering threats from human encroachment and deforestation, some (coffee species) could be extinct in 10 to 20 years, particularly with the added influence of climate change," Davis said.

The study published in *Science Advances* – a collaboration between scientists in the UK and Ethiopia – says that unless governments and commercial producers ramp up protections for coffee species and stockpile more seeds, it could impact your daily grind. Fewer coffee crops means your morning cup might get more expensive and taste worse.

Out of 124 types of wild coffee, 75 are at risk of extinction. About 35 of the 124 species grow in areas with no conservation protections. The most popular kind of coffee for commercial production, arabica, is already on the endangered species list. Davis' previous research revealed that arabica coffee could become extinct in as little as 60 years.

But even the less common types of coffee are vital, researchers said. Preserving a diverse crop of wild coffee plants is useful for developing commercial coffee that's resistant to changing climates and pests. To create genetically modified plants, researchers need to preserve diverse coffee genes.

The Kew scientists say that compared to other plants, it's more difficult and more expensive to keep coffee seeds alive in storage banks. So focusing on saving coffee's natural environment is key. Ethiopia recently created three new protected areas in an effort to save wild arabica coffee, according to Davis. But the study reveals the highest threat is to coffee growing in Madagascar and Tanzania.

"The first thing you need to do is conserve them in the wild, so we need to improve the management of protected areas," Davis said. "And we also need to designate new protected areas."

The study's findings are not just important for coffee drinkers. "There are many countries which depend on coffee for the ... bulk of their export earnings," Davis told Reuters. "It's estimated there are 100 million people producing coffee in farms around the world."

Ethiopia, for example, is the natural birthplace of wild Arabica coffee and Africa's largest coffee exporter. Around 15 million Ethiopians work in coffee production and annual exports have an estimated value of a \$1 billion, according to Reuters.

The country has taken steps to preserve biodiversity through maintaining forest-based coffee farming systems and minimizing coffee farmers' vulnerability to climate change by launching initiatives such as the Yayu Forest Coffee Project, which encourages farmers to plant coffee inside forests, creating a cash crop while protecting precious woodlands.

16. According to the passage, extinction of some coffee species may directly affect which of the following?
- (A) Export earnings of coffee producers
 - (B) Forest-based coffee farming systems
 - (C) Precious woodlands
 - (D) Number of coffee-drinkers
17. Which of the following steps hasn't been recommended to lower the risk of extinction of coffee?
- (A) Prevention of deforestation
 - (B) Preservation of coffee seeds
 - (C) Growing climate change-resistant species
 - (D) Protection of natural habitats
18. Even less common types of coffee are vital, according to the author, because:
- (A) diverse crops will help in battling the adverse effects of climate change.
 - (B) Arabica coffee, the most popular one, will be extinct in about 60 years.
 - (C) it is expensive to keep coffee seeds alive in storage banks.
 - (D) diverse coffee genes add to the quality and taste of the coffee.
19. Which of the following is true according to the passage?
- (A) Coffee grown in forests is resistant to climate change effects.
 - (B) Coffee can only be grown in specific habitats.
 - (C) Commercial coffee is a diverse mix of wild coffee plants.
 - (D) Coffee cannot grow in places with high temperatures and rainfall.

DIRECTIONS for questions 20 to 24: The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

Until 2008, going global seemed to make sense for just about every company in the world...In the aftermath of the recent global recession, we've entered a different phase, ...[called], guarded globalization. Governments of developing nations have become wary of opening more industries to multinational companies and are zealously protecting local interests. They choose the countries or regions with which they want to do business, pick the sectors in which they will allow capital investment, and select the local, often state-owned, companies they wish to promote. That's a very different flavour of globalization: slow-moving, selective, and with a heavy dash of nationalism and regionalism.

Several factors have contributed to this trend. One, many governments find it risky to continue opening industries to foreign competition, because local companies and consumers often attempt to block new entrants. Two, some countries have built large foreign exchange reserves and boosted exports, so they are no longer trying to attract large amounts of foreign investment. Three, governments are defining national security more broadly. As financial instability, cyber espionage, and increases in food prices, for instance, become global issues, the financial services, information technology, telecommunications, and food sectors have all been politicized.

Four, China, which will soon have the world's largest economy, now establishes, rather than follows, international business rules and norms. Socialism with Chinese characteristics is casting a long shadow over globalization. Finally, policy makers in developing countries are intervening to create uneven playing fields that give local players an advantage. The state perceives more and more sectors to be of strategic importance and deters foreign companies from entering them. Indeed, the rise of state capitalism in some of the world's most important emerging markets has shifted the tectonic plates...Globalization now comes with new costs and risks.

In globalization's heyday, strategic sectors – those in which governments take an active interest – and nonstrategic ones were easy to identify. Multinational companies could enter some industries, such as soft drinks, all over the world; other sectors, such as aircraft manufacturing, were off-limits. That's why Coca-Cola sells its products in more than

200 countries today, while Lockheed Martin generates 80% of its revenues from sales to the U.S. government and employs 95% of its workforce in the United States. In the new era of guarded globalization, however, any sector could prove to be strategic, depending on a government's attitudes and policies...

CEOs of multinationals must understand the ways in which governments in developing countries are redefining their interests and drawing up new policies to further them. At one extreme, sticking close to home may ensure lower political risk, but it could also mean ceding market share to global competitors. At the other extreme, pursuing a strategy without considering geopolitical dynamics could boost growth in the short term but heighten the risk that politics could fatally undermine business operations in the future.

To factor globalization's new risks into strategy, executives must ask two questions: Is our industry strategically important to the government of the country we wish to enter? Is our industry strategically important to our home government?

Visualizing the answers in a two-by-two matrix can help a company determine its position on the globalization landscape. Two "no" answers place a company in the upper-right quadrant, where a globalization strategy generates little friction at home or abroad (à la Coke). Two "yes" answers land it in the lower-left quadrant, where national security concerns dominate its industry (Lockheed Martin's reality).

20. Guarded globalisation doesn't involve the government being

- (A) selective about business partners and business sectors.
- (B) favourable towards companies which promote local interests.
- (C) sceptical about multinational companies willing to invest capital.
- (D) lenient towards state-owned companies when it comes to quality assurance.

21. Which of the following is NOT a reason that has contributed to the trend of guarded globalization, according to the author of the passage?

- (A) Countries with massive foreign exchange reserves don't need to attract investments.
- (B) The powers that be are ensuring preferential treatment towards local companies.
- (C) China is using its heft to alter socialism-driven international business rules.
- (D) National security has broadened to include more sectors.

22. A company is most vulnerable to the risk of globalisation if it is a part of the industry which is

- (A) strategically important to its home government as well as to the country it wishes to enter.
- (B) strategically important to the country it wishes to enter.
- (C) strategically important to the home government.
- (D) strategically unimportant to the home government as well as to the country it wishes to enter.

23. Coca-Cola can sell its products in more countries than Lockheed Martin does because:

- (A) multinational companies have far more freedom than companies predominantly based in one country.
- (B) Coca-Cola is in the non-strategic sector, whereas Lockheed Martin is in a strategic sector.
- (C) a majority of Lockheed Martin's employees are in the United States.
- (D) Coca-Cola's globalisation strategy wouldn't meet as much opposition abroad as it does at home.

24. The author's primary argument about guarded globalisation is that:

- (A) global recession resulted in the increasing popularity of guarded globalisation.
- (B) governments of developing countries are promoting local companies, while being selective about the sectors open to multinational companies.

(C) guarded globalisation makes all multinational companies extremely vulnerable.

(D) guarded globalisation leads to the politicisation of national security concerns.

DIRECTIONS for question 25: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

25. (1) When you dissolve the material at a high temperature and then cool the solution, the material sometimes doesn't crystallize out because the molecules don't know how.
- (2) This can occur because the saturation point becomes higher as the temperature of the solution is increased.
- (3) They require something to get them started, a seed crystal, or a grain of dust or even a sudden scratch or tap on the surrounding glass.
- (4) A supersaturated solution is one in which the saturation point, at which no more material will dissolve, has been exceeded.

DIRECTIONS for question 26: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

26. (1) Earlier this year, it gained three of the four spots in an annual ranking of Arab universities by *Times Higher Education*, a British weekly magazine.
- (2) Nor does it have Egypt's long history of scholarship, with the likes of the Al Azhar university, which has been going since the tenth century.
- (3) It may not be quite the country for the usual university experience: moving out of home; experimenting; dating.
- (4) The kingdom rarely pulls things off as well as, let alone better than, its more savvy fellow Gulf states.
- (5) But Saudi Arabia is gaining an unlikely reputation for learning in the Middle East.

DIRECTIONS for question 27: The paragraph given below is followed by four summaries. Choose the option that best captures the author's position.

27. Previous studies, focussing on the difference in behaviors, cognitive function, and personality traits between 'only children' and 'those with siblings', had shown that 'only children' tend to exhibit more positive developmental outcomes, such as higher intelligence and creativity. However, the sole attention of parents, and grandparents to an extent, resulted in what they called "undesirable" personality traits: dependency, selfishness, and social ineptitude. 'Only children' miss out on early opportunities to practice social skills and empathy. A new study in China has shown that the 'only children' who performed higher on creativity showed a higher volume of grey matter in the parietal lobe, a part of the brain associated with mental flexibility and imagination. The scans of those 'only children' who showed less agreeable traits showed less grey matter in the medial prefrontal cortex, a part of the brain known to be involved in thinking about the self in relation to others.

- (A) A new study has found that all children who grow up without siblings and who are branded selfish and socially inept are likely to have different brain structures than those who have siblings, as seen in the grey matter compositions of the parietal lobes and the medial prefrontal cortices.
- (B) Corroborating previous findings, a new study has shown that Chinese 'only children' outperformed those with siblings on creativity but consistently scored lower on 'agreeable' personality traits.
- (C) While previous studies have focussed on behavioural, cognitive and personality differences between those with and without siblings, a new study has found that parts of the brain associated with the development of agreeable personality traits were indeed structurally different in the two populations.
- (D) While prior studies have revolved around psychological differences between 'only children' and 'those with siblings', a new study has shown that 'only children', who were more creative, showed a higher volume of grey matter in the parietal lobe, while those who displayed less agreeable social traits had lesser grey matter in the medial prefrontal cortex.

DIRECTIONS for question 28: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

28. (1) Yet, intermarriage between African-Americans and other ethnicities is much less common than between different white ethnicities, or between white and Asian ethnicities.
- (2) The "melting pot" metaphor implies both a melting of cultures and intermarriage of

ethnicities, yet cultural assimilation or acculturation can also occur without intermarriage.

- (3) In *The Melting Pot* (1908), Israel Zangwill combined a romantic denouement with an utopian celebration of complete cultural intermixing.
- (4) Thus African-Americans are fully culturally integrated into American culture and institutions.
- (5) In terms of immigrants to the United States, the "melting pot" process has been equated with Americanization, that is, cultural assimilation and acculturation.

DIRECTIONS for question 29: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

29. (1) They thought the first mind sparked awake sometime after we split from chimps and bonobos.
- (2) In the West, consciousness was long thought to be a divine gift bestowed solely on humans.
- (3) Even after Darwin demonstrated our kinship with animals, many scientists believed that the evolution of consciousness was a recent event.
- (4) Western philosophers historically conceived of nonhuman animals as unfeeling automatons.

DIRECTIONS for question 30: The passage given below is followed by four summaries. Choose the option that best captures the author's position.

30. There is little controversy among economists that growth is essential for poverty reduction under the assumption that the distribution of income remains more or less constant. In fact, much evidence points in this direction. Likewise, much evidence suggests that a worsening of the distribution tends to increase poverty. Yet, the real issue in establishing a development strategy is whether growth and distribution are independent of each other or, strongly inter-related. Is it the case, for instance, that faster growth tends to reduce inequality or on the contrary, to increase it? Could too much inequality in a given country act to slow or, to accelerate growth?
- (A) Growth cannot reduce poverty, unless distribution of income is consistent.
 - (B) Too much inequality can sometimes affect growth and thereby, increase poverty.
 - (C) It is not known whether growth and distribution can together reduce poverty.
 - (D) A development strategy can be made only when the relation between growth and distribution is established.

DIRECTIONS for question 31: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

31. (1) So, the government incentivized Wall Street to step in.
(2) Few Americans were in a buying mood, and for those who were, mortgages were harder to come by than they had been before the crash.
(3) But who would fill these empty homes?
(4) In early 2012, it launched a pilot program that allowed private investors to easily purchase foreclosed homes by the hundreds from the government agency Fannie Mae

DIRECTIONS for question 32: Five sentences related to a topic are given in the question below. Four of them can be put together to form a meaningful and coherent short paragraph. Identify the odd one out. Choose its number as your answer and key it in.

32. (1) The variations extend across many regions of the brain, including those that govern such essential cognitive functions as memory and the interpretation of visual and auditory stimuli.
(2) We have to teach our minds how to translate the symbolic characters we see into the language we understand.
(3) Experiments demonstrate that readers of ideograms, such as the Chinese, develop a mental circuitry for reading, that is very different from the circuitry found in those of us whose written language employs an alphabet.
(4) We can expect as well that the circuits woven by our use of the internet will be different from those woven by our reading of books and other printed works.
(5) And the media or other technologies we use in learning and practicing the craft of reading play an important part in shaping the neural circuits inside our brains.

DIRECTIONS for question 33: The sentences given in the question, when properly sequenced, form a coherent paragraph. Each sentence is labelled with a number. Decide on the proper order for the four sentences and key in the sequence of four numbers as your answer, in the input box given below the question.

33. (1) Picasso, in painting *The Three Dancers* in 1925, consciously restated the violence and ecstasy of the *Demoiselles*.
(2) He saw surrealism in quotation marks, comprehending that it was both perceptive and naive.
(3) And then he went farther.
(4) He did not so much join surrealism as learn from its interpretation of his art.

DIRECTIONS for question 34: The passage given below is followed by four summaries. Choose the option that best captures the author's position.

34. The way you become original is through imitation to some degree. When starting out as a creator, your work is likely going to largely reflect the ideas of your influences. That's how you find your voice. The more you make things, the more your voice will become a collection of those influences and start to feel unique. When that happens, you'll rely less on the inputs you're getting from your influences and more on your own original thoughts. Sure, maybe something one of your influences did will be the inspiration for a creative project, but you'll be able to expand on it much more so than you used to. You'll have gotten some more world experience and have developed more of a unique point of view. Hopefully, you will have been able to build up your following as well so that your audience will have adapted to your voice and bought into your originality.
(A) One cannot create something that is entirely original and doesn't have even a little bit of another's creation.
(B) One can evolve, from reflecting the ideas of influences to developing a unique point of view based on a collection of those ideas, by creating more.
(C) One can evolve to develop a unique voice that is totally different from the voices of the influences one has been inspired by.
(D) One can develop a unique voice only by gaining world experience which gives one a unique point of view.

SECTION – II

Number of Questions = 32

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

125 small, identical and unpainted cubes are arranged to form a large cube. All the six faces of the large cube are painted green. Now a $3 \times 3 \times 3$ cube, comprising 27 small cubes, is removed out of one of the corners of the large cube.

This $3 \times 3 \times 3$ cube is now painted blue on all six faces, while all the three surfaces of the large cube exposed due to the removal of the $3 \times 3 \times 3$ cube are painted black. Then, the $3 \times 3 \times 3$ cube is put back in its original position in the large cube and the large cube is finally painted yellow on all six faces.

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

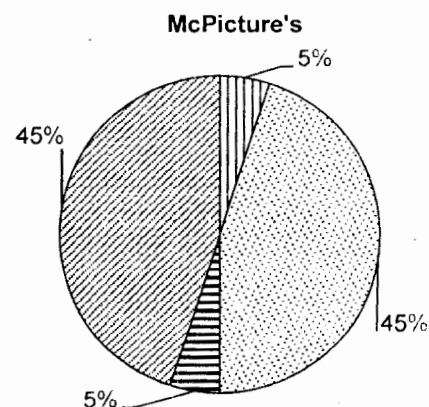
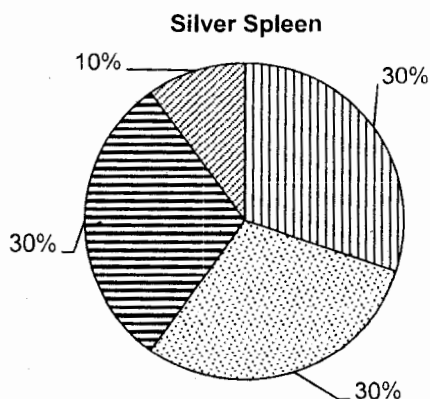
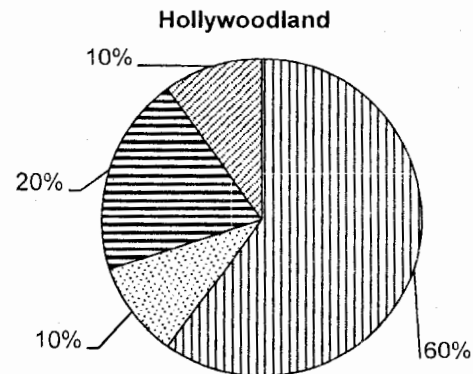
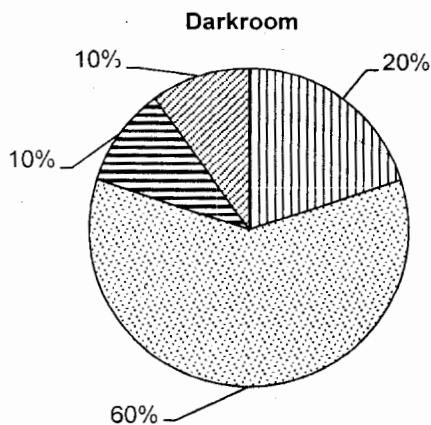
- What is the number of small cubes with exactly three faces painted?
(A) 16 (B) 18 (C) 19 (D) 15
- What is the number of small cubes with exactly one face painted?
(A) 36 (B) 60 (C) 45 (D) 48

- What is the number of small cubes with no face painted?
(A) 1 (B) 8
(C) 10 (D) 12
- What is the number of cubes that have exactly one face painted Black and exactly one face painted Yellow?
(A) 12 (B) 20
(C) 15 (D) 18

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:



Life of Pie
 Lord of the Onion Rings
 V for Vanilla
 The Inedible Hulk

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 the questions on the basis of the information given below.

Paul, a school principal, has to select students from among Anil, Bhagat, Chandu, Deepak, Emran, Farah and Girish to represent the school in an upcoming inter-school competition. The following additional information is given regarding the selection of the students:

- (i) If Chandu is there in the team then Emran should not be there but Farah should be there in the team.
- (ii) Only if Anil is not there in the team, Bhagat is there in the team.
- (iii) If Emran is there in the team then Anil is also there in the team.
- (iv) If Bhagat is there in the team then Deepak must also be there in the team.
- (v) Only if Girish is there in the team, Bhagath is there in the team.

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

- 9. If the number of students selected into the team is 'n', then what is the number of values that 'n' can assume?
(A) 2
(B) 4
(C) 6
(D) 5

- 10. If a team of maximum size is selected for the inter-school competition, then who among the following cannot be present in the team?

(A) Emran (B) Anil
(C) Bhagat (D) None of the above

- 11. If Chandu is selected in a five member team, who among the following need not necessarily be selected into the team?

(A) Bhagat (B) Deepak
(C) Farah (D) Girish

- 12. If a team of two students is to be selected, who among the following cannot be in the team?

(A) Girish (B) Deepak
(C) Bhagat (D) Chandu

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

A vegetable vendor has four weighing measures with him marked 2 kg, 5 kg, 7 kg, and 9kg. But none of the measures he has is marked with the actual weight of the measure. Therefore, the vendor decided to find out the actual weight of each measure. In the process, he made the following observations about the measures:

- (i) The actual weights (in kg) of all the measures were natural numbers.
- (ii) The actual weight of none of the four measures equals the weight marked on any of the four measures.
- (iii) The difference between the marked weight and the actual weight of none of the four measures was more than 3 kg.
- (iv) The actual weight of the 2 kg measure was less than that of the 7 kg measure.
- (v) The actual weight of the 2 kg measure and the 7 kg measure combined was the same as that of the 9 kg measure.
- (vi) The 5 kg measure and the 7 kg measure together weighed the same as a bag of potatoes that was actually 10 kg in weight.

For measuring the weight of the vegetables, the vendor uses a common balance but always places the measures in only one of the pans.

DIRECTIONS for questions 13 and 14: Select the correct alternative from the given choices.

- 13. How much does the 2 kg measure weigh?

(A) 1 kg
(B) 3 kg
(C) 4 kg
(D) Cannot be determined

- 14. Which of the following weights will the vendor not be able to measure using the measures in any combination?

(A) 20 kg (B) 16 kg
(C) 18 kg (D) None of the above

DIRECTIONS for questions 15 and 16: Type in your answer in the input box provided below the question.

15. The vendor has a common balance in which he places the measures on only one side of the balance.

If he uses the common balance only once, in how many different ways can he measure a weight of 14 kg using the four measures in any combination?

16. The vendor has a common balance in which he places the measures on only one side of the balance.

If the vendor uses the common balance only once, how many distinct weights will the vendor be able to weigh using the four measures in any combination?

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

The table below presents the values of various financial indicators for eight companies – Company 1 through Company 8. However, only the second column, representing the Total Assets (in ₹ mn) of each company, is labelled accurately and the other seven columns (labelled A through G) represent the seven indicators (values rounded off to three decimal places) defined below, not necessarily in the same order:

- **Net Sales** - in ₹mn.
- **Total Costs** - in ₹mn.
- **Shareholders' Equity** - in ₹mn.
- **Debt Equity Ratio** - calculated as $\frac{\text{Total Debt}}{\text{Shareholders' Equity}}$
- **Asset Turnover** - calculated as $\frac{\text{Net Sales}}{\text{Total Assets}}$
- **Leverage** - calculated as $\frac{\text{Total Assets}}{\text{Shareholders' Equity}}$
- **Return on Equity** - calculated as $\frac{\text{Net Sales} - \text{Total Costs}}{\text{Shareholders' Equity}}$

Company	Total Assets (₹ mn)	A	B	C	D	E	F	G
Company 1	2.000	0.600	1.200	0.167	0.700	3.000	0.667	0.700
Company 2	2.500	0.720	1.800	0.040	1.600	5.000	0.500	0.640
Company 3	1.400	2.429	3.400	0.050	3.200	4.000	0.350	0.450
Company 4	2.600	0.962	2.500	0.033	2.450	1.500	1.733	0.333
Company 5	3.100	0.613	1.900	0.056	1.700	3.600	0.861	0.861
Company 6	2.400	0.583	1.400	0.031	1.250	4.800	0.500	0.438
Company 7	1.200	2.917	3.500	0.088	3.050	5.100	0.235	0.235
Company 8	0.800	3.000	2.400	0.125	2.100	2.400	0.333	0.333

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

17. What is the Asset Turnover of Company 5?

- (A) 1.9
(B) 0.613
(C) 0.861
(D) 3.6

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

18. If Net Profit is defined as Net Sales – Total Cost, the highest Net Profit for any company (in ₹) is

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

19. The company which has the second highest value of Total Debt is
(A) Company 1.
(B) Company 2.
(C) Company 7.
(D) Company 5.
20. Which of the following statements is true?
(A) The company with the highest Net Sales also has the highest Total Cost.
(B) The company with the lowest Return on Equity also has the lowest Asset Turnover.
(C) The company with the highest Leverage also has the lowest Return on Equity.
(D) The company with the lowest Shareholders' Equity also has the lowest Debt Equity Ratio.

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

A and B are two traders who trade in gold futures at the commodity exchange. They trade from Monday (Day 1) to Friday (Day 5). On Day 1, A started with 100 grams of gold and ₹50000, while B started with 50 grams of gold and ₹100000. Gold is sold or bought only in multiples of 10 grams and at the beginning of Day 1, the price of 10 grams of gold was ₹8600, while at the end of Day 5, the price was ₹8400. At the end of each day, the price of 10 grams of gold went up by ₹200, or else it came down by ₹200. Both A and B took buying and selling decisions, at the end of each trading day. On each day the beginning price of gold was the same as the ending price on the previous day. Below are some additional facts about how A and B traded over the five trading days.

Each day if the price went up, A sold 10 grams of gold at the closing price. On the other hand, each day if the price went down, he bought 10 grams at the closing price.

If on any day, the closing price per 10 grams of gold was above ₹8800, then B sold 10 grams of gold, and if the closing price was below ₹8400, he bought 10 grams, all at the closing price.

DIRECTIONS for questions 21 to 24: Type in your answer in the input box provided below the question.

21. If both A and B sold gold on a particular day from Day 1 to Day 5, then what was the closing price (in ₹) of gold per 10 gms on Day 3?

22. If both A and B bought gold on a particular day, while on the next day, A sold but B did not buy gold, then what was the beginning price (in ₹) of gold per 10 gms on Day 4?

23. What could have been the minimum possible value of the total amount of cash (in ₹) with both A and B together at the end of Day 5?

24. If A had 40 grams of gold more than what B had at the end of Day 5, then what was the closing price (in ₹) of gold per 10 gms on Day 3?

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

Shonika and Smaraki are playing a game where they pick up coins alternately from the coins kept on a table. The rules of the game say that

- each person has to pick up at least one coin in her turn
- no person can pick up more than six coins in each turn

The person who picks up the last coin from the table is the loser and the other person is the winner.

Assume that both Shonika and Smaraki play intelligently so as to win the game.

DIRECTIONS for questions 25 to 27: Select the correct alternative from the given choices.

25. If, at some stage of the game, there are 16 coins on the table, and it is Shonika's turn to pick up the coins, how many coins should she pick to ensure her win irrespective of what Smaraki does in later steps?
(A) 1 (B) 2 (C) 3 (D) 4
26. At one stage during the game, when there were 28 coins on the table and it was Smaraki's turn, Smaraki had to leave to attend a phone call. Her sister Sonia who was watching the game volunteered to play for Smaraki and picked up 2 coins. Is Sonia's move correct to ensure a win for Smaraki?
(A) Yes
(B) No
(C) She cannot win whatever she picks up when there are 28 coins
(D) Data insufficient
27. Some time during the game when it was Shonika's turn, there were 38 coins on the table. Without Shonika realising it, Smaraki wanted to remove some coins from the table. How many coins should she remove to ensure her own win irrespective of what moves Shonika makes later?
(A) 4 (B) 3 (C) 2 (D) 1

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

28. What is the least number of coins greater than 20 at the beginning of the game to ensure a win for Shonika if Smaraki makes the first move?

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

Central Road Research Institute carries out cost studies for road users periodically. The following tables and graph represent the survey results for the year 2017. The survey studied the cost savings involved, for different categories of vehicles, in shifting from a previously existing 'two-lane bad road' to a new 'four-lane good road' in Mehrauli, Uttar Pradesh.

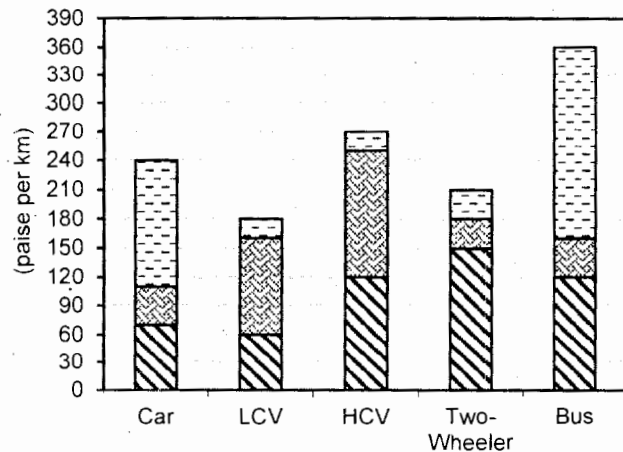
This new four-lane good road is 100 km long and has no other routes connecting into it. In other words a vehicle that enters into this road from one end can exit only from the other end of the road (i.e., after 100 km). The same was the case for the previously existing two-lane bad road. However, after moving to the new four-lane good road, the government set up Toll-gates, to collect toll from the road users every time they use the road. Toll is charged according to the category of the vehicle.

Note : Total Cost Savings are the cost savings due to using the new four-lane good road over the previously existing two-lane bad road.

Distribution of Total Cost Savings

Type of Savings		
A – Direct Cost Savings	B – Indirect Cost Savings	C – Intangible Cost Savings
Fuel : 60%	Spares : 50%	Time : 60%
Tyres : 15%	Maintenance : 50%	Commodity : 40%
Oil : 25%	–	–

Total Cost Savings
(in paise per km for different categories of vehicles)



▨ Direct Cost Savings
 ▩ Indirect Cost Savings
 ▤ Intangible Cost Savings

In the above table, for example, of the total direct cost savings, the money saved due to the decreased consumption of fuel forms 60%.

Toll Charged as a percentage of the Total Cost Savings
for different categories of vehicles

Category of vehicle	Percentage
Car	50
LCV	80
HCV	90
Two – Wheeler	30
Bus	45

Net Cost Savings = Total Cost Savings – Toll Charged

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

29. If one uses a two-wheeler on the new road, then what are the savings on fuel for a to and fro journey?
 (A) ₹126 (B) ₹252 (C) ₹180 (D) ₹90

30. The users of which of the following categories of vehicles will have the highest net cost savings by using the new road?
- (A) Car (B) Two-Wheeler
(C) HCV (D) Bus

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

31. What is the difference in the sum of the Indirect and Intangible cost savings (in paise/km) on using a HCV on the new road and on using a Bus on the new road?

DIRECTIONS for question 32: Select the correct alternative from the given choices.

32. Which of the following is the highest?
- (A) The cost savings on fuel for a one-way trip for a two-wheeler.
(B) The cost savings on time for a one-way trip for a bus.
(C) The cost savings on spares for a two-way trip for a HCV.
(D) The cost savings on fuel for a two-way trip for a HCV.

SECTION – III

Number of Questions = 34

DIRECTIONS for questions 1 to 4: Type in your answer in the input box provided below the question.

1. In how many ways can a person pay an amount ₹120 using two-rupee or five-rupee coins?

2. If $f(n) = 1(1!) + 2(2!) + 3(3!) + \dots + n(n!)$, find the remainder when $f(117) + f(111)$ is divided by 100.

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

4. Ajay had N coins with him and he gave one more than half the number of coins with him to Bulu and then gave two more than one-third of the remaining number of coins to Chintu. If N is a two-digit number, how many distinct values can N assume?

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

5. Find the range of y , if $|2y - 3| \leq 11$.
- (A) $[-4, 7]$
(B) $[3, 7]$
(C) $[-2, 7]$
(D) $[0, 8]$

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

6. The average of the marks of five students in a test is 134. The average increases by 23 marks, if the two lowest scoring students are excluded and decreases by 16 marks, if the two highest scoring students are excluded. What is the third highest score among the five students?

DIRECTIONS for questions 7 to 14: Select the correct alternative from the given choices.

7. If $a = \sqrt{17} + \sqrt{8}$, $b = \sqrt{14} + \sqrt{11}$, $c = \sqrt{16} + \sqrt{9}$, and $d = \sqrt{13} + \sqrt{12}$, which of the following is true?

- (A) $b > d > a > c$
(B) $d > b > c > a$
(C) $d > c > b > a$
(D) $a > c > b > d$

8. If the total surface area of cube A is 36% less than that of cube B, by what percent is the length of the side of cube B more than that of cube A?
- (A) 25% (B) 20% (C) 37.5% (D) 50%

9. Two points A (4, -2) and B (5, 5) lie on the circumference of a circle of radius 5 units. If P is another point lying on the circumference of the same circle, find the maximum possible area (in sq. units) of triangle PAB.

- (A) $\frac{25}{4}(\sqrt{2} + 1)$ (B) $\frac{25}{2}(\sqrt{2} + 1)$
(C) $\frac{25}{4}(\sqrt{2} - 1)$ (D) $\frac{25}{2}(\sqrt{2} - 1)$

10. Consider the following three equations:

$$\begin{aligned} 2x + 3y + 4z &= 33 \\ 4x + 2y + 3z &= 29 \\ 3x + 4y + 2z &= 28 \end{aligned}$$

Which of the following equations is inconsistent with the above equations?

- (A) $x + y + z = 10$
(B) $6x + 5y + 7z = 62$
(C) $y + z - 2x = 4$
(D) $5x + 3y + z = 23$

11. Find the quadratic equation whose roots are half the roots of the equation $x^2 + 5x + 3 = 0$.

- (A) $x^2 + 10x + 12 = 0$
(B) $4x^2 + 20x + 3 = 0$
(C) $x^2 + 9x + 7 = 0$
(D) $4x^2 + 10x + 3 = 0$

12. A country wanted to select four mixed-doubles tennis teams for the upcoming Rio Olympics from 6 female players and 6 male players available for selection. If the selection panel chose the players at random, then in how many ways they could have done that? (A mixed doubles tennis team comprises one male and one female player)
- (A) 129600 (B) 64800
(C) 5400 (D) 1800

13. If two percent of the population of constituency A are octogenarians, whereas six percent of the population of constituency B are octogenarians, and the population of B is three times that of A, what percent of the population of A and B together are octogenarians?

(A) 5% (B) 4%
(C) $3\frac{1}{4}\%$ (D) $4\frac{1}{3}\%$

14. 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.

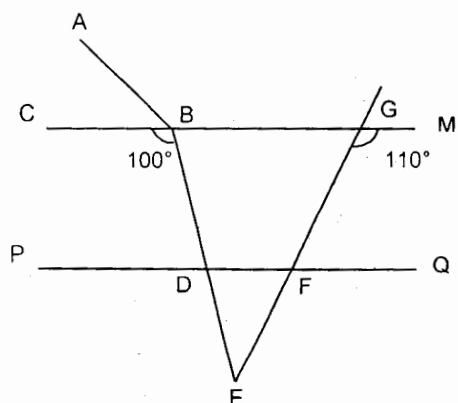
DIRECTIONS for questions 15 and 16: Type in your answer in the input box provided below the question.

15. If $f(x) = x^3 - x^2 - f(x-1)$, for $x \geq 2$ and $f(1) = 1$, then find the value of $f(25)$.

16. If $1 + 3 + 5 + \dots + (2n-1) = 1 + m(m+1)(m+2)(m+3)$, where m and n are natural numbers, find the value of n , when $m = 25$.

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

17.



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

(A) 30° (B) 80° (C) 40° (D) 60°

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

18. If P is 30% more efficient than Q and can complete a certain job in 46 days, how long would P and Q together take to complete the same job?

 days

DIRECTIONS for question 19: Select the correct alternative from the given choices.

19. There are two concentric circles. From a point on the outer circle, a tangent is drawn to the inner circle. If the length of the tangent is one-third the radius of the outer circle, then find the ratio of the radius of the inner circle to that of the outer circle.

(A) $1:\sqrt{2}$ (B) $2:3$

(C) $2\sqrt{2}:3$ (D) $8:9$

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

20. Raghu, Ram and Rajan work in ABC Pvt. Ltd. If their monthly salaries are in the ratio $2:3:5$, and sum of their monthly salaries is ₹200000, find Raghu's monthly salary (in ₹).

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

21. If x is positive, such that $2x - 9y = 10$ and $kx + 2y = 15$, what is the range of k ?

(A) $\left[-\frac{4}{9}, \infty\right)$ (B) $\left[-\frac{4}{9}, \infty\right]$

(C) $\left[-\frac{4}{9}, \frac{4}{9}\right]$ (D) $\left[-\frac{4}{9}, \frac{155}{9}\right]$

22. Maaladar Reddy bequeathed his property comprising 'A' acres of land to his three sons, such that the areas of the shares of land given to the sons were in geometric progression. If the maximum difference between the shares of any two sons is 385 acres and the least possible sum of the shares of any two sons is 770 acres, then find the value of A.

(A) 650 (B) 975 (C) 1463 (D) 1580

23. If fresh grapes contain 80% water and 20% pulp, by weight, and 10 kg of fresh grapes yield 2.5 kg of dry grapes, then find the percentage of pulp, by weight, in dry grapes.

(A) 20% (B) 40% (C) 75% (D) 80%

24. Two painters, Arjo and Bulu, together got a contract to paint a house for ₹6000. On the day of the work, Arjo started the work as scheduled but Bulu turned up one hour late and as a result they took 45 minutes more to complete the job. What would be Bulu's share in the total amount had they both worked for an equal amount of time?

(A) ₹2400 (B) ₹3600 (C) ₹4000 (D) ₹4500

DIRECTIONS for questions 25 to 28: Type in your answer in the input box provided below the question.

25. If $\frac{(x)_6}{(10)_{10}} = (40)_8$, what is the value of x ?

26. Arif, Bill and Chetan were classmates and wanted to watch a movie at South City Mall right after their class got over. Bill had an Activa bike which could accommodate a maximum of two persons at a time and they wanted to reach the mall in the minimum time possible. They started simultaneously from their college, Bill and Arif on the bike and Chetan on foot. Bill dropped Arif at a certain point along the route to the mall, turned back and on his way met Chetan. He picked up Chetan and then traveled towards the mall such that all three of them reached the mall simultaneously. What is the total time (in minutes) taken by them to reach the mall from their college, if the speed of the bike was 30 km/hr, the walking speed of each of them was 6 km/hr and the distance between their college and the mall was 22.5 km?

27. If for all real numbers, a and b , $a * b = 2 - ab$, then how many of the following statements are true?

- I. $(3 * 2) * (2 * 3) = -14$
 II. $(4 * 2) * (2 * 3) = (1 * 6) * (8 * 1)$
 III. $(-1 * 2) * (-2 * 1) = (2 * 8)$
 IV. $(6 * 1) * (3 * 2) = (7 * 3) * (1 * 2)$

28. If the inradius and the circumradius of a rightangled triangle, when expressed in cm, are equal to the roots of the equation $x^2 - 14x + 40 = 0$, find the area (in sq. cm) of the triangle.

DIRECTIONS for questions 29 to 33: Select the correct alternative from the given choices.

29. If the quadratic equations $x^2 - ax + 3 = 0$ and $x^2 + ax - 5 = 0$ have one positive root in common, find the value of a .
 (A) -4
 (B) 2
 (C) 4
 (D) Cannot be determined

30. A thief escaped from a jail and started running at a speed of 10 kmph. Half an hour later, the police started chasing him. If the police brought the thief back to the jail in exactly one hour from the moment they started chasing him, then the distance run by the thief before he was caught is
 (A) 7.5 km. (B) 9 km.
 (C) 10 km. (D) 12 km.

31. Find the value of the least natural number which is divisible by both 112 and 180.
 (A) 5460 (B) 2520 (C) 5040 (D) 4620

32. P is a prime number, which is also a factor of ${}^{240}C_{120}$. If P is a two-digit number, then find the maximum value of P .
 (A) 71 (B) 83
 (C) 97 (D) None of the above

33. A shopkeeper offers a discount of 20% on the marked price of a product and makes a profit of 25%. To make a profit of 10% on the product, the shopkeeper should offer a discount of

- (A) $25\frac{3}{5}\%$ (B) $29\frac{3}{5}\%$
 (C) $42\frac{1}{22}\%$ (D) $26\frac{2}{5}\%$

DIRECTIONS for question 34: Type in your answer in the input box provided below the question.

34. For how many integral values of x will $f(x) = |x - 1| + |x - 2| + |x - 3| + |x - 4|$ assume a minimum value?