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DIRECTIONS *for questions 1 to 4:* The passage given below is followed by a set of four questions. Choose the best answer to each question.

The U.S. is one of the few nations on earth where private, for-profit business formation is seen as a quasi-heroic act. The resulting entrepreneurial culture has captured the world's imagination and driven the nation to great prosperity. Yet now it is clearly faltering.

In a new paper that's already generated much discussion, economists Ian Hathaway of Ennsyte Economics and Robert Litan of the Brookings Institution document four decades of "Declining Business Dynamism in the United States." Looking at data from all fifty states and all metropolitan areas, Hathaway and Litan conclude there's been a secular decline in business formation throughout the country, with a concurrent increase in business dissolution. The rate of business formation in 2016 was almost half of what it was in 1978, with the rate of dissolution somewhat higher than the past couple decades. When they restate this another way, the implications are clearer: "Whatever the reason, older and larger businesses are doing better relative to younger and smaller ones." Deep, disruptive economic change is all around us, but the data indicates that the national response has not been, contrary to our myths and history, one of increased entrepreneurship.

Hathaway and Litan stay close to the data in this work and stop short of speculating about causes of this trend. So allow me. While there are numerous factors in such a massive shift away from business formation, one of the most powerful has to be the consolidation of multiple economic sectors toward a handful of firms with hegemonic power over their industry. Much of this is driven by the needs of the financial sector, which itself has consolidated massively. This paper by the Richmond Fed shows how from 1960 to 2016, the U.S. financial services sector went from 13,000 of independent banks to half that number, while the top ten banks grew from 20% market share to 60%. As of 2016, the top ten banks had 70% of the market.

Consolidation of the financial sector has led to similar dynamics in other industries. In pharmaceuticals, the largest company, Pfizer, is the result of decades of mergers. The current corporate entity is comprised of firms that used to be called: King Pharmaceuticals, Wyeth, American Cyanamid, Lederle, Pharmacia, Upjohn, Searle, SUGEN, Warner-Lambert, Parke-Davis and others. In chemicals, energy, technology, beer and more, you can see a multi-decade trend toward the consolidation of behemoths. In the guitar business, too.

How does this consolidation impact entrepreneurs? Giant firms seek the services of similarly large vendors. New, small entrants into the market will be at pains to form relationships with such firms, and the power imbalance is effectively a monopsony –

sell to us at our price, on our invoice terms, or get lost. Trying to sell into a world of enormous corporate cartels is considerably more difficult than it was forty years ago, when every sector in America was smaller, more diverse and more dynamic.

Also, consider the need for new products and services in a country full of concentrated industries. When a company had dozens of potential competitors in various geographic regions, there was an incentive to innovate before the other guy does. In a concentrated market, competitors are few, and growth may come more from mergers and government lobbying than new product lines. For entrepreneurs, why start something new in such an environment? The current tech boom might serve as a counterexample, but consider that for most venture-backed companies, the ultimate exit plan is for sale of the firm to an existing behemoth, not continued independent operations.

The American entrepreneurial mythos arose in an environment that was perfect for supporting new businesses: rapid growth, technological change, constant competition, limited government intervention. We need to find ways to bring that environment back.

Q1. A suitable title for the passage would be

 a) America: An Age of Mergers and Acquisitions
 b) The loss of the Entrepreneurial Edge in America
 c) The Adverse Impact of Capitalism and Conglomeration in America
 d) The road to the loss of the Entrepreneurial Edge in America

Q2. Which of the following best summarizes the finding(s) of Hathaway and Litan's report?

 a) Entrepreneurs play a critical role in business dynamism, a process vital to sustained economic growth.
 b) Big corporations continue to do well in America, and business leaders have become more risk averse.
 c) There has been a persistent decline in entrepreneurial ventures across the country.
 d) America should do everything it can to encourage entrepreneurs to stay in this country.

Q3. Which of the following best represents the key argument made by the author in the passage?

 a) Monopsony is a market situation in which there is only one seller and monopolistic competition has driven small players out of the market.
 b) Consolidation of nearly all industries in the hands of a few firms has reduced the bargaining power of market entrants.

c) Consolidation of the financial sector has had a cascading effect on almost all other industries.

d) Large banks lend only to large firms and thus entrepreneurs run from pillar to post for seed capital.

Q4. The author of the passage corrects which of the following assumptions regarding the prevalent tech boom in America?

a) The business model of new technology companies is not viable in America in the long term.

b) Venture-backed start-ups with high potential for growth disrupt the narrative of concentrated markets.

c) Silicon start-ups like Instagram and Whatsapp, far from being growth-oriented, are actively seeking monopolistic buyers.

d) Most of the tech start-ups are going to go bankrupt unless acquired at unreal prices by aggressive behemoths like Facebook.

DIRECTIONS *for questions 5 to 7:* The passage given below is followed by a set of three questions. Choose the best answer to each question.

Religion is not a domain where anything goes, where any strange belief could appear and get transmitted from generation to generation. On the contrary, there is only a limited catalogue of possible supernatural beliefs. Even without knowing the details of religious systems in other cultures, we all know that some notions are far more widespread than others. The idea that there are invisible souls of dead people lurking around is a very common one; the notion that people's organs change position during the night is very rare. But, to those who believe in them, both are equally irrefutable. So the problem, surely, is not just to explain how people can accept supernatural claims for which there is no strong evidence but also why they tend to represent and accept these particular supernatural claims rather than other possible ones. We should explain why they are so selective in the claims they adhere to.

Indeed, we should go even further and abandon the credulity-scenario altogether. Here is why: In this scenario, people relax ordinary standards of evidence for some reason. If you are against religion, you will say that this is because they are naturally credulous, or respectful of received authority, or too lazy to think for themselves, etc. If you are more sympathetic to religious beliefs, you will say that they open up their minds to wondrous truths beyond the reach of reason. But the point is that if you accept this account, you assume that people first open up their minds, as it were; and then let it be filled by whatever religious beliefs are held by the people who influence them at that particular time. This is often the way we think of religious adhesion. There is a gate-keeper in the mind that either allows or rejects visitors, that is, other people's concepts and beliefs.

Our present knowledge of mental processes suggests that this scenario is highly misleading. People receive all sorts of information from all sorts of sources. All this information has some effect on the mind. Whatever you hear and whatever you see is perceived, interpreted, explained and recorded by the various inference systems I described above. Every bit of information is fodder for the mental machinery. But then some pieces of information produce the effects that we identify as 'belief'. That is, the person starts to recall them and use them to explain or interpret particular events; they may trigger specific emotions; they may strongly influence the person's behaviour. Note that I said some pieces of information, not all. This is where the selection occurs. In ways that a good psychology of religion should describe, it so happens that only some pieces of information trigger these effects, and not others; it also happens that the same piece of information will have these effects in some people but not others. So people do not have beliefs because they somehow made their minds receptive to belief and then acquired the material for belief. They have some beliefs because, among all the material they acquired, some of it triggered these particular effects.

Q5. When the author says "Our present knowledge of mental processes suggests that this scenario is highly misleading." (para 3), what does "this scenario" refer to?

 a) People opening up their minds to wondrous truths and basing their beliefs on strong logical foundations.
 b) The gatekeeper of the mind selecting or filtering information related to the supernatural more effectively than it others does natural phenomena.
 c) External religious concepts and beliefs finding a home in the mind and becoming the person's own beliefs and concepts, when the gate-keeper allows them in.
 d) A tendency to be too ready to believe that something is real or true.

Q6. Which of the following best describes the author of this passage?

 a) He is a non-religious person who is unable to understand why people subject their minds to religious beliefs.
 b) He is optimistic about the fact that all the not yet unanswered questions related to the psychological basis of religions in human beings will be eventually answered.
 c) He is a passionate advocate of religious causes and feels distressed that many non-believers believe religion to be supernatural.
 d) He is an objective person who considers how the human mental machinery acquires and represents religious concepts.

Q7. Which of the following statements related to beliefs is /are consistent with the information presented in the passage?

Identify all that apply and enter the corresponding number in the input box given below. You must enter your answer in increasing order only. For example, if you think (1) and (3) apply, then enter 13 (but not 31) in the input box.

1. The list of possible supernatural beliefs is endless, one example of a rare belief is that there are invisible dead people lurking around the corner.

2. An athiest would think that people acquire religious beliefs because they are naturally credulous, or respectful of received authority, or too lazy to think for themselves.

3. The author is not interested in deciphering the reasons that people tend to associate with and accept particular supernatural beliefs in place of others.

4. All information gathered by us has some effect on the mind but some information triggers particular effects which are responsible for the creation of beliefs.

5. While all bits of information may be capable of generating belief, some persons develop some bits into belief, other persons develop others into belief.

Q8. **DIRECTIONS** *for question 8:* The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 or 5). Decide on the proper order for the sentences and key in the correct sequence of five numbers as your answer in the input box given below the question.

1. But there is a hitch: tech firms are taking much longer to list.
2. For tech startups, paying employees with shares makes sense.
3. That leaves many workers pining for a payday.
4. Young companies can reduce their bills and so preserve their capital; workers receive a payout which, although deferred and uncertain, is potentially far more valuable than their salary.
5. Their average age at initial public offering (IPO) has risen from four years during the dotcom bubble in 1999-2000 in America to 11 today.

Q9. **DIRECTIONS** *for question 9:* 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 it in.

1. He is a specialist on slow clay surfaces, but ahead of his arrival in New York he had won fewer than half of his matches on hard courts.

2.   Mr Schwartzman, nicknamed "El Peque" ("the small one"), had only once before reached the third round of a major.

3.   The bad news for El Peque is that being at the smaller end of the spectrum seems to be even more of a shortcoming.

4.   Now that the men's field is down to the final eight, one name is particularly surprising: Diego Schwartzman, a 25-year-old Argentine who is just five feet and seven inches tall.

5.   With former champions Novak Djokovic, Andy Murray, and Stan Wawrinka all missing from this year's US Open, a throng of less-familiar names are headed to Flushing with a chance to make a name for themselves.

Q10.   DIRECTIONS *for question 10:* The following question has a paragraph from which a sentence has been left incomplete. From the given options, choose the one that completes the blank in the paragraph in the most appropriate way. Enter the number alongside the correct answer choice in the input box given below the question.

Precision instruments such as motorcycles are designed to achieve an idea, dimensional precision, whose perfection is impossible. There is no perfectly shaped part of the motorcycle and never will be, but when you come as close as these instruments take you, remarkable things happen, and you go flying across the countryside under a power that would be called magic if it were not so completely rational in every way. It's the understanding of this rational intellectual idea that's fundamental. John looks at the motorcycle and he sees steel in various shapes and has negative feelings about these steel shapes and turns off the whole thing. I look at the shapes of the steel now and I see ideas. _____

1.   I was talking about these concepts yesterday when I said that a motorcycle can be divided according to its components and according to its functions.

2.   In a motorcycle this precision isn't maintained for any romantic or perfectionist reasons.

3.   I swing over to the street side of the machine and start on the other cylinder.

4.   He thinks I'm working on concepts; I say that we need to talk about the system.

5.   He thinks I'm working on parts; I'm working on concepts.

Q11.   DIRECTIONS *for question 11:* The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 or 5). Decide on the proper order for the sentences

and key in the correct sequence of five numbers as your answer in the input box given below the question.

      1.   But volcanic eruptions formed barriers of lava that isolated it from the ocean.

      2.   There are a few places where what a geologist would call the ocean floor is actually dry land.

      3.   One such is the Danakil depression, which was covered millions of years ago by the Red Sea.

      4.   These are mined, and the resulting slabs of salt exported by camel, by nomadic Afars who are the nearest thing the depression has to permanent inhabitants.

      5.   What water remained evaporated in the intense heat, leaving brine lakes and saline flats.

Q12. DIRECTIONS *for question 12:* Given below is a paragraph with three blanks, numbered (i), (ii) and (iii). Below the paragraph is a collection of 9 numbered choices. For each blank choose one numbered word from among the choices that will best complete the text. Key in the appropriate numbers of the words for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words labelled (7), (4) and (1) can correctly complete the three blanks in the para, in that order, then enter 741 as your answer in the input box. (Note: Only one word from the common pool can fill each blank in the para correctly.)

As a longtime fan of Stephen Jay Gould, I could hardly resist attending his lecture on immortality at the Harvard Divinity School. What would the eminent geologist and neo-Darwinian venture to say on a topic so far outside his _____(i)_____ naturalistic concerns? Two time-honored approaches were available to him: one, critique the notion of immortality as wishful thinking, not to be _____(ii)_____ by those of a scientific frame of mind; the other, to declare that science and religion are not in conflict, since they don't share any aims, methods, or domains of discourse to provide the basis for _____(iii)_____.

(1) disagreement	(6) reassurance
(2) contravened	(7) callously
(3) deferentially	(8) circumvented
(4) dismissal	(9) ordinarily
(5) countenanced	

Q13. DIRECTIONS *for question 13:* 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 it in.

1. Not for the first time, some energy firms fooled themselves into believing that newfangled technologies and funding mechanisms could let them defy laws of financial gravity.

2. This year, new solar installations in America are expected to more than double.

3. Last year, for the first time, the world invested more in photovoltaic cells than in coal-and gas-fired power generation combined.

4. In some respects this is a bumper era for solar energy.

5. China, which has more solar capacity than any other country, plans to triple it by the end of the decade.

DIRECTIONS *for questions 14 to 17:* The passage given below is followed by a set of four questions. Choose the best answer to each question.

A corked wine does not mean a wine that has tiny particles of cork floating around in the glass, which many drinkers still think. Sommeliers now use the term 'corked wine' for a wine that has become contaminated with cork taint caused by the presence of a chemical compound called TCA (2,4,6 - trichloroanisole).

This increased awareness is largely due to the battle now waging between defenders of the traditional cork stopper and its opponents, who believe that an unacceptable percentage of wine is affected by "corkiness". Unfortunately the battle has developed into a dialogue of the deaf. No one knows exactly how to evaluate the positive contribution made by cork to the quality of a wine, which some claim has to do with its porosity, which allows a desirably slow oxydation – though this is controversial. To complicate matters estimates of the "corkiness" due to defective corks rather than to the wine or to bad storage vary between less than 1% and 8%.

In Britain cork's defenders have unleashed a ferociously negative (and largely counter-productive) public-relations campaign. They have attacked plastic substitutes as imparting their own impurities and claimed that their use would destroy the cork-oak forests of Spain and Portugal, together with their dozens of rare species of birds. .....

The public battle started when a number of big British supermarket groups stated flatly that any systematic fault was as unacceptable in wine as it was in any other product. They were joined by American and Australian producers more aware of profit margins than more traditional wine makers and less inclined to accept the idea of cork contamination as an inescapable act of God. The battle has, belatedly, forced the cork industry into action. For years the price of cork had been increasing and the quality declining as the cork oaks were stripped of their precious bark too frequently. The manufacturing processes remained primitive and continued to rely on the

use of chlorine washes which increased the likelihood of contamination. Today washes have been changed, quality controls tightened and more care, generally, is taken that the corks are not exposed to moisture which encourages the development of TCA during the manufacturing process. Today corks can be treated in a process called INOS designed to use its inherent sponginess as a way of squeezing out possible contaminants. Amorim, the biggest producer, not only uses INOS but has also introduced a new cork "twin top" based on those used in champagne – where the cork's centre is made of agglomerated cork (cork granules stuck together) topped and tailed with slivers of pure cork.

But even Amorim and other quality-conscious producers such as Sabate are going to have to accept that plastic corks – and the screw caps used in many cheaper wines in the United States and by the Swiss for even their finest bevvies – are going to take an increasing share of the market. This is not because they are cheaper. They aren't, and they create their own problems: the perfection of the seal they provide means that the air in the bottle has to be expensively removed before the stopper is inserted, and they are harder to extract than their natural competitors, although they do provide the expected satisfying plop when the bottle is opened.

One obvious winner is the Supreme Corq from America, devised after its inventor had seen plastic bungs being used to seal the casks in some of the classiest estates in France. It is made from a recyclable, inert thermoplastic polymer used to store medicines – a field where cork was abandoned 80 years ago – thus answering many of the accusations hurled at plastic closures.

How likely is the wine-stopper war to end in open hostilities? Demand for wine in bottles (as opposed to wine in bags) is growing faster than the supply of properly prepared cork, so there is actually plenty of room in the market for different types of stopper. At the top end of the market, that does not necessarily favour plastic. For nobody can yet know whether plastic stoppers will remain sound for the 20 or more years during which the greatest wines mature before they are drunk. On the other hand, "the top end" accounts for a very small amount of the total wine drunk, and plastic's chances look correspondingly better. As over 90% of all wine is consumed within a year of being bottled (and within 24 hours of being purchased) for most drinkers the argument about the long-term effects of plastic will seem fairly theoretical.

Q14. Which of the following can serve as the central idea of this passage?

 a) It is the increasing cost of plastic corks that sets defenders of cork and of plastic against each other in a wine-industry row.

b) The large variety of different types of synthetic stoppers for wine bottles available in the market today is a major factor facing defenders of cork stoppers who think that they have to change with the times.

c) Defenders of cork and of plastic have found a win-win solution to the problem faced by them in the global wine-industry.

d) It is not so much cost but dependability that sets the defenders of cork and of plastic against each other in a wine-industry row.

Q15. According to the passage, what threatens the comfort of the natural cork stopper industry as of today?

a) Environmentalists allege that the demand for natural wine cork stoppers has resulted in the destruction of cork-oak forests in Spain and Portugal, together with dozens of rare bird species.

b) Chlorine washes used in the process of manufacturing natural cork stoppers for wine bottles have increased the likelihood of contamination resulting in quality decline.

c) The market share of plastic closures of wine bottles is set to grow even though the stoppers may be expensive.

d) Traditional wine makers in America want to abandon the use of cork stoppers because the medicinal industry in France had long abandoned cork replacing it with innovative material.

Q16. It can be inferred from the passage that the author seems to be ...

a) of the view that synthetically manufactured caps for wine bottles are here to stay.

b) against the usage of plastic stoppers as longevity of the wine is not balanced by the longevity of plastic stoppers.

c) in favour of new innovative entrants in the wine stopper market such as "twin top" and "Supreme Corq".

d) in favour of using natural cork along with improved processes such as INOS as well as innovative treatments which discourage the development of TCA.

Q17. What is the style of the passage?

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

Q18. DIRECTIONS *for question 18:* The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 or 5). Decide on the proper order for the sentences

and key in the correct sequence of five numbers as your answer in the input box given below the question.

    1.   The device monitors their driving and adjusts the rate they pay accordingly.

    2.   For those who drive relatively little, Metromile, an insurer based in San Francisco, simply charges by the mile.

    3.   They can either supply a few bits of information about themselves and receive a quote based on the behaviour of similar people, or they can install a small gadget in their car.

    4.   Drivers buying insurance from Progressive, an American insurer, get a choice.

    5.   Those who refrain from braking sharply and stay off the roads at night can earn a discount of as much as 30% on the generic premium.

Q19. **DIRECTIONS** *for question 19:* 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 it in.

    1.   But beyond mere ostentation, the city-state has more substantial achievements to its credit.

    2.   It has the world's tallest building (the Burj Khalifa), the largest shopping centre (the Dubai Mall) and the longest handmade gold chain (5.52 km), to name but three.

    3.   The question is whether such grand projects make economic sense when oil prices are collapsing and stock markets are declining across the region.

    4.   This year Dubai airport overtook Heathrow in London to become the world's busiest international hub, with some 68.9 m passengers using it yearly.

    5.   Dubai likes to set records.

Q20. **DIRECTIONS** *for question 20:* The following question has a paragraph from which a sentence has been left incomplete. From the given options, choose the one that completes the blank in the paragraph in the most appropriate way. Enter the number alongside the correct answer choice in the input box given below the question.

President John F. Kennedy set a goal in 1961 for the nation to land a man on the Moon by 1970. His successor, Lyndon Johnson, who as Vice President had helped establish NASA, resolved to achieve Kennedy's goal. As Johnson's presidency progressed, he faced growing political pressures stemming from his handling of the Vietnam war. With his reelection in real

jeopardy, Johnson quietly passed the word to NASA to move quickly on the Apollo moon-landing program. _____

1.   Quality thinking has always required courage, honesty and determination.

2.   The administration and the nation, he reasoned, needed a triumph to counterbalance the ongoing tragedy of Vietnam.

3.   Johnson's strategy, coupled with competition from Russian space successes, drove Apollo's managers and engineers to think and work at breakneck speed but quality eroded.

4.   Diverting public attention has always been a useful political stratagem.

5.   A man on the moon was, possibly, going to be easier and would yield greater political benefit than a victory in Vietnam.

Q21.   DIRECTIONS *for question 21:* The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 or 5). Decide on the proper order for the sentences and key in the correct sequence of five numbers as your answer in the input box given below the question.

1.   Finding the best possible solution requires still more imagination of the sort Tom used when his plans for a glorious summer day of swimming collided with Aunt Polly's orders to whitewash ninety feet of board fence standing nine feet high.

2.   Thinking beyond the bounds of conventional wisdom produces unconventional answers.

3.   His day of play having turned into weary work, Tom ransacked his mind for some way out.

4.   Dipping his brush and sloshing a white streak on the wood-planked surface, Tom felt overwhelmed by the huge task ahead and plopped down dejectedly on a bench.

5.   But it does not guarantee any one solution will lead to success.

Q22.   DIRECTIONS *for question 22:* 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 it in.

1.   How the tables have turned.

2.   Aleppo may determine what happens in Syria, the region and beyond.

3.   Not only were Bashar's battalions pushed back from the city; the rebels then turned west and routed them from Idlib too.

4.   In February 2015, Bashar al-Assad's forces launched an offensive to take back Aleppo, once Syria's most populous city but divided between the regime and rebel fighters since 2012.

5.   Two years on, Mr. Assad is attacking Aleppo again and, this time, he is succeeding.

Q23. DIRECTIONS *for question 23:* Given below is a paragraph with three blanks, numbered (i), (ii) and (iii). Below the paragraph is a collection of 9 numbered choices. For each blank choose one numbered word from among the choices that will best complete the text. Key in the appropriate numbers of the words for each blank, in the correct sequential order, in the input box given below the question. For example, if you think that words labelled (7), (4) and (1) can correctly complete the three blanks in the para, in that order, then enter 741 as your answer in the input box. (Note: Only one word from the common pool can fill each blank in the para correctly.)

Gronmo's understanding of compensatory consumption behaviour derived from the notion that while many consumer behaviour models are based on an underlying _____(i)_____ between action and needs. An opposite approach could be equally valid in that parts of the consumer's behaviour are characterised by a systematic lack of correspondence between action and needs. Rather than _____ (ii)_____ specific needs, certain aspects of consumption may be reactions to a more general lack of need satisfaction- that is, to compensate for failure or _____(iii)_____ of some sort.

(1) jejune	(6) assumption
(2) strength	(7) expediencies
(3) correspondence	(8) satisfying
(4) weakness	(9) manifestation
(5) evaluating	

DIRECTIONS *for questions 24 to 26:* The passage given below is followed by a set of three questions. Choose the best answer to each question.

The sociological theory that the loss of the support of objectively established religion, the dissolution of the last remnants of pre-capitalism, together with technological and social differentiation or specialization, have led to cultural chaos is disproved every day; for culture now impresses the same stamp on everything. Films, radio and magazines make up a system which is uniform as a whole and in every part. Even the aesthetic activities of political opposites are one in their enthusiastic obedience to the rhythm of the iron

system. The decorative industrial management buildings and exhibition centres in authoritarian countries are much the same as anywhere else. City housing projects designed to perpetuate the individual as a supposedly independent unit in a small hygienic dwelling make him all the more subservient to his adversary – the absolute power of capitalism. Because the inhabitants, as producers and as consumers, are drawn into the centre in search of work and pleasure, all the living units crystallize into well-organized complexes. The striking unity of microcosm and macrocosm presents men with a model of their culture: the false identity of the general and the particular. Under monopoly, all mass culture is identical, and the lines of its artificial framework begin to show through. The people at the top are no longer so interested in concealing monopoly: as its violence becomes more open, so its power grows. Movies and radio need no longer pretend to be art. The truth that they are just business is made into an ideology in order to justify the rubbish they deliberately produce. They call themselves industries; and when their directors' incomes are published, any doubt about the social utility of the finished products is removed. Interested parties explain the culture industry in technological terms. It is alleged that because millions participate in it, certain reproduction processes are necessary that inevitably require identical needs in innumerable places to be satisfied with identical goods. The technical contrast between the few production centres and the large number of widely dispersed consumption points is said to demand organization and planning by management. Furthermore, it is claimed that standards were based in the first place on consumers' needs, and for that reason were accepted with so little resistance. The result is the circle of manipulation and retroactive need in which the unity of the system grows ever stronger.

No mention is made of the fact that the basis on which technology acquires power over society is the power of those whose economic hold over society is greatest. A technological rationale is the rationale of domination itself. It is the coercive nature of society alienated from itself. Automobiles, bombs and movies keep the whole thing together until their levelling element shows its strength in the very wrong which it furthered.

Q24. According to the passage, how are the entertainment industry and politics part of the same conspiracy?

 a) They both cater to the public appeal of the capitalist state and have a symbiotic relationship with each other.
 b) The dominion of capitalist power, which enforces mass entertainment over variety, also results in the presentation of disparate political systems and ideologies in ways that are uniform.
 c) Capitalist power exerts its influence over the entertainment industry and politics by pushing for the removal of differences in their functioning.

d) Capitalist power will help in enhancing the scope of both the entertainment industry and politics.

Q25. What, according to the author of the passage, do automobiles, bombs and movies have in common?

a) They represent the attitude of the public which ostensibly and actually disrupts the system of the culture industry.
b) They are a heirarchical range of mass produced products of varying quality and desired by all.
c) They represent the new era of technological progress, which is essentially democratic in form.
d) Through technology, they represent a motive which is one of dominion and weighty economic power.

Q26. Which of the following statements does the author of this passage disprove?

a) Culture and industry have joined hands to provide goods and services to the consumer.
b) The basis on which technology acquires power over society is the power of those whose economic hold over society is greatest.
c) The standards present in the entertainment industry were based in the first place on consumers' needs and for that reason were accepted with so little resistance.
d) Culture has become a byword for the materialistic tendencies of man.

DIRECTIONS *for questions 27 to 30:* The passage given below is followed by a set of four questions. Choose the best answer to each question.
Over the past 30 years, the world's urban population has risen from 1.6 billion to 3.3 billion, and over the next 30 years cities in the developing world are set to grow by an extra 2 billion. But many governments have become doubtful of their ability to cope with urbanisation on such an enormous scale; some have concluded that they ought to slow the process down in order to minimise social upheaval. This view owes as much to anti-urban bias as it does to sober analysis. In 2005, more than half of the poor countries surveyed by the UN population division said they wanted to reduce internal migration to rein in urban growth.
Yet new research published by the World Bank in its annual flagship World Development Report suggests that pessimism over the future of huge cities is wildly overdone. The bank argues that third-world cities grow so big and so fast precisely because they generate vast economic advantages, and that these gains may be increasing. Slowing urbanisation down, or pushing it towards places not linked with world markets, is costly and futile, the bank says. At a time of contagion and bail-outs, the research also reaffirms the

unfashionable view that the basic facts of geography – where people live and work, how they get around – matter as much as financial and fiscal policies. It is true that cities are unprecedented in size. The average population of the world"s 100 largest cities now exceeds 6m. In 1900, it was only 700,000. But relative to the size of countries' populations, the current growth is far from unusual. Between 1985 and 2015 the urban share of the population of developing countries rose by eight percentage points. Between 1870 and 1900, the bank says, the urban share in then-industrialising Europe and America went up by about the same amount. .... Urbanisation is accelerating. But history suggests it will not go on rising at this rate for ever. History also suggests that the income gaps that worry governments will narrow. As people move to the city, urban wages are typically 40-50% higher than unskilled farm earnings (that was the premium in Europe in the 19th century; it is about the same in developing countries today). But the income gaps of rich countries have narrowed, so living standards in the West today are roughly the same between town and country.

That convergence is starting in poor countries, too: in poorer Malawi and Sri Lanka, city dwellers account for a much bigger share of consumption than of population (20% compared with 10%). But in richer Chile and Brazil, urbanites account for only slightly more consumption than population.

Why are third-world cities so big? They are not in relative terms all that large. But they are big because they do an economic job that is becoming more, not less, important. Cheap transport in the past 25 years has produced a second sort of trade revolution. Countries now sell each other not final products like port but intermediate ones such as recording heads for hard drives. That has been made possible by an extraordinary fragmentation of production: every step in the production line is broken down. Parts are made separately, then shipped for assembly.

If it is so important where economic activity takes place, what should countries do if they lack big cities – perhaps because they are landlocked, or cut off from world markets or have many poor people living in rural areas? These, the bank thinks, are the real problems of urbanisation, not the multiplication of slums or congestion. The answer, in the bank's view, depends on why people are cut off. If they are trapped in underemployment in remote rural areas, the main task is to establish land markets and basic services (schools, streets, sanitation) to help cities grow. ...

Where urbanisation has started but pockets of the population are trapped far away, governments have to focus more on transport and other sorts of infrastructure to connect lagging regions with fast-growing ones. It is not until a more advanced stage of urbanisation is reached – with 75% of the population in cities (like, say, northern Egypt or Rio de Janeiro) – that it makes any sense to spend a lot on such policies as slum clearances, lest the now-teeming city is split apart by crime and grime.

Q27. The passage suggests that the 'real problems of urbanization' can be tackled by

a) establishing special economic zones to decluster production in cities.
b) arresting the flow of credit to business services in cities and slowing urbanization down.
c) clearing the slums in the cities and rehabilitating the displaced in cheap housing sectors in less congested areas.
d) establishing land markets as well as infrastructure that connects flagging and fast-growing regions.

Q28. It can be understood from the passage that the World Bank report indicates concern about large cities more in the aspect of

a) consumption rather than population.
b) size rather than economic activity.
c) access rather than prevalence of slums.
d) crime rather than income-gaps between cities and rural areas.

Q29. The World Bank allays third world fears that the huge cities would spiral out of control by giving all the following reasons EXCEPT?

a) The rates of urbanization would stabilize after a certain level of urbanization is reached.
b) The share of consumption of urbanites would remain higher than that of country dwellers.
c) Cities make possible focus on specific economic and business segments.
d) The rates of urbanization are quite normal in developing countries.

Q30. Which of the following statements is not in keeping with the content of the passage?
Identify all that apply and enter the corresponding number in the input box given below. You must enter your answer in increasing order only. For example, if you think (1) and (2) apply, then enter 12 (but not 21) in the input box.
1.   Slowing urbanization does not make any sense, under any circumstances.
2.   Developing nations attribute their rising urban population to internal migration.
3.   Location of economic activity is as critical to economic impact as fiscal policies.
4.   Third-world cities are big because they are hubs of economic activity.

5.   Investments in improving the standards of living in underdeveloped areas help cities grow.

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

Six students – Amit, Giri, Kiran, Manoj, Naveen and Ravi – were ranked from 1 to 6 in each of three subjects, Maths, Physics and Chemistry, such that, in any subject, a numerically lower rank was considered better than a numerically higher rank. Further, it is known that no two students received the same rank in any subject and no student received the same rank in any two subjects.

The following table provides, for each of the six students, the sum of the ranks received by him across the three subjects and the difference between the highest rank received by him and the lowest rank received by him in any subject:

Student	Sum of Ranks	Difference in Ranks
Amit	8	3
Giri	11	3
Kiran	6	2
Manoj	12	5
Naveen	13	3
Ravi	13	4

Further, it is also known that

1.   the student who received the third rank in Maths received the fourth rank in Chemistry.

2.   the student who received the first rank in Maths received the sixth rank in Physics.

Q1. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.

Who received the first rank in Chemistry?

a) Amit
b) Kiran
c) Manoj

d) Ravi

Q2. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
What is the difference between the rank received by Giri in Physics and that received by Ravi in Maths?

a) **0**
b) **1**
c) 2
d) More than 2

Q3. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
How many students received a better rank than Ravi in both Maths and Chemistry?

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

Q4. DIRECTIONS *for questions 1 to 4:* Select the correct alternative from the given choices.
Who among the following received the same rank in Physics as Giri received in Maths?

a) Amit
b) Manoj
c) Naveen
d) Ravi

DIRECTIONS *for questions 5 to 8:* Answer these questions on the basis of the information given below.
Pavan, a consultant, travels between four different cities – London, Paris, New York and Zurich. When travelling between any two cities, he always travels by air. Further, any flight that he took between any pair of cities took off and landed on the same day. Also, if he took a flight from any city on a day, he landed in that city again only after at least ten days.
Last year, on May 1st, Pavan landed in Paris from Zurich. During the months of May and June of that year, Pavan travelled only on May 4th, May 7th, May 13th, May 18th, May 22nd , May 26th, June 1st , June 7th and June 13th. On June 13th, he landed in Paris.

The number of days that he stayed in any city does not include the day on which he landed in that city and the day on which he took a flight from that city.

Q5. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
For how many days did Pavan stay in Paris, during the period May 1st to June 13th?

a) **4**
b) **5**
c) 6
d) Cannot be determined

Q6. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
For how many days did Pavan stay in London, during the period May 1st to June 13th?

a) **8**
b) **9**
c) 10
d) Cannot be determined

Q7. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
If Pavan stayed in New York on May 19th, in which city did Pavan stay on June 10th?

a) New York
b) London
c) Zurich
d) Cannot be determined

Q8. DIRECTIONS *for questions 5 to 8:* Select the correct alternative from the given choices.
Which of the following cannot be the origin and destination of a flight that Pavan took during the given period?

a) Origin: Zurich; Destination: New York
b) Origin: Paris; Destination: New York
c) Origin: New York; Destination: London
d) Origin: Paris; Destination: Zurich

DIRECTIONS *for questions 9 and 10:* Each question is followed by two statements, I and II. Study the information given in the statements and assess whether the information is sufficient to answer the question. Then, type in your answer, in the input box provided below the question, as

      1.   if the question can be answered using statement I alone but cannot be answered using statement II alone.

      2.   if the question can be answered using statement II alone but cannot be answered using statement I alone.

      3.   if the question can be answered using both statements I and II together but cannot be answered using either statement alone.

      4.   if the question cannot be answered even after using both statements I and II together.

      5.   if the question can be answered even without using either of the two statements.

Q9. **DIRECTIONS** *for question 9 and 10:* Type in your answer in the input box provided below the question.
Five persons, A through E, were standing in a line, from left to right, all facing the same direction, such that A was standing adjacent to both D and E; C was standing adjacent to B.
Who is standing at the extreme left?
      1.   C was standing two places to the left of A.
      2.   C was standing adjacent to E.

Q10. **DIRECTIONS** *for question 9 and 10:* Type in your answer in the input box provided below the question.
Three teams, Team A, Team B and Team C, participated in a football tournament, in which each team played against each of the other two teams exactly once. The following table provides the number of matches won, lost and drawn by each team and the number of goals scored for (GF) and the number of goals scored against (GA) each team:

Team	Wins	Losses	Draws	GF	GA
Team A	1	1	0	4	3
Team B	0	1	1	2	4
Team C	1	0	1	5	4

How many goals were scored in the match between Team A and Team C?
      1.   In one of the matches, the two teams scored two goals each.
      2.   Team B did not score any goal in the match against Team A.

Q11. DIRECTIONS *for question 11:* Select the correct alternative from the given choices.

Each of Ram and Shyam has an analog watch, having two hands – an hour hand and a minute hand. The watch that Ram has loses ten minutes every hour, while the watch that Shyam has gains five minutes every hour. Both Ram and Shyam set their watches to the correct time at exactly 12 noon on a certain day. In the next fifteen hours, how many times (excluding the first time at 12 noon) will the minute hands of the two watches be at the same position?

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

DIRECTIONS *for questions 12 to 15:* Answer these questions on the basis of the information given below.

In a country, elections were conducted in each of seven states – State A through State G. In each state, the party that secured more than 50% of the votes polled will win the election and come to power. In any state, if no single party secured more than 50% of the votes polled, a coalition is formed between two parties or three parties (but not more) such that the votes secured by the parties involved add up to more than 50% of the votes polled in that state. Further, whenever two or three parties form a coalition in any state, the coalition is formed at a national level, i.e., the parties involved form a coalition in all the other states as well.

In each state, the Chief Minister is appointed from the party that secured more than 50% of the votes polled. In case no party secured more than 50% of the votes polled, the Chief Minister is appointed from the party which secured a maximum number of votes polled among the parties involved in the winning coalition (i.e., the coalition that secured more than 50% of the votes polled).

Exactly six parties – AHP, CGP, TPL, EDP, WDP and TRP – participated in the elections in each of the seven states.

The first table given below provides the percentage of votes secured by each party in each state and the second table provides the number of Chief Ministers from each party appointed across the seven states:

	AHP	CGP	TPL	EDP	WDP	TRP
State A	20%	12%	11%	20%	25%	12%
State B	15%	10%	30%	5%	15%	25%
State C	20%	30%	15%	15%	0%	20%
State D	25%	0%	35%	5%	5%	30%
State E	0%	5%	5%	40%	30%	20%
State F	0%	35%	15%	20%	5%	25%
State G	5%	20%	30%	15%	4%	26%

Party	Number of Chief Ministers
AHP	1
CGP	1
TPL	2
EDP	2
WDP	0
TRP	1

Q12. **DIRECTIONS** *for questions 12 to 15:* Select the correct alternative from the given choices.
Which party was the Chief Minister of State C from?

a) **CGP**
b) **AHP**
c) TRP
d) Cannot be determined

Q13. **DIRECTIONS** *for questions 12 to 15:* Select the correct alternative from the given choices.
The Chief Minister of which state was from TRP?

a) State B
b) State C
c) State D
d) State G

Q14. **DIRECTIONS** *for questions 12 to 15:* Select the correct alternative from the given choices.
In how many states did the party to which the Chief Minister belongs secure less than 25% votes?

a) **0**
b) **1**
c) 2
d) More than 2

Q15. **DIRECTIONS** *for questions 12 to 15:* Select the correct alternative from the given choices.
In how many states was the Chief Minister not from the party which secured the maximum number of votes?
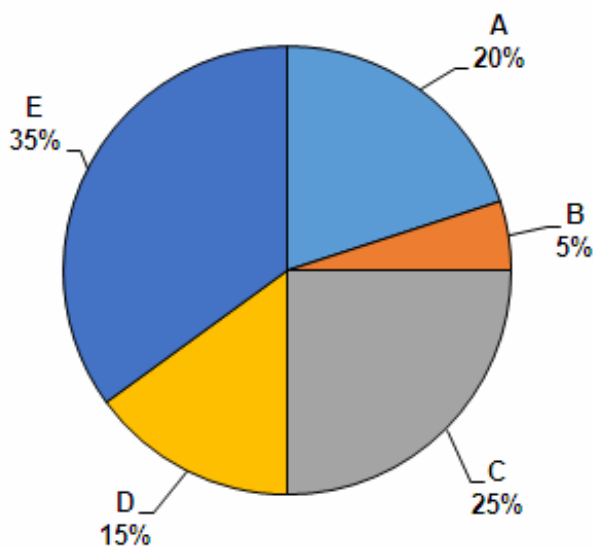
a) **3**
b) **2**
c) 1
d) **0**

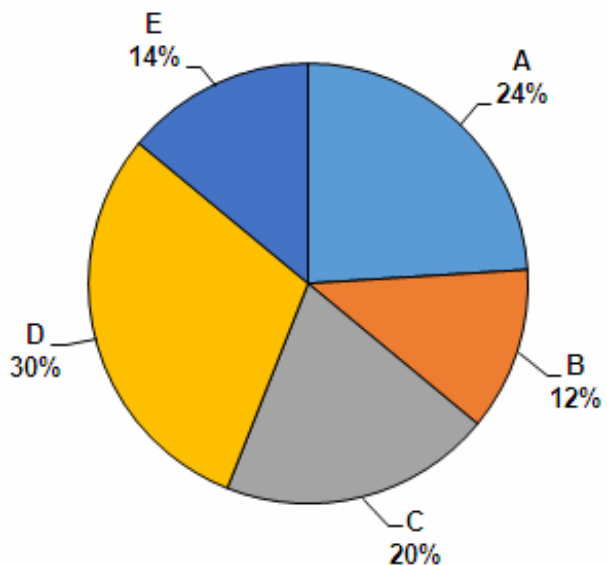**DIRECTIONS** *for questions 16 to 19:* Answer these questions on the basis of the information given below.
In a theatre, there are five different types of seats – A, B, C, D and E. The price per seat of all the seats of a particular type is the same. However, the price per seat is different for different types of seats.
The first pie chart below provides the percentage breakup of the number of seats in the theatre by the type of seat. The second pie chart provides a similar breakup of the revenue that the theatre could have earned for one show if all the seats in the theatre were sold.

Percentage breakup of Seats

A 20%
B 5%
C 25%
D 15%
E 35%

Percentage breakup of Revenue

E 14%
A 24%
B 12%
C 20%
D 30%

Q16. **DIRECTIONS** *for question 16:* Select the correct alternative from the given choices.
If, on a particular day, the revenue from each type of seat was the same and all the seats of one particular type were sold out, which of the following type of seat was sold out?

a) **B**
b) **A**

c) C
d) **E**

Q17.   DIRECTIONS *for question 17:* Type in your answer in the input box provided below the question.
If, on a particular day, the revenue from each type of seat was the same and the price of a seat of type C is Rs.80, what is the minimum number of seats sold on that day?

Q18.   DIRECTIONS *for question 18:* Select the correct alternative from the given choices.
If, on a particular day, at least 60% of the seats of each type were filled and the revenue from n types of seats were the same, what is the maximum possible value of n?
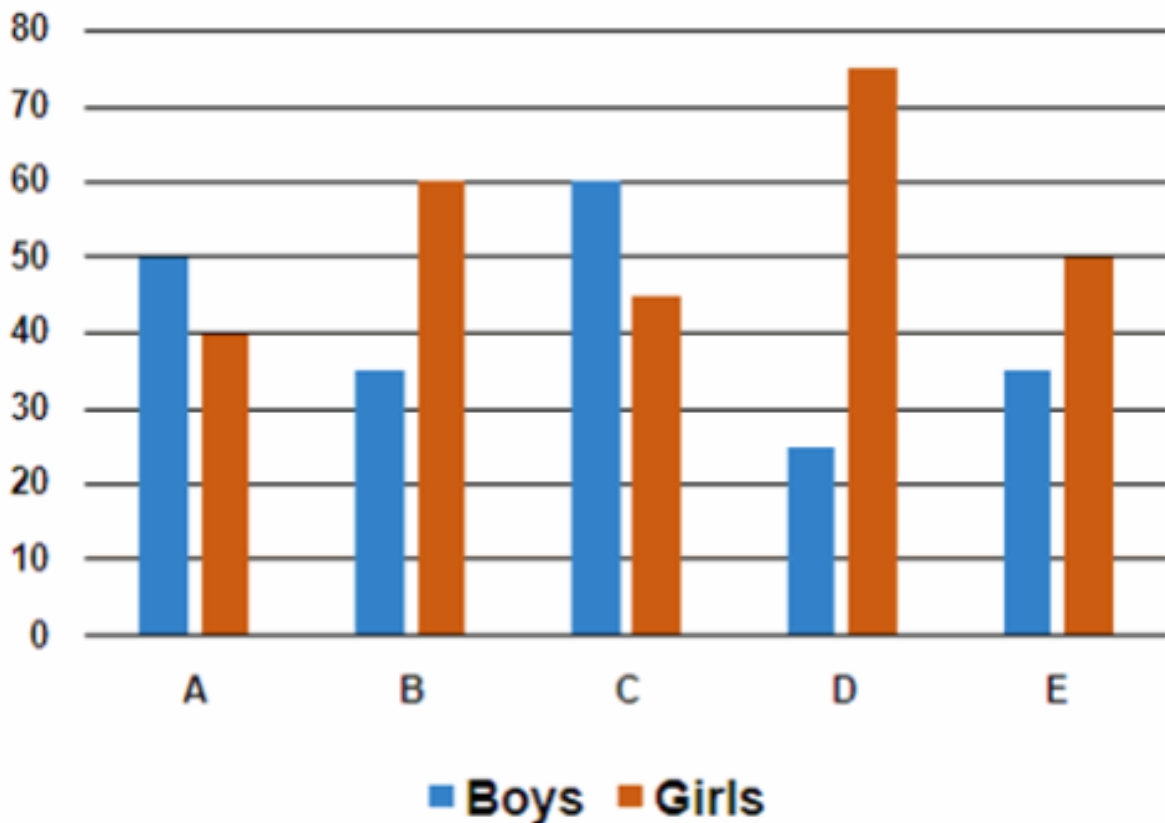
a) **5**
b) **4**
c) 3
d) **2**

Q19.   DIRECTIONS *for question 19:* Type in your answer in the input box provided below the question.
If, on a particular day, at least p% of the seats of each type were filled and the revenue from four different types of seats were the same, what is the maximum possible value of p?

Q20. DIRECTIONS *for question 20:* Select the correct alternative from the given choices.
The following line graph provides the number of boys and number of girls in five different schools, A, B, C, D and E, in a city:

If the five schools were ranked from 1 to 5 in the descending order of the total number of children in the school, what is the number of girls in the school ranked third as a percentage (approximately) of the number of boys in that school?

a) 170%
b) **80%**
c) 75%
d) 300%

DIRECTIONS *for questions 21 to 24:* Answer these questions on the basis of the information given below.
Each of five celebrities, Pavan, Rishi, Tarun, Himesh and Imran, endorses a different type of product among Soft Drink, Video Game, Smartphone, Backpack and Watch, not necessarily in the same order. The brand names of the products that they endorse are Fizz, Pop, Soda, Carb and Gulp, not necessarily in the same order.
It is known that

1. Pavan, who endorses a Smartphone, does not endorse Soda.
2. Imran, who endorses Pop, does not endorse a Video Game.
3. Rishi endorses neither a Video Game nor a Soft Drink.
4. Pop is not a Soft Drink, while Gulp is a Watch.
5. Himesh endorses neither Fizz nor Soda.

Q21. **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
Which product does Imran endorse?

a) Backpack
b) Watch
c) Soft Drink
d) Cannot be determined

Q22. **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
Which brand does Tarun endorse?

a) **Pop**
b) Soda
c) Carb
d) Fizz

Q23. **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
Who among the following endorses Carb?

a) Tarun
b) Himesh
c) Pavan
d) Rishi

Q24. **DIRECTIONS** *for questions 21 to 24:* Select the correct alternative from the given choices.
Which product does Himesh endorse?

a) Soft Drink
b) Video Game
c) Watch
d) Cannot be determined

DIRECTIONS *for questions 25 and 26:* Each question is followed by two statements, I and II. Study the information given in the statements and assess whether the information is sufficient to answer the question. Then, type in your answer, in the input box provided below the question, as
　　1.　　if the question can be answered using statement I alone but cannot be answered using statement II alone.
　　2.　　if the question can be answered using statement II alone but cannot be answered using statement I alone.

3. if the question can be answered using both statements I and II together but cannot be answered using either statement alone.
4. if the question cannot be answered even after using both statements I and II together.
5. if the question can be answered even without using either of the two statements.

Q25. **DIRECTIONS** *for question 25 and 26:* Type in your answer in the input box provided below the question.

In a certain city, there are three parks – Amusebush, Thrilley and Greengrass. During a week, exactly 120 persons visited only Amusebush and Greengrass, 45 persons visited both Thrilley and Greengrass, 20 persons visited only Thrilley, while 60 persons visited exactly one park.

How many persons visited only Amusebush?

1. No person who visited Thrilley visited Amusebush.
2. Exactly 200 persons visited Greengrass.

Q26. **DIRECTIONS** *for question 25 and 26:* Type in your answer in the input box provided below the question.

Each of five persons, P, Q, R, S and T, purchased a pen such that the price (in Rs.) of each pen was a distinct integral multiple of 5. The price of the pen that P purchased was Rs.25 less than the price of the pen that Q purchased, which in turn was Rs.20 less than the price of the pen that T purchased.

What is the price of the cheapest pen that any of them purchased?

1. The average price of a pen that they purchased was Rs.25.
2. The price of at least one of the five pens was a multiple of Rs.3.

DIRECTIONS *for questions 27 to 30:* Answer these questions on the basis of the information given below.

On a particular day, six persons – Kiran, Lalit, Manoj, Naveen, Omar and Piyush – visited a coffee shop, each at a different time. Further, each of the six persons had a different beverage among Antoccino, Cappuccino, Chococcino, Frappuccino Marocchino and Mochaccino, at the coffee shop. The following information is known about the order in which the six persons visited the coffee shop and the beverages that they had:

1.   The person who was the first to visit the coffee shop had neither an Antoccino nor a Frappuccino, while the person who was the last to visit did not have a Marocchino.

2.   The person who had a Frappuccino visited the coffee shop immediately before the person who had a Marocchino.

3.   Kiran, who did not have an Antoccino, visited the coffee shop immediately before Manoj, who had a Chococcino.

4.   Lalit, who had a Cappuccino, visited the coffee shop immediately before the person who had an Antoccino.

5.   Naveen, who did not have a Marocchino, visited the coffee shop immediately after Omar but both of them visited the coffee shop before Lalit.

Q27.   DIRECTIONS *for questions 27 to 30:* Select the correct alternative from the given choices.
Who was the last person to visit the coffee shop?

 a) Manoj
 b) Piyush
 c) Naveen
 d) Omar

Q28.   DIRECTIONS *for questions 27 to 30:* Select the correct alternative from the given choices.
How many persons visited the coffee shop before Manoj?

 a) **0**
 b) **1**
 c) 2
 d) More than 2

Q29.   DIRECTIONS *for questions 27 to 30:* Select the correct alternative from the given choices.
The person who visited the coffee shop immediately before the person who had Cappuccino had

 a) Frappuccino.
 b) Mochaccino.
 c) Chococcino.
 d) None of the above.

Q30.   DIRECTIONS *for questions 27 to 30:* Select the correct alternative from the given choices.
Which of the following pairs of beverages were had by persons who visited the coffee shop consecutively?

a) Marocchino, Capuccino
b) Mochaccino, Chococcino
c) Marocchino, Chococcino
d) Chococcino, Antoccino

QA

Q1. DIRECTIONS *for questions 1 to 3:* Type in your answer in the input box provided below the question.
The sum of two natural numbers when added to their LCM, gives a total of 143. How many such pairs of numbers exist?

Q2. DIRECTIONS *for questions 1 to 3:* Type in your answer in the input box provided below the question.
What is the minimum value of the sum of the squares of the roots of the equation $x^2 - (\alpha - 2)x + (\alpha - 5) = 0$?

Q3. DIRECTIONS *for questions 1 to 3:* Type in your answer in the input box provided below the question.
Rahul had two equal lots of chocolates. He distributed the first lot of chocolates equally among the children of group A and the second lot of chocolates equally among the children of group B. Each child in group A received as many chocolates as the square root of the number of children in it and there were nine chocolates remaining in the first lot after the distribution. Each child in group B received as many chocolates as the number of children in it and there were no chocolates remaining in the second lot after the distribution. It is known that Rahul had less than 2000 chocolates initially. If all the chocolates initially with Rahul had been divided equally among all the children of both the groups together, then how many chocolates would Rahul have been left with?

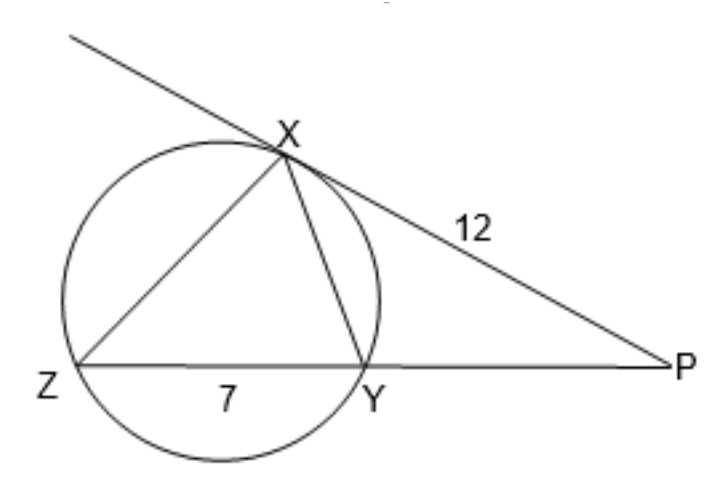**Q4. DIRECTIONS** *for questions 4 to 7:* Select the correct alternative from the given choices.
A man is 20 minutes late to the office, if he walks at 20 kmph and he is 15 minutes early, if he walks at 30 kmph. By how much time will he be early/ late, if he travels at 25 kmph?

a) 5 minutes early
b) 1 minute late
c) 7.5 minutes late

d) 1 minute early

Q5. DIRECTIONS *for questions 4 to 7:* Select the correct alternative from the given choices.
In the figure below, PX = 12 cm, YZ = 7 cm and the perimeter of PXY is 27 cm. Find the perimeter of (PXZ.

a) 36 cm
b) 32 cm
c) 34.5 cm
d) 31.5 cm

Q6. DIRECTIONS *for questions 4 to 7:* Select the correct alternative from the given choices.
If log5(3x – 17), log5(3x – 65) and log54 are in arithmetic progression, *x* can be

a) the square of an integer.
b) a rational number but not an integer.
c) an irrational number.
d) Either (A) or (C)

Q7. DIRECTIONS *for questions 4 to 7:* Select the correct alternative from the given choices.
The students of three classes P, Q and R appear for a test. The average scores in the test of the students in classes P, Q and R are 78, 83 and 77 respectively. If the average scores of the students of classes P and Q together and Q and R together are 80 and 80 respectively, find the average score of the students of all the three classes put together.

a) $80\dfrac{1}{3}$

b) $79\dfrac{6}{7}$

c) $79\dfrac{1}{7}$

d) None of the above

DIRECTIONS *for questions 8 and 9:* Answer the questions on the basis of the information given below.
For a set, S, of natural numbers, any collection of ordered pairs of the form (a, b), where $a \in S$ and $b \in S$, is said to be a relation, R, defined on S. If for every $a \in S$, $(a, a) \in R$, then R is said to be a reflexive relation on S. Otherwise it is not reflexive on S. For example, if S = {1, 2, 3, 4}, then R1 = {(1, 1) (2, 2) (3, 3) (4, 4)} and R2 = {(1, 1) (2, 2) (3, 3) (4, 4) (1, 4)} are reflexive on S but R3 = {(1, 1) (2, 2)} is not reflexive on S.

Q8. **DIRECTIONS** *for question 8:* Type in your answer in the input box provided below the question.
If S = {1, 2, 3, 4, ……. 20}, and the number of reflexive relations defined on S is 2k, find *k*.

Q9. **DIRECTIONS** *for question 9:* Select the correct alternative from the given choices.
If S = {1, 2, 3, …… *n*}, find the number of non-empty relations defined on S which are not reflexive.

a) $2^{n^2-1}\left(2^n-1\right)$

b) $2^{n^2-n}-1$

c) $2^{n^2}\left(2^n-1\right)-1$

d) $2^{n^2-n}\left(2^n-1\right)-1$

Q10.

DIRECTIONS *for question 10:* Type in your answer in the input box provided below the question. For what positive integral value of *n,* is 28 + 211 + 2n a perfect square?

Q11. DIRECTIONS *for questions 11 to 13:* Select the correct alternative from the given choices.
Consider the sequence of numbers μ1, μ2, μ3 …… where μ1 = –62.33 and μ2 = 27. Find the sum of the first 9008 terms of this sequence, if μk = μk – 1 – μk –2, for every $k \geq 3$.

 a) 89.33
 b) –35.33
 c) –81.33
 d) 70.66

Q12. DIRECTIONS *for questions 11 to 13:* Select the correct alternative from the given choices.
A nationwide online examination was held over a five day window period. There were two slots on each day. In each slot there were a total of 60 questions, spread across three sections with each section comprising 20 questions. All the questions asked were taken from a question bank comprising 360 questions. If no question was used in more than five slots and all the 360 questions were used at least once, then the number of questions that were used exactly five times was at most

 a) **40.**
 b) 120.
 c) 45.
 d) **60.**

Q13. DIRECTIONS *for questions 11 to 13:* Select the correct alternative from the given choices.
There is a square paper with each of its sides measuring 10 cm. Govind wants to cut (using only a single straight cut) a triangular piece of paper out of this square. If the length of the cut can be at most 8 cm, what is the maximum possible area (in sq. cm) of the triangular piece?

 a) 16
 b) **15**
 c) 20
 d) **24**

DIRECTIONS *for questions 14 and 15:* Answer the questions on the basis of the information given below.
Nirav plans to prepare a schedule for a seven day period in which he shall play exactly one sport out of Cricket, Football, Hockey and Volleyball on each day.

Q14. **DIRECTIONS** *for questions 14 and 15:* Select the correct alternative from the given choices.
The number of schedules that Nirav can prepare in which each of the sports is played on at least one day during the seven day period is

 a) 1260.
 b) 8400.
 c) 5880.
 d) None of the above.

Q15. **DIRECTIONS** *for questions 14 and 15:* Select the correct alternative from the given choices.
If Nirav must play at least two sports on at least three days each, then how many different schedules can Nirav prepare?

 a) 1050
 b) **350**
 c) 2100
 d) None of the above

Q16. **DIRECTIONS** *for questions 16 to 22:* Select the correct alternative from the given choices.
A convex quadrilateral ABCD, circumscribes a circle of radius *r* cm. If the sides AB, BC and CD are 12 cm, 10 cm and 13 cm respectively, what is the length (in cm) of the side AD?

 a) **5r**
 b) **15**
 c) 10
 d) Cannot be determined

Q17. **DIRECTIONS** *for questions 16 to 22:* Select the correct alternative from the given choices.

If a function f is defined as $f(x) = \log\left(\dfrac{1+x}{1-x}\right)$, then the value of $f\left(\dfrac{x_1 + x_2}{1 + x_1 x_2}\right)$ is same as that of
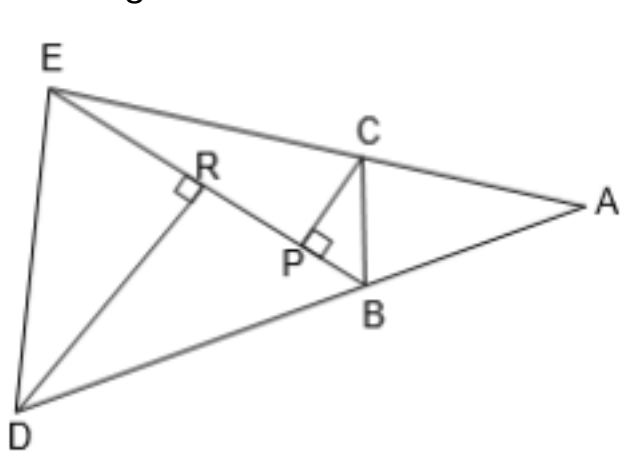
a) $f(x_1)\, f(x_2)$.

b) $\dfrac{f(x_1)}{f(x_2)}$.

c) $f(x_1) + f(x_2)$.

d) None of the above

Q18. DIRECTIONS *for questions 16 to 22:* Select the correct alternative from the given choices.
The number of positive integers, n, in the range $50 \le n \le 70$, such that at least one of the numbers $n/2$, $n/3$, $n/4$, $n/5$, $n/6$, $n/7$, $n/8$ is an integer, is

a) **17.**

b) **3.**

c) 16.

d) **4.**

Q19. DIRECTIONS *for questions 16 to 22:* Select the correct alternative from the given choices.

In figure above, ADE is a triangle, in which AB : BD = 3 : 7 and BC is parallel to DE. If CP and DR are the perpendiculars drawn to BE from C and D respectively, find the ratio of the area of triangle BPC and the area of triangle ERD.

a) 3 : 10

b) 9 : 100

c) 9 : 49

d) 25 : 144

Q20. DIRECTIONS *for questions 16 to 22:* Select the correct alternative from the given choices.
If $x = -0.2$, which of the following is the largest?

a) $-\left(x^{-\frac{1}{x}}\right)$

b) **250x2**

c) $\dfrac{10}{\left(\sqrt{-x}\right)^3}$

d) $5^{-\frac{1}{2x}}$

Q21. DIRECTIONS *for questions 16 to 22:* Select the correct alternative from the given choices.
Three positive integers, p, q and r, are such that $q > p > r$.
The following functions are now defined:
$f(p, q, r) = $ minimum $\{(p + r), (q + r)\}$.
$g(p, q, r) = $ maximum $\{(q - p), (p - r)\}$.
$h(p, q, r) = $ Average of $\{f(p, q, r), g(p, q, r)\}$.
Which of the following is always false?

a) $f(p, q, r) < g(p, q, r)$
b) $h(p, q, r) < f(p, q, r)$
c) $h(p, q, r) < g(p, q, r)$
d) None of the above

Q22. DIRECTIONS *for questions 16 to 22:* Select the correct alternative from the given choices.
Given that $-3 \le x \le 5$, $-4 \le y \le 4$, $-5 \le z \le 3$ and $u = xyz$, what are the maximum and the minimum possible values of u?

a) 60 and –60 respectively
b) 36 and –60 respectively
c) 36 and –72 respectively.
d) 100 and –100 respectively

DIRECTIONS *for questions 23 and 24:* Answer the questions on the basis of the information given below.
Two taps A and B can fill a tank in a and b minutes respectively. Shiva opened both taps and went out. He mistakenly thought that B was an emptying tap and that it could empty the tank in b minutes and calculated

that the tank would fill in *m* minutes. Since, his watch was gaining time, he returned after '*n*' minutes, thinking that exactly *m* minutes had passed, and noticed that the fraction of the tank that had filled up was only *y*.

Q23. DIRECTIONS *for questions 23 and 24:* Select the correct alternative from the given choices.

If $n = \dfrac{m}{2}$ and the tank was not yet full when shiva returned, which of the following cannot be the value of *b* : *a*?

a) 3 : 1
b) 4 : 1
c) 5 : 1
d) 9 : 2

Q24. DIRECTIONS *for questions 23 and 24:* Select the correct alternative from the given choices.

If $n = \dfrac{m}{3}$ and $y = \dfrac{5}{9}$, find *b* : *a*.

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

Q25. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
How many real roots are there for the equation $(x - 3)(x - 5)(x - 7) + k2(x - 4)(x - 6)(x - 8) = 0$?

a) **3**
b) **1**
c) **0**
d) None of the above

Q26. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.

If the roots of the quadratic equation $x2 - 3x + p = 0$ are α and β, then which of the following two statements – I and II – is/are sufficient for finding the value of *p*

I. The coefficient of *x*2 in the quadratic equation whose roots are $\dfrac{1}{\alpha}$ and $\dfrac{1}{\beta}$ is 2.

II. $\alpha - \beta = 1$

  a) Only I is sufficient
  b) Only II is sufficient
  c) Both I and II together are sufficient
  d) Even I and II together are not sufficient.

Q27. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
The people of Koho, an island in the Indian Ocean, play a game similar to chess but on a board that has 8 × 12 squares, instead of the usual 8 × 8 squares. Find the total number of squares of all possible sizes that can be observed on such a board.

  a) **312**
  b) **298**
  c) **276**
  d) **348**

Q28. DIRECTIONS *for questions 25 to 28:* Select the correct alternative from the given choices.
I am in a park which has a vertical tower at its centre. The angle of elevation of the top of the tower at a point A on the ground, due South of the tower, is 60° and the same at a point B on the ground, due West of the point A, is 30°. If the distance AB = 300 m, the height (in metres) of the tower is

  a) $20\sqrt{3}$
  b) $150\sqrt{3}$
  c) $75\sqrt{6}$
  d) $30\sqrt{30}$

DIRECTIONS *for questions 29 and 30:* Answer the questions on the basis of the information given below.
Ritu was asked to multiply a two-digit number N by a three-digit number M. But she mistakenly multiplied N by the number formed by writing the digits of M in the reverse order, thereby getting an answer which was 22770 more than the correct answer.

Q29. DIRECTIONS *for questions 29 and 30:* Type in your answer in the input box provided below the question.
Find the correct product of N and M, if it is known that had Ritu reversed the digits of both the numbers N and M, she would have got an answer 12816 more than her earlier answer.

Q30. **DIRECTIONS** *for questions 29 and 30:* Type in your answer in the input box provided below the question.
What is the minimum possible sum of the digits of M?