T.I.M.E.
Triumphant Institute of
Management Education Pvt. Ltd.

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

Four centuries after Galileo Galilei discovered that Jupiter had four moons, it remains impossible to understand the solar system without understanding Jupiter. The Jovian moon, Europa, is thought to have beneath its icy surface a liquid-water ocean that might conceivably support life. Jupiter's enormous magnetic field traps and accelerates high-energy particles (protons and electrons) thrown off by the sun. It has the fiercest radiation belts of any planet in the solar system, making it extremely hostile.

Man-made satellites have simply flown past Jupiter on their way elsewhere, taking a few photographs to send back home while they gathered energy from the Jovian gravitational field in a slingshot manoeuvre, to speed their journeys up. Only *Galileo* was an exception: it orbited Jupiter. Now, *Juno* [a probe of NASA] will be launched to help unravel Jupiter's origin.

Jupiter is a "gas giant". It was formed from the same primordial cloud of hydrogen and helium as gave birth to the sun. But how this happened is unclear. The "core accretion" theory holds that a rocky core formed first, assembling itself under the influence of gravity from dust grains, pebbles and boulders. Once the core acquired sufficient mass, it attracted hydrogen and helium from the primordial cloud, having enough gravity to hold onto them. If this is correct, Jupiter could be a rocky planet similar to Earth. The core-accretion theory has a timing problem. Light exerts pressure, and the pressure of light from the infant sun should have driven off the hydrogen and helium before Jupiter had a chance to grab the primordial cloud.

A rival hypothesis argues that Jupiter formed without the need for a large rocky core, from a knot in the gas cloud itself. That would make it quite a different beast from an overblown terrestrial planet. One of *Juno*'s jobs, is to measure variations in Jupiter's gravitational field, to determine whether the planet has a core, and the core's size. This will not resolve the question of how Jupiter formed but it should narrow the range of possibilities.

Jupiter's atmosphere is another puzzle. Back in 1995, *Galileo* dropped a probe into that atmosphere, which reported comparatively greater amounts of heavy elements like nitrogen and argon, than are found in the sun. This suggests that Jupiter formed in the cool outer reaches of the early solar system, where such elements would have been more abundant, before migrating to its current position. But there was much less of one heavy element – oxygen – than expected. The probe detected little water, the compound into which gas-cloud oxygen is overwhelmingly bundled. ...

There are fears that something went amiss. So *Juno* will attempt the same experiment by sampling different parts of the atmosphere with each of its diving loops. Combining measurements from all over the planet should help sort the theoretical sheep from the goats.

Nor is it theories of Jupiter's formation alone that are at stake. The chance to poke a gas giant up close could help shed light on how planetary systems other than the sun's have formed. One of the big surprises of exoplanetology has been the discovery of a type of planet known as "Hot Jupiters" (gas giants which orbit close to their parental stars and have orbital periods measured in few days). Such worlds could not have formed in their present locations. The radiation from their parent stars would have disassembled them as fast as they formed.

1. Based on information provided in the passage, we can infer that, as compared to the sun, the Jovian atmosphere is reported to have greater proportions of
   (A) protons and electrons.
   (B) hydrogen and helium.
   (C) nitrogen and argon.
   (D) oxygen and dust grains.

2. Based on the data that Juno collects, which of the following hypothesis related to Jupiter can be verified?
   (A) Jupiter may have come into being elsewhere and then migrated closer to the sun.
   (B) The same primordial cloud of hydrogen and helium formed both Jupiter and the sun.
   (C) Comets and asteroids from the outer reaches of the early solar system supplied heavy elements to Jupiter's atmosphere.
   (D) There was a systematic variation between the primeval atmospheric conditions of Jupiter and those of other planets of the extrasolar system.

3. Which of the following studies will add the most depth to the author's objective mentioned in the passage?
   (A) A study that illustrates the similarity between Jupiter's four largest moons and the planets of the solar system.
   (B) An investigation that unifies all the findings related to the historical origin of Jupiter.
   (C) A study resolving the question of when and where Jupiter and several Hot Jupiters were formed.
   (D) Astronomical assessment of the merits and flaws of the "core accretion" theory and the rival hypothesis mentioned in the passage.

4. In para 5, the finding that "the probe detected little water, the compound into which gas-cloud oxygen is overwhelmingly bundled" can be most undermined by which of the following?
   (A) A liquid-water ocean was observed on the surface of Jupiter's moon, Europa.
   (B) The probe survived for less than a day before contact with Jupiter was lost.
   (C) *Galileo* sampled different parts of the Jovian atmosphere with each of its diving loops.
   (D) The probe dropped into a particularly dry part of the planet's atmosphere.

DIRECTIONS *for questions 5 to 9:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

What vehicle is most strongly associated with Republican voting districts? Extended-cab pickup trucks. For Democratic districts? Sedans. Those conclusions may not be particularly surprising. After all, market researchers and political analysts have studied such things for decades. But what is surprising is how researchers working on an ambitious project [based at Stanford University] reached those conclusions: by analysing 50 million images and location data from Google Street View, the street-scene feature of the online giant's mapping service.

For the first time, helped by recent advances in artificial intelligence, researchers are able to analyse large quantities of images, pulling out data that can be sorted and mined to predict things like income, political leanings and buying habits. In the Stanford study, computers collected details about cars in the millions of images it processed, including makes and models.

All of a sudden, we can do the same kind of analysis on images that we have been able to do on text...For computers, as for humans, reading and observation are two distinct ways to understand the world. In that sense, computers don't have one hand tied behind their backs anymore.

Text has been easier for A.I. [artificial intelligence] to handle, because words have discrete characters – 26 letters, in the case of English. That makes it much closer to the natural language of computers than the freehand chaos of imagery. But image recognition technology, much of it developed by major technology companies, has improved greatly in recent years.

The Stanford project gives a glimpse at the potential...But first, a database curated by humans had to train the A.I. software to understand the images. The researchers recruited hundreds of people to pick out and classify cars in a sample of millions of pictures. Some of the online contractors did simple tasks like identifying the cars in images. Others were car experts who knew nuances like the subtle difference in the taillights on the 2007 and 2008 Honda Accords.

"Collecting and labelling a large data set is the most painful thing you can do in our field," said Ms. Timnit Gebru, who received her Ph.D. from Stanford and works for Microsoft Research. "But without experiencing that data-wrangling work you don't understand what is impeding progress in A.I. in the real world." [she added]

Once the car-image engine was built, its speed and predictive accuracy was impressive. It successfully classified the cars in the 50 million images in two weeks. That task would take a human expert, spending 10 seconds per image, more than 15 years.

Identifying so many car images in such detail was a technical feat. But it was linking that new data set to public collections of socioeconomic and environmental information, and then tweaking the software to spot patterns and correlations, that makes the Stanford project part of what computer scientists see as the broader application of image data...

The significance of the project, experts say, is a proof of concept – that new information can be gleaned from visual data with artificial intelligence software and plenty of human help. The role of such research will be mainly to supplement traditional information sources [like the household surveys conducted by the Census Bureau]...

...Image-based studies could be a big help now that public response rates to sample surveys are declining. An A.I.-assisted visual census could fill in gaps in the current data, but also provide more timely insights than the traditional census, conducted every 10 years...

5. The broader application of image data referred to in the passage is to:
   (A) replace traditional surveys and reports.
   (B) make various inferences and predictions about the general public life.
   (C) find a correlation between socioeconomic and environmental data sets.
   (D) measure public response rates during census surveys.

6. According to Ms. Gebru, progress in A.I. in the real world is impeded because:
   (A) there is lack of awareness about how important data-wrangling work is.
   (B) collecting and labelling a large data set is extremely painful.
   (C) curated data sets to train the A.I. software are not available.
   (D) there isn't much experience available when it comes to data analysis.

7. Text is easier than images for A.I. to handle because?
   (A) Words are permutations of fixed set of letters, whereas images are harder to decipher accurately.
   (B) There are only 26 letters but more number of images.
   (C) The database capacity to parse imagery is not feasible.
   (D) Imagery isn't close enough to the natural language of humans.

8. Why did computers have one hand tied behind their back until now, according to the author?
   (A) Computers were able to read but not observe.
   (B) Computers couldn't analyse images as if they were letters.
   (C) Computers weren't used for processing imagery.
   (D) Computers cannot read and observe at the same time.

9. The 'proof of concept' mentioned in the penultimate para is that:
   (A) Images can be analysed in large numbers.
   (B) It is possible to glean through images without human help.
   (C) It is possible to analyse visual data.
   (D) Imagery is far more complicated than text to analyse.

DIRECTIONS *for questions 10 to 14:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

The place to start is 18th-century Scotland. Adam Smith's book ... is often credited as the beginning of economics. The case for free trade is one of its major themes.

Smith argued that trade among nations is like trade among people. No one feels compelled to sew his own clothes and grow his own food simply to keep busy. Instead, we find employment doing what we do best and rely on other people for most goods and services. Similarly, nations should specialize in producing what they do best and freely trade with other nations to satisfy their consumption needs.

This argument was expanded by David Ricardo in the 19th century. Ricardo addressed the question: What if one nation does everything better than another? His answer was that trade depends on comparative advantage – how good a nation is at producing one thing relative to how good it is at producing another.

For example, even if Portugal was better than England at producing both wine and cloth, if Portugal had a larger advantage in wine production, Portugal should export wine and import cloth. Both nations would end up better off.

The same principle applies to people. Given his athletic prowess, Roger Federer may be able to mow his lawn faster than anyone else. But the advantage he has playing tennis is far greater. So, according to Ricardo, Mr. Federer should hire a lawn service and spend more time on the court.

More recently, economists have emphasized how trade affects productivity. When a nation opens up to international trade, the most productive firms expand their markets, while the least productive are forced out by increased competition. As resources move from the least to the most productive firms, overall productivity rises.

A sceptic might say that all this is just theory. Where's the evidence? One approach to answering this question is to examine whether countries that are open to trade enjoy greater prosperity. In a 1995 paper, the economists Jeffrey D. Sachs and Andrew Warner studied a large sample of nations and found that open economies grew significantly faster than closed ones.

A second approach is to look at what happens when closed economies remove their trade restrictions. Again, free trade fares well. Throughout history, when nations have opened themselves up to the world economy, the typical result has been an increase in their growth rates.

These results, while suggestive, come with a caveat. Trade restrictions often accompany other government policies that interfere with markets. Perhaps these other policies, rather than trade restrictions, impede growth.

To address this problem, a third approach to measuring the effects of trade, proposed by the economists Jeffrey A. Frankel of Harvard and David C. Romer [University of California], focuses on geography. Some countries trade less because of geographic disadvantages.

For example, New Zealand is disadvantaged compared with Belgium because it is farther from other populous countries. Similarly, landlocked nations are disadvantaged compared with nations with their own seaports. Because these geographic characteristics are correlated with trade, but arguably uncorrelated with other determinants of prosperity, they can be used to separate the impact of trade on national income from other confounding factors.

After analyzing the data, Mr. Frankel and Mr. Romer concluded that "a rise of one percentage point in the ratio of trade to growth rate (GDP) increases income per person by at least one-half percent." In other words, nations should take the theories of Smith and Ricardo seriously.

10. The author's suggestion, that overall productivity rises as resources move from the least to the most productive firms, can be weakened if:
(A) productivity of companies doesn't hit a plateau if resources are available.
(B) productivity of companies depends on the rules and regulations in markets.
(C) productivity of companies is a good indicator of longevity.
(D) productivity of companies positively influences a nation's growth.

11. The author concludes that the theories of Smith and Ricardo should be taken seriously because free trade:
(A) leads to better economic growth.
(B) leads to increased ratio of trade to GDP.
(C) leads to better living standards.
(D) leads to increased earning capability.

12. The problem addressed by Frankel and Romer's approach is that:
(A) some countries are landlocked and hence, cannot indulge in free trade.
(B) the increase in growth rates due to free trade are affected by government policies.
(C) not all closed economies remove trade restrictions and measure growth rates.
(D) the effect of trade on growth is unclear because of policies and restrictions.

13. The analogy of Roger Federer has been given by the author to show that:
(A) not everyone can reach excellence in everything.
(B) some people are good at everything.
(C) one should do the activity in which one has the most comparative advantage.
(D) one should excel only at one activity.

14. All of the following prove the efficacy of free trade EXCEPT:
(A) Free trade pushes resources towards the more productive firms.
(B) Economies with no trade restrictions grow faster than the ones that have restrictions.
(C) Closed economies grow faster as soon as trade restrictions are lifted.
(D) Growth in geographically remote nations is stunted.

DIRECTIONS *for questions 15 to 19:* The passage given below is accompanied by a set of five questions. Choose the best answer to each question.

What exactly do genes imply about our behaviour and abilities? [Robert] Plomin shows persuasively that the genes we inherit affect, sometimes profoundly, our personality, temperament, physical and mental health and, thereby, our life outcomes. Although Plomin tries to dispel accusations of biological determinism by repeating the slogan of today's geneticists that "genes are not destiny," I suspect many readers of Blueprint [Plomin's book] will be left wondering why not.

Plomin [an American psychologist] has long been at the forefront of efforts to understand our genes. He has seen his research [being] denounced as irresponsible and even quasi-fascistic – not to mention scientifically mistaken. He has seen the field suffer from false claims and a lack of hard evidence; but he has also seen it transformed by the sudden availability of genomic data from large numbers of individuals. This data glut is due to the dramatic drop in the cost and timescale of decoding genomes in the wake of the Human Genome Project.

...Plomin believes that naysayers should now accept that genes influence not only our health, height, appearance and hair colour but pretty much every behavioural trait we can measure.

While some of the statistical tools and their interpretation remain under discussion, he is broadly right to say that behavioural genetics has established that link. To deny these facts leaves the door open to abuse by those with dangerous political agendas, as well as to overlook a biomedical resource of immense potential for health, social policy and our understanding of human nature.

Modern behavioural genetics shows why "eugenic" solutions to intellectual disability or assertions of "innate" racial differences that justify hierarchies or stereotypes are flawed from a scientific point of view, as well as an ethical one. Blueprint conveys that traits such as intelligence or mental health – vulnerability to schizophrenia or autism, say – are not determined by a few genes, but influenced by tens, hundreds or even thousands of them. In general, the relationships are neither linear nor confined to single traits; so neat divisions between populations seem implausible, and any simple winnowing of "bad" mutations impossible.

Thus, the popular notion that there are "genes for" some complex trait such as height or sexual orientation is plain wrong. Some researchers are now even talking about "omni-genetic" traits (including height), affected by more or less the whole genome made up of some 23,000 genes. In one especially valuable discussion, Plomin shows that many common mental illnesses and disabilities are not all-or-nothing "defects" but extremes on a spectrum that includes us all.

Plomin says the discovery that most traits are "polygenic" – influenced by many genes that have individually near-negligible effects – was "shocking" to those in the field. This is an inadvertent admission that the "genes for" trope now so lamented by experts was created not by the media but by scientists who spun them this tale...

Many genes, which operate at a very basic level in governing the biochemistry and growth of our cells and tissues, are multitaskers. The time it took for scientists to shift their views shows how even empirical disciplines can develop collective myopia.

Today's evidence shows that almost any human propensity is influenced by (many) genes, although the process is more complicated than most media reports acknowledge. Plomin recounts his involvement in a study in the 1980s reporting significant correlations between how much children watched television and their genes (as assessed by adoptive and non-adoptive siblings). How could such a genetic trait have possibly emerged from natural selection over just the few generations with access to television?

15. Which of the following is in sync with the idea conveyed by Blueprint?
(A) Most traits are polygenic.
(B) There are specific genes for complex, omni-genetic traits.
(C) The cost and timescale of decoding genomes is not feasible for collecting large amounts of genomic data.
(D) Eugenics can provide solutions to intellectual disabilities.

16. The discovery that most traits are influenced by several genes was 'shocking' because:
(A) genes that have near-negligible effects cannot influence entire traits.
(B) the media had spun tales against such a possibility.
(C) experts believed that there are specific genes for specific traits.
(D) all-or-nothing defects are caused by genes at the extremes of the spectrum.

17. Which of the following questions, if answered, can help verify the author's conclusion as can be inferred from the last line of the passage?
(A) Are there correlations between how much children watched television and their genes?
(B) Are adoptive and non-adoptive siblings not similar?
(C) Do genetic traits emerge from natural selection?
(D) Are the effects of natural selection not seen in the span of a couple of generations?

18. The flaw from 'a scientific point of view' referred to in the fifth para (As far as...'bad' mutations impossible.) is that:
(A) assertions of innate racial differences cannot justify hierarchies and stereotypes.
(B) traits such as intelligence are determined by a large number of genes.
(C) it is possible to weed out bad mutations to achieve better mental health.
(D) it leaves the door open to abuse by those with dangerous political agenda.

19. The criticism unleashed against Plomin's research is that it
(A) lacked hard evidence.
(B) was based on scarce genomic data.
(C) was quasi-fascistic.
(D) was ethically flawed.

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.

When we philosophers try to defend our discipline, the question of why philosophy is important sometimes gets entangled with our own self-importance. When we seek to protect philosophy, we are also protecting our livelihood. There is an irony here, since philosophers often present themselves as thinkers who attain a supreme objectivity in relation to whatever issues they engage with.

The question of our objectivity concerning the significance of philosophy gives us good reason to listen to Bertrand Russell's views on this subject. Russell was more than a philosopher: he was also a mathematician, a peace campaigner, an educator, a populariser of modern science and a cultural critic. The range and diversity of his work makes him well-placed to comment on the value of philosophy, for he appreciated the relationship between philosophy and other kinds of inquiry. And Russell more than once showed himself to be committed to the pursuit of truth even when this jeopardised his professional life [or conflicted with his earlier work].

[In his 1946 essay, Philosophy for Laymen,] Russell discusses the nature, purpose and importance of philosophy... in a set of questions belonging to philosophical inquiry: "Do we survive death in any sense, and if so, do we survive for a time or for ever? Can mind dominate matter, or does matter completely dominate mind, or has each a certain limited independence? Has the universe a purpose? ...If there is a cosmic scheme, has life more importance in it than astronomy would lead us to suppose, or is our emphasis upon life mere parochialism and self-importance?"

He continues: "Human life would be impoverished if they were forgotten, or if definite answers were accepted without adequate evidence." One important purpose of philosophy, therefore, is to keep interest in these questions alive...

Socrates argues ... that the philosopher's pursuit of truth involves reorienting his whole soul towards the good, as well as theoretical clarification of what the soul is and what its good consists in. Russell stands in this tradition, arguing that "if philosophy is to play a serious part [in the lives of men who are not specialists], it must not cease to advocate some way of life". He identifies key differences between philosophical and religious approaches to living well: philosophy refuses any appeal to the authority of a tradition or a sacred book.

Russell evidently regarded authoritarianism as the essence of religion, and on this basis his philosophy is emphatically anti-religious. An ethically oriented scepticism lies at the heart of his own conception of a properly philosophical way of life. For Russell, philosophy should lead to peace ... "Dogmatism is an enemy to peace, and an insuperable barrier to democracy," he writes. Even minimal philosophical training, he argues, would teach us to see through the "bloodthirsty nonsense" preached in the name of nationalist, sectarian interests – and also, in the name of democracy.

Russell teaches his "laymen" readers to think more objectively about emotive issues: "When [in a sentence expressing political opinion] there are words that arouse powerful but different emotions in different readers, try replacing them by symbols, A, B, C, and so on and forgetting the particular significance of the symbols. Suppose A is England, B is Germany and C is Russia. So long as you remember what the letters mean, most of the things you will believe will depend upon whether you are English, German or Russian, which is logically irrelevant."

20. The purpose of philosophy is to keep interest alive in all of the following questions EXCEPT:
(A) Do we evade death till eternity?
(B) Do mind and matter function independently to an extent?
(C) Is it purpose that drives the universe?
(D) Does astronomy undermine the self-importance associated with life?

21. Russell exhorts use of symbols in political opinions
(A) because it is difficult to forget the significance of symbols.
(B) to remember the emotional significance of the words.
(C) because laymen cannot think emotively about objective issues.
(D) to avoid logically irrelevant bias.

22. A philosophical approach differs from a religious approach, according to Russell, in that the former:
(A) doesn't appeal to any authority.
(B) subscribes to a tradition or a sacred book.
(C) isn't based on traditional values.
(D) doesn't have any literature.

23. The irony in philosophers protecting philosophy is that:
(A) it is closely linked to their sense of self-importance.
(B) they are not concerned about their livelihood.
(C) they are staying relevant.
(D) they are not being objective.

24. All of the following are reasons we should listen to Bertrand Russell, according to the author, EXCEPT:
(A) Russell's diverse work adds value to his views on philosophy.
(B) Russell approved of the relationship between philosophy and other kinds of inquiry.
(C) Russell put truth ahead of his professional life.
(D) Russell's work is in conflict with philosophical truths pursued by him.

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) No Deal basically means that if we can't find a solution that would benefit us both, we agree to disagree agreeably.
(2) In other words, no expectations have been created, no performance contracts established.
(3) It is so much better to realize these important points upfront instead of downstream when expectations have been created and both parties have been disillusioned.
(4) For example, I don't hire you or we don't take on a particular assignment together because it's obvious that our values or our goals are going in opposite directions.

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) Some art can exist just as well in silence and obscurity as on the pages of newspapers.
(2) The same is true of real modern art.
(3) Banksy's art has no life as art, no aesthetic or even anti-aesthetic effect, no content beyond the trite, no personality.
(4) The Mona Lisa is always being talked about, but even if no one ever again concocted a headline about this roughly 510-year-old painting it would still be as great.
(5) It is an archetypal product of our society: it exists only to be talked about, the perfect message for social media.

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

27. The common notion that the unrestrained pursuit of self-interest is beneficial for all is illusory. The "I" world brings out the worst in people. It breeds a toxic social, economic and political environment. The ideological tensions and extreme political partisanship present in many countries also find their source in narcissism. Self-focused world leaders, interested in short-term gains, lack the empathy to view issues and situations from the perspective of others. This neglect of community results in a series of powder kegs with potentially catastrophic consequences, including the destruction of our planet.

(A) Contrary to common belief, narcissism pollutes the environment and creates leaders whose lack of empathy costs the planet dearly.
(B) Narcissism, contrary to popular opinion, creates a conflicted environment where lack of empathy leads to disastrous consequences.
(C) The pursuit of unrestrained self-interest creates strife and eliminates empathy, leading to dire consequences.
(D) World leaders who lack empathy and pursue short-term gains are the by-product of a toxic social, political and economic environment.

DIRECTIONS *for question 28*: 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.

28. (1) One secret letter talked about how a doctor asked fellow Red Army survivors to write to her with their memories even as Soviet censors stopped her from publishing her account.
(2) In 2010, Czyz's daughter discovered 27 of these secret letters in her grandmother's old rolling pin and a chopping board.
(3) Using urine as invisible ink in censored letters, Krysia Czyz and other Polish prisoners told their families about their whereabouts and the obscene medical experiments being carried out on them.
(4) Ravensbruck's concentration camp inmates, taken away on death transports, hid notes in their clothes for their friends in the camp to find, when their clothes were returned there, telling them their new location.

DIRECTIONS *for question 29*: 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.

29. (1) Of course, the speed of sound depends on how high above sea level the plane is and what the temperature is.
(2) And the supersonic boom of the Concorde or Space Shuttle was caused not by one shock wave but the interaction of a series of shock waves radiating from different parts of the aircraft.
(3) That creates an instantaneous change in pressure, resulting in a shock wave that contains a huge amount of sound energy.
(4) However, once an aircraft accelerates beyond the speed of sound (above Mach 1), the air molecules simply can't get out of the way fast enough but pile up at certain points on the aircraft.
(5) Below Mach 1, the molecules of air in front of an aircraft are pushed out of the way, much as a boat travelling through water creates a bow or stern wave.

DIRECTIONS *for question 30*: 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.

30. (1) The more important the task that you complete, the greater the quantity of endorphins that your brain releases.
(2) Every time you complete a task of any kind, your brain releases a small quantity of endorphins.
(3) Over time, you can develop a positive addiction to the feelings of well-being that you receive from this "endorphin rush".
(4) These natural morphine-like compounds give you a sense of well-being and elation, stimulate your creativity and improve your personality.

DIRECTIONS *for question 31*: 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.

31. (1) By touch alone, this tactile visual aid can help travellers with visual impairments orient themselves among the real town's streets and buildings.
(2) This is not just a model but it's also a tactile map of Landshut, Germany, and it's meant to be explored with your fingertips.
(3) World Braille Day is an event observed each year on the birthday of Louis Braille, who created Braille in 1824.
(4) The map is also embossed with the raised dots used in Braille's writing system, employed here to identify important parts of the town.
(5) The miniature representation of this Bavarian town includes local landmarks like the towering St. Martin's church, the tallest church in Bavaria and the second tallest brick structure in the world.

DIRECTIONS *for question 32*: The paragraph given below is followed by four summaries. Choose the option that best captures the author's position.

32. 1992 was the last year that the Welsh curriculum let English speaking schoolgirls from Swansea drop Welsh language lessons in favour of French or German. The Welsh Language Act of 1993 changed the scenario. The country's mother tongue was given equal footing with English in the public sector, and soon after, road signs began turning bilingual and the Welsh language became a compulsory subject in schools until the age of 16. Instead of withering on the vine like Cornish and the variants of Gaelic, Welsh budded, blossomed and bloomed. The 2001 census showed the first rise in Welsh speakers in 100 years, from 508,000 to 582,000. The big increase of Welsh speaking was in the 5-24 age group. Youngsters have reclaimed Welsh as their own. It's no longer the language of hearth, home and chapel – it's also the language of everyday conversation, of blogs and of music.

(A) Welsh seemed like a doomed language in Wales but now it is an obligatory language in schools and in society at large.
(B) The Welsh Language Act helped increase the popularity of the language among youngsters and has become an everyday language.
(C) The youth culture in Wales helped revive the Welsh language, which is now the language of daily conversation and writing in Wales.
(D) Welsh seemed to be in terminal decline just like Cornish and Gaelic variants, but the great Welsh language revival arrested this decline.

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) But once he could no longer write down equations, theories had to be translated into geometry in his head.
(2) His words necessarily became so few and his theories of everything emerged in a voice that was both robotic, and curiously laden with emotion.
(3) In youth, Stephen Hawking never lacked mathematical acumen.
(4) And after a tracheotomy in 1985, the ocean of his thinking had to be forced through a cumbersome and narrow technological aperture.

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

34. Apple has always been an opportunistic innovator, seeking to capitalise on the next "big thing" with a powerful brand, superior design and user-friendliness, not to mention an efficient global supply system. But where the iPod, iPhone and iPad have driven growth in the past, it's not yet clear what the next big thing will be. Though successful, connected watches did not quite deliver. Voice-controlled intelligent homes and self-driving cars offer major opportunities, but Apple is not as strongly positioned as Amazon and Google in the former case and carmakers (Tesla included) in the latter. So, as we have seen with the protracted transition from products to services at other big ICT companies such as IBM, Apple's shareholders may just have to be patient until the transition to ecosystem opportunities and services pays off.

(A) One has to wait to see when Apple's current bet on ecosystem opportunities will come off the way some of its past innovations have paid off.
(B) Apple is stuttering in its strategy of capitalising on the next big thing owing to the competition from other well-known brands.
(C) While Apple's innovations succeeded in the past, its transition to ecosystem opportunities is in choppy waters.
(D) The rise of competition has adversely affected Apple's business, particularly its plan to cash in on ecosystem innovations.

SECTION –II
Number of Questions = 32

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

Each of nine persons, P, Q, R, S, T, U, V, W and X, lives in a different flat in an apartment building, which has six floors (excluding the ground floor, which is used only for parking) and three flats on each floor. The three flats on each floor are in a row and no two adjacent flats on a floor are occupied. At least one person lives on each floor.

Further, the following information is known:

(i) P and Q live on the same floor.
(ii) R and S live on different floors.
(iii) T lives in the middle flat on the fourth floor.
(iv) U lives on the sixth floor and V lives on the first floor.
(v) W lives on the floor which is immediately above the floor on which X lives.

DIRECTIONS *for questions 1 and 2*: Select the correct alternative from the given choices.

1. If W and U do not live on the same floor, then which of the following cannot be true?

(A) W lives on the third floor.
(B) Q lives on the third floor.
(C) R lives on the second floor.
(D) P lives on the second floor.

2. If S and R are living on the first floor and the sixth floor respectively, then which of the following must be true?

(A) T is living on the same floor as X.
(B) Q is living on the second floor.
(C) P is living on the third floor.
(D) W is living alone on his floor.

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

3. If Q lives on the third floor, then how many combinations of persons could live on the second floor?

DIRECTIONS *for question 4:* Select the correct alternative from the given choices.

4. If P lives on the fifth floor, then on which of the following floors can X live?
(A) Sixth (B) Fourth
(C) Third (D) Second

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

In a chess tournament, each of the ten players, A through J, played every other player exactly once. one point is awarded for a win, half a point for a draw and 0 points for a loss. The player with the highest number of points, at the end of all the matches, is ranked first and he will be the winner of the tournament. The player with the next highest number of points is ranked second, the next one, third, and so on. If two players end up with the same number of points, the one with more number of wins is ranked better among the two. If two players have the same number of points as well as wins, both of them will be ranked the same. The following is a partially filled table of points scored by the players at the end of the tournament.

Player	A	B	C	D	E	F	G	H	I	J
A	–	1/2	1		1		1	0		1/2
B		–		1	0		1	1	0	1
C		0	–	1/2	1		1/2	1	0	
D	1/2			–	1/2	1				
E					–				0	1/2
F	1	1/2	1		1/2	–				
G				1/2	0	1	–	1	0	1
H				1/2	1	1/2		–	1/2	
I	1/2			0		1			–	1
J			1/2	1		1/2		0		–

In the above table, the number of points scored by some players in the matches against some of the other players are given. For example, A scored 1 point in the match against C.

DIRECTIONS *for questions 5 to 7:* Select the correct alternative from the given choices.

5. Which player was ranked second in the tournament?
(A) A (B) B (C) H (D) I

6. Which player had the maximum number of draws?
(A) A (B) F (C) J (D) D

7. Which of the following pairs of players are ranked the same?
(A) A and B
(B) D and H
(C) C and E
(D) F and G

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

8. How many pairs of players were awarded the same number of points?

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

Eight students, A through H, are sitting around a circular table. Each student specializes in a different subject among Chemistry, Computer Science, Ecology, Geography, Mathematics, Medicine, Physics and Sociology, not necessarily in that order. The students are ranked in the descending order of their heights with rank 1 being the tallest, and no two students are of the same height. The sum of the ranks of any two students sitting opposite each other is odd. Further it is known that,

(i) the tallest student is not sitting opposite the shortest student, who, in turn, specializes in Ecology.
(ii) A, whose specialization is Geography, is the fourth tallest student and he is sitting opposite the student who is the fourth shortest and whose specialization is Sociology.
(iii) the students whose specializations are Chemistry and Physics are sitting adjacent to each other.
(iv) B and C are sitting opposite each other and one of them specializes in Medicine, and the other, in Computer Science.

(v) E is sitting two places away from A, while the student sitting opposite E specializes in Chemistry.
(vi) D is sitting to the immediate right of A, while the student sitting opposite D specializes in Mathematics.
(vii) there is exactly one student between F, the second shortest student, and the second tallest student.

DIRECTIONS *for questions 9 to 11:* Select the correct alternative from the given choices.

9. If it is known that the third tallest student is sitting adjacent to the second tallest student, then who is sitting to the immediate right of the tallest student?
(A) A (B) G (C) E (D) H

10. If G is sitting adjacent to the student whose specialization is Medicine, then the student whose specialization is Computer Science is sitting adjacent to who among the following?
(A) H (B) E (C) D (D) F

11. If it is known that when the shortest student and the tallest student interchange their places, the student whose specialization is Computer Science will be sitting opposite G, who among the following specializes in Sociology?
(A) H (B) E (C) D (D) F

DIRECTIONS *for question 12:* Type in your answer in the input box provided below the question.

12. How many of the following statements are definitely true?

I. If G specializes in Sociology, then the second tallest student specializes in Computer Science.
II. If the student who specializes in Computer Science is sitting adjacent to the shortest student, then the student who specializes in Medicine is sitting adjacent to the student who specializes in Chemistry.
III. If B is the tallest student, then C is the second tallest student.
IV. If B is the second tallest student, then C specializes in Computer Science.

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

Table A provides data about the Wind Speed Reading and the corresponding increase in the Beaufort Number over the Beaufort Number of the immediately preceding Wind Speed Reading. Table B gives the Sea Disturbance Number and its corresponding Beaufort Number (given in parentheses) and the associated Average Wave Height. Table C gives the observable wind characteristics, i.e., the common name assigned to the wind, for the corresponding Beaufort Number.

Table A

Wind Speed Reading (in Km/Hr)	Increase in Beaufort Number *
1 – 5	1
6 – 11	1
12 – 19	2
20 – 38	1
39 – 49	3
50 – 61	2
62 – 74	3
75 – 88	3
89 – 102	2
> 102	1

Table B

Sea Disturbance Number (Beaufort Number)	Average Wave Height
0 (0)	0
0 (1)	0.1
1 (2)	0.3
2 (4)	0.4
3 (5)	0.6
4 (8)	1.2
5 (10)	2.4
6 (13)	4
7 (16)	6
8 (18)	9

Table C

Beaufort Number	Wind Name
0	Calm
1	Light Air
2	Light Breeze
4	Gentle Breeze
5	Moderate
8	Fresh
10	Strong
13	Gale
16	Storm
18 or more	Hurricane

* Beaufort Number is 0 for Wind Speed Reading of less than 1 km/hr and for all wind speeds in excess of 1 km/hr, the Beaufort Number is calculated over that of the immediate preceding wind speed reading.

DIRECTIONS *for questions 13 to 15:* Select the correct alternative from the given choices.

13. What is the range over which the Average Wave Height can vary when the wind speed reading varies between 20 and 74 km/hr?
(A) 0.3 – 2.4 (B) 0.1 – 6
(C) 0.6 – 4 (D) Data inadequate

14. Which of the following is not a possible Wind Speed Reading (in km/hr) when the wind is either Light Breeze, Gentle Breeze, Moderate, Fresh or Strong?
(A) 60 (B) 42 (C) 32 (D) 72

15. The coast guard of Bangladesh raises cautionary signal 1 for a Storm, 2 for a Gale and 3 for a Hurricane in times of inclement weather. On 5th June 2003, the wind speeds at Coastal Bangladesh were in excess of 94 km/hr. Which of the following is true regarding the cautionary signal raised?
(A) The signal raised was 1.
(B) The signal raised was 2.
(C) The signal raised was 3.
(D) Either signal 1 or signal 2.

DIRECTIONS *for question 16:* Type in your answer in the input box provided below the question.

16. What is the increase in the Sea Disturbance Number when the Wind Speed Reading has increased from 17 km/hr to 83 km/hr?

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

Christopher was scheduled to meet four friends – Kareena, Jiya, Bipasha and Mary – on the same day, at a clubhouse. He made sure that each of his friends were to meet him at a different location inside the clubhouse and at a different time.

(i) The friend whom he met at the lawns, and Jiya were the last and the first friends he met respectively.
(ii) Mary was not the friend he met at the pattiserie and she was not the last friend he met.
(iii) He met Bipasha after he met Kareena.
(iv) He met exactly one friend in between meeting Bipasha and meeting the friend at the pattiserie, not necessarily in the same order.
(v) He met the friend at the bar before meeting the friend at the library.

DIRECTIONS *for questions 17 to 20:* Select the correct alternative from the given choices.

17. Whom did Christopher meet at the library?
(A) Mary (B) Jiya
(C) Kareena (D) Bipasha

18. At which of the following locations did Christopher meet a friend immediately before meeting the friend at the lawns?
(A) Pattiserie
(B) Bar
(C) Library
(D) Either Pattiserie or Library

19. Whom did Christopher meet immediately before he met Bipasha?
(A) Jiya
(B) Kareena
(C) Mary
(D) Cannot be determined

20. Which of the following statements is definitely true?
(A) Christopher met Jiya at the pattiserie.
(B) Christopher met exactly two friends before he met Bipasha.
(C) Christopher met Mary immediately after he met Jiya.
(D) Christopher met Kareena before he met Mary.

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

The following tables give information about the number of copies sold as well as the readership factor of five magazines.

Number of Copies Sold

Magazine \ Year	2007	2008	2009	2010	2011
LF	1,86,300	1,95,000	2,48,000	2,25,000	2,65,000
SS	1,38,400	1,46,000	2,50,000	1,78,000	2,22,400
BL	1,65,600	1,68,000	2,25,000	1,76,000	2,85,500
TI	1,78,200	1,65,000	2,62,000	1,84,000	2,36,000
ND	1,93,500	2,10,000	2,45,000	2,20,000	3,25,000

Readership factor

Magazine \ Year	2007	2008	2009	2010	2011
LF	4	4	3.5	6	5
SS	4.2	4.5	2	5	4.5
BL	3.5	5.5	2.5	3	5.5
TI	6.2	6	4.2	4.5	4.5
ND	3.2	5.2	3.5	3.5	4

Note:
(i) The Readership Factor of a magazine is the average number of people reading a copy of the magazine.
(ii) For any magazine, Total Number of Readers = No. of Copies Sold × Readership Factor

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

21. Which magazine had the highest number of readers in the year 2011?
(A) LF (B) ND (C) TI (D) BL

22. Which magazine has shown the highest percentage increase in the number of readers from 2007 to 2011?
(A) LF (B) SS (C) BL (D) ND

DIRECTIONS *for questions 23 and 24:* Type in your answer in the input box provided below the question.

23. Every year, a company places its advertisements in exactly one of the five magazines mentioned above. If each year, the company chooses that magazine which had the highest number of readers in the previous year, in how many different magazines did the company advertise from 2008 to 2012?

24. If the revenue received from the sale of magazines is the only source of revenue for each of the magazines and if the selling prices of the magazines LF, SS, BL, TI, ND, in each of the given years, are in the ratio of 11 : 12 : 13 : 14 : 15 respectively, then what is the maximum number of years for which any magazine had the highest revenue per reader during given period?

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

At an International School, each of the students in Class XII has to opt for at least one of the three subjects, Physics, Chemistry or Biology. It is also known that, the number of students who opted for Physics is less than the number of students who opted for Chemistry, which, in turn, is less than the number of students who opted for Biology.

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

25. If 97 students opted for Physics, the total number of students is at least

26. If 45 students opted for Biology and it is known that the number of students who opted for exactly one, exactly two, and exactly three subjects are all different and also the number of students who opted for only Physics, only Chemistry and only Biology are all different, then the total number of students is at most

27. If it is now made mandatory that each student opt for at least two of the three given subjects, and 96 students opted for Chemistry, then the total number of students is at least

28. 100 students opted for Physics, 200 students opted for Chemistry 300 students opted for Biology. If the maximum possible number of students opted for only Chemistry and Biology, then the total number of student is at most

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

Company ABC has business across the country in only Cement, Construction and IT sectors. The growth in the total sales and the growth in the sales of the company in each of the three sectors, in the year 2009, when compared to the previous year, in five major states, where the company operates, are given in the table below. The total growth in the sales of the company in any state is the weighted average of the growth in the sales of the company in each of the three sectors in that state.

Percentage growth in sales of company ABC

(all figures in percentage terms)

State	A.P.	U.P.	M.P.	T.N.	W.B.
Total Sales	**10.2**	**15.6**	**12.2**	**3.5**	**9.8**
Cement	14.0	18.1	10.8	4.2	8.4
Construction	8.5	13.5	8.2	3.2	10.8
IT	5.2	10.3	15.5	3.0	8.8

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

29. In the year 2008, the cement business of company ABC in the state A.P. contributed at least what percentage (approximately) of the total sales of the company in that state?
(A) 21% (B) 31% (C) 41% (D) 61%

30. In the year 2008, if the total sales of company ABC in the state M.P. were Rs.2500 crore, what were the maximum possible sales (approximately) of the IT business in that state?
(A) ₹1110 crore (B) ₹1250 crore
(C) ₹1370 crore (D) ₹1480 crore

31. Which of the following can be concluded about the individual sales of the three businesses of company ABC in the state of W.B. for the year 2008?
(A) Cement business had the maximum sales.
(B) Construction business had the maximum sales.
(C) IT business had the maximum sales.
(D) Construction business had the minimum sales.

32. In the year 2009, the cement business of company ABC in the state U.P. contributed at most what percentage of the total sales of the company in that state (approximately)?
(A) 54% (B) 78%
(C) 60% (D) 70%

SECTION – III
Number of Questions = 34

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

1. A shopkeeper had 15 cartons of pencil boxes with him and each carton had 120 pencil boxes, with each pencil box having 15 pencils. If the shopkeeper was able to sell only 10% of the pencils present in 15% of the pencil boxes in 20% of the cartons that he had, how many pencils was the shopkeeper able to sell?
(A) 81 (B) 99 (C) 72 (D) 78

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

2. If $f(x) = -2x^2 - 2|x|$ and $g(x) = 3x^2 - 3|x|$, at how many points in the coordinate plane will $f(x)$ and $g(x)$ intersect?

DIRECTIONS *for questions 3 to 7:* Select the correct alternative from the given choices.

3. What is the remainder when $28! + 27^{28}$ is divided by 29?
(A) 0 (B) 13 (C) 2 (D) 28

4. From five positive integers, every possible combination of three numbers is selected and the total of the three numbers is found. If the ten possible sums are 30, 33, 34, 35, 36, 37, 38, 40, 41 and 42, find the sum of the least and the greatest of the five numbers.
(A) 25 (B) 26
(C) 27 (D) Cannot be determined

5. In an airport, a plane is scheduled to take off every 35 minutes, starting from 8:00 AM, and a plane is scheduled to land every 20 minutes, starting from 8:05 AM. Whenever a take-off and a landing are going to occur at the same time, the ground control will delay the plane that is about to land by three minutes, while all the subsequent planes will take-off/land on schedule. How many planes that are scheduled to land between 8:00 AM and 9:30 PM will get delayed?
(A) 5 (B) 3 (C) 2 (D) 6

6. If $x = 2 + 2^{2/3} + 2^{1/3}$, then which of the following is true?
(A) $2x^3 - 2x^2 + 6x + 3 = 0$
(B) $6x^3 + x^2 - 12 + 6 = 0$
(C) $x^3 - 6x^2 + 6x - 2 = 0$
(D) $x^3 - 12x^2 + x - 4 = 0$

7. What is the number of integral values of x which satisfy both the inequalities $8x^2 + 6x - 27 < 0$ and $-x^2 + 11x + 80 > 0$?
(A) 1 (B) 3 (C) 2 (D) 4

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

8. Find the sum of all positive even numbers less than 300 which are not divisible by 7.

DIRECTIONS *for questions 9 and 10:* Select the correct alternative from the given choices.

9. Two vessels, A and B, contain a mixture of kerosene and petrol in the ratio 4 : 3 and 8 : 11 respectively. If the contents of A and B are mixed, which of the following cannot be the ratio of kerosene and petrol in the mixture thus formed?
(A) 13 : 17 (B) 11 : 9 (C) 10 : 7 (D) 7 : 9

10. How many triplets of prime numbers can be formed such that the terms of the triplet are in arithmetic progression?
(A) 1 (B) 2
(C) 3 (D) More than 3

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

11. What are the last two digits of $849^{23} + 521^{63}$?

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

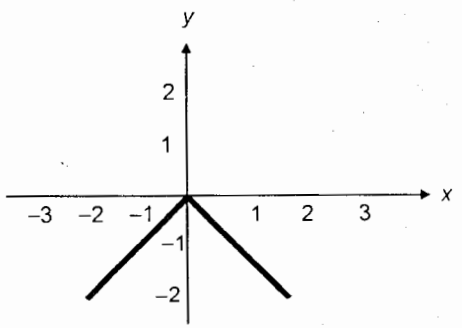
12. How many four-letter words can be formed by using the letters of the word PROPORTION, such that all the four letters are distinct?
(A) 720 (B) 60 (C) 180 (D) 360

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

13. Ravi borrowed ₹10000 from a bank at a simple interest of 10% per annum. If Ravi repaid his loan in five equal yearly instalments, paying each instalment at the end of the respective year, how much did Ravi pay each year?
₹

DIRECTIONS *for questions 14 to 18:* Select the correct alternative from the given choices.

14. The graph below gives a function $f(x)$, represented by thickened line segments. From among the choices given, choose the function that best describes $f(x)$.



(A) $f(x) = -f(-x)$ (B) $f(x) = f(-x)$
(C) $f(x) = f(-x) + 2$ (D) $f(x) = 1 - f(-x)$

15. Find the area of the quadrilateral whose vertices are (4, 0), (5, 6), (10, 6) and (12, 0) respectively.
(A) 39 sq. units (B) 52 sq. units
(C) 65 sq. units (D) 78 sq. units

16. What is the area of the circumcircle of a right angled triangle whose base is 5 cm and height, 12 cm?
(A) 42.25π sq.cm.
(B) 144π sq.cm.
(C) 169π sq.cm.
(D) 84.5π sq.cm.

17. The LCM of two distinct prime numbers a and b is divisible by c, which is greater than both a and b. What is the value of c?
(A) $a + b$
(B) ab
(C) $a + 2b$
(D) Cannot be determined

18. If x and y are positive and $x^6y^4 = 1024$, find the minimum value of $12x + 8y$.
(A) 32 (B) 40 (C) 44 (D) 20

DIRECTIONS *for question 19:* Type in your answer in the input box provided below the question.

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

DIRECTIONS *for questions 20 to 23:* Select the correct alternative from the given choices.

20. Twenty persons went on a picnic. Three out of every five in the group do not like pulav but two out of every four carried pulav with them. Then, we can conclude that
(A) at least two persons who do not like pulav carried pulav with them.
(B) at least eight persons who do not like pulav carried pulav with them.
(C) at most eight persons who do not like pulav carried pulav with them.
(D) at most two persons who do not like pulav carried pulav with them.

21. If the roots of the equation $(x - p)(x - q) + r = 0$ are 4 and 5, where p, q and r are non-zero positive integers, then what is the highest possible value of r?
(A) 12 (B) 16 (C) 18 (D) 20

22. If the product of a surd $a + \sqrt{b}$ and its conjugate is 33 and the product ab is 18, which of the following can be the value of a?
(A) 2 (B) 3 (C) 6 (D) 9

23. Two sisters, Aparna and Sushma, were born on the same day of the week in two different years and they celebrate their birthdays on the same day of the week every year. If Aparna was born on 7th February 2005, then which of the following can be the date of birth of Sushma?
(A) 10th January, 2011
(B) 7th March, 2006
(C) 13th March, 2012
(D) 24th January, 2009.

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

24. When 952 divides a number, the remainder left is 124. Find the remainder left if 68 divides the same number.

DIRECTIONS *for question 25:* Select the correct alternative from the given choices.

25. John participated in a 500 m race, during which he increased his speed by 10% after every 100 m that he covered. If he finished the race in 3 minutes and 14 seconds, what was his approximate speed for the first 100 m of the race?
(A) 7.73 kmph (B) 6.12 kmph
(C) 6.47 kmph (D) 7.12 kmph

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

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

DIRECTIONS *for questions 27 to 30:* Select the correct alternative from the given choices.

27. Tarun and Varun invested in a business in the ratio of 4:5, at the beginning of a year. If Tarun withdrew from the partnership after eight months, what percentage of the annual profit will Tarun receive?
(A) 34.78% (B) 33.33%
(C) 29.63% (D) 35%

28. Tap A and Tap B, when opened simultaneously, completely fill an empty tank in 20 minutes. If Tap A alone can fill three-quarters of the tank in 33 minutes, how long will it take Tap B alone to completely fill the tank?
(A) 35 minutes
(B) 34.33 minutes
(C) 36.67 minutes
(D) 34 minutes

29. The question below is followed by two statements, I and II. Study whether the information given in the statements is sufficient to answer the question and select the correct answer option.

If a, b and c are natural numbers, is $ab^2 + 2bc + a^2c$ even?

I. $ab + c^2$ is odd
II. $bc + a$ is odd

(A) The question can be answered using one of the statements alone, but cannot be answered using the other statement alone.
(B) The question can be answered using either statement alone.
(C) The question can be answered using I and II together but not using I or II alone.
(D) The question cannot be answered even using I and II together.

30. Kiran had only ₹10 notes and ₹5 notes with him when he went to a stationery shop. He purchased two erasers and six pencils from the shop and paid the exact amount using three notes of a single denomination. If the price of a pencil is ₹3 more than that of an eraser, what is the price of two erasers and nine pencils?

(A) ₹40 (B) ₹43.5 (C) ₹52 (D) ₹48

DIRECTIONS *for questions 31 and 32:* Type in your answer in the input box provided below the question.

31. The average weight of five persons in a group was 76 kg. After one year, the average weight of the same group became 81 kg. If each person in the group gained at least 2 kg, what is the maximum weight that any person in the group could have gained?

[ ] kg

32. The difference between the simple interest and the compound interest accrued in two years on a certain sum at a certain rate of interest is ₹80. If the simple interest for the second year is ₹1000, find the sum.

₹ [ ]

DIRECTIONS *for question 33:* Select the correct alternative from the given choices.

33. In a test on English, Mathematics and Reasoning, for every question on English, there are three questions on Mathematics and for every two questions on Mathematics, there are seven questions on Reasoning. If Roopa, who attempted all the questions on English, half the number of questions on Mathematics and one-third the number of questions on Reasoning, attempted 36 questions in all, what is the total number of questions in the test?

(A) 69 (B) 87 (C) 75 (D) 93

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

34. What is the number of points with integer coordinates in the co-ordinate plane which satisfy the inequality $|x| + |y| < 6$?

[ ]