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 – 40 Questions (ii) Data Interpretation and Logical Reasoning – 30 Questions and (iii) Quantitative Ability – 30 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: VERBAL ABILITY AND READING COMPREHENSION

SUB-SECTION: READING COMPREHENSION
Number of Questions = 24

DIRECTIONS *for questions 1 to 6:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

The tranquil chorus of the natural world is in danger of being lost to today's generation as people screen out the noises that surround them, a senior US researcher warns.

Rising levels of background noise in some areas threaten to make people oblivious to the uplifting sounds of birdsong, trickling water, and trees rustling in the wind, which can often be heard even in urban centres, said Kurt Fristrup, a senior scientist at the US National Park Service.

The problem was exacerbated by people listening to iPods through their earphones instead of tuning in to the birds and other sounds of nature that can easily be drowned out by traffic, music and others noises, he said.

"This gift that we are born with – to reach out and hear things hundreds of metres away, all these incredible sounds – is in danger of being lost through a generational amnesia," Fristrup told the American Association for the Advancement of Science meeting in San Jose.

"There is a real danger, both of loss of auditory acuity, where we are exposed to noise for so long that we stop listening, but also a loss of listening habits, where we lose the ability to engage with the environment the way we were built to," he added.

For the past 10 years, the US National Park Service has recorded sound levels at more than 600 sites across the US, including Yosemite in California, Yellowstone and Denali in Alaska. Not one was unaffected by some form of noise from human activity, be it over-flying aircraft, motorbikes, motorboats, or tour buses.

"It's not surprising people are putting on earphones or even noise cancelling earphones to try and create a quieter or more congenial environment," he said.

"As you raise background sound levels, it has the same effect on your hearing that fog would have on your vision. Instead of having this expansive experience of all the sounds around you, you are aware of only a small area around you," he said. "Even in most of our cities there are birds and things to appreciate in the environment, and there can be very rich natural choruses to pay attention to. And that is being lost."

The warning came as other scientists reported beneficial health effects from listening to natural sounds. Speaking at the same meeting, Derrick Taff, a social scientist at Pennsylvania State University, described preliminary experiments which suggest that listening to recordings from national parks, of waterfalls, birdsong and wind, helped people recover from stressful events.

In one experiment, Taff told participants who visited his lab to give an impromptu talk that would be judged by researchers standing behind a one-way mirror. Measurements of their heart rate and the stress hormone, cortisol, before and after the speech, found that people calmed down faster when they listened to nature recordings than when the same audio tracks were interspersed with sounds from road traffic, aeroplanes, and even normal conversation.

"We know that natural sounds are very important to people. They are some of the main reasons people visit protected areas. They want to hear the natural quiet, the birdsong, and the wind and water," Taff said. "We may be losing this as people are listening to the iPods all the time, but I do believe that the public is appreciative of these sounds. My advice is to go to your protected areas and experience what you are missing."

Why natural sounds might be calming to people is unclear, but Fristrup speculates that over millions of years of evolution, our brains may have come to associate the more tranquil sounds of the natural world with safety. "I suspect there's something about these intact soundscapes that reminds our ancestral brains of a place that's safe, where there's no sense of a predator nearby, and that these more cluttered soundscapes are problematic for us because we know we've lost that surveillance capability," he said.

1. Which of the following can be concluded from the experiment conducted by Derrick Taff described in the passage?
   (A) Listening to sounds of nature will help people suffering from various stress related diseases recover faster.
   (B) Stress levels of people will decrease when they hear sounds of nature while they are talking.
   (C) Natural sounds tend to decrease the stress levels of people.
   (D) Sounds from road traffic, aeroplanes will increase the stress levels of people.

2. According to the passage, people listening to iPods will
   (A) lose the ability to hear distant sounds.
   (B) miss out on hearing birdsongs, rustling of trees.
   (C) increase the background noise in the environment.
   (D) suffer from increased levels of stress.

3. What is the difference between "loss of auditory acuity" and "loss of listening habits", according to the passage?
   (A) The former refers to the disregard of background noises while the latter refers to the reduction in the inherent ability to understand the environment from its sounds.
   (B) The former means a reduction in the ability to hear low sounds whereas the latter refers to ignoring the sounds that one hears.
   (C) The former refers to the reduction in the ability to understand sounds whereas the former is a loss in the ability to pay attention to the sounds.
   (D) The former refers to partial deafness whereas the latter refers to the attention deficit in understanding sounds.

4. As can be inferred from the passage, how does increasing background sound affect hearing?
   (A) People will lose the ability to hear the sounds of nature.
   (B) People will be able to clearly hear sounds only within a small area around them.
   (C) The stress levels of people will increase due to high background noise.
   (D) People may not be able to reap the benefits of listening to natural sounds.

5. According to Fristrup, what could be the primary reason for the tendency of people to calm down when they hear natural sounds?
   (A) People may associate the presence of tranquil sounds of nature with the absence of predators.
   (B) Our brains have been evolutionarily programmed to associate natural sounds with the presence of predators.
   (C) Natural sounds have become so rare in everyday life that listening to them calms people down.
   (D) The presence of the tranquil sounds of nature may jog our genetic memory, subliminally prompting a perception of safety.

6. Which of the following excerpts taken from the passage will most likely render Taff's advice of going "to your protected areas and experience what you are missing" ineffective?
   (A) "For the past 10 years, the US National Park Service has recorded sound levels at more than 600 sites... be it over-flying aircraft, motorbikes, motorboats, or tour buses."
   (B) "Listening to recordings from national parks, of waterfalls, birdsong and wind, helped people recover from the stressful events."
   (C) "We know that natural sounds are very important to people... They want to hear the natural quiet, the birdsong, and the wind and water."
   (D) "The problem was exacerbated by people listening to iPods through their earphones instead of tuning in to the birds..., he said."

DIRECTIONS *for questions 7 to 12:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

Whether you're into mining, energy or tourism, there are lots of reasons to explore space. Some "pioneers" even believe humanity's survival depends on colonising celestial bodies such as the moon and Mars, both becoming central hubs for our further journey into the cosmos. Lunar land peddlers have started doing deals already – a one-acre plot can be yours for just £16.75.

We need to be clear about the legal validity of extra-terrestrial real estate as the same ideas that were once used to justify colonialism are being deployed by governments and galactic entrepreneurs. Without proper regulation, the moon risks becoming an extra-planetary Wild West.

To figure out whether "earthly" laws can help decide who owns what in space – or if anything can be owned at all – we must first disentangle sovereignty from property. Back in the 17th century, natural law theorists such as Hugo Grotius

and John Locke argued that property rights exist by virtue of human nature but that they can have legal force only when they are recognised by a sovereign government. Within the context of space law, the big question is whether sovereignty reaches infinity.

When the US was confronted with this query in the early 1950s, it lobbied for the recognition of outer space as a global commons. The Soviet Union was difficult to infiltrate to gather intelligence, so open access to Soviet air space was crucial for the US during the Cold War. Perceiving outer space as a commons was also another way of preventing national sovereignty in space. But neither the USSR nor the US was keen to fight out the Cold War on yet another front. Geopolitics dictated the decision to treat outer space as being non-appropriable.

This principle can be found back in Article II of the 1967 Outer Space Treaty which clearly forbids "national appropriation by claims of sovereignty, means of use or occupation by any other means". It has been widely accepted: no one complains the various moon landings or satellites in space have infringed their sovereignty.

However, legal commentators disagree over whether this prohibition is also valid for private appropriation. Historical records of the Space Treaty negotiations clearly indicate people were against private appropriations at the time, but an explicit prohibition never made it into Article II. Lessons have been learned from this omission and the ban was far more explicit in the subsequent Moon Agreement of 1979. However only 16 countries signed the agreement, none of which were involved in manned space exploration, leaving it somewhat meaningless as an international standard.

Consequently, space entrepreneurs such as Dennis Hope from the Lunar Embassy Corporation seem to think that there is a loophole in Article II which allows private citizens to claim ownership of the moon. Most space lawyers disagree however. They point out that states assume international responsibility for activities in space, whether by national companies or private adventurers, and therefore that the same prohibition extends to the private sector.

But all of these arguments are rather theoretical. If you just simply occupy a place and no one else can access or use it, aren't you the de facto owner? Lawyers call this corporate possession (*corpus possidendi*) and it represents another reason why title deeds cannot be a legal proof of lunar ownership – no one is physically there. In order to possess something, both mind and body need to be involved. Intention alone is not sufficient; possession also requires a physical act.

7. According to natural law theorists, what is the relation between sovereignty and property?
(A) Property rights exist by virtue of human nature and can be legal even in the absence of sovereignty.
(B) Property rights carry import only when recognized by sovereignty.
(C) Sovereignty is meaningless in the absence of property rights.
(D) For either of Sovereignty or property rights to exist, the other must be present.

8. Which of the following statements are the reasons for the US calling the outer space as "a global commons"?
I. The US was not enthusiastic about starting another fight with the Soviet Union for claiming territory in outer space.
II. Soviet Union wanted territorial rights in outer space which was opposed by the US.
III. The US considered outer space as an avenue for spying on the Soviet Union during the cold war.
IV. The US was against granting open access to the US airspace to the Soviet Union.
(A) I and III only (B) I, II and III only
(C) II and III only (D) III and IV only

9. According to the Article II of the 1967 Outer Space Treaty, nations
(A) cannot claim sovereignty over property in outer space but can claim ownership of property that they use.
(B) can claim sovereignty over property in outer space as long as that property is being utilized for scientific endeavours.
(C) cannot claim sovereignty over property in outer space but can claim ownership of property if they occupy the property.
(D) cannot claim sovereignty over property in outer space nor can they occupy such property by any means.

10. Which of the following would most likely have been a clause in the Moon Agreement of 1979 but not present in the Article II of the 1967 Outer Space Treaty?
(A) Outer space, including the Moon and other celestial bodies, is not subject to national appropriation.
(B) Ownership of any extra-terrestrial property by any organization or person is banned.
(C) All states have an equal right to conduct research on celestial bodies.
(D) Altering the environment of celestial bodies is banned.

11. Which of the following is presented in the passage as a reason why title deeds cannot be a legal proof of lunar ownership?
(A) Moon Agreement of 1979 prohibits private ownership of lunar property.
(B) Private citizens do not possess enough wealth to travel to the moon for claiming lunar ownership.
(C) Title deeds should be complemented by physical occupancy for ownership to be recognized.
(D) No institution on earth is authorized to issue title deeds for properties on the moon.

12. What does the loophole, mentioned in the penultimate paragraph of the passage, refer to?
(A) Only 16 nations were signatories to the treaty.
(B) Article II of the 1967 Outer Space Treaty does not specify the penalty for private ownership of lunar properties.
(C) Article II of the 1967 Outer Space Treaty specifies that private individuals can own lunar properties but does so in an ambiguous way.
(D) Article II of the 1967 Outer Space Treaty does not explicitly prohibit private individuals from owning lunar properties.

DIRECTIONS *for questions 13 to 15:* The passage given below is followed by a set of three questions. Choose the best answer to each question.

One of the more bizarre news stories of recent weeks concerns John McAfee, founder of the eponymous anti-virus software company, going on the run from the Belize police. According to his blog, McAfee disguised himself by colouring his hair and beard grey, darkening his face with shoe polish, and stuffing his right nostril to give it – in McAfee's own words, "an awkward, lopsided, disgusting appearance".

This rather theatrical approach to disguise apparently helped McAfee observe the police going about their investigations and evade detection until he made his way to Guatemala, where he surfaced earlier this week.

But, fugitives in the future may not have it so easy. Recently, the FBI revealed plans for its Biometric Identification Tools Program, which amongst other things, aims to develop mobile facial recognition software.

So would this kind of app have succeeded in catching out McAfee? Probably not if it is based on current technology. In reality, facial recognition technology is still surprising clumsy. Some people do not need to do anything nearly as extreme as McAfee to fool facial recognition systems. In fact, they don't need to do anything at all. That's because certain faces are just too "normal" for facial recognition systems to work with, according to Jean-Luc Dugelay, a video surveillance expert at Eurecom, a French research institution.

To understand why this might be, it's worth considering how most face recognition systems work. According to Anil Jain, a computer science professor at Michigan State University, they first have to work out that they are being presented with a face – a process known as face detection – and then move on to recognition and matching it with a face that is already known to the system.

Face detection usually involves detecting tell-tale "intensity signatures" of dark and light spots on an image that are typical of a human face. "Humans look for an oval for the face, with two eyes, a nose between them and a mouth beneath," Dr Jain explained. "Computers work in a different way. They may look for a horizontal pattern of dark, light dark, which corresponds to a line between the eyes."

Once a face has been detected, there are a number of techniques that can be used to recognize it. One way is to create a mathematical representation of the face – something known as a "feature vector" – that is constructed from pieces of hundreds of "standard faces" in different proportions. These standard faces are known as Eigenfaces, and are themselves generated by analysing thousands of real faces using a process called principal component analysis.

Systems that use Eigenfaces have another flaw which stems from the fact that they need to use the whole face as part of the recognition process. That means that it may be possible to successfully disguise your face against a recognition system simply by grinning or pulling some other face, according to Dr Jain – a strategy which would be unlikely to fool a real person.

13. According to the passage, John McAfee would probably
    (A) have been caught even with his disguise by the facial recognition technology available currently.
    (B) have been caught by the facial recognition technology available currently, if his disguise had not been so extreme.
    (C) not have been caught with his disguise by the facial recognition technology available currently.
    (D) not have been caught by the facial recognition technology available currently because he has distinctive facial features.

14. Which of the following is not a step in the technique mentioned in the passage for recognizing a detected face?
    (A) Construction of feature vectors.
    (B) Generation of Eigenfaces.
    (C) Analysing a number of real faces.
    (D) Detecting intensity signatures on an image.

15. Who among the following would most probably be recognized by a facial recognition software?
    (A) A person with typical facial features.
    (B) A person who is making faces.
    (C) A person with distinctive features.
    (D) A person with normal facial features making faces.

DIRECTIONS *for questions 16 to 18:* The passage given below is followed by a set of three questions. Choose the best answer to each question.

There are very few subjects in contemporary times on which so much is written by so many persons from different walks of life, as "human rights". Yet, so much still remains to be discerned and discussed to make human rights a central concern of justice and governance, nationally as well as internationally. In this context, Justice J. S. Verma' book "The New Universe of Human Rights", is a welcome contribution. He seeks a broad vision of the meaning of human rights encompassing human dignity in every aspect of human life. The writer has attempted, with some degree of success, to link all the essays in the book together under the broad theme of constitutional governance. The message is that the degree of human rights protection will determine the quality of governance and the ultimate test of justice lies in promising life with dignity to all the citizens.

Whether one goes by Amartya Sen's approach of highlighting "freedom" as the essence of human rights or Justice Verma's attempt to locate it on "dignity", the fact remains that for a vast majority of people in the developing world, the key question continues to be survival or basic needs. Unfortunately, public discourse on human rights has been almost exclusively on civil and political rights leaving very little space for "survival rights".

They were seen as part of the development debate, a third generation issue in human rights agenda to be addressed by each country according to its needs and resources. The consequent tensions between the two covenants were explained in terms of indivisibility and inter-dependence, which did not help to advance "dignity" as the central issue in human rights protection. One can see the predicament reflected in the Convention on Child Rights, where a feeble attempt has been made to integrate the two sets of rights to make it meaningful to the rightholder.

A large part of the book is devoted to the role assumed and played by the Indian judiciary in the matter of protection and expansion of human rights. Public interest litigation, democratization of judicial remedies, the concept of constitutional torts, domestication of international human rights instruments, correlation of rights and duties, enhancing standards of compliance through partnerships and continuing mandamus, are all steps which judicial activism generated in the cause of human rights. In the process, concepts of democracy, development, accountability, equality and freedom, have gathered new meanings enriching the reference point to judge governance, and mobilizing more and more people to repose faith in the system of governance under the rule of law.

16. From the approaches of Amartya Sen and Justice Verma as discussed in the second paragraph, we can understand that
(A) one has given due recognition to the idea of 'survival needs', and the other to the question of 'civil and political rights'.
(B) one is at variance from the other because of the degree of divergence in determining the importance of human dignity as the essence of human rights.
(C) one, unlike the other, thinks that in order to determine human rights one has to first understand survival needs.
(D) both have subjectively handled the issue of human rights on the basis of their own perceptions.

17. Which of the following statements cannot be understood from the passage?
(A) All talk of a human rights movement would sound a verbal jugglery if the large portion of humanity continues to suffer destitution and indignity.
(B) Attempts have been made to reconcile the two covenants viz Amartya Sen's belief and Justice Verma's belief by considering them indivisible and interdependent; and dignity has been advanced as the central issue in human rights protection.
(C) The survival rights in one country might differ from that in another country because of the differences in needs and resources.
(D) Judicial activism in the cause of human rights has led to domestication of international human rights instruments.

18. What is the attitude of the author of the passage towards the book he is reviewing?
(A) Great fascination
(B) Skeptical and sarcastic
(C) Positive but critical
(D) Neutral and dispassionate

DIRECTIONS *for questions 19 to 24:* The passage given below is followed by a set of six questions. Choose the best answer to each question.

In English writing we seldom speak of tradition, though we occasionally apply its name in deploring its absence. We cannot refer to 'the tradition' or to 'a tradition'; at most, we employ the adjective in saying that the poetry of So-and-so is 'traditional' or even 'too traditional'. Seldom, perhaps, does the word appear except in a phrase of censure. Certainly the word is not likely to appear in our appreciations of living or dead writers. Every nation, every race, has not only its own creative, but its own critical turn of mind; and is even more oblivious of the shortcomings and limitations of its critical habits than of those of its creative genius.

We know, or think we know, from the enormous mass of critical writing that has appeared in the French language, the critical method or habit of the French; we only conclude (we, the British, are such unconscious people) that the French are 'more critical' than we, and sometimes even plume ourselves a little with the fact. But we might remind ourselves that criticism is as inevitable as breathing, and that we should be none the worse for articulating what passes in our minds when we read a book and feel an emotion about it, for criticizing our own minds in their work of criticism.

One of the facts that might come to light in this process is our tendency to insist, when we praise a poet, upon those aspects of his work in which he least resembles anyone else. We dwell with satisfaction upon the poet's difference from his predecessors, especially his immediate predecessors; we endeavour to find something that can be isolated in order to be enjoyed. Whereas if we approach a poet without this prejudice we shall often find that not only the best, but the most individual parts of his work may be those in which the dead poets, his ancestors, assert their immortality most vigorously. Yet if the only form of tradition, of handing down, consisted in following the ways of the immediate generation before us in a blind or timid adherence to its successes, 'tradition' should positively be discouraged. We have seen many such simple currents soon lost in the sand; and novelty is better than repetition.

Tradition is a matter of much wider significance. It involves, in the first place, the historical sense, which involves a perception, not only of the pastness of the past, but of its presence; the historical sense compels a man to write not merely with his own generation in his bones, but with a feeling that the whole of the literature of Europe – from Homer

and within it, the whole of the literature of his own country – has a simultaneous existence and composes a simultaneous order. This historical sense, which is a sense of the timeless as well as of the temporal, and of the timeless and of the temporal together, is what makes a writer traditional.

No poet, no artist of any art, has his complete meaning alone. His significance, his appreciation is the appreciation of his relation to the dead poets and artists. I mean this as a principle of aesthetic, not merely historical, criticism. The necessity that he shall conform, that he shall cohere, is not one sided; what happens when a new work of art is created is something that happens simultaneously to all the works of art which preceded it. The existing monuments form an ideal order among themselves, which is modified by the introduction of the new (the really new) work of art among them. For order to persist after the supervention of novelty, the whole existing order must be, if ever so slightly, altered; and so the relations, proportions, values of each work of art towards the whole are readjusted; and this is the conformity between the old and the new. Whoever has approved this idea of order, of the form of European, of English literature, will not find it preposterous that the past should be altered by the present as much as the present is directed by the past.

19. According to the first paragraph of the passage, the word 'tradition' in English writing appears:
(A) in our critique of living or dead writers.
(B) mostly as a disapprobation of some practice.
(C) as a metaphor to qualify a particular culture.
(D) only when one laments that it is conspicuous by its absence.

20. What is the attitude of the author in the second paragraph of the passage?
(A) Prosaic (B) Caustic
(C) Self-disparaging (D) Ridiculing

21. What, according to the author, is a prerequisite for understanding the relationship between tradition and unique talent?
(A) The idea that the individual expertise of a writer lies in combining the best of both worlds – the timeless and the temporal.
(B) The understanding that most individual parts of an author's work may be those in which his ancestors may assert their immortality (and styles) most vigorously.
(C) The knowledge that all writers are bound by some or the other traditional practices but should transcend 'blind or timid adherence' or 'repetition'.
(D) A thorough knowledge of both the old and new traditions and a firm belief that novelty is better than repetition.

22. With reference to the 'tradition' in literature as discussed in the passage, the author would find favour with which kind of litterateurs?
(A) Litterateurs who firmly believe that their individualistic perspectives have no scope and therefore stick to 'tradition' when they compose literary works.
(B) Litterateurs who primarily aim to be different from their ancestors while writing.
(C) Litterateurs who keep in mind the whole of the literature of their culture while writing.
(D) Litterateurs who stick to the writing style of their immediate predecessors.

23. What, according to the author, is the conformity between the old and the new?
(A) The progress of an artist which is a continual self-sacrifice, a continual extinction of personality as his new work is inspired by the old but he needs to religiously cohere to 'tradition'.
(B) The alignment and improvement of an old body of work as soon as a new one is added to it.
(C) The fact that the conscious present is an awareness of the past in a way and to an extent which the past's awareness of itself cannot show.
(D) A new work of art should be judged by the canons of dead critics.

24. Which of the following would best complete the theme of the fourth paragraph of the passage?
(A) He must be aware that the mind of Europe is a mind which changes, and that this change is a development which abandons nothing *en route*, which does not superannuate either Shakespeare, or Homer, or the rock drawing of the Magdalenian draughtsmen.
(B) The dead writers are remote from us because we know so much more than they did.
(C) What is to be insisted upon is that the poet must develop or procure the consciousness of the past and that he should continue to develop this consciousness throughout his career.
(D) And it is at the same time what makes a writer most acutely conscious of his place in time, of his contemporaneity.

SUB-SECTION: VERBAL ABILITY
Number of Questions = 16

DIRECTIONS *for questions 1 to 4:* Five sentences related to a topic are given below. Four of them can be put together to form a meaningful and coherent paragraph. Identify the odd one out. Choose its number as your answer and key it in.

1. (1) Hubble's orbit outside the distortion of Earth's atmosphere allows it to take extremely high-resolution images, with substantially lower background light than ground-based telescopes.
(2) Space telescopes were proposed as early as 1923.
(3) With a 2.4-meter (7.9 ft) mirror, Hubble's four main instruments observe in the near ultraviolet, visible, and near infrared spectra.
(4) Although not the first space telescope, Hubble is one of the largest and most versatile, and is well known as both a vital research tool and a public relations boon for astronomy.
(5) The Hubble Space Telescope (HST) is a space telescope that was launched into low Earth orbit in 1990, and remains in operation.

2. (1) In modern times the iconic boats still have a role in public transport in the city, serving as ferries over the Grand Canal.
(2) The gondola is a traditional, flat-bottomed Venetian rowing boat, well suited to the conditions of the Venetian Lagoon.
(3) Their primary role today, however, is to carry tourists on rides at fixed rates.
(4) For centuries the gondola, propelled by a gondolier, was the chief means of transportation and the most common watercraft within Venice.
(5) Mark Twain dedicated much of *The Innocents Abroad*, chapter 23, to describing the curiosity of urban life with gondolas and gondoliers.

3. (1) Our minds do not naturally process statistics on incidents of violence, and so Kahneman helps explain why my claim is news.
(2) His central message could not be more important, namely, that human reason left to its own devices is apt to engage in a number of fallacies and systematic errors.
(3) I've called Daniel Kahneman the world's most influential living psychologist and I believe that is true.
(4) So if we want to make better decisions in our personal lives and as a society, we ought to be aware of these biases and seek workarounds.
(5) He pretty much created the field of behavioural economics and has revolutionised large parts of cognitive psychology and social psychology.

4. (1) But curiously, there's little follow-up: What happens, exactly, to those hundreds of thousands of ex-employees?
(2) Whenever a big company announces a work force reduction, you can count on seeing it on the evening news and reading about it in the morning papers the next day.
(3) The U.S. job market is so vast that even the biggest corporate downsizings simply disappear into the nation's statistics.
(4) Layoff stories have become a sobering staple of business journalism over the past decade.
(5) Do they start mailing resumes, hoping to land a job just like their old one? Are they consigned to forever chase behind their former salaries?

DIRECTIONS *for questions 5 to 8:* The sentences given in each of the following questions, 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 this sequence of five numbers as your answer.

5. (1) Yet, from where I saw him, he was all this – these were the stuff of legends and made him somewhat of a heroic figure for a young rocket engineer like me – and much more.
(2) He combined an acute intelligence with the qualities of a fine leader and I was immensely lucky to come in the orbit of such a man.
(3) Dr. Sarabhai set up ISRO, articulated India's space mission, he was chairman of the Atomic Energy Commission and also set up a number of institutions like IIMA.
(4) A scientist, educationist, institution builder and visionary, Dr. Vikram Sarabhai was one of modern India's greatest thinkers and doers.
(5) It was also the country's good fortune that he was chosen to helm its fledgling space programme after Independence.

6. (1) Although the U.S. production of movies intended as second features largely ceased by the end of the 1950s, the term B movie continued to be used in the broader sense it maintains today.
(2) On the one hand, the primary interest of many inexpensive exploitation films is prurient; on the other, many B movies display a high degree of craft and aesthetic ingenuity.
(3) In its post–Golden Age usage, there is ambiguity on both sides of the definition.
(4) In its original usage, during the Golden Age of Hollywood, the term more precisely identified a film intended for distribution as the less-publicized, bottom half of a double feature.
(5) A B movie is a low-budget commercial motion picture that is not an arthouse film.

7. (1) These ideas were elaborated by Ptolemy in the second century A.D. into a complete cosmological model.
(2) Aristotle thought that the earth was stationary and that the sun, the moon, the planets, and the stars moved in circular orbits around the earth.
(3) According to this model, the earth stood at the center, surrounded by eight spheres that carried the moon, the sun, the stars and the five planets known at the time, Mercury, Venus, Mars, Jupiter and Saturn.
(4) He believed this because he felt, for mystical reasons, that the earth was the centre of the universe, and that circular motion of the other bodies was ideal.
(5) The planets themselves moved on smaller circles attached to their respective spheres in order to account for their rather complicated observed paths in the sky.

8. (1) After the founding of the United States in 1776, black people continued to be enslaved, with four million denied freedom from bondage prior to the Civil War.
(2) These circumstances were changed by Reconstruction, development of the black community, participation in the great military conflicts of the United States, the elimination of racial segregation, and the Civil Rights Movement which sought political and social freedom.

(3) African-American history starts in the 16th century, with peoples from West Africa forcibly taken as slaves to Spanish America who were then, in the 17th century, taken to English colonies in North America.
(4) Believed to be inferior to white people, they were treated as second-class citizens.
(5) The Naturalization Act of 1790 limited U.S. citizenship to whites only, and only white men of property could vote.

DIRECTIONS *for questions 9 and 10:* The following question has a paragraph from which the last sentence has been left incomplete. From the given options, choose the one that completes the paragraph in the most appropriate way.

9. If nature is by definition whatever is free of human manipulation, then we can never speak of a natural human environment in the same way that we speak of a natural animal environment. But what humans do is intricately linked with the environments of animals. Sometimes 'artificial' ecologies are more resilient than the ones that were displaced. Environmentalists and conservationists often deploy the word 'nature' as something that does not belong to humans, but that humans must nevertheless actively steward and protect. This places humankind outside of nature and yet somehow instrumental in maintaining it. Climate change is clearly a threat to life on the entire planet, but the planet has been through disasters in the past. Fossil records suggest that Mother Nature does not seem to be concerned about protecting animals and plants from extinction. Whether we like it or not, the desire to preserve biodiversity and ecosystems is a very human desire.

(A) Humans are not simultaneously outside nature and part of it because change is 'in the nature' of things.
(B) Many of us have what resembles an aesthetic appreciation for (nonhuman!) life on earth in its current form.
(C) I am sure many nature-lovers and environmentalists would find the following sentence rather annoying: 'Beavers naturally make dams; humans naturally make plastic.'
(D) Animals are incapable of changing nature and cannot find the true balance of life due to changes in nature.

10. There can be little doubt that Karl Marx and Friedrich Engels would have agreed with Lenin's nutshell definition of Marxism as "the theory and practice of the proletarian revolution." In this violently compressed formula, the key component is not the unity of theory and practice; unfortunately that has become a platitude. Nor is it "revolution"; unfortunately that has become an ambiguity. The key is the word "proletarian"-the class-character component. But "proletarian revolution" too, very early, took on a considerable element of ambivalence, for it could be and was applied to two different patterns. In one pattern, the proletariat carries out its own liberating revolution.

(A) In the other, the proletariat is not interested in carrying out a revolution but is happy with status quo.
(B) In the other, the revolution itself carries the proletariat to a higher level.
(C) It must be emphasized that this pattern is not something peculiar to the socialist movement, but extends into socialism.
(D) In the other, the proletariat is used to carry out a revolution.

DIRECTIONS *for questions 11 to 13:* In each of the following questions, there are sentences or fragments of sentences that form a paragraph. Identify the sentence(s) or fragments of sentence(s) that is/are correct in terms of grammar and usage, including spelling, punctuation and logical consistency, and enter the letters corresponding to the sentence(s) or fragments of sentence(s) in the input box provided below the question. You must enter your answer in alphabetical order only. For example, if you think that statements (4) and (5) are correct, then enter 45 (but not 54) in the input box.

11. (1) It is sometimes said that
(2) while excavating the tomb of ancient queen at Ur, a gold knob was found.
(3) When carefully it was removed, a hole was seen in the ground
(4) beneath it. This suggested that, under the knob, there was something
(5) made of wood which decayed and turned to dust leaving only the hole.

12. (1) Cubist sculpture developed in parallel to Cubist painting. During autumn of 1909
(2) Picasso sculpted *Head of a Woman* with positive feature depicted by negative space
(3) and vice versa. According to Douglas Cooper, "the first true Cubist piece was Picassos impressive *Woman's Head*,
(4) sculpted in 1909–10, a counterpart, in three dimensions,
(5) to many similar analytical and faceted heads in his paintings at the time."

13. (1) In the 1980s, Japan was a closely studied example for economic dynamism.
(2) In the decades since it has commanded attention largely for its economic stagnation.
(3) After years of falling prices and fitful growth, Japan's nominal GDP was roughly the same in 2015 like it was 20 years earlier.
(4) America's grew by 134% during the same time period; even Italy's went up by two-thirds. Now Japan
(5) is in the spotlight for a different reason: its attempts with economic resucsitation.

DIRECTIONS *for questions 14 to 16:* In each of the following questions, the word in capitals is used in four different ways. Identify and select the option(s) in which the usage of the word is INCORRECT or INAPPROPRIATE.

Select all that are INCORRECT or INAPPROPRIATE:

14. ROUND

(1) The news of his arrest quickly made the rounds.
(2) The shepherd rounded off the sheep from different parts of the green meadow.
(3) The father gave his son a round sum of money for the international trip being organized by his college.
(4) Michael Schumacher's car was rounding into the final lap of the race when it suddenly hit the guardrail by the track.

15. READ

(1) You are requested not to read too much for such a thoughtless remark.
(2) The college professor read his students a lecture because they had bunked his class.
(3) The novel is an eye-opener for us and a very memorable read.
(4) In Agatha Christie's novels, the Belgian detective Hercule Poirot could read abandonment in a broken door or shattered window.

16. BREAK

(1) We waited patiently for a break in the weather so as to continue on our trek but it never came.
(2) Massive volcanic eruptions need not be caused when two parts of the Earth's crust break apart.
(3) The sales executive's self control breaks up when he cannot meet his targets.
(4) We are trying to break away from the idea that women cannot work in the defence sector.

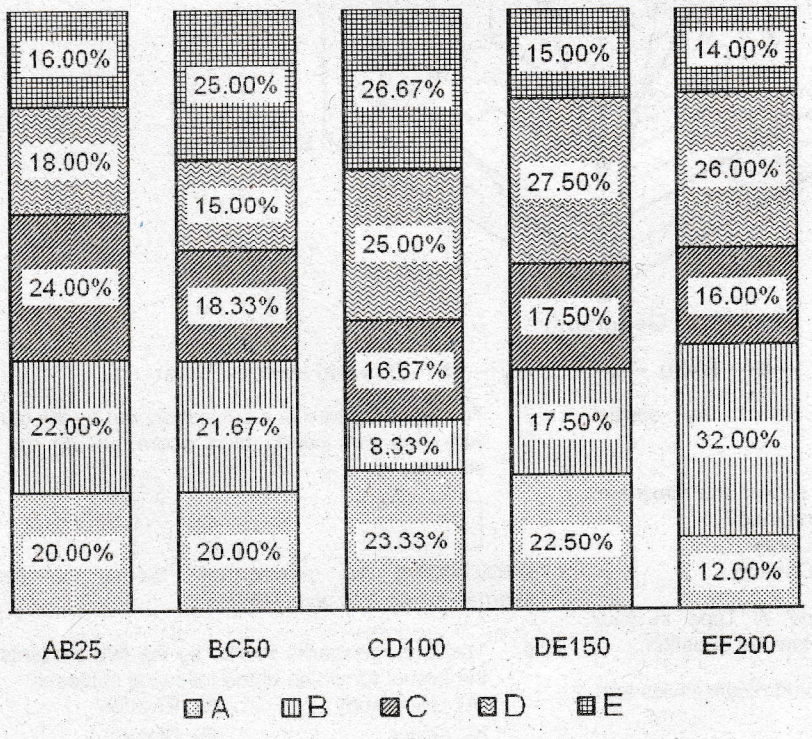
SECTION II: DATA INTERPRETATION AND LOGICAL REASONING

SUB-SECTION: DATA INTERPRETATION
Number of Questions = 15

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

In each of five cities, A, B, C, D and E, exactly five models of motorcycles – AB25, BC50, CD100, DE150 and EF200 – are present. The bar-chart below provides, for each model of motorcycle, the city wise percentage breakup of the total number of motorcycles present across all the five cities. The table provides the number of motorcycles of each model present in city A.

Percentage Breakup of Motorcycles



Number of motorcycles	
Model	**City A**
AB25	100
BC50	120
CD100	140
DE150	90
EF200	60

DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.

1. In city D, the maximum number of motorcycles are of the model
   (A) CD100. (B) DE150.
   (C) EF200. (D) AB25.

2. In city E, what is the highest number of motorcycles of any model as a percentage of the total number of motorcycles in that city?
   (A) 30.77% (B) 28.85%
   (C) 32.24% (D) 26.7%

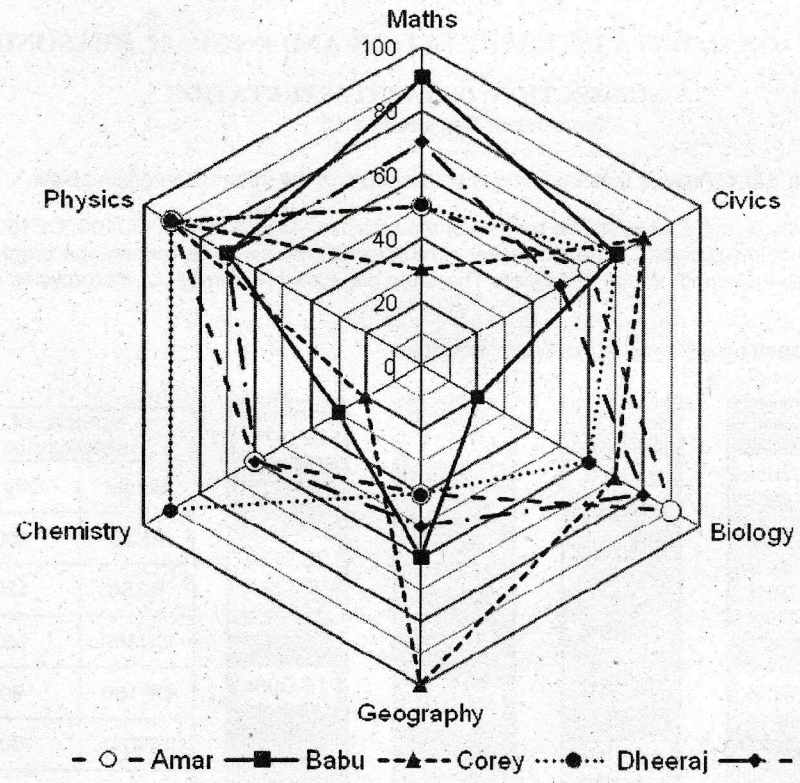
3. The difference between which of the following pairs of values is the highest?
   (A) Number of DE150 motorcycles in city D and number of EF200 motorcycles in city A
   (B) Number of AB25 motorcycles in city C and number of CD100 motorcycles in city B
   (C) Number of CD100 motorcycles in city D and number of BC50 motorcycles in city C
   (D) Number of DE150 motorcycles in city E and number of EF200 motorcycles in city B

DIRECTIONS *for question 4:* Type in your answer in the input box provided below the question.

4. The total number of motorcycles present across all the five cities is

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

The annual examinations in a school were conducted in six subjects – Biology, Chemistry, Civics, Geography, Maths and Physics. The following chart gives the marks scored by five students – Amar, Babu, Corey, Dheeraj and Eswar – in each subject:



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

5. Among the five students, who scored the maximum marks in all the six subjects combined?
   (A) Amar (B) Corey
   (C) Eswar (D) Dheeraj

DIRECTIONS *for questions 6 and 7:* Type in your answer in the input box provided below the question.

6. The average marks of the five students in Civics are

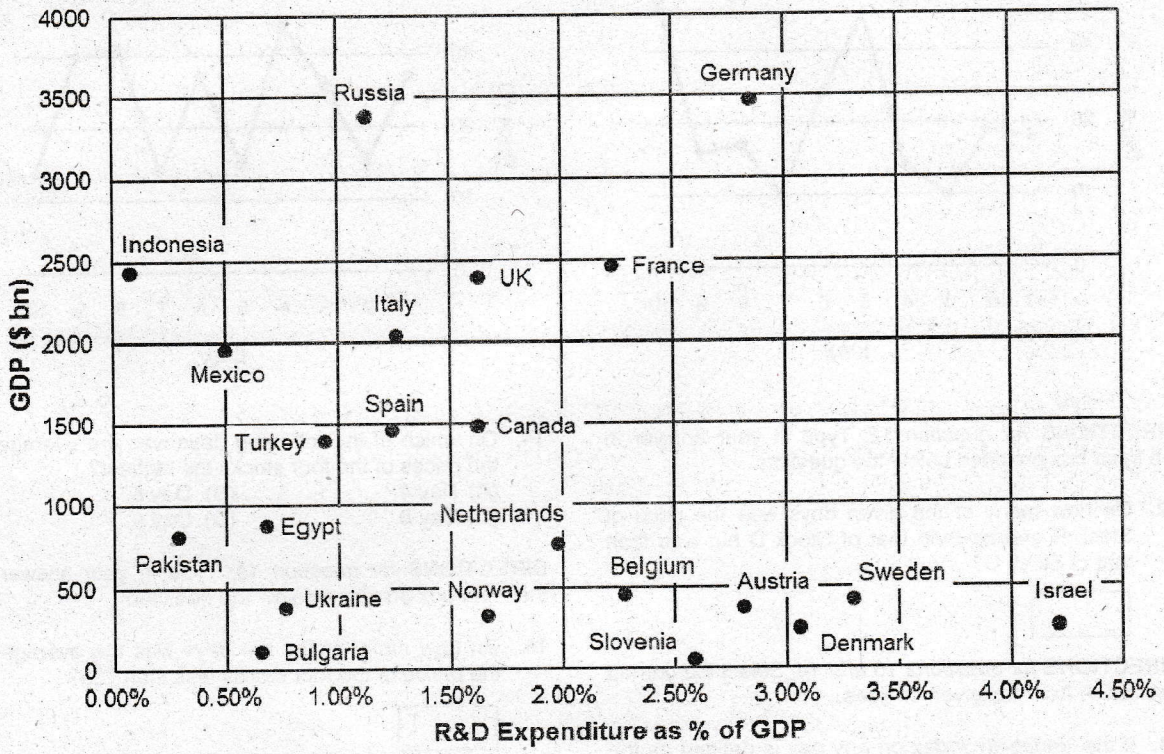
7. The highest score in a subject scored by the student who has the lowest total score among the five students is

DIRECTIONS *for question 8:* Select the correct alternative from the given choices.

8. The average marks scored by the five students are the lowest for which of the following subjects?
   (A) Geography (B) Physics
   (C) Civics (D) Biology

DIRECTIONS *for questions 9 to 11:* Answer these questions on the basis of the information given below.

The following scatter graph shows, for 22 countries, the R&D expenditure as a percentage of the GDP for each country, along the horizontal axis, and the GDP of each country (in $ bn), along the vertical axis:



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

9. For which of the following countries is the R&D expenditure the highest?
(A) UK (B) Sweden
(C) Italy (D) Israel

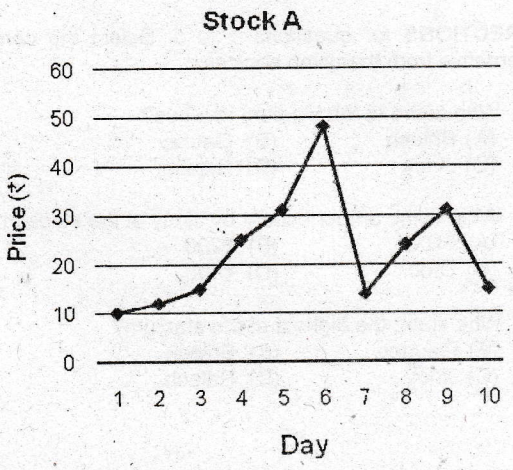
10. What is the highest R&D expenditure (approximately) of any country which has a GDP of less than $2000 bn and an R&D expenditure of more than 2.5% of its GDP?
(A) $13.7bn (B) $12.2bn
(C) $10.9bn (D) $9.5bn

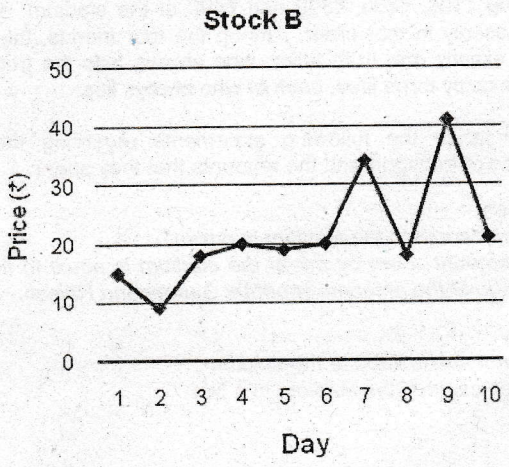
DIRECTIONS *for question 11:* Type in your answer in the input box provided below the question.

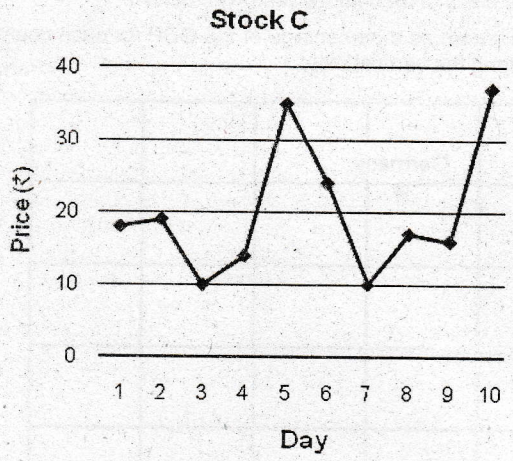
11. For how many countries is the R&D expenditure less than $20bn?

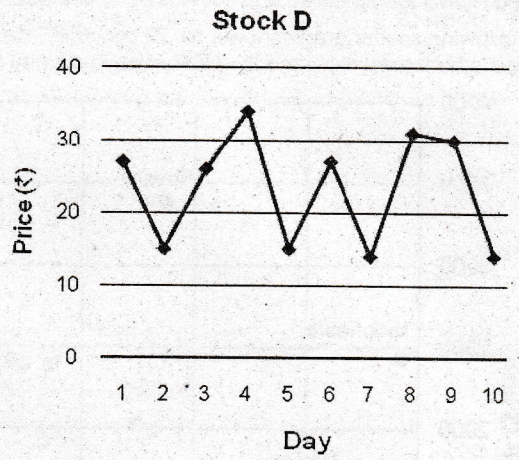
DIRECTIONS *for questions 12 to 15:* Answer these questions on the basis of the information given below.

The following line graphs present the prices of four stocks – Stock A, Stock B, Stock C and Stock D – over a period of ten days, from Day 1 to Day 10:









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

12. On how many of the given days was the price of Stock B greater than that of Stock D but less than that of Stock C?

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

13. If the *Variability Index* on any day is defined as the maximum difference between the price of any two stocks on that day, on which of the following days is the *Variability Index* the lowest?
(A) Day 2 (B) Day 3
(C) Day 8 (D) Day 10

14. On which of the following days was the average of the prices of the four stocks the highest?
(A) Day 4 (B) Day 5
(C) Day 8 (D) Day 9

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

15. On how many of the ten days was the average of the prices of the four stocks less than ₹20?

SUB-SECTION: LOGICAL REASONING
Number of Questions = 15

DIRECTIONS *for questions 1 to 3:* Answer these questions on the basis of the information given below.

Four friends – Gaurav, Brijesh, Jinoy and Rajesh – went to see a hockey match in a stadium. Each of them used a different mode of transport among Auto, Bike, Bus and Car to get to the stadium and spent a different amount among ₹100, ₹200, ₹300 and ₹400 at the stadium, not necessarily in that order. Among the four friends, there was exactly one truth teller, who always tells the truth, and exactly three liars, each of who always lies.

They made the following statements regarding their modes of transport and the amounts that they spent:

Brijesh:
I did not come to the stadium in a bike.
The amount spent by me at the stadium is equal to the average of the amounts spent by Gaurav and Rajesh.

Jinoy:
I did not spend ₹300 at the stadium.
Rajesh came to the stadium in a bus.

Gaurav:
I came to the stadium in an auto.
I spent the highest among the four of us at the stadium.

Rajesh:
I came to the stadium in a bus.
I spent ₹100 at the stadium.

DIRECTIONS *for questions 1 to 3:* Select the correct alternative from the given choices.

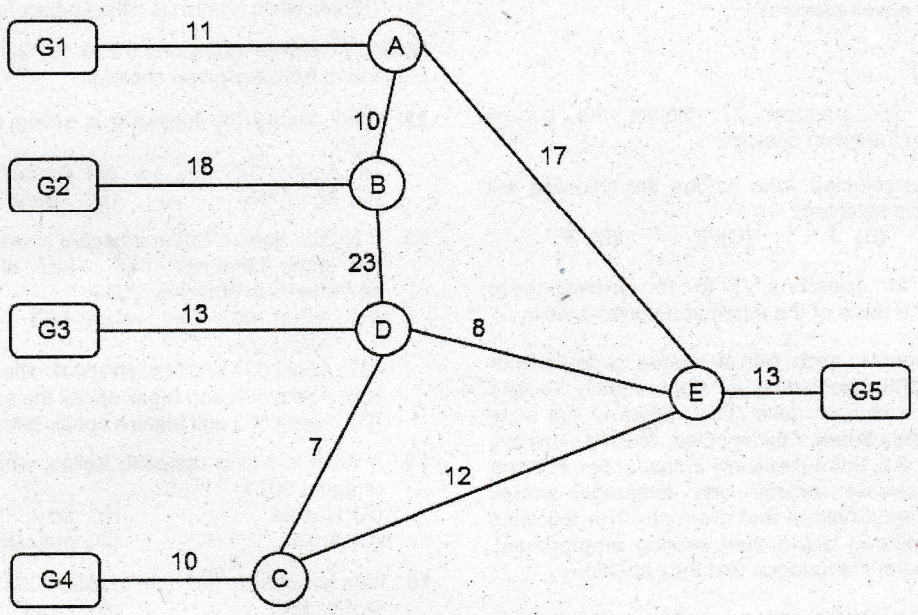
1. Who came to the stadium in a bus?
(A) Brijesh (B) Gaurav
(C) Jinoy (D) Rajesh

2. What is the amount spent by Jinoy at the stadium?
(A) ₹100 (B) ₹200
(C) ₹300 (D) ₹400

3. Who spent the highest at the stadium?
(A) Gaurav (B) Brijesh
(C) Jinoy (D) Rajesh

DIRECTIONS *for questions 4 to 7:* Answer these questions on the basis of the information given below.

A museum of natural history has five exhibits – A, B, C, D and E – and five different gates – G1 through G5. Any person can enter the museum only through the gates G1 through G4 but can exit through any of the five gates. The network diagram below presents the routes available to navigate through the museum and the times taken (in seconds) to move between the gates and the exhibits. On any day, each of the four gates, G1 through G4, is operated such that exactly 100 persons are allowed to enter through it after which the gate is closed for the day and no one is allowed to enter through that gate. Any person visiting the museum can enter the museum through any of the four gates, provided the gate is not closed, and can exit the museum through any of the five gates (including G5). Any person who enters the museum will visit all the five exhibits exactly once, spending exactly one minute at each exhibit, and exit immediately. Further, any person visiting the museum will choose the gates (to enter and exit) and the order in which he visits the exhibits such that the time that he spends in the museum is the minimum possible. If the time taken to pass through the routes through any two entry gates is the same, people will be indifferent between the two gates and choose one of them randomly. Exactly 400 people visit the museum everyday.



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

4. If Ram was the 247th person to visit the museum on a certain day, which gate would he have used for exiting the museum?
(A) G1 (B) G2 (C) G3 (D) G4

DIRECTIONS *for question 5:* Type in your answer in the input box provided below the question.

5. What is the total number of people who exit the museum through gate G2 on any day?

DIRECTIONS *for question 6:* Select the correct alternative from the given choices.

6. Considering all the persons who visited the museum on any day, what is the average time spent by each person in the museum?
(A) 373.5 seconds
(B) 372.75 seconds
(C) 374.25 seconds
(D) 372.25 seconds

DIRECTIONS *for question 7:* Type in your answer in the input box provided below the question.

7. On any day, the number of people for whom exhibit B is the second exhibit that they visit is

DIRECTIONS *for questions 8 to 11:* Answer these questions on the basis of the information given below.

Ravi, a cricket team coach, has to select a team of seven players from eleven available players – A through K. Among the eleven players, A, B, C and D are batsmen, E, F and G are bowlers, H and I are all-rounders, while J and K are wicketkeepers. Further, A, E, H and J are overseas players, while the rest are local players. Ravi has to select at least two batsmen, at least two bowlers, exactly one all-rounder, exactly one wicketkeeper and exactly two overseas players in the team.
Further, it is also known that

(i) B and C cannot be in the team together.
(ii) if G is selected, I must also be selected.
(iii) if E is selected, D must also be selected.
(iv) if B is selected, F must also be selected.
(v) C and K cannot be in the team together.

DIRECTIONS *for question 8:* Select the correct alternative from the given choices.

8. Who cannot be a part of the team?
(A) H (B) J
(C) C (D) None of the above

DIRECTIONS *for questions 9 and 10:* Type in your answer in the input box provided below the question.

9. In how many ways can Ravi select the seven players, if he wants three bowlers in the team?

10. If K must be selected, in how many ways can Ravi select the seven players?

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

11. If C is not selected, who among the following will definitely be selected?
(A) K (B) J (C) E (D) F

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

Eight secret agents, each with a unique code number from 001 to 008, are sitting in eight equally spaced chairs around a circular table. The names of the eight agents are Ankit, Bibek, Chirag, Dev, Rashid, Naman, Karan and Manish, not necessarily in that order. Further, each agent speaks exactly one language among English, Russian, Chinese and German. The following information is known about their seating arrangement, their names and the languages that they speak:

(i) Any pair of agents sitting opposite each other do not speak the same language and the code numbers of any pair of agents sitting next to each other are not consecutive.
(ii) There are at least two agents sitting between any two agents who speak Chinese and there is exactly one agent sitting between Manish and agent 002.
(iii) The number of agents who speak German is more than the number of agents who speak any other language.
(iv) Naman is sitting to the left of agent 006 and between them, they speak Chinese and Russian.
(v) Agent 002, who is not Karan, is sitting opposite Rashid and neither of them speak Russian.
(vi) Agent 007, who is neither Chirag nor Karan, is sitting opposite agent 005, who speaks Chinese.
(vii) Chirag, who speaks Russian, is sitting opposite Bibek, while Manish is sitting adjacent to agent 003.

DIRECTIONS *for questions 12 to 15:* Select the correct alternative from the given choices.

12. Who among the following is sitting opposite agent 001?
(A) Agent 002 (B) Agent 003
(C) Agent 006 (D) Agent 004

13. If no two agents sitting adjacent to each other speak the same language, then which of the following statements is definitely true?
(A) Agent 002 and agent 003 speak different languages.
(B) Agent 001 and Manish speak different languages.
(C) Agent 005 and Bibek speak the same language.
(D) Agent 002 and Manish speak different languages.

14. If Ankit is sitting opposite Karan, what is the name of agent 007?
(A) Rashid (B) Dev
(C) Ankit (D) Manish

15. Who is sitting to the right of agent 008?
(A) Karan (B) Bibek
(C) Chirag (D) Naman

SECTION III: QUANTITATIVE ABILITY
Number of Questions = 30

DIRECTIONS *for questions 1 to 5:* Select the correct alternative from the given choices.

1. In a four-digit number, if the sum of the thousands digit and the tens digit is eight times the sum of the remaining two digits, then the number must be divisible by which of the following?
(A) 5 (B) 9 (C) 11 (D) 13

2. Find the number of digits in N, if $N = (80)^{100}$ and $\log 2 = 0.3010$.
(A) 189 (B) 191 (C) 190 (D) 192

3. A retailer made a profit of 25% by selling an article for ₹120. At what price should he have sold the article, if he wished to make a profit of 50%?
(A) 124 (B) 132 (C) 144 (D) 150

4. If x, y and z are the lengths of the sides of a triangle and $xyz = x + y + z$, which of the following cannot be the value of $(x + y + z)^2 - (x^2 + y^2 + z^2)$?
(A) 11 (B) 13
(C) $15\frac{1}{2}$ (D) 1024

5. Amropali, a mathematician, had a strange wish of finding out the number of ways in which she could express her mobile number '9898989898' as the difference between the squares of two natural numbers and she observed that it can be done in x ways. What was the value of x arrived at by her?
(A) 0 (B) 1
(C) 3 (D) More than 3

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

6. If $A = 827^{123n} - 823^{123n}$, $B = 627^{123n} - 623^{123n}$, $C = 927^{123n} - 923^{123n}$ and $D = 727^{123n} - 723^{123n}$, where n is a natural number, rank A, B, C and D, from 1 to 4, in the decreasing order of their magnitudes and enter the correct sequence of the ranks of A, B, C and D (in that order) in the input box provided below.

DIRECTIONS *for questions 7 and 8:* Select the correct alternative from the given choices.

State buses continually commute between two cities, A and B, from 6 am to 10 pm, such that every 30 minutes a bus leaves A, towards B, and another bus leaves B, towards A. All buses travel at a uniform speed U_1. Prajnan started from A, towards B, at 2 pm by car, at a speed of U_2. He observed that every t_1 minutes, he crossed a bus coming in the opposite direction and every t_2 minutes, he overtook a bus moving in the same direction.

7. If $U_1 : U_2 = 2 : 3$, which of the following gives the ratio of $t_1 : t_2$

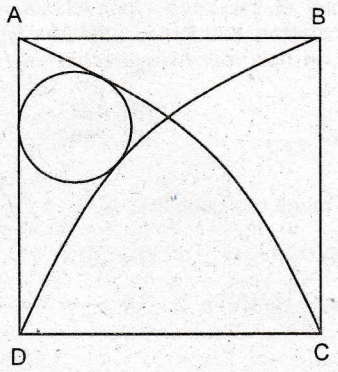
(A) 3 : 2
(B) 1 : 5
(C) 4 : 9
(D) Cannot be determined

8. If after every t_3 minutes, Prajnan crossed two buses simultaneously, find the value of t_3 given $U_1 : U_2 = 2 : 5$ and $U_2 = 50$ km/hr.

(A) 20
(B) 60
(C) 120
(D) He will never cross two buses simultaneously.

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

9. In the figure given below, ABCD is a square, in which two quadrants, ADC and BCD, are drawn with their radii equal to the side of the square. The side of the square is how many times the radius of the circle?



DIRECTIONS *for questions 10 to 12:* Select the correct alternative from the given choices.

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

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

11. If $x + \frac{1}{x} = \sqrt{2} + 1$, find the value of $x^4 - 2x^3 + x^2 - 2x + 5$.

(A) −1
(B) $-3+5\sqrt{2}$
(C) 4
(D) None of the above

12. Find the maximum value of $10\sin x + 24\cos x$.

(A) 24
(B) 26
(C) $17\sqrt{2}$
(D) None of the above

DIRECTIONS *for questions 13 to 17:* Type in your answer in the input box provided below the question.

13. The visibility on a certain road is limited to a distance of 80 m due to fog. A car travelling on that road crossed a cart moving in the same direction. If the speed of the cart and the car are 8 km/hr and 44 km/hr respectively, then for how long (in seconds) will the car be visible to the driver of the cart after it overtook the cart?

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

15. N is a three-digit number in the number system to the base 6. If the order of the digits is reversed and the number is then considered in base 11, its value becomes four times the value of the original number in base 6. How many values are possible for N.

16. If in the year 1948, Rounak's age as well as his grandfather's age were equal to the last two digits of their respective years of birth (year of birth of each person being taken as a four-digit number), what was the difference between their ages?

17. How many positive integral values of n exist, such that $\frac{n+76}{n+4}$ is an integer?

DIRECTIONS *for questions 18 to 20:* Select the correct alternative from the given choices.

18. If the quadratic equations $x^2 - ax + 3 = 0$ and $x^2 + ax - 5 = 0$ have one positive root in common, find the value of a.

(A) −4
(B) 2
(C) 4
(D) Cannot be determined

19. If the rate of simple interest on a certain sum becomes one and a half times what it is, then what would be the percentage reduction in the time taken for the sum to become three times itself?

(A) 20%
(B) $33\frac{1}{3}\%$
(C) $66\frac{2}{3}\%$
(D) 50%

20. If in a triangle ABC, $\frac{\tan A}{a} = \frac{\tan B}{b} = \frac{\tan C}{c}$, then the triangle ABC must be
(A) obtuse angled.
(B) right angled.
(C) equilateral.
(D) None of the above.

DIRECTIONS *for questions 21 and 22:* Type in your answer in the input box provided below the question.

21. A boy, while reading a story book, realized that a certain number of consecutive leaves were missing from the book. Each leaf is numbered on either side and is considered as two pages. When he added all the page numbers that were missing, he got a sum of 180. The number of leaves that were missing from the book was

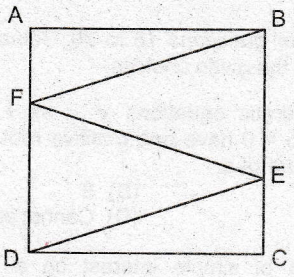
22. A number M has exactly six factors. If the reciprocal of each factor of M is a terminating number, then how many values can M assume?

DIRECTIONS *for question 23:* Select the correct alternative from the given choices.

23. An inlet pipe is opened into an empty tank, but when the tank was one-fourth filled, it was observed that there was a leak at the bottom of the tank, after which the leak was immediately plugged. If the time taken to fill the remaining portion of the tank was equal to the time for which the leak had been operational, then the time taken by the leak alone to empty the tank is how many times the time taken by the inlet alone to fill it?
(A) $\frac{3}{2}$ (B) 2 (C) $\frac{2}{3}$ (D) $\frac{3}{4}$

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

24. In the figure given below, ABCD is a square. If BF = FE = ED = 20 cm, find the area (in sq. cm) of the square.



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

25. If $S = 1 - \frac{4}{3} + \frac{9}{3^2} - \frac{16}{3^3} + \frac{25}{3^4} - \frac{36}{3^5} + \ldots$ then the value of S =
(A) $\frac{9}{32}$. (B) $\frac{7}{25}$. (C) $\frac{11}{36}$. (D) $\frac{13}{45}$.

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

26. Set A has a elements and set B has b elements. If the sum of the number of proper subsets of A and the number of proper subsets of B is 142, then find the value of $a + b$.

DIRECTIONS *for questions 27 to 29:* Select the correct alternative from the given choices.

27. If m and n are whole numbers, how many pairs (m, n) exist, such that the quadratic equation $x^2 - (m!)\,x + n! = 0$ has equal roots for x?
(A) 0 (B) 1
(C) 2 (D) more than 2

28. Three friends, Kolu, Godu and Gopi, went to a restaurant for a lunch buffet. At the buffet, there were three different types of soups, three different types of starters and four different types of main courses available and each of the friends decided to take one soup, one starter and one main course. If, among the three of them, they finally ended up taking two of the three types of soups, all three types of starters and three of the four types of main courses, in how many ways could they have done that?
(A) 216 (B) 432
(C) 1296 (D) 2592

29. Find the range of x such that $\frac{1}{x-2} > \frac{3}{x-3}$.
(A) (1, 4) (B) (2, 3)
(C) $\left(-\infty, \frac{3}{2}\right) \cup (2, 3)$ (D) $(-\infty, 1) \cup (1, 4)$

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

30. Find the area (in sq. units) of the polygon formed by joining the vertices (5, 5), (–1, 3), (–2, –2), (1, –4) and (6, 0).