

Ref: AIMCAT1703

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 80 questions in three sections: (i) Verbal Ability and Reading Comprehension – 32 Questions (ii) Data Interpretation and Logical Reasoning – 24 Questions and (iii) Quantitative Ability – 24 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 = 21

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

Listening to music may make the daily commute tolerable, but streaming a story through the headphones can make it disappear. You were home; now you're at your desk: What happened?

Storytelling happened, and scientists have mapped the experience of listening to podcasts, specifically "The Moth Radio Hour." In a paper published in the journal *Nature*, a research team from the University of California, Berkeley, laid out a detailed map of the brain as it responded to a story. Widely dispersed sensory, emotional and memory networks were humming, across both hemispheres of the brain; no story was "contained" in any one part of the brain.

Seven volunteers participated in the study while their brain activity was recorded with an M.R.I. machine. Each participant's brain blood flow was measured as he or she listened, with eyes closed and headphones on, to more than two hours of stories from "The Moth Radio Hour," a public radio show in which people recount humorous and poignant autobiographical experiences.

Their brain imaging data were then matched against time-coded, phonemic transcriptions of the stories. Phonemes are units of sound that distinguish one word from another.

That information was then fed into a word-embedding algorithm that scored words according to how closely they are related semantically.

The results were converted into a thesaurus-like map where the words are arranged on the flattened cortices of the hemispheres of the brain rather than on the pages of a book. Words (social elements, for example, like friends and parties, as well as locations and emotions) were grouped under twelve headings: visual, tactile, numeric, locational, abstract, temporal, professional, violent, communal, mental, emotional and social. These categories tended to cause activation in the same parts of people's brains at the same points throughout the stories.

They then retested that model by seeing how it predicted M.R.I. activity while the volunteers listened to another Moth story. Would related words like mother and father, or times, dates and numbers trigger the same parts of people's brains? The answer was yes.

"Consider the case of just the word 'dog,'" Dr. Gallant said. "Hearing that is going to make you think about how a dog looks, how it smells, how the fur feels, the dog you had as a kid, a dog that bit you on your paper route. It's going to activate the entire network for 'dog.'"

And so it goes, for each word and concept as it is added to the narrative flow, as the brain adds and alters layers of networks: A living internal reality takes over the brain. That kaleidoscope of activation feels intuitively right to anyone who's been utterly lost listening to a good yarn. It helps explain the proliferation of ear-budded zombies walking the streets, riding buses and subways, fixing the world with their blank stares.

1. What does the author imply when he says "A living internal reality takes over the brain." (last para)?
 - (A) A person is immersed in thoughts related to reality.
 - (B) Parts of the brain are triggered in response to specific narratives.
 - (C) The brain creates an internal reality to match external reality.
 - (D) One is not attached to the external world as a person without podcasts is.

2. Which of the following can be understood from the first para of the passage?
 - (A) Streaming a story through the headphones while travelling can make the story narrative disappear from your memory.
 - (B) Listening to music is a far better method in dealing with the problems of daily travel than streaming a story through the headphones.
 - (C) Streaming a story through the headphones is better in dealing with the problems of daily travel than listening to music.
 - (D) Streaming a story through the headphones while travelling can make you forget that you were home and remind you that you now at your workstation.

3. Which of the following summarizes the main finding of the passage?
 - (A) By monitoring blood flow to different parts of the brain, researchers were able to see the complex ways that people experience words in music. The semantic system is organized into intricate patterns that seem to be consistent across individuals.
 - (B) By monitoring blood flow to different parts of the brain, researchers were able to determine what regions of the cortex are active during language processing, and to identify smaller regions that specifically respond to a set of related words, such as words representing numeric concepts, or emotional concepts.
 - (C) Researchers were able to determine how a subject thinks when words like "dog" or "mother" are narrated.
 - (D) By tracking the blood flow in people's brains as they listened to a story, scientists have mapped out where the meanings associated with basic words are encoded in the cortex, creating the first semantic atlas of the brain. The human brain is a living word cloud, turning spoken language into intricate neural patterns of meaning that we all appear to share.

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

The pervasiveness of anthropocentrism is not generally thought to be a problem for philosophical analysis. If one considers questions in epistemology, for example, the centrality of human knowing seems a straightforward focus of concern. Even in ethics, a focus on human value, on human benefits and harms, seems highly appropriate. Most ethical discussion, analysis, and justification concerns human agents, and the actions among human beings and human institutions. The field of environmental ethics is, of course, a notable exception – for in environmental ethics we intentionally consider the possible value of nonhuman entities, and the effects of human actions on nonhuman nature – but here the exception proves the rule: environmental ethics may be the only field of philosophy that even considers the possibility of moving beyond the perspective of anthropocentrism.

But environmental ethics is not the only discipline that deals with the human relationship to the nonhuman world. Consider the philosophy of nature, a traditional sub discipline of metaphysics. In the development of a theory that describes the nature of the natural world, should we be limited by a human centred understanding? Must our understanding of nature be limited by the anthropocentric content and structure of our ideas? Is it possible to understand nature from the perspective of nature itself?

This problem – the possibility of escaping anthropocentrism – has fundamental importance for any attempt to address the contemporary environmental crisis. Environmental policy, if it is to be morally defensible, must be connected in some way to a plausible theory of environmental ethics. But a plausible theory of environmental ethics must, in turn, be based on an adequate philosophy of nature – a valid physical and metaphysical description of the way the world is. Is any of this philosophical analysis – policy, ethics, metaphysics – possible from the limited horizon of anthropocentrism?

The philosophy of deep ecology is a test case for these issues. The advocates of deep ecology claim, in part, that their position addresses environmental issues from a wider perspective than traditional anthropocentrism. In considering the intrinsic value of nonhuman life forms, in the process of identification with non-human natural entities and systems, and in the development of policies of action that stress non-interference and the harmony of human life and nature, deep ecologists claim to transcend anthropocentrism and adopt a perspective of ecocentrism.

Whether or not deep ecology is anthropocentric will depend on how deep ecology is defined. The meaning of deep ecology as a philosophical position is not always clear. Arne Naess, the Norwegian philosopher who coined the distinction between shallow environmentalism and deep ecology, is deliberately ambiguous when it comes to delineating the fundamental ideas of deep ecology. Because deep ecology is primarily a social and political movement, the advocates of the position do not want to alienate potential supporters with a narrow or technical ideology. Naess has emphasized repeatedly that there are many deep ecology positions and he has used his "apron diagram" with its various levels to show that different philosophical and religious positions can be used to derive and justify the platform of the deep ecology movement. To borrow a phrase from the Republican Party in the United States, deep ecology claims to be a "big tent" within which many different fundamental philosophical perspectives can feel at home.

One way to characterize the central ideas of the philosophy of deep ecology would be to look carefully at the philosophical content of the deep ecology political platform, for the platform represents the central common ground occupied by all advocates of the deep ecology movement. Indeed, Andrew McLaughlin claims that the deep ecology platform is the heart of deep ecology, for deep ecology is "an ecocentric movement for radical social change", and not a theoretical or foundational philosophical system. The platform, as the "common ground" of deep ecology, expresses the basic ideas of the position, regardless of the differing paths taken to arrive at, derive, or justify these basic ideas. McLaughlin claims that the "point" of the platform "is to define the Deep Ecology movement, create clarity within the Movement, and make clear where real disagreement might exist."

4. According to the passage, which of the following can be inferred about the philosophy of nature?
 - (A) The philosophy of nature transcends anthropocentrism and tries to understand nature from the perspective of nature.
 - (B) Unlike environmental ethics, philosophy of nature deals with the relationship between the human world and the nonhuman world.
 - (C) The philosophy of nature is limited by its anthropocentric approach in describing the nature of natural world.
 - (D) The philosophy of nature is the only anthropocentric discipline in the field of philosophy.
5. According to the passage, for an environmental policy to be morally justifiable, it should be based on which of the following?
 - (A) A philosophy of nature which is dependent on credible environmental ethics.
 - (B) A philosophy of nature which describes the world as it is and in all its aspects.
 - (C) A philosophy of nature which is not anthropocentric.
 - (D) A philosophy of nature which is anthropocentric.
6. Which of the following is a possible reason that the scope of deep ecology is ambiguously defined by Naess?
 - (A) To embrace as many supporters as possible into the ambit of deep ecology.
 - (B) To enable the justification of deep ecology movement through various philosophical and religious positions.
 - (C) To maintain the identity of deep ecology as a social and political movement.
 - (D) To create a distinction between shallow environmentalism and deep ecology.
7. As understood from the passage, which of the following is true regarding deep ecology?
 - (A) Deep ecologists are not limited by an anthropocentric viewpoint in understanding nature.
8. Which of the following is a difference between Andrew McLaughlin and Arne Naess in their approach towards defining deep ecology?
 - (A) Naess defined deep ecology primarily as a social and political movement, whereas McLaughlin defines deep ecology as a foundational philosophical system.
 - (B) Naess was ambiguous in defining the fundamental ideas that constitute deep ecology while McLaughlin seeks clarity in its definition.
 - (C) Naess defined deep ecology as a "big tent" which can accommodate various philosophical perspectives whereas McLaughlin prefers its definition to be narrower in scope.
 - (D) Naess only pointed out the differences between shallow environmentalism and deep ecology, while McLaughlin defined the fundamental ideas that constitute deep ecology.
9. How many of the following fields of philosophy definitely do not deal with the relationship between the human world and the nonhuman world?
Type in your answer in the input box provided below.

- I. Philosophy of nature
- II. Environmental ethics
- III. Deep ecology
- IV. Epistemology

DIRECTIONS for questions 10 to 15: The passage given below is followed by a set of six questions. Choose the best answer to each question.

While the term 'scientific literature' is a commonplace usage, few scientists would acknowledge any connection between how they write and the works of novelists or poets. In the seventeenth century, the English originators of the scientific journal vigorously set themselves against all forms of fancy writing. The newly formed Royal Society of London separated "the knowledge of Nature ... from the colours of Rhetorick". The aim of scientific writing was to report, whereas rhetoric worked to distort. Today, few scientists consider themselves to be rhetoricians. How many even know the meaning of anaphora, antimetabole or litotes?

But it's not that simple. Scientific literature reports, but it also aims to persuade readers that what it reports is reliable and significant. And the arts of persuasion are inevitably literary and, specifically, rhetorical. It is an arduously learned skill to write in the way that *Nature* deems acceptable. Conventions of scientific writing have changed enormously over

the past few centuries and even over recent decades. The very big differences between Jane Austen's *Persuasion* and a scientific paper lie in the different patterns of rhetoric used in the latter, not in their absence from it.

There are now many sociological studies of scientific communication. Joseph Harmon and Alan Gross's book, *The Scientific Literature*, is something different — neither a research monograph on the history of scientific writing nor a straightforward compilation of excerpts.

An excerpt is rarely longer than 500 words and sometimes as brief as 150, or may just be a diagram. These scientific snippets are embedded in strands of editorial commentary interpreting them. The tone is genial: this "guided tour" doesn't threaten arduous intellectual adventure. Rhetorical terms are explained and pertinent scientific contexts introduced.

There is no single argument embodied in this book — more a selection of sensibilities intended to help readers appreciate the remarkable and shifting set of literary forms that scientific writing has assumed. One theme is historical change. The authors point out that, not surprisingly, specialization has been accompanied by increasingly exclusive scientific writing. There never was a golden age when every educated person could read everything in the scientific literature — Newton's *Principia* defeated all but a small number of natural philosophers and mathematicians.

The accelerating incomprehensibility of scientific writing to the average educated person is not merely the fault of the much-lamented 'public ignorance of science'. Specialists have been so successful in constructing and bounding their own audiences that they rarely feel any need to address the laity or even scientists in other disciplines.

Another theme is the impersonality of scientific prose. Scientific writing has always been relatively impersonal, but the literary forms of impersonality have changed over time. In the seventeenth century, Robert Boyle used thickly layered circumstantial reporting to portray himself as a modest witness of his experiments, his judgement uncoloured by theoretical interest. He was nevertheless a witness at the centre of his own narratives, not averse to using the first-person singular — "I did X, I saw Y". By the nineteenth century — when the French physiologist Claude Bernard coined the aphorism "Art is I; Science is We" — the scientific author became increasingly submerged in either the first-person plural ("We did X, we saw Y") or in the passive voice now standard in scientific papers ("X was done, Y was seen").

The rhetorical convention here implies that scientific authors do not matter to what they report in the same way that Jane Austen matters to *Persuasion*. Although some insist that scientific research is an imaginative exercise and that its findings have an aesthetic character, the convention of impersonality is testimony to the opposite sensibility. Science is considered to discover; art to create.

Harmon and Gross are right to draw attention to non-verbal forms of communication and the changes produced by representational technologies on the ability of the scientific literature to show as well as say. Wood or copperplate engravings were important in seventeenth-century science, but such images were expensive to produce. Now, practically every issue of a scientific journal is a cornucopia of high-bandwidth visual communication sometimes even in online video form. It is becoming easier to envisage present-day science communication without words than without images. It is disappointing then that many of the illustrations in *The Scientific Literature* are so murkily reproduced. Maybe it is easier for humanists to say that visual communication is important than for them and their publishers to act as if it is.

10. Based on your reading of the passage, which of the following excerpts taken from different scientific papers would belong to a publication of recent times?
 - (A) "I increased the pressure applied to an ionic crystal. I was able to force the ions of like charges in the crystal closer to each other."
 - (B) "We analyzed the music of 2000 species of songbirds. We found that of all the species of songbirds, the Brown Thrashers were excellent mimics. We discovered that they could sing about 1000 tunes."
 - (C) "The Mammalian central neurons were studied. They were found to express more than a dozen different types of voltage-dependent ion channels. An increasingly detailed understanding of how the expression of particular channel types underlies the remarkably diverse firing behaviour of various types of neurons has been offered."
 - (D) "We used an imaging spectrometer on NASA's Mars Reconnaissance Orbiter (MRO). Signatures of hydrated minerals on slopes where dark mysterious streaks are seen on the Red Planet were detected."
11. Comparing scientific and literary writing, the reviewer says that
 - (A) the two differ in their objective and style — scientific reporting needs to be made intelligible to the common man while literary writing should include the persuasive magic of rhetoric.
 - (B) the former also uses rhetoric, perhaps of a different pattern, to persuade the readers to accept it as authentic.
 - (C) the conventions of writing have changed in both cases over the years.
 - (D) the former seeks to represent reality, the latter to blow it out of proportion.
12. 'The Scientific Literature' can best be described as
 - (A) a collection of scientific essays from the last century that suggest commonalities in the rhetoric devices employed in scientific literature and those employed by novelists of the past.
 - (B) a piloted expedition, the editorial commentary linking and explaining the excerpts.
 - (C) a book on science that uses literary devices for embellishment and appeal.
 - (D) a light hearted reading that neither persuades the reader nor becomes a heavy academic exercise.

13. What does the reviewer find disappointing in the book 'The Scientific Literature' ?
- The failure of publishers to faithfully reproduce the visual representations.
 - The failure of the author to utilize visual representation effectively.
 - The book's unsuccessful use of the online video forms.
 - The generalized manner of narration, lacking involvement and the neglect of literary trappings in the pursuit of objectivity.
14. A careful reading of 'The Scientific Literature' would help one to notice
- the increasing use of rhetoric in scientific writings down the ages.
 - the tendency for scientific writing to use language innovatively so as to make the narrative sound more credible.
- (C) that scientists have moved towards clarity and simplicity in their writings.
(D) that scientific literature has tended to become obscure not only to educated lay men but also to scientists of other fields.
15. We can gather from the first paragraph of the passage that anaphora, antimetabole and litotes are
- a bridge between the works of scientists and the works of novelists.
 - fancy means of writing which can help to unravel the mysteries of nature.
 - rhetorical devices used in literary writing.
 - destructive tools if employed in scientific writing to persuade the reader to believe what is mentioned.

DIRECTIONS for questions 16 to 21: The passage given below is followed by a set of six questions. Choose the best answer to each question.

The catastrophe that overwhelmed the cities of Pompeii and Herculaneum turned out to be of tremendous significance to archaeology.

In August A.D. 79, there were signs that Vesuvius was again about to erupt. On the forenoon of the 24th, it became clear that a disaster of unparalleled dimensions was in the making. The top of the mountain split apart with a thunderous explosion. Smoke mushroomed into the sky, darkening the sun. A rain of volcanic cinder and ashes began to sift down, amid terrific crashes and terrifying flashes of light. Birds tumbled dead out of the air, people ran about screaming, animals slunk into hiding.

This violence descended on Pompeii and Herculaneum during the busy, sunny hours of early morning and worked their destruction in two different ways. An avalanche of mud – a mixture of volcanic ash, rain, and lava – poured massively over Herculaneum, forcing its way into streets. The flow covered roofs, ran in through doors and windows, and eventually filled Herculaneum as water fills the interstices of a sponge.

At Pompeii it was different. Here there were no floods of muck; disaster began with a light fall of ash. Soon, however, lapilli began to come down, then occasional bombs of pumice weighing many pounds. Clouds of sulphur fumes settled down on the city. They seeped through cracks and crevices and billowed up under the cloths that the suffocating townsfolk held up to their faces. If they ran outdoors seeking air and freedom, they were met by a thick hail of lapilli that drove them back in terror to the shelter of their homes. The fumes reached them, and they choked to death.

The sun came out forty-eight hours later, but by this time Pompeii and Herculaneum had ceased to exist. For a distance of eleven miles around, the landscape had been destroyed.

Almost 1700 years passed. New generations, with new forms of knowledge, struck spades into the earth and brought forth the dead cities from oblivion. It was almost like a resurrection, a miracle.

The archaeologist, infatuated with his work to the exclusion of the usual pieties, is quite capable of praising this sort of catastrophe as a stroke of luck. Even Goethe said of Pompeii: "I hardly know of anything more interesting ..." and did not realize he was being callous. It is indeed hard to imagine a better way of preserving a whole city for the benefit of posterity, of catching it fairly in the midst of its everyday activity, than by sealing it beneath a great blanket of ash. Pompeii was quite different from the ruins of a city which had died a natural death by a process of withering away. The living community was touched with a magic wand, and the laws of time, of becoming and of fading, lost their validity.

Before the first excavation nothing but the bare memory of the two cities' entombment remained. But once digging began, the whole dramatic event took shape in men's minds, and information on the catastrophe left by the authors of antiquity came to life. The excavators' shovels revealed all manner of family tragedies. Body after body was found. In one house, funeral rites had been in progress when cataclysm fell.

The rows of houses, the Temple of Isis, the amphitheater – all were there exactly as they had looked on the fateful August day. The wax tablets still lay on the study table, the papyrus rolls were still in the library, the tools in the work-sheds. Vessels and dishes were found on inn tables, likewise the money left by departing guests. The scrubbing brushes were still in the baths.

It was the cultured man of the eighteenth century who first saw this richly detailed museum of the past. The Renaissance had prepared him for the æsthetic appreciation of antique splendors. But he also sensed the incipient power of science and was eager to dedicate himself to facts rather than rest content with mere contemplation of the beautiful and strange. To do justice to both these viewpoints someone was needed who combined a love for the art of antiquity with a talent for systematic investigation and criticism.

16. Which of the following can be inferred from the author's statement "It was almost like a resurrection, a miracle." (para 6)?
 - (A) After a lot of effort, the cities of Pompeii and Herculaneum were rediscovered.
 - (B) The cities of Pompeii and Herculaneum were uncovered in their original form.
 - (C) The histories of the two cities were so fascinating that they had to be rewritten after their rediscovery.
 - (D) Before 1779 A.D., no one thought that the two cities of Pompeii and Herculaneum had existed.

17. Which of the following correctly captures the attitude of the archaeologists who were involved in the excavation of Pompeii and Herculaneum, as can be inferred from the passage?
 - (A) The archaeologists were not deeply religious but were infatuated with the rediscovery of Pompeii and Herculaneum.
 - (B) The archaeologists were not concerned about the way people died in the tragedy.
 - (C) The archaeologists were happy that they discovered Pompeii and expressed concern for the way people had died in the catastrophe.
 - (D) Though insensitive about the loss and destruction in the Pompeii story, the archaeologists considered themselves fortunate to be able to study a civilization.

18. Which of the following statements is true with reference to the destruction of Pompeii and Herculaneum?
 - (A) Many citizens of Pompeii and Herculaneum choked to death due to sulphur fumes and torrents of water that rushed through the streets.
 - (B) Ash, smoke and terrifying flashes of light were accompanied by an avalanche of pumice, mud and lapilli.
 - (C) Herculaneum was submerged in an inundation of volcanic ash and rain while Pompeii was assailed with pumice, lapilli and sulphur fumes.
 - (D) Herculaneum absorbed the avalanche of mud that besieged it like a sponge while Pompeii was covered with clouds of ash for a distance of eleven miles which blocked the sun for two days.

19. What reason(s) does the author give for his introductory comment as given in the boldfaced part of the passage?

Identify all that apply and enter the corresponding number in the input box given below. You must enter your answer in increasing order only. For example, if you think (1) and (2) apply, then enter 12 (but not 21) in the input box.

- (1) The cities were preserved as they were when they were alive and in the middle of daily activity.
- (2) The blanket of ash that covered Pompeii ensured that significant buildings and artefacts remained intact.
- (3) Archaeologists are callous in considering the deaths of so many people a stroke of good luck.
- (4) Nature did not completely wipe out the remnants of the two cities whose future was evidence of their past.
- (5) For the very first time, good fortune played a significant role in archaeological pursuits.

20. With reference to the two viewpoints as mentioned in the last paragraph of the passage, which of the following characteristics would be considered to be important for a greater understanding of archaeology?
 - (A) A greater interest in deeper scientific facts rather than in mere external aesthetic beauty.
 - (B) A penchant for greater appreciation of artistic splendours without a focus on mundane events or facts.
 - (C) A penchant for appreciation of the beauty of antique structures and a knowledge of science.
 - (D) None of the above.

21. Match the columns and select the appropriate option.

<u>Paragraph of passage</u>	<u>Style of paragraph</u>
i) Para 3	a) Narrative
ii) Para 6	b) Descriptive
iii) Para 7	c) Analytical
iv) Para 9	d) Argumentative
v) Para 10	e) Factual

- (A) i – e, ii – a, iii – e, iv – c, v – a
- (B) i – e, ii – b, iii – b, iv – c, v – a
- (C) i – a, ii – a, iii – c, iv – d, v – b
- (D) i – b, ii – a, iii – c, iv – b, v – c

SUB-SECTION: VERBAL ABILITY
Number of Questions = 11

DIRECTIONS for questions 1 to 3: The sentences given below, when properly sequenced, form a coherent paragraph. Each sentence is labeled with a number (1, 2, 3, 4 or 5). Decide on the proper order for the sentences and key in the correct answer for the question given below the five sentences.

1. (1) In the 1500s, Nicolaus Copernicus kicked Earth from its perch at the centre of the universe.
 (2) In the 20th century, geologists found that all human history amounts to less than an eyelash in the span of a planet that they discovered is 4.6 billion years old.
 (3) Later, Charles Darwin showed that humans are just another species of animal.
 (4) Now, though, those geologists' spiritual descendants may give humans an unexpected promotion: there was a good case for ringing down the curtain on the Holocene and recognising that Earth has entered a new geological epoch, the Anthropocene.
 (5) One way to think of science is as a series of painful demotions.

2. (1) Franny Moyle's biography, the latest of many in recent decades, is a fat, satisfying popular history of the man who was arguably Britain's greatest painter.
 (2) Ms. Moyle says he wept on seeing a painting by Claude on a subject that he had also tackled: "I shall never be able to paint anything like that picture," he said.
 (3) Turner himself would have disagreed as his hero was Claude Lorrain, a 17th-century French landscape painter.
 (4) Neither old admirers nor recent converts can seem to get enough of J. M. W. Turner.
 (5) The book-jacket goes further, declaring Turner to be the world's most famous landscape painter.

3. (1) But researchers are trying to find out.
 (2) In this, MRI scanners normally employed for diagnosis are used to study volunteers for the purposes of research.
 (3) Nobody knows how the brain works.
 (4) By watching people's brains as they carry out certain tasks, neuroscientists hope to get some idea of which bits of the brain specialize in doing what.
 (5) One of the most eye-catching weapons in their arsenal is functional magnetic-resonance imaging (fMRI).

DIRECTIONS for questions 4 and 5: Five sentences [(i), (ii), (iii), (iv) and (v)] each with a blank are given in each of the following questions. Four words are also given below the sentences. The blank in each sentence

can be filled by one or more of the four words given. Each word can go into any number of sentences. Note that the sentence can change contexts depending on the use of different words which can be appropriate. Identify the number of sentences each word can go into and enter, in the input box given below the question, the maximum number of sentences that any word can fit in. For example, if you think that a word goes into a maximum of two sentences, then enter 2 in the input box given below the question.

4. (i) Even with eyes, we do not _____, with ears we do not hear.
 (ii) We welcome the opportunity to _____ how we can develop innovative solutions to your financial challenges.
 (iii) Is there anything we need to _____?
 (iv) The alchemists began to _____ their findings and their speeches were punctuated by moments of delight and surprise.
 (v) We need to _____ the possible course of action to be employed in this case.
- | | |
|-------------|----------|
| (a) discuss | (b) see |
| (c) fret | (d) know |
-
5. (i) Mr. Smith had a terrible sense of _____.
 (ii) Such an outcome is not _____.
 (iii) Her constant efforts at losing weight were only a success.
 (iv) Since he was our boss, all of us were forced to _____ him and laugh at his dreadful jokes.
 (v) Sita was too _____ to chocolate to avoid it totally.
- | | |
|-------------|-------------------|
| (a) partial | (b) inconceivable |
| (c) cliché | (d) humour |
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- DIRECTIONS** for questions 6 and 7: Each of the following questions has a paragraph or two from which a sentence has been removed. From the given options below the question paragraph(s), choose the one that completes the blank in the paragraph in the most appropriate way.
6. Reefs improvised from junk often do not work well. Corals struggle to colonise some metals, and cars and domestic appliances mostly disintegrate in less than a decade. Some organisms do not take to paints, enamels, plastics or rubber. Precious little sea life has attached itself to the 2 million or so tyres sunk in the early 1970s to create a reef off Fort Lauderdale, Florida. Tyres occasionally break free, smash into coral on natural reefs and wash ashore.
- Some of the reefs built in Japanese waters support a biomass of fish that is 20 times greater than similarly
- Triumphant Institute of Management Education Pvt. Ltd. (**T.I.M.E.**) HO: 95B, 2nd Floor, Siddamsetty Complex, Secunderabad – 500 003.
 Tel : 040–27898195 Fax : 040–27847334 email : info@time4education.com website : www.time4education.com
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- sized natural reefs, says Shinya Otake, a marine biologist at Fukui Prefectural University. He expects further gains from a decision by the Japanese government to build new reefs in deep water where they will be bathed in nutrients carried in plankton-rich seawater welling up from below.
- (A) But, archaeologists have found mounds of oyster shells, known as middens, dating back to 6950 B.C. in some artificial reefs in Japanese waters.
 (B) Yet building artificial reefs that are attractive to marine life can pay dividends.
 (C) Reef balls can be positioned to make the most of photosynthesis and for plankton to drift slowly across their curved inner surface.
 (D) With a rapidly expanding world population, artificial reefs appear to be a promising way to improve fish catches.
7. Cashew nuts still haunt the backers of conditional-aid schemes, which dole out money to poor countries if they meet set criteria. In 1995 the World Bank promised loans to Mozambique if it cut its high export tariff on raw nuts, in an effort to open its economy. Soon the country's once-thriving nut-processing industry was in the doldrums. More than 10,000 workers were out of a job.
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- But a recent report by William & Mary, a university in Virginia, suggests that one idea is working well: the "compacts" of the Millennium Challenge Corporation (MCC). Set up by the American government in 2004, the MCC dispenses aid on merit. To qualify for grants, countries must be poor, not too corrupt and meet criteria in 20 areas, including better immunisation and land rights. So far, 25 countries have received more than \$9 billion between them.
- (A) Given tight budgets and ever-growing public scepticism, donor countries have steep incentives to make conditional aid-schemes work.
 (B) Other forms of aid, such as emergency relief, are still needed.
 (C) The accepted view is that poor countries would prefer to receive cash with no strings attached.
 (D) Such slips have given conditional aid a bad reputation.
- DIRECTIONS** for questions 8 to 11: Each of the questions presents a sentence, part or all of which is underlined. Beneath the sentence, four different ways of phrasing the sentence are given. Select the answer choice that produces the most effective sentence in terms of word choice and sentence construction; your answer should make the sentence clear, exact and free of grammatical error. It should also minimize awkwardness, ambiguity and redundancy.
8. The college is a corner of our hearts, where hope has not yet died, the prison house has not yet closed, the battle has not lost, we assert, endow and defend here as final reality the best of our dreams.
- (A) The college is a corner of our hearts where hope has not yet died, the prison house has not yet closed, the battle has not yet been lost; where we assert, endow and defend as final reality the best of our dreams.
- (B) A college is a corner of our hearts, where hope has not yet died, the prison house is not yet closed, the battle has not lost, here we assert, endow and defend as final reality the best of our dreams.
 (C) A college is a corner of our hearts where hope has not yet died, the prison house has not yet closed, the battle is not yet lost; here we assert, endow and defend, as final reality, the best of our dreams.
 (D) A college is a corner of our hearts where hope has not yet died, the prison house has not yet closed, the battle has not yet been lost; here we assert, endow and defend in final reality the best of our dreams.
9. According to government analysts, the purported survey conducted by little known private organizations, whatever its merits, they estimated that, in comparison to last year, when only 61 percent of government companies was profitable, this year 29 percent will be, are questionable.
- (A) whatever its merits may be, estimated that, in comparison to last year, when only 61 percent of government companies was profitable, this year 29 percent will be, are questionable.
 (B) whatever its merits, has estimated that, in comparison to last year, when 61 percent of government companies were profitable, this year, only 29 percent will be, and is questionable.
 (C) whatever its merits, that which estimated that, in comparison to last year, when only 61 of percent government companies was profitable, this year 29 percent will be, is questionable.
 (D) whatever its merits may be, has estimated that, in comparison to last year, when 61 of percent government companies were profitable, this year only 29 percent will be, are questionable.
10. The rise of Morgan Motor Company, and its commitment to create luxury electric sport cars, have created such positive momentum for EVs (Electric vehicles) that nearly every major automaker in the world has an EV on the production pipeline.
- (A) for creating luxury electric sport cars has created such positive momentum for EVs (Electric vehicles) that every major automaker nearly in the world has an EV on the production pipeline.
 (B) to create luxury electric sports cars have created such positive momentum for EVs (Electric Vehicles) that nearly every major automaker in the world has an EV in the production pipeline.
 (C) to create luxury electric sport cars have created so positive a momentum for EVs (Electric Vehicles) that every major automaker in the world nearly has an EV in the production pipeline.
 (D) to create luxury electric sport cars have created so positive a momentum for EVs (Electric Vehicles) to nearly every major automaker in the world who has an EV in the production pipeline.

11. If we speak generally, and taking them as a whole, all historians are charlatans as all of them preface their works with the undertaking that they are going to give the truth to the world; and that truth never came.
- Speaking generally, and taking them as a whole, all historians are charlatans as all of them preface their works with the undertaking that they are going to give the truth to the world;
 - If we speak generally, and taking them as a whole, all historians are charlatans as all of them prefaced their works with the undertaking that they were going to give the truth to the world;
 - If we speak generally, and take them as a whole, all historians are charlatans as all of them preface their works with the undertaking that they are going to give the truth to the world;
 - Speaking generally, and taking them as a whole, all historians were charlatans as all of them prefaced their works with the undertaking that they were going to give the truth to the world;

SECTION II: DATA INTERPRETATION AND LOGICAL REASONING

SUB-SECTION: DATA INTERPRETATION

Number of Questions = 12

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

The table below provides the number of people staying in a colony in various age groups at the beginning of 2000, 2005, 2008 and 2009. While a few babies were born between 1998 and 2010, no person in the colony died during these years. Further, no person moved out of the colony and no new person moved into the colony during this period. At the beginning of 2000, the age of each person in the colony was at least one year.

Age Group	2000	2005	2008	2009
0-10	32	28	31	31
11-20	15	25	21	20
21-50	48	48	47	45
51-60	32	25	31	35
>60	12	23	25	26

DIRECTIONS for questions 1 to 3: Type in your answer in the input box provided below the question.

1. What is the number of people in the colony whose age was 12 years at the beginning of 2000?

2. At the beginning of 2007, what is the number of people in the colony whose age was 58 years?

3. How many people in the colony were born in 1998?

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

4. Which of the following statements is definitely false?
- In 2000, the number of people in the colony whose age was 42 years was 5.
 - In 2001, the number of people in the colony whose age was 51 years was less than the number of people in the colony whose age was 52 years.
 - In 2008, the number of people in the colony whose age was 50 years was less than the number of people in the colony whose age was less than 20 years.
 - In 2000, for each possible age between 1 and 60, there was at least one person of that age in the colony.

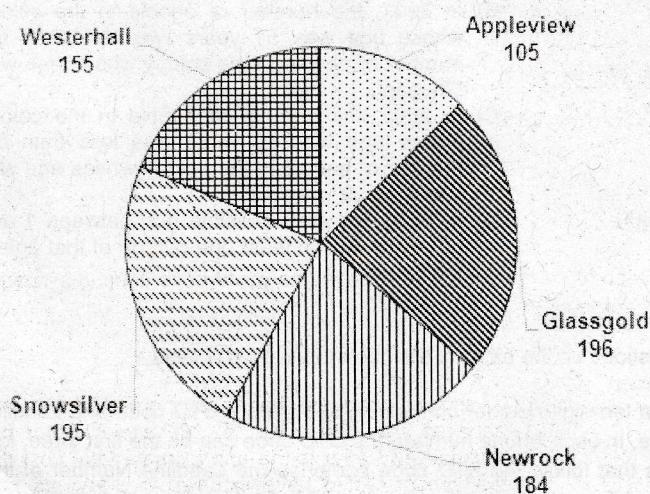
DIRECTIONS for questions 5 to 8: Answer these questions on the basis of the information given below.

In a country called Droador, each Phone number is a ten-digit number comprising two parts – STD code and Landline Number. Each city in Droador has a distinct STD code. In each Phone number, the STD code can be the first three, four or five digits from the left, while the remaining digits that follow the STD code comprise the Landline Number of that phone. Further, the first digit of the Landline number of a phone signifies the Landline Network to which that phone belongs. Each phone in Droador belongs to exactly one Landline Network among Eureka, Revula, Telbon and Zephyr, indicated in each case with the first digit of the Landline Number of that phone being 2, 3, 4 and 5 respectively.

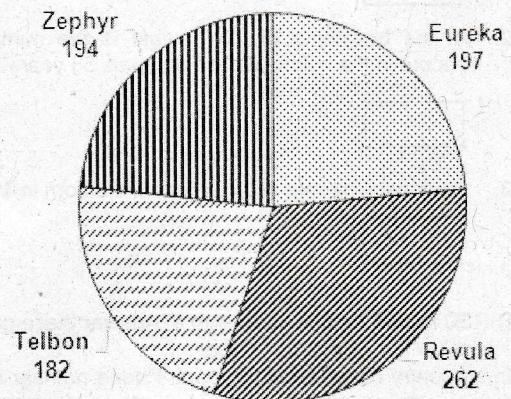
Kuczynsky, a resident of Droador, called fifteen different Phone numbers during a week. The Phone numbers that he called belonged to five different cities, Appleview, Glassgold, Newrock, Snowsilver and Westerhall, the STD codes of which are 081, 0812, 08123, 08124 and 08125 respectively. The table below provides the Name of the person that he called, his/her Phone Number and the duration of call (in seconds) for each call that he made. The first pie chart provides the city-wise breakup of the total duration (in seconds) of all the calls that he made during the week. The second pie chart provides the breakup of the total duration (in seconds) of all the calls that he made during the week by the Landline Network to which the phone that he called belongs.

Name	Phone Number	Duration (sec)
Mary	0812421847	28
Javier	0812241568	34
Eric	0812445178	54
Tracey	0812336487	100
Cecil	0812525594	34
Katherine	0812322748	36
Brian	0813634781	41
Mulu	0812533547	56
Elias	0812444578	74
Kifle	0812234788	65
Lisbet	0812357789	30
Agnes	0812525486	97
Francine	0812345578	54
Aurele	0812532547	65
Astrid	0812454268	67

Duration by City



Duration by Network



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

5. Among the fifteen persons, what is the maximum number of persons whose phones belong to the same network?

DIRECTIONS for questions 6 to 8: Select the correct alternative from the given choices.

6. For which city can it be said that the phones of no two persons from that city belong to the same network?
 (A) Appleview (B) Newrock
 (C) Snowsilver (D) Westerhall

7. Which of the following pairs of persons belong to the same city?
 (A) Mary, Francine (B) Aurele, Agnes
 (C) Eric, Javier (D) Agnes, Javier

8. Which of the following is a Phone number from the city Appleview belonging to the network Eureka?
 (A) 0812421847 (B) 0812241568
 (C) 0812444578 (D) 0812234788

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

A fruit salad vendor prepares a fruit salad with five varieties of fruits – Apples, Oranges, Bananas, Pomegranates, and Papayas. He can prepare five different types of fruit salad – Fruit Salad 1 through Fruit Salad 5 – by varying the quantities of the varieties of fruit used in preparing each type of fruit salad. The vendor, if required, can cut and use only a part of a fruit, leaving the rest of the fruit for later use. The bar chart given below shows the percentage breakup by weight of each type of fruit salad, according to the varieties of fruits used in it.

At the beginning of a particular day, the vendor had a certain number of fruits of each variety and the table below gives the number and the total weight of the fruits of each variety that the vendor had with him. Assume that all the fruits of a particular variety weigh the same.



■ Apples ■ Oranges ■ Bananas ■ Pomegranates ■ Papaya

Variety	Quantity	Weight (kg)
Apples	20	5.0
Oranges	15	2.3
Bananas	45	2.3
Pomegranates	5	1.0
Papaya	12	6.0

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

9. If, on that day, the vendor prepared an equal quantity of each of the five types of fruit salad, which of the following varieties of fruit could have been exhausted completely?
 (A) Oranges (B) Bananas
 (C) Pomegranates (D) Papaya
10. If he prepared at least 250 gm of each type of fruit salad, except Fruit Salad 2, what is the maximum

number of papayas he could have used in preparing Fruit Salad 2?

- (A) 2.5 (B) 2.667
 (C) 2.367 (D) 2.333

11. If apples, oranges, bananas, pomegranates and papayas cost ₹40, ₹10, ₹5, ₹20 and ₹15 per fruit respectively, what is the approximate total cost that the vendor would have incurred in preparing Fruit Salad 3, given that he used one apple in preparing that salad?

- (A) ₹364.5 (B) ₹318.3
 (C) ₹338.7 (D) ₹348.7

12. If the vendor wanted to prepare only one type of salad, preparing the maximum quantity of which fruit salad will result in the minimum total weight of fruits being left over?
- (A) Fruit Salad 5 (B) Fruit Salad 3 (C) Fruit Salad 2 (D) Fruit Salad 1

SUB-SECTION: LOGICAL REASONING

Number of Questions = 12

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

Five friends, Ankur, Babu, Kaka, Rohan and Satish, wear five different watches, of which, one watch always shows the correct time, one uniformly loses two minutes every hour, one uniformly gains two minutes every hour, one uniformly loses a minute every hour and one uniformly gains a minute every hour. The four friends who wear the watches that gain or lose time adjust the times in their watches to the correct time every day, with each of them adjusting his watch at a different time among 7:00 am, 10:00 am, 1:00 pm and 4:00 pm. The following information is known about the times shown by the watches of each person:

- (i) At 10:00 pm, Ankur's watch is ahead of Rohan's watch by at least 25 minutes.
- (ii) No two watches will show the same time except at 7:00 am, 10:00 am, 1:00 pm, and 4:00 pm.
- (iii) At 2:00 am, Satish's watch is ahead of Babu's watch by at least 20 minutes and at most 30 minutes.
- (iv) The time shown by Kaka's watch at 7:00 pm is 7:06 pm.

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

1. Which of the following watches does Rohan wear?
 - (A) The watch which shows the correct time
 - (B) The watch which loses 2 minutes every hour
 - (C) The watch which loses 1 minute every hour
 - (D) The watch which gains 2 minutes every hour

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

2. At 11:00 pm, what is the difference between the times (in minutes) shown by Ankur's watch and Satish's watch?

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

3. Who among the following adjusts his watch every day at 10:00 am?

(A) Ankur	(B) Babu
(C) Rohan	(D) Satish
4. At which of the following times will the difference between the times shown by any two watches be 30 minutes?

(A) 5:00 pm	(B) 6:00 pm
(C) 7:00 pm	(D) 8:00 pm

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

Seven friends – Amar, Imran, Omar, Rahul, Rakesh, Ramesh and Wasim – went to watch a match of their

favourite team – Team Warrior. Each friend wore a t-shirt which had exactly one letter on its back among A, I, O, R and W. During the first half of the match, they stood in an order such that the letters on the t-shirts that they wore, when read from left to right by a person standing behind them, spelt the word "WARRIOR". However, for the second half of the game, due to a dismal performance by their team, some of the friends randomly changed their positions. The following information is known about the t-shirts that they wore and their relative positions during the match:

- (i) Amar, who was wearing a t-shirt with the letter 'R', was standing adjacent to Omar during the first half.
- (ii) During both the first half and the second half of the match, Ramesh and Wasim were standing adjacent to each other, but neither of them was standing at either end.
- (iii) Only during the second half of the game was Imran standing to the immediate left of the person wearing a t-shirt with the letter 'A'.
- (iv) No two friends wearing t-shirts with consonants were standing next to each other during the second half.
- (v) Rahul was wearing a t-shirt with the letter 'O' and there was exactly one friend who remained his neighbour throughout the match.
- (vi) During the second half, Ramesh was standing between two friends who were wearing t-shirts with the same letter.
- (vii) During the second half, the person who was wearing a t-shirt with the letter 'I' was standing adjacent to the person wearing a t-shirt with the letter 'W'.

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

5. Who was wearing a t-shirt with the letter 'I'?

(A) Omar	(B) Ramesh
(C) Wasim	(D) Imran
6. Which of the following is a letter on the t-shirt worn by a person standing adjacent to Amar during the second half of the game?

(A) A	(B) R
(C) O	(D) W
7. Who among the following was standing adjacent to Wasim during the first half?

(A) Rahul	(B) Amar
(C) Rakesh	(D) Imran
8. Which of the following pairs of people were standing adjacent to each other during the second half of the game but not during the first half?

(A) Imran, Rahul	(B) Rakesh, Ramesh
(C) Rakesh, Rahul	(D) Omar, Wasim

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

Eight persons, Kamal, Lalit, Manoj, Nitin, Piyush, Raj, Shiva and Varun, attended a job interview, not necessarily in the same order. Each of the eight persons was interviewed in a different slot among eight slots, Slot 1 through Slot 8. After the eight persons were interviewed, they were ranked from 1 to 8 based on their performance in the interview, such that among any two persons, the person who performed better received a numerically lower rank. No two persons who attended the interview in consecutive slots received consecutive ranks. Further, the slot number of the slot in which any person was interviewed was not the same as the rank received by the person.

It is also known that

- (i) Kamal received a better rank than Lalit, who was interviewed before Manoj, while Raj received a better rank than Shiva.
- (ii) the difference in the ranks of Piyush and Shiva was the same as the number of persons who were interviewed between Piyush and Shiva.
- (iii) neither Manoj nor Varun was interviewed in slot 8, and one of them was ranked eighth.
- (iv) Nitin, who was the fourth person to be interviewed, received a better rank than Kamal and a worse rank than Shiva.
- (v) the rank of Varun was one more than that of Shiva
- (vi) exactly four persons were interviewed before Piyush and at least six persons were interviewed before Varun.

DIRECTIONS for question 9: Select the correct alternative from the given choices.

9. Who was interviewed in Slot 1?
- (A) Piyush
 - (B) Kamal
 - (C) Lalit
 - (D) Cannot be determined

DIRECTIONS for questions 10 to 12: Type in your answer in the input box provided below the question.

10. What is the rank of the person interviewed immediately after Shiva?

11. Among the persons interviewed before Manoj, how many were ranked better than Nitin?

12. What is the rank of the person interviewed in Slot 8?

SECTION – III: QUANTITATIVE ABILITY

Number of Questions = 24

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

1. The product $(\sqrt{3} + \sqrt{5} + \sqrt{7})(-\sqrt{3} + \sqrt{5} + \sqrt{7})(\sqrt{3} - \sqrt{5} + \sqrt{7})(\sqrt{3} + \sqrt{5} - \sqrt{7})$ is equal to
- (A) $2\sqrt{105}$.
 - (B) $15 - \sqrt{105}$.
 - (C) 49.
 - (D) 59.

DIRECTIONS for questions 2 to 4: Type in your answer in the input box provided below the question.

2. How many of the four-digit numbers with non-zero digits have the sum of their digits as 12?

3. If $x + x^{-1} = 3$, find the value of $x^4 + x^3 + x^2 + x + x^0 + x^{-1} + x^{-2} + x^{-3} + x^{-4}$.

4. A and B started swimming simultaneously from opposite ends of a swimming pool, PQ, and met each other for the first time after B had covered 60 m. Thereafter, they continued swimming and after both had completed a lap, they met for the second time, at a distance of 20 m from the end that

B had started from. Find the length (in m) of the swimming pool.

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

5. If a circle of radius 10 cm and a square of side $10\sqrt{3}$ cm are concentric, what fraction of the area of the circle is contained within the square?

- (A) $\frac{1}{3} + \frac{\sqrt{3}}{\pi}$
- (B) $\frac{1}{2} + \frac{\sqrt{2}}{\pi}$
- (C) $\frac{1}{3} + \frac{\sqrt{2}}{\pi}$
- (D) $\frac{2\sqrt{3}}{\pi} - \frac{1}{2\sqrt{3}}$

6. If $10 < p < q < r < s$, which two of the following four fractions could be equal in magnitude?

- | | |
|-------------------------|------------------------|
| (I) $\frac{p+q}{r+s}$ | (II) $\frac{q+r}{p+s}$ |
| (III) $\frac{q+s}{p+r}$ | (IV) $\frac{p+s}{q+r}$ |
| (A) I and II | (B) III and IV |
| (C) II and IV | (D) I and III |

7. A mixture of alcohol and water comprises 80% alcohol. First, 20% of the mixture is replaced with water and then the volume of the resultant mixture is increased by 20% by adding only alcohol. If the entire process is then repeated once all over again, what is percentage of alcohol in the final mixture?

(A) 63.33% (B) 72.28%
(C) 61.25% (D) 81.24%

8. Find the value of
 $\sqrt{1 + \frac{1}{1^2} + \frac{1}{2^2}} + \sqrt{1 + \frac{1}{2^2} + \frac{1}{3^2}} + \sqrt{1 + \frac{1}{3^2} + \frac{1}{4^2}} \dots \dots$
 upto 2016 terms.

(A) $2015 + \frac{1}{2015}$ (B) $2016 - \frac{1}{2016}$
(C) $2016 + \frac{1}{2016}$ (D) $2017 - \frac{1}{2017}$

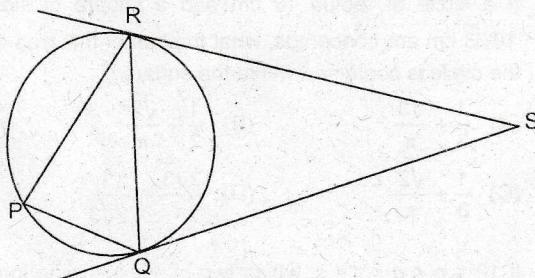
DIRECTIONS for questions 9 and 10: Type in your answer in the input box provided below the question.

9. David had notes only in the denominations of ₹50, ₹20 and ₹5. In how many ways can he settle a bill of ₹120 for his lunch in a local hotel?

10. Find the value of $\sec^2 \frac{\pi}{32} + \sec^2 \frac{3\pi}{32} + \sec^2 \frac{5\pi}{32} + \sec^2 \frac{7\pi}{32} + \sec^2 \frac{9\pi}{32} + \sec^2 \frac{11\pi}{32} + \sec^2 \frac{13\pi}{32} + \sec^2 \frac{15\pi}{32}$.

DIRECTIONS for questions 11 and 12: Select the correct alternative from the given choices.

11. In the figure below, a circle is drawn circumscribing the triangle PQR. If the tangents drawn to the circle at Q and R meet each other at S and $\angle QPR = 2\angle QSR$, find the measure of $\angle QSR$.



(A) 18° (B) 24°
(C) 36° (D) 40°

12. If the line joining the points A (3, 1) and B (4, 2) is rotated about the point A in an anticlockwise direction through an angle of 15° , find the equation of the line in its new position.

- (A) $\sqrt{3}x - y - 3\sqrt{3} - 1 = 0$
(B) $\sqrt{3}x - 3y - \sqrt{3} + 1 = 0$
(C) $\sqrt{3}x - y - 3\sqrt{3} + 1 = 0$
(D) None of the above

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

13. Tito is a toy maker who makes toys and sells them in the local market everyday. The selling price of each toy is ₹100. The cost of making n toys per day is $an^2 + bn + 200$. Tito observed that, if he increased the number of toys he makes per day from 8 to 10, his daily production cost would increase by $33\frac{1}{3}\%$

and if he increased the number of toys he makes per day from 10 to 12, his daily production cost would increase by 30%. Find the maximum profit (in ₹) that Tito can earn per day. Consider that all the toys made on each day are sold on that day.

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

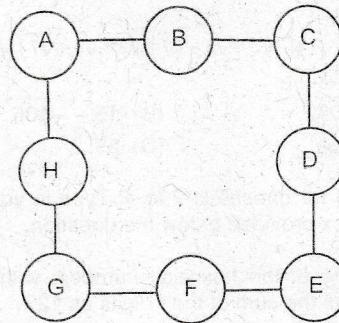
14. Find the area (in sq. units) of the triangle bounded by the lines $x = y$, $x = -y$ and $x = 5$.

(A) 25 (B) 40
(C) 50 (D) 12.5

DIRECTIONS for questions 15 to 19: Type in your answer in the input box provided below the question.

15. How many natural numbers divide at least one of 120 and 288?

16.



In the figure above, A, B, C, D, E, F, G and H represent distinct numbers from 1 to 8, such that the sum of the three numbers on each side of the square is equal to a constant, S. The difference between the maximum and the minimum value of S is

17. How many integral values of x satisfy the equation $x = |2x - |120 - 3x||$?

18. Find the remainder when $7^{32^{23}}$ is divided by 19.

19. There are two concentric circles, whose radii (in cm) are positive integers, such that a chord of length 26 cm drawn in the outer circle is tangent to the inner circle. If the difference (in cm) in the circumference of the inner circle and that of the outer circle is $k\pi$ cm, find k .

DIRECTIONS for question 20: Select the correct alternative from the given choices.

20. $L(x)$ is a linear function of x , such that $L(1) \leq L(2)$ and $L(4) \leq L(2)$. If $L(3) = 3$, find the value of $L(0)$.
- (A) 0 (B) 1
(C) 3 (D) None of the above

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

21. A spherical ball is exactly contained inside the frustum of a cone, such that the ball touches the inner (slant) surface of the cone and the diameter of the ball is equal to the height of the frustum. If the

larger diameter of the frustum is $\left(\frac{5+\sqrt{21}}{2}\right)$ times its

smaller diameter and the volume of the frustum is n times the volume of the ball, find the value of $6n^2$.

DIRECTIONS for questions 22 and 23: Select the correct alternative from the given choices.

22. If the principal at the beginning of the fifth year on a certain sum at a certain rate of interest, compounded annually, is 20% more than that at the beginning of the fourth year, then by what percent does the compound interest for the eleventh year exceed the compound interest for the eighth year?
- (A) 44% (B) 72.8%
(C) 69% (D) 61.6%

23. A number when divided by 31 leaves a remainder of 3. If the same number when divided by 93 leaves a remainder of r , how many possible values can r assume?

(A) 1 (B) 2
(C) 3 (D) 5

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

24. Five positive integers have their mean, median and mode each equal to 10. If their range is equal to 15, how many possible values can the least of the five integers assume?