CAT 2015 SOLVED PAPER
(Memory Based)

SECTION I : VRC

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

1. The poets in question have, like other poets, various faults.
2. But they were, at best, engaged in the task of trying to find the verbal equivalent for states of mind and feeling.
3. And this means both that they are more mature, and that they wear better, than later poets of certainly not less literary ability.
4. Poetry comes from the heart and not from random philosophical concepts.
5. It is not a permanent necessity that poets should be interested in philosophy, or in any other subject.

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

1. The opening words of James Joyce's Ulysses seem initially to come from the realist world.
2. However, the appearances are going to be deceptive, and they become more so as we go through the novel.
3. Joyce, after all, was a grand master.
4. Its stylistic deviations become more obvious, even though they are at base founded in remarkably accurate history.
5. The primary modernist technique here lies in Joyce's making of allusions, which lead us to feel the presence of underlying conceptual or formal structures.

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

1. The planet is tidally locked to its star, much as the moon is to Earth, and has one face in permanent daylight, the other in darkness.
2. Given the world's size and mass, researchers suspect it is rocky, like the inner planets of our solar system.
3. It orbits 1.4m miles from its star, far closer than Mercury, which is never less than 36m miles from the sun.
4. Red dwarfs are by far the most common type of star in the Milky Way but because of their low luminosity, individual red dwarfs cannot easily be observed.
5. Because the red dwarf is so small, and the planet is on such a close orbit, astronomers should find it fairly easy to detect and study any atmosphere the world has.

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

"Myth has two main functions," the poet and scholar Robert Graves wrote in 1955. "The first is to answer the sort of awkward questions that children ask, such as 'Who made the world? How will it end? Who was the first man? Where do souls go after death?'…The second function of myth is to justify an existing social system and account for traditional rites and customs." In ancient Greece, stories about gods and goddesses and heroes and monsters were an important part of everyday life. They explained everything from religious rituals to the weather, and they gave meaning to the world people saw around them.

In Greek mythology, there is no single original text like the Christian Bible or the Hindu Vedas that introduces all of the myths' characters and stories. Instead, the earliest Greek myths were part of an oral tradition that began in the Bronze Age, and their plots and themes unfolded gradually in the written literature of the archaic and classical periods. The poet Homer's 8th-century BC epics the Iliad and the Odyssey, for example, tell the story of the (mythical) Trojan War as a divine conflict as well as a human one. They do not, however, bother to introduce the gods and goddesses who are their main characters, since readers and listeners would already have been familiar with them.

Around 700 BC, the poet Hesiod's Theogony offered the first written cosmogony, or origin story, of Greek mythology. The Theogony tells the story of the universe's journey from nothingness (Chaos, a primeval void) to being, and details an elaborate family tree of elements, gods and goddesses who evolved from Chaos and descended from Gaia (Earth), Ouranos (Sky), Pontos (Sea) and Tartaros (the Underworld).

Later Greek writers and artists used and elaborated upon these sources in their own work. For instance, mythological figures and events appear in the 5th-century plays of Aeschylus, Sophocles and Euripides and the lyric poems of Pindar. Writers such as the 2nd-century BC Greek mythographer Apollodorus of Athens and the 1st-century BC Roman historian Gaius Julius Hyginus compiled the ancient myths and legends for contemporary audiences.

At the center of Greek mythology is the pantheon of deities who were said to live on Mount Olympus, the highest mountain in Greece. From their perch, they ruled every aspect of human life. Olympian gods and goddesses looked like men and women (though they could change themselves into animals and other things) and were–as many myths recounted–vulnerable to human foibles and passions.

4. Which of the following is one of the main functions of Myth?

(a) To answer questions that are yet unexplained by science

(b) To satisfy the curiosity of children about our world

(c) To explain the rationale behind everyday rituals

(d) To answer the unanswerable questions

5. What is the difference between Hindu and Greek Mythology?

(a) There are texts explaining Hindu Mythology but no such texts exist about Greek mythology.

(b) In Hindu mythology all stories and characters can be explained by a single text (or collection) but this is not true of Greek mythology.

(c) Hindu mythology was passed on through written text but Greek mythology was passed on through oral recitation.

(d) In Greek mythology the main characters of a story are not as well explained as in Hindu mythology.

6. Who created the first story of Greek Mythology?

(a) Homer

(b) Hesiod

(c) Apollodorus

(d) Cannot be determined from the passage

7. What is the role played by Theogony in Greek mythology?

(a) It tells the story of how the world began.

(b) It introduces the four main characters of Greek Mythology.

(c) It helps explain the myth of Chaos.

(d) It tells the story of the Earth and the Sky.

8. What does the author mean by '*pantheon of deities*'?

(a) Temple of all gods

(b) The realm of the heroes

(c) Place of worship

(d) Group of gods

9. What were the similarities between Olympian Gods and Human Beings?

A. These Gods looked like humans.

B. They had weaknesses like humans.

C. They were as passionate as humans.

(a) A and B (b) B and C

(c) C and A (d) A, B and C

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

From Billie Holiday to Kurt Cobain, Jeff Buckley to Lana Del Rey, we enjoy the music of suffering and sadness, songs that help us through our worst moments – broken relationships, melancholy, mania. Summed up by John Cusack's indie-sad lad in the film of High Fidelity – "What came first? The music or the misery?" – we espouse the miserable and the hopeless.

However, the musicians behind the songs are often an afterthought. Or if not that, they're subject to the notion that their depression is a creative spark and their mental illness the driving force behind compelling art. As someone who has suffered from severe depression, the romantic notion of the doomed artist is not all that. You put on weight and then lose it, you sleep too much or too little, and the myriad other symptoms dictate that it's not the gladiola-swinging, woe-is-me fest it's talked up to be. But does this connection between art and angst have any foundation?

Research earlier this year linked high childhood IQ to an increased risk of experiencing bipolar traits in later life. "There is something about the genetics underlying the disorder that are advantageous," said Daniel Smith of the University of Glasgow, who led the study. "One possibility is that serious disorders of mood – such as bipolar disorder – are the price that human beings have had to pay for more adaptive traits such as intelligence, creativity and verbal proficiency."

Marjorie Wallace, chief executive of Sane, a mental health charity, considers this concept potentially harmful, given that not all cases of bipolar disorder are the same. Although tormented geniuses exist – figures such as Robert Schumann and Van Gogh – she says their talents are not necessarily a byproduct of being bipolar. "The majority of people may have the illness but not the gift."

"There is," she adds, "the possibility that somebody who has fragile mental health can be sensitive to other dimensions. I also think that there is a 'tormented genius' link, particularly with people who have bipolar disorder. However, not everybody with mental illness can possibly be gifted artistically or musically. So it can make people who aren't feel even less adequate, and even more of a failure."

So is the troubled artist fallacy damaging the music industry? Alanna McArdle, formerly of Joanna Gruesome, believes so."It's a harmful trope that leads to ignorance and a lack of awareness of what mental illness actually is and what it can do to a person," she says. "I went out with a guy who told me that I shouldn't be so resentful of my mental illness because it's allowed me to create some amazing art. But I think that's wrong, and I also think it's a very offensive stance to take. I would much rather never write another song if the trade-off was to not have my illness."

The idea of mental illness as a creative force is, to most people who suffer from it, a myth. The chronic lack of self-esteem caused by mental illness, the numbing effect of antidepressants and the grip of anxiety on a performer who looks as if they have it easy are barriers that can prevent a musician from doing their job. Pete Doherty, for example, cancelled a number of Libertines shows in September after suffering from a severe anxiety attack. "Depression and anxiety, in different ways, have the effect of limiting someone's capacity for expression and reaching out towards the world," says Simon Procter, a programme director at music therapy charity Nordoff Robbins, who has co-headed a paper on music therapy and depression.

10. Which of the following options depict the main idea of the passage?

(a) The idea of mental illness as a positive creative force is unhelpful to the people who suffer from it – and some of them claim it's damaging the music industry.

(b) Attitudes towards mental health, while improving, are still poor, and when it involves people making music we love, we tend to ignore it.

(c) Glorifying the angsty artist leaves those suffering from mental illness more in the dark than ever.

(d) Music can work wonders as therapy for mental illness, but is unhelpful to the people who suffer from it.

11. Which of the following statements by a famous musician can substantiate the perspective that mental illness helps creativity?

(a) The coming out of the depression is often the period of time where I can create the most.

(b) I always have a desire to write out my depression, so I'll make a song as catharsis.

(c) High-profile musicians' panic attacks and breakdowns help lift the stigma from mental illness.

(d) Both (a) and (b)

12. How is the idea of mental illness as a creative force harmful to people in general?

(a) People with mental illness give it as an excuse for their bad behavior.

(b) People feel it is ok to have a mental illness if the by-product is creative genius.

(c) People with mental illness might not be able to convert their creativity into success.

(d) It makes those with the illness, but not the artistic genius, feel like a failure.

13. Which of the following can be inferred from the given passage?

(a) It is not clear if there exists a connection between art and angst.

(b) Mental disorders, as a by product of creative genius, is a myth.

(c) In most successful artists the presence of a mental disorder is a likely result of their lifestyles.

(d) Ignoring mental disorders because it adds to creativity is a common occurrence.

14. What can be inferred about Alanna McArdle from the passage?

(a) She is an art prodigy.

(b) She has suffered from mental illness.

(c) She appreciates that her illness has allowed her to be creative.

(d) She does not like people commenting on her illness.

15. Which of the following can most likely be the view of Simon Procter?

(a) Music therapy is a plausible remedy for depression

(b) Depression can limit the ability to express oneself

(c) Mental illness is most definitely not a cause of creative genius

(d) All of the given

Directions for questions 16 to 18: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Hundreds of protesters gathered outside Downing Street Thursday to protest David Cameron's invitation to Egyptian President Abdel Fattah el-Sisi. Seven people were arrested during Thursday's demonstration, including two people for assault. Five others were arrested after holding a "die-in" to block the Egyptian president from entering No. 10, Metropolitan police told BuzzFeed News. All seven are still being held by police officers, BuzzFeed News has been told.

Sisi arrived in London on Wednesday night and met Thursday with Cameron and senior members of the cabinet. He is also expected to meet defence secretary

Michael Fallon later today to discuss issues surrounding regional security and counterterrorism.

At a press conference held in Downing Street on Thursday afternoon, both Sisi and Cameron stated that security services were doing all they could to ensure the security of tourists in the Egyptian resort of Sharm el Sheikh. Cameron also said that the UK and Egypt would work together in ensuring the safety of British tourists.

"We are working intensively together in the spirit of close cooperation and I'm immensely grateful for all the efforts the Egyptian authorities have made so far," Cameron said. Sisi claimed that the British government had been satisfied with Egyptian airport security when it requested information 10 months ago, but asserted that Egypt was "completely ready to co-operate with all of our friends" to strengthen security.

Sisi's Downing Street invitation has been highly criticised by activists who accuse the British government of ignoring human rights concerns regarding the Egyptian regime, in particular the death of over 800 people at the hands of Egyptian military forces in Ra'baa in 2013.

On Wednesday night, a number of Egyptian activists addressed a crowd of protesters. Among those who spoke were the sisters of Ibrahim Halawa, a 19-year-old Irish man who has been held in an Egyptian prison since 2013 for participating in the Ra'baa protests against the regime.Human rights groups such as Amnesty International and Human Rights Watch have urged the British government to confront Sisi on human rights issues.

"David Cameron needs to show that he's got what it takes to stand up to repressive leaders not just give them a handshake and a grand tour of No. 10," Amnesty International's Egypt researcher, Nicholas Piachaud, told the *IB Times*. "That means raising serious human rights concerns including the repressive laws which are putting peaceful protesters behind bars."

David Mepham, UK director at Human Rights Watch, said the British government should show its "support for an international inquiry into grave crimes committed by the Egyptian security forces" and call for the release of prisoners arrested "solely for peaceful protest or their political or religious sympathies".

16. Which of the following statements states the main idea of this passage appropriately?

(a) Press, media and people did not very well take to the idea of David Cameron inviting the Egyptian President as an act of socio-political friendliness.

(b) The visit of the Egyptian President Sisi was as controversial as it was necessary and opened multiple discussions on whether it was the best course of action by Cameron.

(c) Whenever there is some terroristic activity involved, the nations concerned are always under pressure to rectify the political tension by extending friendly invitations as is the case for the UK and Egypt.

(d) The proposed and realized visit of the Egyptian President Sisi to the UK was an event marked with concern and hope on behalf of both the host country and the home country of the invitee because of recent unrest.

17. In the given context, what is the role that para 4 plays in shedding some light on the relationship between the UK and Egypt?

(a) Para 4 acts as a stamp of good intent and positive outlook on parts of both Cameron and Sisi as they state their motivations in trying to reconcile the differences created between the two nations.

(b) Para 4 is a connecting link between the invitation extended by Cameron and the positive response from Sisi, which in turn reflects well on both parties as they shake hands.

(c) Para 4 is an attempt to prove that both Cameron and Sisi have only the best intentions for their respective countries' benefit as they come together to forget past disasters.

(d) Just like Germany has done for Greece and the US has for Iraq, the UK is now doing the same for Egypt by extending a friendly hand when the latter needs one the most.

18. Based on the information furnished in the passage above, all of the following statements are correct EXCEPT

(a) David Cameron and President Sisi have met at least once to discuss the political-military unrest caused by events in 2013.

(b) There were protestations and exhibition of disagreement and dislike amongst people at the venue of Sisi's proposed visit and there were security measures required.

(c) The demonstrations by Halawa's family were supported by Human Rights Watch and Amnesty International as a sign of their allegiance to the Ra'baa victims.

(d) There has been insistence following the Ra'baa events to question the Egyptian forces on their past acts of unjustified violence against peaceful protestors.

Directions for questions 19 to 21: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

People in monogamous relationships catch sexually transmitted diseases just as often as those in open relationships, a new survey suggests, largely due to infidelity spreading infections.

Reported in the current *Journal of Sexual Medicine*, the survey of 554 people found that monogamous couples are less likely to use condoms and get tested for STDs — even when they're not being faithful to their partner.

"It turns out that when monogamous people cheat, they don't seem to be very good about using condoms," Justin Lehmiller, a psychologist at Ball State University and author of the study, told Fox News by email. "People in open relationships seem to take a lot of precautions to reduce their sexual health risks."

The finding matters because people who think they are in monogamous relationships may face higher odds of an infection than they suspect, Lehmiller and other researchers told Fox News. And a stigma around open relationships that views such couples as irresponsible — even among researchers who conduct studies — may be skewing the evidence.

One in four of the 351 monogamous-relationship participants in Lehmiller's survey said they had cheated on their partners, similar to rates of sexual infidelity reported in other surveys. About 1 in 5, whether monogamous or not, reported they had been diagnosed with an STD. Participants averaged between 26 to 27 years old, and most (70%) were women.

For people in supposedly exclusive relationships, Lehmiller said, "this risk is compounded by the fact that cheaters are less likely to get tested for (STDs), so when they pick something up, they are probably less likely to find out about it before passing it along."

Psychologist Terri Conley of the University of Michigan told Fox News that the survey results echoed her team's findings in a 2012 *Journal of Sexual Medicine* study that found people in open relationships were more likely to use condoms correctly in sexual encounters than people in exclusive relationships.

To bolster confidence in the results, Conley said, more funding is needed to test research subjects for STDs directly, rather than relying on their own notoriously unreliable self-reporting of infections.

She compared just assuming that monogamous relationships are safer to assuming abstinence education will really stop teenagers from having sex: "Sure, abstinence would be great, but we know that isn't reality."

To put it another way, Lehmiller said, "There's a potential danger in monogamy in that if your partner puts you at risk by cheating, you're unlikely to find out until it's too late."

In a commentary on Lehmiller's study in *Journal of Sexual Medicine*, Conley argued that sex researchers are "committed to the belief that monogamy is best" and are "reluctant to consider contradictory evidence."

"I'm not saying monogamy is bad," Conley said. "What I found is that the level of hostility among reviewers to suggesting people in consensual non-monogamous relationships are more responsible is really over the top."

Conley said she initially struggled to publish her 2012 study. When she changed the framing of its conclusion to find that "cheaters" in monogamous relationships were more irresponsible, the study was suddenly published.

"Even in a scientific review process, challenging researchers' preconceived notions is perilous," she wrote in her commentary.

Other relationship researchers disagree, however, saying that sociologists have cast shade on monogamy — finding declines in happiness, sexual satisfaction, and frequency of intercourse — for decades. "This is about as widespread a finding as one gets," Harry Reis, a psychologist at the University of Rochester, told Fox News. He called the idea that social scientists are biased against studies showing the value of non-monogamous relationships was "poppycock."

19. Which of the following options can most appropriately continue the passage?

(a) Sex researcher Debbie Herbernick of Indiana University echoed this view, saying funding is not an issue: "I've never seen much negative reaction or pushback."

(b) More critically, Reis said, reviewers might be dubious about the data collected on open relationships, given their relative rarity making reliable data collection difficult.

(c) Although Lehmiller published his study, he agreed with Conley that a stigma still marks open relationships, even in science.

(d) "People, including many sex researchers," he said, "have a tendency to put monogamy on a pedestal and to be very judgmental when it comes to consensual non-monogamy."

20. From the statements given below, choose the one that can be easily inferred from the lines 'Conley said…suddenly published'. (lines 39-41)

(a) People in monogamous relationships tend to be defensive about their cheating habits and hence will do everything they can to avoid being exposed.

(b) Scientific studies often have difficulty obtaining validation when they feature issues concerning people's private lives and sexual behaviour.

(c) Conley's research put at risk the non-monogamous relationship status of those researchers who otherwise touted their status as monogamous and faithful partners.

(d) Conley faced difficulty in publishing her research because she was challenging the preconceived and well-defended notion that monogamous relationships are preferable.

21. How does the author use the word 'stigma' in the fourth paragraph?

(a) A pessimistic opinion

(b) A mark of disgrace or infamy

(c) A negative reputation

(d) A sense of notoriety

Directions for questions 22 to 27: The passage given below is followed by a set of six questions. Choose the most appropriate answer to each question.

Did you know that the Impressionists favored the elimination of the color black from their painter's palette? According to Wilkins et al, Impressionism encouraged this:

"The new color theory emphasized the presence of color within shadows and, in asserting that there was no black in nature, inspired the Impressionists to ban black from their palette."

The founder of Impressionism is Claude Monet (1840-1926), a French painter born in Paris. He was a close associate of the French painter, Edouard Manet, who helped art move away from Realism in the nineteenth century. Monet served along with fellow artist Edgar Degas and author Emile Zola as a pall bearer at Manet's funeral in 1883. Degas later created ballet scenes including 1874's Ballet Rehearsal which showed some qualities of Impressionism.

Early in his career, Monet created a style of painting that focused on the light in the shadows. This study of natural light is the focus of his landmark painting, Impression – Sunrise, completed in 1872. This work is the source of the term "Impressionism." Impression – Sunrise is full of powerful shades of blue, gray, and orange, and a few fishermen in small boats float in the foreground as the sun rises at the top of the painting.

Art historians note that Impressionist paintings such as Impression – Sunrise were rejected by the Paris Salon, leading the painters to hold their own autonomous shows. Monet first exhibited this work in Paris in 1874 in a non-Salon-approved exhibition. Honour and Fleming note that the independent exhibitions by the Impressionists showed how the artists were trying to escape the "tyranny of the official art-world." In other words, if an artist could not get accepted by the Salon, he or she would have no method of becoming a professional artist in France.

Monet contributed many other paintings to the art world over the remainder of his career. He consistently explored how the human eye sees landscapes or scenes in the outdoors. He wanted to capture real events and watch how they related to the light. In Gare St.-Lazare (1877), Monet showed that a Paris train station could be the center point of the natural light shining through the glass roof on a sunny day.

The Impressionists also painted "a typically middle-class vision of happiness" in keeping with their bourgeois backgrounds, according to Honour and Fleming. The authors use the example of Monet's sketch for The Picnic which predates Impression – Sunrise by six years. It was never finished, but it shows middle-class ladies and gentleman at a picnic beneath a beautiful canopy of trees.

As the founder of this a new style of painting, Monet left a huge mark on the art worlds of the 19th and 20th centuries. He died of lung cancer in 1926 and was buried at the church in Giverny, France.

22. Why did the Impressionists favor the elimination of the color black from their painter's palette?

(a) There is no black in nature.

(b) Black is the colour of shadows and not of real things.

(c) There exists colour in everything, even shadows.

(d) They wanted to imitate nature in minute detail.

23. What was the most significant contribution of Manet to art?

(a) He helped art to move away from Realism and towards Impressionism.

(b) He influenced art towards newer movements in techniques.

(c) He helped artists in breaking away from influence of Realism.

(d) Cannot be determined from the passage

24. Which of the following is true of Impressionism?

A. It received its name from a painting of Monet.

B. It is a study of light in shadows.

C. In its early stage, it was rejected by the Paris Salon.

(a) A and B (b) B and C

(c) C and A (d) A, B and C

25. The passage is most likely

(a) an article on Monet

(b) an article on impressionist art

(c) an article on impressionist artists

(d) an article on movement of art from Realism to Impressionism

26. What does the author mean by 'a typically middle-class vision of happiness'?

(a) depiction of a middle class family

(b) depiction of middle class people having a good time

(c) depiction of normal ladies and gentleman in everyday scenarios

(d) depiction of the normality of a middle class life

27. Which of the following was/were artists' attempt(s) to escape the tyranny of the official art-world?

(a) Holding independent art shows

(b) Creating painting that were not commissioned

(c) Holding non-Salon-approved exhibition

(d) All of the given

28. Five sentences are given below, labeled 1, 2, 3, 4 and 5. They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below.

1. It is less than a year since Bellerín was "abandoned" by Per Mertesacker to endure a gruelling ordeal in a bruising Arsenal defeat by Stoke at the Britannia Stadium.
2. And he contributes plenty in attack, too, thanks to blinding speed and smart choices.
3. At 20 he offers ample scope to get even better, and it is an encouraging sign that in matches where it had initially looked as if his rapid opponent might get the better of him, he has quickly risen to the challenge and come out emphatically on top.
4. Bellerín has gone on not only to prove he can cut it in the Premier League but that he is a cut above most other defenders.
5. Héctor Bellerín (Arsenal) is another young Spaniard about whom there were once questions over Premier League suitability.

29. Five sentences are given below, labeled 1, 2, 3, 4 and 5. They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below.

1. Another features a hostage-taking in a hospital.
2. Elsewhere, an old lover surprises a lounge pianist, sending her reeling back into painful memories.
3. An overbearing mother remembers visititing her wary son and his boisterous, pregnant wife.
4. Most stories turn on some kind of betrayal.
5. One story takes place at the funeral reception of a man whose wife has just learned of his infidelity.

30. Five sentences are given below, labeled 1, 2, 3, 4 and 5. They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below.

1. There is, however, a gap of at least a billion years between the formation of the earth and these first signs of living organisms.
2. Cyanobacteria are still abundant on earth today.
3. The principal kinds of bacteria were cyanobacteria: the name refers to the blue-green colour, not the production of cyanide.
4. A small amount of evidence, mostly still controversial, records the presence of bacteria and perhaps other microbial life in Archaean rocks from Australia and South Africa dated at 3.5 b yr ago.
5. At some point in that interval, life arose on earth in the form of relatively simple self replicating molecules.

31. Five sentences are given below, labeled 1, 2, 3, 4 and 5. They need to be arranged in a logical order to form a coherent paragraph. Write the correct answer in the space given below.

1. Olive bursts into tears when she meets an anorexic young woman.
2. "I don't know who you are," she confesses, "but young lady, you're breaking my heart."
3. "You're not starving," the girl replies, looking at this large woman, with her thick wrists and hands, her "big lap."
4. "Sure I am," Olive says. "We all are."
5. "I'm starving, too," Olive tells her, "Why do you think I eat every doughnut in sight?"

32. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer

The study of Buddhism over the past century or so has resembled the encounter of the blind men and the elephant in many ways. Students of Buddhism have tended to fasten onto a small part of the tradition and assume their conclusions held true about the whole. Often the parts they have seized on have been a little like the elephant's tusks — a striking, but unrepresentative, part of the whole animal. As a result, many erroneous and sweeping generalizations about Buddhism have been made, such as that it is 'negative', 'world-denying', 'pessimistic', and so forth. Although this tendency to over generalize is now less common, it is still found in some of the older literature where authors tended to exaggerate certain features of the tradition or assume that what was true of Buddhism in one culture or historical period held good everywhere.

1. The story of three blind men and the elephant can tell us much about Buddhism.
2. Buddhism has been generalized and many of its facets over-exaggerated by its perpetuators over the years.
3. The way the three blind men make conclusions about the elephant is analogous to how the world views Buddhism.
4. Authors in general are unable to grasp the nuances of Buddhism.

33. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer

Volkswagen, trying to get to the bottom of its emissions-cheating scandal, pressured employees to tell what they know, announcing an amnesty program for informants that will expire soon. The company has yet to explain publicly who was responsible for installing software in 11 million diesel vehicles that was designed to disguise the output of nitrogen oxide, a pollutant harmful to the lungs. Volkswagen also admitted that it underreported the levels of carbon dioxide produced by about 800,000 of its diesel and gasoline vehicles in Europe and that had it exaggerated their fuel economy.

1. Volkswagen exaggerated their fuel economy and is now trying to pressurize the employees to take the blame.
2. Volkswagen, is pressurizing its employees to spill the beans by stating that the amnesty program will soon end.
3. Volkswagen has been underreporting the levels of carbon dioxide produced by its diesel and gasoline vehicles in Europe.
4. Volkswagen, trying to get to the bottom of its emissions cheating scandal, pressured employees to tell what they know.

34. The passage given below is followed by four alternative summaries. Choose the option that best captures the essence of the passage. Key in the number of the option you choose as your answer

A major glacier in Greenland that holds enough water to raise global sea levels by half a metre has begun to crumble into the North Atlantic Ocean, scientists say. The huge Zachariae Isstrom glacier in northeast Greenland started to melt rapidly in 2012 and is now breaking up into large icebergs where the glacier meets the sea, monitoring has revealed. The calving of the glacier into chunks of floating ice will set in train a rise in sea levels that will continue for decades to come, the US team warns. "Even if we have some really cool years ahead, we think the glacier is now unstable," said Jeremie Mouginot at the University of California, Irvine. "Now this has started, it will continue until it retreats to a ridge about 30km back which could stabilise it and perhaps slow that retreat down."

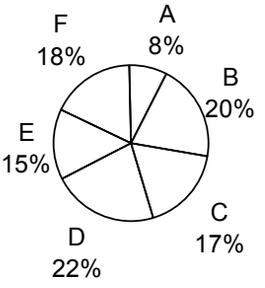
1. Huge Zachariae Isstrom glacier has begun to break up, starting a rapid retreat that could continue to raise sea levels for decades to come.
2. Global Warming and other related factors are breaking up glaciers that are raising the level of North Atlantic ocean.
3. The huge Zachariae Isstrom glacier is now breaking up into large icebergs where the glacier meets the sea.
4. Huge Zachariae Isstrom glacier will continue to melt until it retreats to a ridge about 30km back which could stabilise it.

SECTION II : LRDI

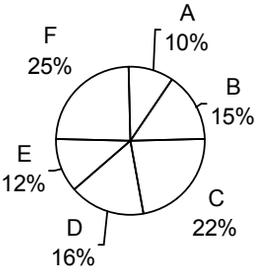
Directions for questions 35 to 38: Answer the questions on the basis of the information given below.

The following pie chart gives details of the production, expenses and export of the six products manufactured by company KL Enterprises, which manufactures only the given six products, in the year 2014. In the given year, the company followed a very strict internal audit policy and any item that did not meet the specifications were rejected and disposed off. All the products exported were those manufactured in the same year itself.

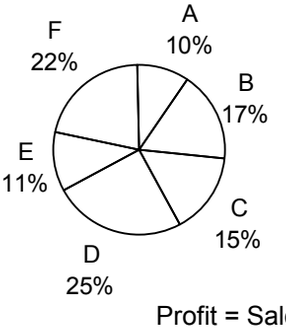
Production



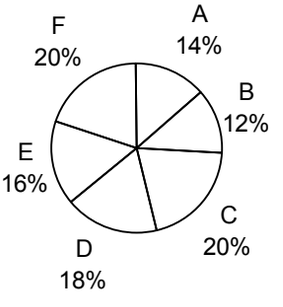
Expenses



Export (by volume)



Export (by value)



Profit = Sales – Expenses

$$\text{Profitability (\%)} = \frac{\text{Profit}}{\text{Expenses}} \times 100$$

Note: Export is the only source of sales.

35. In 2014, the products exported as a percentage of the products manufactured by the company could not be more than

(a) 73.3% (b) 81.81%
(c) 80% (d) 88%

36. In 2014, if product D was a profit making product for the company, what was the maximum number of products that were loss making products for the company?

(a) 2 (b) 3
(c) 4 (d) Zero

37. The export price per unit of which product was the highest?

(a) A (b) C

(c) D (d) E

38. For which product the rejection rate was maximum?

(a) C (b) F

(c) E (d) B

Directions for questions 39 to 42: Answer the questions on the basis of the information given below.

Sixteen teams – A through P – participated in the Hockey World Cup,2013. The tournament was conducted in two stages. In the first stage, the teams were divided into two groups – teams A to H in group 1 and teams I to P in group 2. In the first stage, each team in a group played exactly one match against every other team in that group. At the end of the first stage, the top four teams from each group advanced to the second stage while the rest got eliminated. The second stage comprised three rounds – Quarterfinals, Semi-finals and Finals. A round involves one match for each team. The winner of a match in a round advanced to the next round, while the loser got eliminated. The team that remains undefeated in the second stage was declared the winner of the tournament.

At the end of the first stage, top four teams in each group were determined on the basis of total number of matches won by individual teams; in case, two or more teams in a group were ended up with the same number of wins, ties were resolved by a series of complex tie-breaking rules to determine the top four positions. The teams qualifying for the second stage from group 1 were A, B, C and D and those from group 2 were I, J, K and L. No match in the tournament ended in a draw/tie.

39. In the tournament, if E and L won the same number of matches and L was the winner of the tournament, then what was the sum of the number of matches won by E and that by L?

40. The number of matches won in the first stage by a team that advanced to the second stage could not be less than

41. How many of the following statements is/are true?

(i) Maximum number of teams which could have one win in the first stage was 6.

(ii) Maximum number of teams which could have three wins in the first stage was 12.

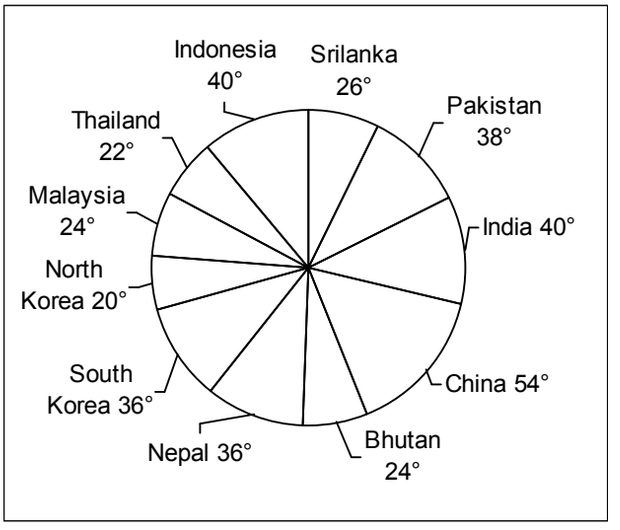
(iii) Number of teams which had exactly 2 wins in the second stage was 2.

42. The value of the total of number of matches won, in the first stage, by teams A, B, C and D together could not be more than

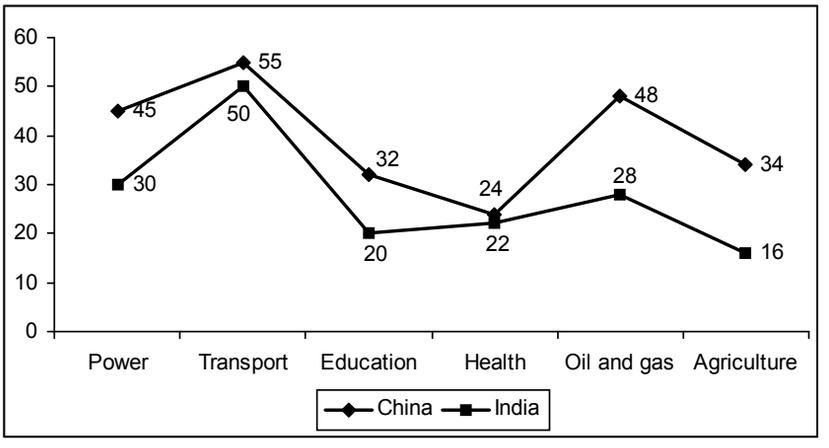
Directions for questions 43 to 46: Answer the questions on the basis of the information given below.

The following pie chart gives the distribution of the total loans disbursed by ADB in 2012 among eleven Asian countries.

Total amount of loans disbursed = Rs. 7200 cr



The following line graph gives the percentage contribution of loan from ADB in the total investment made in different sectors in the same year by India and China.



For both China and India, the loan received from ADB was utilized in the given sectors only.

43. If the total investment in Education sector in China was 60% higher than that in India, then what is the ratio of A and B, where

A : The percentage of loan from ADB invested in Education sector by China

B : The percentage of loan from ADB invested in Education sector by India

(a) 256 : 135 (b) 256 : 189

(c) 256 : 225 (d) Cannot be determined

44. The amount of loan invested in Transport sector by China was equal to 60% of the total loan given by ADB to Malaysia. The amount of loan invested in Transport sector by India was equal to 60% of the total loan given by ADB to North Korea. The total investment made in Transport sector by India was approximately what percent of that made by china?

(a) 75.76 (b) 91.67

(c) 80.80 (d) 81.81

45. If the total investments made in Education, Health and Agriculture sectors in India in 2012 was Rs. 150 cr., Rs. 120 cr and Rs. 400 cr. respectively, then the amount of ADB loan invested by India in these three sectors constitute what percentage of the total loan granted to India by ADB?

(a) 15.05% (b) 18.85%

(c) 12.33% (d) 16.66%

46. The total loan invested in Power, Transport and Education sectors by India was 500 cr. What was the maximum possible investment (in Rs. crore) in these three sectors made by India?

[The loan amount invested in all of these three sectors is a multiple of 30 cr]

(a) 2000 (b) 2100

(c) 2360 (d) 2400

Directions for questions 47 to 50: Answer the questions on the basis of the information given below.

The total electricity production of five thermal power plants in India in year 2009-10 is given in the table below. Capacity utilization for any power plant is the percentage of maximum capacity, of that power plant, which is used for power production.

Maximum capacity (100%) = Capacity utilization (In %) + Unutilized production (In %)

Power Plant	Capacity Utilization	Unutilized production (In MW units)	Number of units sold as a percentage of maximum capacity
A	93%	595	89%
B	88%	750	87%
C	92.50%	750	90%
D	86%	1190	85%
E	81%	1805	80%

	Production Cost (In Rs. / kw units)	Selling Price (In Rs. / Kw units)
A	2.1	3.4
B	2.25	3.2
C	2.0	2.9
D	2.35	3.0
E	2.2	2.8

Total cost of production = Units Produced (in Kw) × Production Cost (in Rs. / Kw units)

Total Revenue = Units Sold (in Kw) × Selling price (in Rs. / Kw units)

$$\text{Profitability} = \left(\frac{\text{Revenue} - \text{Cost}}{\text{Cost}}\right) \times 100\%$$

47. In the given year, if capacity of power plant B had 12.5% of the total power capacity of India, and thermal power capacity of India is 95% of its total power capacity. The total capacity of these 5 thermal power plants was what percentage of the total thermal power capacity of India?

(a) 91.92% (b) 85.5% (c) 77.73% (d) 90%

48. Which of the following represents the decreasing order of units sold by the given 5 power plants?

(a) E > C > D > A > B (b) C > E > A > D > B

(c) E > C > A > D > B (d) C > A > E > B > D

49. Which power plant had the third highest profitability?

(a) A (b) C

(c) D (d) B

50. Which of the following statements is true?

(a) The power plant with the lowest percentage capacity utilization sold minimum number of units.

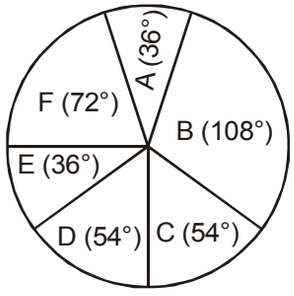
(b) The power plant with the second highest per unit selling price sold minimum number of units.

(c) The power plant B had the second lowest capacity.

(d) The total capacity of E was more than 10,000 MW units.

Directions for questions 51 to 54: Answer the questions on the basis of the information given below.

The pie chart given below shows the break-up of production cost of six products – A through F – of Zen Private Ltd. in year 2011. The total production cost was Rs. 250 Cr.



Each of the six products is produced in two varieties- Type P and Type Q. The ratio of the units produced for each product and the profit percentage on selling them is given in the table below.

Product	Ratio of production		Profit Percentage	
	Type P	Type Q	Type P	Type Q
A	3	2	15	30
B	4	3	25	20
C	5	6	15	20
D	1	1	15	10
E	5	3	25	20
F	5	4	20	15

Also for each product, the cost of production per item of Type P and Type Q varieties are in the ratio 4 : 5.

51. For how many of the six products, is the profit made on items of type Q not more than the profit made on items of type P?

52. For which product is the ratio of total profit to total production cost, the lowest?

(a) B (b) C

(c) D (d) F

53. For how many products, overall profit percentage is more than 20%?

54. The nearest integer to the total cost (In Rs. Cr.) incurred in producing type A of products A, D & F is

Directions for questions 55 to 58: Answer the questions on the basis of the information given below.

A group has to be selected from seven persons containing two women (Rehana and Kavya) and five men (Rohit, Rahul, Kamal, Nusarat and John). Rohit would not like to be in the group if Rahul is selected. Rahul and John want to be selected together in the group. Kavya would like to be in the group only if Kamal is also there. Kamal, if selected, would not like Nusarat in the group. Rohit would like to be in the group only if Nusarat is also there. Kamal insists that Rehana must be selected in case he is there in the group.

55. Which of the following is an acceptable combination of a group of three?

(a) Rohit, John, Kavya

(b) Rahul, Kamal, Nusarat

(c) Rohit, Nusarat, Rahul

(d) Rohit, Nusarat, Rehana

56. Which of the following is an acceptable combination of a group of four?

(a) Rohit, Nusarat, Rehana, John

(b) Rahul, John, Kavya, Kamal

(c) Rahul, John, Rehana, Kamal

(d) Rehana, Kamal, Rohit, Nusarat

57. Which of the following statements is true?

(a) Kavya and Rohit both can be selected in a group of four.

(b) A group of four can have both the women.

(c) A group of four can have four men.

(d) None of the above

58. If a group of five members has to be selected, then in how many ways is it possible such that Kamal is definitely a member of the group?

(a) 1 (b) 0

(c) 2 (d) 3

Directions for questions 59 to 62: Answer the questions on the basis of the information given below.

In a given season of F1 racing, 9 races are to be held. There are 8 teams with two drivers in each team and the points are awarded to the drivers in each race as per to the following table.

Rank	1st	2nd	3rd	4th	5th	6th	7th	8th	9th to 16th
Points	10	8	6	5	4	3	2	1	0

Two championships viz. 'Driver's Championship' and 'Constructor's Championship' take place simultaneously.

'Driver's Championship' is given to the player who has the maximum number of points at the end of the season. 'Constructor's Championship' is given to the team for which the sum of the points of two its drivers is the maximum. A driver is said to get the podium finish only when he is among the top 3 rankers in a race.

After the first 6 races, the point standings of the 16 drivers is as follows:

Driver	Team	Points
Alonso	Renault	54
Schumacher	Ferrari	39
Kimi	Mclaren	29
Fisichella	Renault	27
Montoya	Mclaren	22
Massa	Ferrari	22
Button	Honda	21
Barichello	Honda	10
Villeneuve	Red Bull	4
Webber	Williams	3
Roseberg	Williams	2
Coulthard	BMW Soubers	1
Heidfeld	Red Bull	0
Klien	BMW Soubers	0
Liuzzi	Toro Rosso	0
Scott Speed	Toro Rosso	0

59. If Alonso got the podium finish in each of the first 6 races, then what was the maximum number of races in which he had 2nd rank?

(a) 4 (b) 3

(c) 2 (d) 1

60. Apart from the first six races, Alonso got the podium finish in the 7th race as well. However, he was not allowed to participate in the subsequent races due to mechanical failure. At the end of the season, if Schumacher won the 'Driver's Championship', then which of the following could have been his lowest rank in any of the last three races?

(a) 5th (b) 6th

(c) 7th (d) 4th

61. Which of the following statements CANNOT be true?

(a) Renault and Ferrari had a tie for the 'Constructor's Championship'.

(b) Alonso got the podium finish in each of the first 6 races out of which he did not have rank 1st in the 6th race.

(c) Fisichella got the podium finish in the 9th race and Honda won the 'Constructor'sChampionship'.

(d) Barichello got the podium finish in the 3rd race but he did not score any point in the 1st race.

62. If Schumacher ranked 9th in one of the first six races, then which of the following CANNOT be the points scored by him in any one of the first six races?

(a) 3 (b) 2

(c) 1 (d) 0

Directions for questions 63 to 66: Answer the questions on the basis of the information given below.

From ISBT, buses ply on 6 different routes viz. 414, 413, 427, 966, 893 and 181 at an interval of 10 min, 10 min, 12 min, 15 min, 20 min and 30 min, not necessarily in that order, to four different destinations viz. Mehrauli, Badarpur, Uttam Nagar and Azadpur. There is at least one bus for each destination. Further information is also known:

i. Two buses to the same destination cannot start at the same time.

ii. If the timings of two buses plying different routes but heading towards the same destination clash, then the bus of the route number having the shorter time interval will skip this journey.

iii. Buses on two different routes ply between ISBT and Mehrauli.

iv. The difference between the time intervals of a route to Mehrauli and Uttam Nagar is equal to the difference between the time intervals of the two routes to Uttam Nagar.

v. Buses on a route to Mehrauli leaves after every 10 min.

vi. 414 leaves for Badarpur after every 30 min.

vii. Time intervals between two different routes heading towards the same destination cannot be equal.

viii. Buses on one of the routes to Uttam Nagar leave after every 15 min.

ix. Buses to any destination can leave from ISBT with an interval of at least one minute or an integral multiple of one minute.

63. If 427 leaves to Mehrauli after every 10 min, then in a given hour a minimum of how many buses can ply on route 427?

(a) 3 (b) 4

(c) 6 (d) 2

64. On a festival day, if frequency of all buses was increased by decreasing the time interval of all the routes by 5 min, then what can be the minimum time difference between any two buses plying to Mehrauli?

(a) 2 min

(b) 5 min

(c) 1 min

(d) None of these

65. Which of the following statements is necessarily TRUE?

(a) A maximum of 3 buses can depart at a given time.

(b) Maximum of 11 buses can depart for Mehrauli in 1 hour.

(c) Maximum difference between the intervals of the buses plying to Uttam Nagar and Badarpur is 10 min.

(d) The difference between the time intervals of buses plying to Uttam Nagar is an integral multiple of 5 min.

66. If condition (iii) is not there, then what can be the minimum difference between the time intervals between the buses plying to Uttam Nagar?

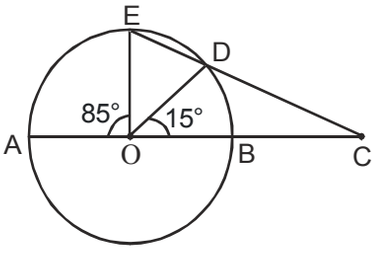
(a) 2 min (b) 3 min

(c) 4 min (d) 5 min.

SECTION III : QA

67. If $x^4 - y^4 = 15$, where x and y are natural numbers, then find the value of the expression $x^4 + y^4$.

68. In the given figure, AB is the diameter of the circle with centre O. If $\angle BOD = 15°$, $\angle EOA = 85°$, then find the measure of $\angle ECA$.



(a) 20° (b) 25°

(c) 35° (d) Cannot be determined

69. The smallest possible circle touching two opposite sides of a rectangle is cut-out from a rectangle of area 60 sq. units. If the area of this circle is $\frac{3}{2}$ times the area left out in the rectangle, find the length of the smaller side of the rectangle.

(a) $\frac{6}{\sqrt{\pi}}$ units (b) $\frac{9}{\sqrt{\pi}}$ units

(c) $\frac{12}{\sqrt{\pi}}$ units (d) $\frac{15}{\sqrt{\pi}}$ units

70. From a vessel completely filled up with pure wine, 140 litres of content is removed and replaced with equal quantity of water. The process is repeated one more time. In a 98 litres sample of the resulting solution 80 litres is water. Find the capacity (in litres) of the vessel.

71. There are 40 students in a class. A student is allowed to shake hand only once with a student who is taller than him or equal in height to him. He can't shake hand with anyone who is shorter than him. Average height of the class is 5 feet. What is the difference between the maximum and minimum number of handshakes that can take place in the class?

(a) $\left(\frac{^{40}C_2}{2} - 20\right)$ (b) 361

(c) $^{40}C_2 - 40$ (d) $^{40}C_2$

72. x is the smallest positive integer such that when it is divided by 7, 8 and 9 leaves remainder as 4, 5 and 6 respectively. Find the remainder when $x^3 + 2x^2 - x - 3$ is divided by 132.

(a) 49 (b) 76

(c) 94 (d) 15

73. Both the roots of the quadratic equation $x^2 + rx + s = 0$ are real and greater than 1. If $R = \left(\frac{r+s+1}{s-r}\right)$, then which of the following is definitely true?

(a) R = 0 (b) R < 0

(c) R > 0 (d) Cannot be determined

74. An amount borrowed at simple interest gets tripled in 24 years. How many years does it take to get doubled, if the interest rate is same.

75. P is the product of the first 100 multiples of 15 and Q is the product of the first 50 multiples of 25^{20}. Find the number of consecutive zeroes at the end of $\frac{P^2}{Q} \times 10^{1767}$.

(a) 1968 (b) 1914

(c) 3 (d) 2024

76. A four-digit number is divisible by the sum of its digits. Also, the sum of these four digits equals the product of the digits. What could be the product of the digits of such a number?

(a) 6 (b) 8

(c) 10 (d) 12

77. ABCD is an isosceles trapezium with BC = AD = 10 units, AB = 2 units and CD = 14 units. The mid-points of the sides of the trapezium are joined to form a quadrilateral PQRS. Find the ratio of the area of the circle inscribed in the quadrilateral PQRS to the area of trapezium ABCD.

(a) $\frac{3\pi}{8}$ (b) $\frac{3\pi}{16}$

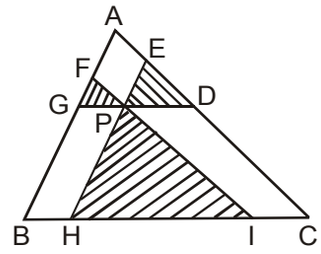
(c) $\frac{\pi}{4}$ (d) $\frac{\pi}{8}$

78. A certain sum of money is made up of Re. 1, 50 paise and 25 paise coins. The ratio of the number of these coins is 5 : 6 : 8. Then, 3/5th of the Re. 1 coins are changed to 50 paise and 25 paise coins, such that the ratio of the total number of these coins in the same order became 1: 2. Now, half of the 50 paise coins are changed to Re. 1 coins and all the 25 paise coins are changed to Re. 1 and 50 paise coins in the ratio 7: 4. What is the ratio of the Re. 1 and 50 paise coins at the end of the conversions? (Note:- If you change a Re.1 coin into 50 paise coins, then you will get two coins of 50 paise for a Re. 1 coin.)

(a) 11 : 23 (b) 16 : 13

(c) 54 : 71 (d) None of these

79.



Through point P, lines are drawn parallel to the sides of triangle ABC. The areas of the ΔPED, ΔPFG and ΔPHI are 9, 16 and 49 sq. cm respectively. Find the area (in sq. cm) of triangle ABC.

80. Let P be the set of all odd positive integers such that every element in P satisfies the following conditions.

I. $100 \leq n < 1000$

II. The digit at the hundred's place is never greater than the digit at tens place and also never less than the digit at units place.

How many elements are there in P?

(a) 93 (b) 94

(c) 95 (d) 96

81. There is a string of length 100 m running from east to west. 1000 ants are dropped onto the string. Assume that each ant lands on the string facing either the east or the west direction. As soon as they land, each ant starts moving in the direction which is being faced by it at 50 m/ min till it falls off the string. But if an ant collides with another ant coming from the opposite direction, both of them reverse their directions and proceed to move now in the opposite directions. Ants fall only at either of the ends of the string. What is the minimum time by which the string is definitely free of ants?

(a) 1 min (b) 2 min

(c) 200 min (d) Infinite time

82. Three persons - A, B and C - are playing the game of death. 3 bullets are placed randomly in a revolver having 6 chambers. Each one has to shoot himself by pulling the trigger once after which the revolver passes to the next person. This process continues till two of them are dead and the survivor of the game becomes the winner. What is the probability that B is the winner if A starts the game and A, B and C take turns in that order.

(a) 0.33 (b) 0.3

(c) 0.25 (d) None of these

83. Let x, y, z and t be the positive numbers which satisfy the following conditions:

I. If x > y, then z > t and

II. If x > z, then y < t

Which of the following is necessarily true?

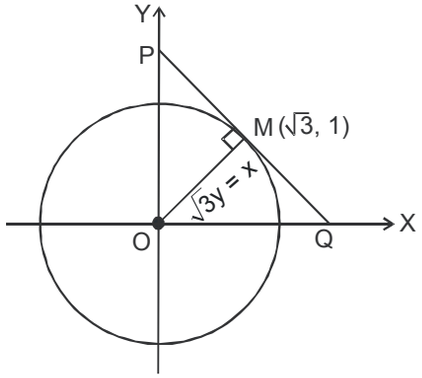
(a) If x < y, then z < t

(b) If x > z then x – y < z + t

(c) If x > y + z, then z > y

(d) None of these

84. The line $\sqrt{3}y = x$ is the radius of the circle, it meets the circle centred at origin O at point M $(\sqrt{3}, 1)$. If PQ is the tangent to the circle at M as shown, find the length of the PQ.



(a) $\frac{5}{2}\sqrt{3}$ units (b) $3\sqrt{3}$ units

(c) $2\sqrt{3}$ units (d) $\frac{8}{\sqrt{3}}$ units

85. If 3x + y + 4 = 2xy, where x and y are natural numbers, then find the ratio of the sum of all possible values of x to the sum of all possible values of y.

(a) $\frac{2}{3}$ (b) $\frac{15}{19}$

(c) $\frac{17}{21}$ (d) $\frac{7}{9}$

86. Find the solution set for [x] + [2x] + [3x] = 8, where x is a real number and [x] is the greatest integer less than or equal to x.

(a) $1 \leq x < \frac{4}{3}$ (b) $x < \frac{5}{3}$

(c) $\frac{3}{2} \leq x < \frac{5}{3}$ (d) None of these

87. The coordinates of two diagonally opposite vertices of a rectangle are (4, 3) and (-4,-3). Find the number of such rectangle(s), if the other two vertices also have integral coordinates.

(a) 1 (b) 4

(c) 5 (d) 10

88. A shopkeeper sold 10 items, all of which are of the same cost price, such that profit percentage on no two item is the same. The profits made on the given items were in an arithmetic progression. If the profit percentage of the item the selling price of which is 4th highest and the item the selling price of which is 7th highest were 13 % and 10 % respectively, find the profit percentage on the whole.

(a) 11.5% (b) 12%

(c) 12.5% (d) Data insufficient

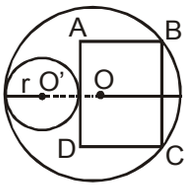
89. Which of the following will completely divide $(106^{90} - 49^{90})$?

(a) 589 (b) 186

(c) 124 (d) None of these

90. All reputed B-schools place their students. One-sixth of those B-schools that place their students are reputed and one-fourth of all B-schools that are recognised, place their students. There are exactly 6 reputed B-schools that are recognised too and there are 39 B - schools that are recognised but do not place their students. If there is a total of 78 B-schools that place their students, then how many of these B-schools are neither recognised nor reputed but place their students?

91.



In the figure, O and O' are the centres of the bigger and smaller circles respectively and small circle touches the square ABCD at the mid point of side AD. The radius of the bigger circle is equal to 15 cm and the side of the square ABCD is 18 cm. Find the radius of the smaller circle.

(a) 4.25 cm (b) 4.5 cm

(c) 4.75 cm (d) 5 cm

92. How many ordered triplets (a, b, c) exist such that LCM (a, b) = 1000, LCM(b, c) = 2000, LCM (c, a) = 2000 and HCF (a, b) = k × 125?

(a) 32 (b) 28

(c) 24 (d) 20

93. An isosceles right angled triangle with length of its equal sides being 30 cm, is rotated 180° about its centroid to form a new triangle. Find the area of the region common to the original and the new triangles.

(a) 275 sq. cm (b) 300 sq. cm

(c) 375 sq. cm (d) 350 sq. cm

94. A field is in the form of a rectangle of dimension 24 m × 56 m. There is 2700 m of fencing that is available. The field has to be divided into many identical smaller square plots, having integral sides (in metres), each of which is to be fenced. Find the side of each of the square plots such that the fencing material that is left out is minimum.

(a) 1 m (b) 2 m

(c) 4 m (d) 8 m

95. If $x^2 + (x + 1)(x + 2)(x + 3)(x + 6) = 0$, where x is a real number, then one value of x that satisfies this equation is

(a) $3 - \sqrt{3}$ (b) $3 + \sqrt{3}$

(c) $(-3 + \sqrt{3})$ (d) 0

96. Out of 4 numbers a, b, c, and d, each pair of numbers has the same highest common factor. Find the highest common factor of all the four numbers if the least common multiple of a and b is 310 and that of c and d is 651.

97. In a rowing competition, first boat rows over the course at an average speed of 4 yards/second. Second boat rows over the first half of the course at the rate of $3\frac{1}{2}$ yards /second and over the remaining half at $4\frac{1}{2}$ yards/second, thereby reaching the winning post 15 seconds after the first boat. Find the time taken (in minutes) by the second boat to cover the entire course.

98. ΔABC is a right angled triangle, with $\angle B = 90°$, AB = 20 cm and BC = 21cm. A circle with centre O is inscribed in triangle ABC. OD, OE and OF are perpendiculars drawn on the sides AB, BC and CA respectively. Find the ratio of the area of the quadrilateral FOEC to the area of the quadrilateral ADOF.

(a) 15 : 14 (b) 14 : 15

(c) 12 : 11 (d) 7 : 5

99. If we arrange the letters of the word 'KAKA' in all possible ways, what is the probability that vowels will not be together in an arrangement?

(a) $\frac{2}{3}$ (b) $\frac{1}{3}$

(c) $\frac{1}{2}$ (d) $\frac{5}{6}$

100. If $\log 2x = 2 \log (x + 1)$, find the number of real values of x?.

ANSWERS

1. (4)	**2.** (3)	**3.** (4)	**4.** (b)	**5.** (b)	**6.** (d)	**7.** (a)	**8.** (d)	**9.** (a)	**10.** (a)
11. (d)	**12.** (d)	**13.** (a)	**14.** (b)	**15.** (b)	**16.** (d)	**17.** (a)	**18.** (c)	**19.** (b)	**20.** (d)
21. (b)	**22.** (a)	**23.** (b)	**24.** (c)	**25.** (a)	**26.** (b)	**27.** (c)	**28.** (51423)		**29.** (51234)
30. (43215)		**31.** (12534)		**32.** (3)	**33.** (4)	**34.** (1)	**35.** (c)	**36.** (b)	**37.** (d)
38. (c)	**39.** (10)	**40.** (2)	**41.** (2)	**42.** (22)	**43.** (a)	**44.** (b)	**45.** (a)	**46.** (c)	**47.** (d)
48. (b)	**49.** (d)	**50.** (b)	**51.** (4)	**52.** (c)	**53.** (3)	**54.** (55)	**55.** (d)	**56.** (c)	**57.** (d)
58. (a)	**59.** (b)	**60.** (c)	**61.** (c)	**62.** (b)	**63.** (a)	**64.** (c)	**65.** (d)	**66.** (a)	**67.** (17)
68. (c)	**69.** (c)	**70.** (245)	**71.** (d)	**72.** (d)	**73.** (c)	**74.** (12)	**75.** (b)	**76.** (b)	**77.** (d)
78. (b)	**79.** (196)	**80.** (c)	**81.** (b)	**82.** (b)	**83.** (c)	**84.** (d)	**85.** (d)	**86.** (c)	**87.** (c)
88. (a)	**89.** (a)	**90.** (58)	**91.** (b)	**92.** (b)	**93.** (b)	**94.** (b)	**95.** (c)	**96.** (31)	**97.** (16)
98. (a)	**99.** (c)	**100.** (0)							

EXPLANATIONS

1. The correct sequence is 1235. The paragraph talks about poets. Sentence 4 talks about the origin of poetry. Hence, it is the odd one out. It is too general in context too.

2. The correct sequence is 1245. 2 and 4 make a mandatory pair (The pronoun "Its" in 4 refers to "the novel" in 2). 1 best introduces the paragraph as it mentions the name of the novel under discussion (*Ulysses*). 5 follows 4 as it mentions the word "here" which makes it contextually appropriate. The entire paragraph refers to a novel by James Joyce. Sentence 3 is the odd one out. It is a conclusion about Joyce which is too broad. There is no precedent to justify the usage of "after all" in the sentence.

3. The correct sequence is 1235 as they form a mandatory sequence. Sentence 4 talks about Red dwarfs. The entire paragraph talks about one specific planet. Hence, 4 doesn't fit the paragraph.

4. Refer to the first paragraph. It clearly states the two main functions of myth. a is wrong because it refers to Science as a discipline which is not mentioned in the first paragraph. c talks about rituals which is factually wrong. d mentions the word unanswerable which is undefined in the paragraph.

5. Refer to the first line of the second paragraph ("In Greek mythology, there is no single original text like the Christian Bible or the Hindu Vedas that introduces all of the myths' characters and stories"). a is wrong because the passage doesn't state that there is no such text in Greek mythology. c and d are irrelevant options.

6. The passage doesn't state this fact. It simply mentions the authors. But the phrase "first story of Greek mythology" is not mentioned in the passage. Hesiod's story simply mentions the origin of Greek mythology.

7. Refer to the third paragraph ("Around 700 BC, the poet Hesiod's Theogony…Tartaros (the Underworld)". a is the clear answer. b, c, and d can't be inferred from the passage.

8. It is mentioned in the last paragraph. It talks about deities who lived on Mount Olympus. a is incorrect. It doesn't talk about a temple of all Gods. b and c are incorrect too. d can be contextually inferred.

9. A and B can be derived from the last line of the paragraph. C is factually incorrect as the paragraph simply mentions that the Olympian Gods were vulnerable to weaknesses and passion. But it doesn't mention the degree of passion. The phrase "as passionate as humans" will be factually wrong.

10. It is a central idea question. c and d can be eliminated because they are too narrow in scope. b is wrong because the central idea of the passage is "the troubled artist fallacy". The passage doesn't focus on how attitude of the world towards mental issues has improved. a is the best answer.

11. The passage talks about the "troubled artist fallacy". It talks about the perception that people who suffer from mental illness create great work as a result of their struggle. Both a and b highlight such a situation. c is irrelevant as it doesn't mention the creation of artistic work. a mentions the period of recuperation as the period of artistic fertility. It too is a part of the mental illness.

12. Refer to the lines "However, not everybody with mental illness… more of a failure" in the last but two paragraph. d is the correct option. a mentions bad behaviour which is not mentioned in the paragraph. b and c are incorrect options.

13. b is too extreme an opinion to be derived from the passage. c is incorrect because the passage doesn't mention lifestyle as a reason for their artistic genius. d is wrong because of the phrase "common occurrence". a can be inferred from the entire passage as the author's tone is cautious on the matter .

14. Refer to the penultimate paragraph. (Lines: "…I shouldn't be so resentful of my mental illness.") a mentions the word prodigy which can't be inferred due to lack of data. c is wrong because she doesn't appreciate the view point. d is an extreme conclusion. She resents the view point that her illness was the reason for her success as an artist. She might not disapprove a general comment on her mental struggle.

15. Refer to the last paragraph. Simon Procter clearly mentions b. Hence, it is the best option.

16. The passage is about the visit initiated by Cameron and the graceful acceptence by Sisi and how the two political figures tried to mend bonds between the two countries. a makes the event sound unsuccessful. b puts the onus onto Cameron, which is not the case either. c is just another general statement made with the main subjects in the passage but with no real relation to the passage. d correctly sums up the fact that the visit was a political action and had relevance for both nations. Hence, d is correct.

17. The role of a paragraph should always be determined in context of the ongoing argument. a does it best by stating how the invitation and the visit of Sisi affected the situation between Egypt and the UK. The other options state the same as well, but change a few details here and there which makes them slightly incorrect and thus bad choices. b calls it a connecting link, where it is an independent paragraph and not linked to any other paragraph. c states that there were disasters in the past, and that is factually incorrect and d brings in analogies which, as we know, is a bad strategy when answering questions in reading comprehension. Hence, a is correct.

18. The information given in a can be found in para 2, and b can be found in paras 1 and 3. d is clearly indicated in para 6. c is not mentioned anywhere. Hence, c is correct.

19. Since this is a question about continuity, we have to find something that takes forth the last sentence with sufficient logic. a introduces the question of funding which has not yet been mentioned. c goes on to talk about the discussion that the two main researchers in the passage have, but we have not yet come to that point in our given extract. d includes a point that would flow very well after statement b but not on its own. b talks about the paucity of evidence which links itself nicely to the last sentence which aims at ridiculing the believability of such research as 'poppycock'. This statement furthers the argument that it is still nascent as a research field. Hence, (b) is correct.

20. Questions on inference tend to always include statements of generic intent. a and b do just that, but make sweeping generalizations on people's behaviour and scientific study and its viability in publishing. c assumes that there was foul play involved at the research stage and that there were researchers involved in affecting publication of Conley's work. This is incorrect. d correctly infers that since the study was revelatory in nature, it did not sit well with the group that it aimed at exposing. Hence, d is correct.

21. The term 'stigma' means a sense of infamy or disgrace associated with a concept or an idea. Stigma is not an opinion but a universally accepted notion. Options (c) and (d) indicate that it is to do with the status of a person (by using the words 'notoreity' and 'reputation') which is also incorrect by definition. Hence, b is correct.

22. Refer to the lines "The new color theory…in asserting that there was no black in nature…their palette."ais the clear answer. b is a twisted option. The passage doesn't state that black is the colour of shadows. Similarly, we can eliminate c and d.

23. It is a factual question. The answer can be located in the third paragraph. Refer to the line "Edouard Manet, who helped art move away from Realism in the nineteenth century". b is the only correct option.

24. Only A and C can be located in the passage. B is not mentioned in the passage.

25. The entire passage focuses on Monet as a proponent of impressionism. Hence a is the best answer. b, c, and d don't focus on Monet. Due to insufficient data, they can be eliminated.

26. From the penultimate paragraph, b is the clear answer. a is wrong because the author doesn't talk about only one family. c is a twisted option. The normal ladies and gentlemen might refer to any class. d twists the line. Normality is not defined in the paragraph.

27. It is mentioned in the fifth paragraph. After being rejected by the Paris Salon, the artists held their own exhibitions. a doesn't mention this aspect. Hence it can be eliminated. b talks about commissioned paintings, which is beyond the scope of the passage. d can be eliminated as a and b are wrong. c is the best option.

28. 5 mentions the full name of the sportsperson. Hence, it will be the opening sentence. 42 make a mandatory pair. The word "too" in 2 adds to the idea mentioned in 4. 1 will come before 4 because it mentions the situation (being abandoned by Per Mertesacker) which leads to 4. 3 is the concluding statement.

29. 51 make a mandatory pair (One-another). 2 mentions the word "elsewhere". Thus, it continues the idea of plot setting. 3 and 4 can come after 2. 4 is the concluding statement ("most stories").

30. 4 begins the paragraph by introducing the subject: bacteria. 3 follows 4 since it talks about the principle kinds of bacteria. 32 is a mandatory pair. 3 introduces cyanobacteria and 2 gives general information about it. 1 follows by giving general information. The presence of the word 'however' in 1 suggests that 1 cannot begin the paragraph, it will only come at a later point. 5 follows 1. 'that interval' in 5 refers to the 'gap' mentioned in 1.

31. 12 make a mandatory pair (anorexic young woman – young lady). 5 continues the explanation for why the young girl is breaking Olive's heart. 3 is the young girl's response to Olive. 4 will, thus, be the last sentence logically.

32. 1 is too narrow and it doesn't mention the central idea of the paragraph. 4 is wrong as the paragraph doesn't mention authors as the central idea. 2 could have been the right answer but it doesn't match the tone of the author, which is slightly negative. Proponents of Buddhism haven't exaggerated rather it was done by few authors. 3 is the best answer as it contains the central idea of the paragraph.

33. 1 is wrong because Volkswagen is not trying to shift the blame onto the employees. Rather it has encouraged employees to share information and has announced an amnesty plan. 3 is wrong as it is too narrow. 2 is too narrow and is a twisted option. The amnesty programme will end soon but that is not the reason why Volkswagen is pressurizing the employees. 4 is the best option.

34. 2 is not mentioned in the paragraph. Only one glacier is the focal point of the paragraph. 3 mentions the sub idea and misses the central idea of the paragraph i.e. the ecological impact of the disintegration of the glacier. 4, too, is a narrow option. Option 1 mentions the central idea and it is the best answer.

35. Let the production be 100x and export (volume) be 100y.

As the share in export for three products (i.e. A, D and F is more than that in production but A witness the maximum change in share.)

For maximizing the export (volume) assume all volume of A is exported

$$\therefore \quad 8x = 10y \Rightarrow \frac{y}{x} = 0.8 = 80\%.$$

36. Let the expenses and export by value be 100 x and 100y respectively.

As D is making profit

$$\therefore \quad 16x > 18y \Rightarrow x > \frac{9}{8}y$$

Now, we can see that three products B, C and F can be in loss.

37. Let export (by volume) and export by value be 100x and 100y respectively then price per unit for all products is shown below:

$$A = \frac{14y}{10x},\ B = \frac{12y}{17x},\ C = \frac{20y}{15x},\ D = \frac{15y}{25x}$$

$$E = \frac{16y}{11x},\ F = \frac{20y}{22x}$$

Hence, E has the highest price per unit.

38. Let the production and export is 100x and 100y respectively.

Rejection rate of all products is given below:

$$A = 1-\frac{10y}{8x},\ B = 1-\frac{17y}{20x},\ C = 1-\frac{15y}{20x}$$

$$D = 1-\frac{25y}{22x},\ E = 1-\frac{11y}{15x},\ F = 1-\frac{22y}{18x}$$

Hence, E has the maximum rejection rate.

39. Since, L is the winner of the tournament, it must have won at least five matches. E is not qualified for second stage, it means E definitely won less than six matches.

Only possible case is shown below:

Number of matches won by E = Number of matches won by L = 5

Hence, required number = 5 + 5 = 10.

40. Any team who had won two matches, there is a possibilities that the team will qualify for second stage. A possible case for the number of wins = 2 2 2 2 2 6 6 6.

41. Statement (i) is obviously true.

Three teams in group 1 and three teams in group 2 can win one match each in stage 1.

Statement (ii) is incorrect because maximum number of teams which could have three wins in the first stage would be 14.

Possible case: 3 3 3 3 3 3 3 7 i.e. seven teams in each group would have three wins in the first stage.

Statement (iii) is clearly correct.

Hence, statement (i) and (iii) are correct

42. Four teams cannot have six wins each hence maximum number of matches won in the first stage by teams A, B, C and D together would be 22

Possible case for number of wins: 2 1 1 2 4 6 6 6.

Required number = 4 + 6 + 6 + 6 = 22.

43. Let the total investment in education sector by India be Rs. 'P' crore the same in China will be Rs. 1.6 P crore.

For china, 32% of 1.6 P was from ADB loans which will constitute

$$A = \frac{0.32 \times 1.6P}{\left(\frac{54}{360} \times 7200\right)} \times 100\%$$

For India,

$$B = \frac{0.2 \times P}{\left(\frac{40}{360} \times 7200\right)} \times 100\%$$

A : B = 256 : 135.

44. Amount of loan invested in transport sector by China

$$= \frac{60}{100} \times \frac{24}{360} \times 7200 \text{ cr}$$

Total investment in transport by china

$$= \frac{60}{100} \times \frac{24}{360} \times 7200 \times \frac{100}{55} = 523.63 \text{ cr}$$

Amount of loan invested in transport sector by India

$$= \frac{60}{100} \times \frac{24}{100} \times 7200 \text{ cr}$$

Total investment in transport by India

$$= \frac{60}{100} \times \frac{24}{360} \times 7200 \frac{100}{50} = 480 \text{ cr}$$

$$\text{Required percentage} = \frac{480}{523.63} \times 100 = 91.67\%.$$

45. Loan amount invested in education

= 20% of 150 = Rs 30 cr

Loan amount invested in Health

= 22% of 120 = Rs 26.4 cr

Loan amount invested in Agriculture

= 16% of 400 = Rs 64 cr

$$\text{The required percentage} = \frac{30 + 26.4 + 64}{\left(\frac{40}{360} \times 7200\right)} \times 100$$

= 15.05.

46. Total investment will be maximum when maximum loan amount is invested in education i.e. Rs. 440 cr. And Rs. 30 cr each is invested in other two sectors.

Total investment in the 3 sectors will be

$$= 440 \times \frac{100}{20} + 30 \times \frac{100}{30} + 30 \times \frac{100}{50}$$

= Rs. 2360 cr

For questions 47 to 50:

	Total Capacity (n MW units)	Units Sold (In MW units)
A	8,500	7,565
B	6,250	5,437.50
C	10,000	9,000
D	8,500	7,225
E	9,500	7,600

47. Total capacity of India $= 6{,}250 \times \frac{100}{12.5}$

= 50,000 MW units

Thermal capacity of India = 95% of total capacity

= 47,500 MW units

Total capacity of these five power plants

= 42,750 MW units

$$\text{Required percentage} = \frac{42{,}750}{47{,}500} \times 100 = 90\%.$$

48. The correct order is C > E > A > D > B

49. Profitability can be compared by comparing the ratio of total revenue to total cost.

$$\text{Profitability for A} = \frac{(89\% \text{ of TC}) \times 3.4}{(93\% \text{ of TC}) \times 2.1} = \frac{89 \times 3.4}{93 \times 2.1}$$

= 1.549.

where TC is the total capacity of that power plant.

Same values of others are

$B \rightarrow 1.406$, $C \rightarrow 1.4108$

$D \rightarrow 1.2617$, $E \rightarrow 1.257$

So, B has the third highest ratio and hence third highest profitability.

50. Only statement 'b' is true.

For questions 51 to 54:

Product	Total cost of production (In Rs. Crore)		Total profit (In Rs. Lakh)	
	Type P	Type Q	Type P	Type Q
A	13.64	11.36	204.6	340.8
B	38.71	36.29	967.8	725.8
C	15	22.5	225	450
D	16.67	20.83	250.1	208.3
E	14.3	10.7	357.5	214
F	25	25	500	375

51. The profit made on items of Type Q is not more than the profit made on items of Type P for products B, D, E and F.

52. For D, the desired ratio is lowest among all the products.

53. For A, B and E, the overall profit percentage is more than 20%.

54. Total Cost = 13.64 + 16.67 + 25 = Rs. 55.31 crore.

55. Option (a) Violates the condition that Rahul and John want to be selected together.

Option (b) Violates the condition that Kamal cannot be in the group with Nusarat.

Option (c) Violates the condition that Rahul and John are to be selected together.

Option (d) Rohit, Nusarat, Rehana – is acceptable

56. Option (a) Violates the condition that John and Rahul are selected together.

Option (b) Violates the condition that Kamal has to be with Rehana.

Option (c) Rahul, John, Rehana, Kamal – is acceptable

Option (d) Violates the condition that Nusarat cannot be with Kamal.

57. Option (a) is not correct as if Kavya and Rohit both the selected then Rahul and John cannot be selected and Kamal and Rehana must be selected. If Kamal is selected then Nusarat cannot be selected but as Rohit is selected Nusarat must be selected which is contradictory.

Option (b) is also incorrect.

Both women $\Rightarrow$ Rehana and Kavya

Kavya $\Rightarrow$ Kamal

Now, one more male is required. He cannot be Rahul or John because they should necessarily be together. Rohit cannot exist in the group without Nusarat and Nusarat cannot exist because Kamal is already selected. Hence, a group of 4 having both women is also not possible.

Option (c) is not correct as Kamal should not be with Nusarat and Rohit cannot be with Rahul.

58. The only possible group:

Kamal, Kavya, Rehana, Rahul and John.

59. Alonso finished on podium in each of the first six races and scores 54 points.

He can score 54 points as

10, 10, 10, 8, 8, 8 [in any order]

10, 10, 10, 10, 8, 6

So, he can get 2nd rank in at most 3 races.

60. Alonso finishes the next race on podium.

$\Rightarrow$ his total points are 60 or 62 or 64.

For finding lowest rank obtained by Schumacher, we take Alonso's score as 60 (lowest among 60, 62, 64)

To win the championship Schumacher needs 61 points.

$\Rightarrow$ in the last three races he has to score 61 – 39 = 22 points.

For lowest rank 22 can be scored as 10, 10, 2 (in any order).

Hence, the lowest rank obtained by Schumacher is 7th (corresponding to 2 points).

61. If Fisichella finishes on podium in race 9 (or in any of the last 3 races), the points scored by Renault will be 87 (or more).

Hence, even if Honda drivers take top two ranks in all three races they will end up with 85 points.

i.e. 31 + 3 (8 + 10) = 31 + 54 = 85 points.

Hence, in this case Honda won't be able to win the 'Constructor's Championship'.

62. After first six races Schumacher's total points are 39.

He didn't score any point in 1 race. Hence effectively, he scored 39 points in 5 races and 0 points in 1 race.

If in any of the 5 races he scores 7th rank or 2 points, then in other four races he has to score 37 points, which is not possible in any combination.

63. A bus to Uttam Nagar departs after every 15 min.

One of the buses to Mehrauli leaves after every 10 min.

Other bus to Mehrauli can leave after every 12 min or 20 min

Let us assume bus on route no. 427 leaves after every 10 min between 9:00 a.m & 10:00 a.m i.e. at 9:00, 9:10, 9:20, 9:30, 9:40, 9:50 and 10:00 a.m.

12 min

If timings of buses plying after 12 & 10 min clash then the bus plying after every 12 min will go.

If timings of any of the buses plying after 12 min coincides with departure time of 427 then the next bus timings will clash only after 60 min(LCM of 12 & 10)

So maximum of 1 bus timings can clash with route no. 427 in a given hour.

Hence, a minimum 7 – 1= 6 buses on route 427 can depart in an hour.

20 min

If timings of buses plying after 20 & 10 min clash then the bus plying after every 20 min will go.

If timings of any of the bus plying after 20 min coincides with departure time of 427 then the next

bus timings will clash again after 20 min(LCM of 20 & 10)

If the timings of two buses clash at 9:00 AM then timings will again clash at 9:20, 9:40 and 10:00

Hence, a minimum 7 – 4 = 3 buses on route 427 can depart in an hour.

64. If frequency of all buses increases by 5 min then new time intervals become 5, 5, 7, 10, 15 and 25 min.

So now one of the bus to Mehrauli departs after every 5 min. The Other bus can depart after every 7 min or 15 min.

The minimum time difference between buses plying after 5 and 7 min can be 1 min (GCD of 5 and 7).

65. The difference in time intervals between a particular bus to Mehrauli and Uttam Nagar is same as the difference in time intervals between two buses plying towards Uttam Nagar.

Hence, time intervals between Buses for Mehrauli and Uttam Nagar can only be:

Mehrauli – 10 and 12 / 20

Uttam Nagar – 15 and 10 / 20

So the time interval between two different routes to Uttam Nagar is always a multiple of 5.

66. If condition (iii) is waved off then there can be possibility of 3 buses plying to Uttam Nagar. Then 3 buses to Uttam Nagar can ply between intervals 10,12 and 15 mins or between intervals of 10,15,20 mins.

So the minimum time interval can be in the first case i.e. when 3 buses ply after an interval of 10, 12, 15 mins.

Minimum difference between time interval = 12 – 10 = 2 minute.

67. $(x^2 - y^2)(x^2 + y^2) = 15$

$\Rightarrow (x^2 - y^2)(x^2 + y^2) = 1 \times 15 = 3 \times 5$

$\Rightarrow x^2 - y^2 = 3$ and $x^2 + y^2 = 5$

(because x and y are natural numbers)

$\therefore \quad 2x^2 = 8$

$\Rightarrow \quad x^2 = 4$

$\therefore \quad y^2 = 1$

$\Rightarrow \quad x^4 + y^4 = 4^2 + 1^2 = 17.$

68. $\angle EOA = 85°$

$\angle BOD = 15°$

$\therefore \quad \angle EOD = 180° - (85° + 15°) = 80°$

$\therefore$ In ΔOED

$OE = OD$ (radius)

$\therefore \quad \angle OED = \angle ODE = 50°$

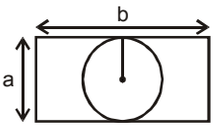
In ΔEOC,

$\angle EOC = 80° + 15° = 95°$

and $\angle OEC = 50°$

$\therefore \quad \angle ECA = 180° - (95° + 50°) = 35°$

69.



Let 'a' be the length of smaller side

$\therefore$ Radius $= \frac{a}{2}$

$$\Rightarrow \quad \pi\left(\frac{a}{2}\right)^2 = \frac{3}{2}\left[60 - \pi\left(\frac{a}{2}\right)^2\right]$$

$$\Rightarrow \quad 5\pi\left(\frac{a}{2}\right)^2 = 180$$

$$\Rightarrow \quad \frac{\pi a^2}{4} = 36$$

$$a = \sqrt{\frac{36 \times 4}{\pi}} = \frac{12}{\sqrt{\pi}} \text{units}.$$

70. Let x be the initial quantity of wine in the vessel. y litres of content is removed twice. The part of wine left is $x\left(1 - \frac{y}{x}\right)^2$.

Now in 98 L of sample 18 L is wine which is same as $\frac{18}{98}$ part of the solution

$$\left(1 - \frac{y}{x}\right)^2 = \frac{(x-y)^2}{x^2} = \frac{18}{98} = \frac{9}{49}$$

$$\Rightarrow \frac{(x-140)^2}{x^2} = \frac{9}{49} \Rightarrow x = 245.$$

71. If all are of equal height, number of handshakes $= {}^{40}C_2$.

If all are of different heights, number of handshakes = 0.

Difference $= {}^{40}C_2 - 0 = {}^{40}C_2$.

72. x = L.C.M. of (7, 8, 9) – 3 = 504 – 3 = 501

$x^3 + 2x^2 + x - 3 = (x-1)(x+1)(x+2) - 1$

$= 500 \times 502 \times 503 - 1$

Remainder when 500 ×502 × 503 – 1 is divided by:

11 = 4

3 = 0

4 = 3

Required remainder = least possible number which when divided by 11, 3 and 4 leavs remainder 4, 0 and 3 respectively

Such least no. is 15.

73. $x^2 + rx + s = 0$

r = – (sum of roots) r = –ve

s = product of roots s = +ve

s – r = +ve

r + s + 1

= – a – b + ab + 1 (where a & b are roots)

= (a – 1) (b – 1) = +ve

$\Rightarrow \frac{+ve}{+ve} = +ve$

Alternative Method:

Take roots as 2, 2

$\Rightarrow$ r = – 4 & s = 4

$\Rightarrow \frac{r+s+1}{s-r} = \frac{1}{8} = +ve$.

74. For the amount to get tripled, the increase is 200% of the principal. If it happens in 24 years then it will take 12 years for the increase to be 100% of the principal.

75. $P = 15^{100}(1 \times 2 \times 3 \times ... \times 100)$

$= 15^{100} \times 100!$

Highest power of 2 in P = 97 (2 will be deciding factor for number of zeroes because number of fives will be greater than number of zeroes in this number)

$Q = 25^{20\times50}(1 \times 2 \times 3x... \times 50) = 5^{2000} \times 50!$

Highest power of 2 in Q = 47

So Highest power of 2 in

$\frac{P^2}{Q} \times 10^{1767} = 2 \times 97 + 1767 - 47 = 1914.$

Hence, number of zeroes = 1914.

76. Check the options.

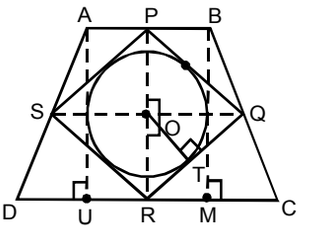
Option (a): If the product of the digits is 6, then the factors of 6 are 1, 2, 3 and 6. There is no combination of digits which satisfies the given conditions. So it is not the answer.

Option (b): If the product of the digits is 8, then the factors of 8 are 1, 2, 4 and 8. So only possible combination is 1, 1, 2, 4.

Hence, the number is 4112.

Similarly, we can check options (c) and (d).

77.



PQRS is a rhombus, so the centre of the inscribed circle will be the center of the rhombus PQRS

$SQ = \frac{1}{2}(AB + CD) = \frac{1}{2}(2 + 14) = 8$ units

$OR = \frac{1}{2}PR$

$DU = \frac{1}{2}(CD - MU) = \frac{1}{2}(14 - AB) = 6$ units

$PR = AU = \sqrt{AD^2 - DU^2} = \sqrt{10^2 - 6^2} = 8$ units

PR = SQ = 8

$\Rightarrow$ PQRS is a square.

$\Rightarrow OT = 2\sqrt{2}$ units

$\text{Area of trapezium} = \frac{1}{2}(AB + CD) \times PR = 64$ sq. unit

$\text{Required ratio} = \frac{\pi OT^2}{64} = \frac{\pi \times 8}{64} = \frac{\pi}{8}$.

78. Let the number of Re. 1, 50 paise and 25 paise coins be 360, 432 and 576 respectively (ratio 5 : 6 : 8).

Re. 1	50 paise	25 paise
360	432	576

I transaction: 3/5th of Re. 1 coins changed 216 coins of Re. 1 would be changed with 144 coins of 50 paise and 576 coins of 25 paise (so that total 50 paise coins = 576 and total 25 paise coins = 1152 in the

ratio 1:2)

Re. 1	50 paise	25 paise
144	576	1152

II transaction: Half of 50 paise coins to Re. 1 and all 25 paise coins to Re. 1 and 50 paise in the ratio 7:4

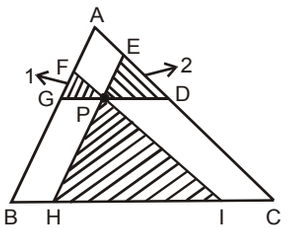
Half of 50 paise coins $\Rightarrow$ 144 coins of Re. 1

1152 coins of 25 paise $\Rightarrow$ 224 coins of Re. 1 and 128 coins of 50 paise

Re. 1	50 paise	25 paise
512	416	0

Ratio = 512 : 416 = 16 : 13.

79.



ΔPED is similar to ΔGFP

Ratio of area = 9 : 16

Therefore ratio of sides = $\sqrt{\frac{9}{16}} = 3:4$

Hence, P divides GD in the ratio 3 : 4.

$\Delta AGD = \left(\frac{7}{3}\right)^2 \times 9 = 49$ sq.cm

[ΔAGD similar to ΔFGP]

So area of AEPF = 49 – [16 + 9] = 24 sq. cm

Similarly area of BFI = $\left(\frac{10}{3}\right)^2 \times 9 = 100$ sq. cm

Therefore area of BHPG = 100 – (49 + 9) = 42 sq. cm

Similarly area of PDCI = $\left(\frac{11}{7}\right)^2 \times 49 - 49 - 16$

= 56 sq.cm

Area of triangle ABC = (9 + 16 + 49 + 24 + 42 + 56)

= 196 sq. cm

Alternative method:

Ratio of the corresponding sides is 3:4:7 since the areas are in the ratio 9:16:49 and all the triangles are similar.

Hence GP + PD = BH+IC = HI. So HI is half of BC. Since triangle 3 is similar to Triangle ABC and HI is the corresponding Side to BC , and is half of it the area of triangle 3 must be $\frac{1}{4}$ the area of triangle ABC. So area of triangle ABC = 196 sq cm.

80. Let n be xyz and since n is odd z can take only odd values i.e. 1, 3, 5 and 9 Now, $x \le y$ and $x \ge z$

Possible values			
x	**y**	**z**	**n**
1	1, 2, 3, 4, ...9	1	9
2	2, 3, 4, ...9	1	8
3	3, 4, ...9	1, 3	14
4	4, 5, 6, ...9	1, 3	12
5	5, 6, ...9	1, 3, 5	15
6	6, 7,...9	1, 3, 5	12
7	7, 8, 9	1, 3, 5, 7	12
8	8, 9	1, 3, 5, 7	8
9	9	1, 3, 5, 7, 9	5

$\therefore$ Total number of elements in P = 95.

81.

Let's take there are two ants.

Considering worst possible case we can see easily the required time is same as the time taken by an ant to reach one extreme point to another extreme point.

Which will be same when there are 1000 ants.

ie, maximum time = $\frac{100}{50}$ min. = 2 min.

82. Total number of the cases = ${}^6C_3 = 20$.

The favourable cases for B surviving are:

(B : Bullet; N : No Bullet)

BNBBNN or BNBNBN or BNBNNB or BNNNBB or NNBBNB or NNBBBN.

Hence probability = $\frac{6}{20} = 0.3$.

83. By assuming the values of x, y, z and t, (a) and (b) can be very easily ruled out.

Checking option (c), if x > y + z, then x > y and x > z(since all numbers are positive).

So, using statements I and II, x > z > t > y.

So, option (c) is correct.

84. PQ is perpendicular to line $y = \frac{x}{\sqrt{3}}$

$\therefore$ Slop of PQ $= \frac{-1}{\frac{1}{\sqrt{3}}} = -\sqrt{3}$

$\therefore$ Let equation of line PQ be $y = -\sqrt{3}x + c$

At point M, when $x = \sqrt{3}$, $y = 1$.

$\therefore \quad c = 4$

$\Rightarrow \quad y = -\sqrt{3}x + 4$

$\therefore$ Co-ordinates of point Q = $\left(\frac{4}{\sqrt{3}}, 0\right)$ and Co-ordinates of point P = (0, 4).

Hence, PQ = $\sqrt{\left(\frac{4}{\sqrt{3}}\right)^2 + 4^2} = 4\sqrt{\frac{1}{3}+1}$

$= \frac{8}{\sqrt{3}}$ units

85. $3x + y + 4 = 2x\,y$

$\Rightarrow \quad 3x + 4 = y(2x - 1)$

$\Rightarrow y = \frac{(3x+4)}{(2x-1)}$

When $x = 6 \Rightarrow y = 2$

When $x = 1 \Rightarrow y = 7$

These two are the only possible pairs of values of x and y. Where x and y are natural numbers.

$\therefore$ Required ratio $= \frac{(6+1)}{(2+7)} = \frac{7}{9}$.

86. By observing we can find that $x > 1$ and $x < 2$.

Else the RHS $\neq 8$.

So the combinations are [x] = 1, [2x] = 2 or 3, [3x] = 4 or 5

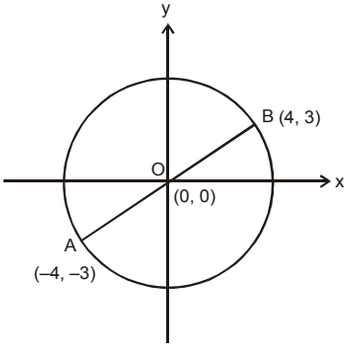
The combinations that give RHS = 8 are 1 + 2 + 5 or 1 + 3 + 4.

For any value of x, the case of "1 + 2 + 5" is not possible. Hence it has to be the case of "1 + 3 + 4". Which will occur

when $x \geq \frac{3}{2}$ and $x < \frac{5}{3}$.

Hence the solution is $\frac{3}{2} \leq x < \frac{5}{3}$.

87.



Other two vertices will make two right angled triangles with AB as the common hypotenuse. So they must lie on the circle with AB as the diameter and O as the centre. Radius of that circle will be 5 units.

There will be 5 such pairs in which both the coordinates are integers.

[(5, 0), (–5, 0)], [(–4, 3), (4, – 3)],

[(–3, 4), (3, –4)] [(–3, –4), (3, 4)] and [(0, 5), (0, –5)]

88. If the profit amount are in A.P then the profit % ages are also in an A.P.

If $P_4 = 13\%$

and $P_7 = 10\%$

then $P_5 = 12\%$

and $P_6 = 11\%$.

Average of the middle terms will give the profit % on the whole i.e. (11 + 12)/2 = 11.5 %

89. $x = 106^{90} - 49^{90}$

$(x^n - a^n)$ is divisible by both $(x - a)$ and $(x + a)$ whenever n is even

$\Rightarrow (106^{90} - 49^{90})$ is divisible by both 57 and 155

$57 = 19 \times 3$

$155 = 31 \times 5$

Therefore, $(106^{90} - 49^{90})$ will be divisible by $(19 \times 31) = 589$ as well.

Also, note that $(106^{90} - 49^{90})$ will be odd and options (b) and (c) are even. Hence, they can be rejected.

90. There are a total of 78 B-schools that place their students

$\therefore$ No. of B-schools which are reputed and place their students $= \frac{1}{6} \times 78 = 13$

Let No. of B-schools that are recognised = x

$\therefore$ No. of recognised B-schools that place their students $= \frac{1}{4}x$

$\therefore$ No. of recognised B-schools that do not place their students $= \frac{3x}{4}$

$\therefore \frac{3x}{4} = 39 \Rightarrow x = 52$

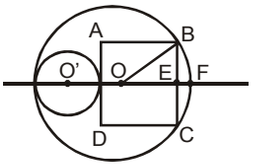
Out of 13 reputed B-schools, 6 are recognised too

$\therefore$ Number of B-schools that are either recognised and place their students or reputed and place their students

$= 13 + 13 - 6 = 20$

$\therefore$ Number of B-school that are neither reputed nor recognised but place their students = 78 – 20 = 58.

91.



Let the radius of the bigger circle be R and that of the smaller circle be r and the side of the square is 2a.

$\therefore$ $OE = R - EF$

$= R - [2R - (2r + 2a)]$

$OE^2 + EB^2 = OB^2$

i.e $[2a + 2r - R]^2 + a^2 = R^2$

$a = 9$ ($\because$ $2a = 18$); $R = 15$

$\therefore$ $(18 + 2r - 15)^2 + 9^2 = 15^2$

$\therefore$ $2r + 3 = 12$

$\therefore$ $r = \frac{9}{2} = 4.5$ cm

92. $1000 = 2^3 \times 5^3$ and $2000 = 2^4 \times 5^3$

Since LCM (c, a) and LCM (b, c) is $2^4 \times 5^3$ and LCM (a, b) = $2^3 \times 5^3$, so the factor 2^4 must be present in c.

Hence $c = 2^4 \times 5^x$, where x ranges from 0 to 3

Therefore, there are four possible values of C.

Since, HCF of (a, b) = $K \times 5^3$, it means

$a = 2^y \times 5^3$

$b = 2^z \times 5^3$

x = 0 to 3, y = 0, then z = 3 $\rightarrow$ 4 cases.

x = 0 to 3, y = 1, then z = 3 $\rightarrow$ 4 cases.

x = 0 to 3, y = 2, then z = 3 $\rightarrow$ 4 cases.

x = 0 to 3, y = 3, then z = 3 $\rightarrow$ 4 cases.

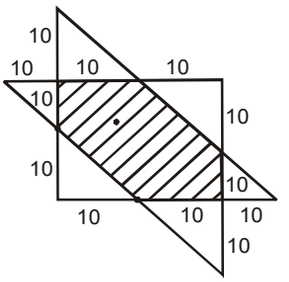
x = 0 to 3, y = 3, then z = 2 $\rightarrow$ 4 cases.

x = 0 to 3, y = 3, then z = 1 $\rightarrow$ 4 cases.

x = 0 to 3, y = 3, then z = 0 $\rightarrow$ 4 cases.

Hence, total cases = 28.

93.



Area of the shaded region

$= \frac{1}{2} \times 30 \times 30 - 3 \times \left(\frac{1}{2} \times 10 \times 10 \right)$ = 300 sq. cm.

94. Since the HCF of 24 and 56 is 8, the side of the identical square plots must be one of the factors of 8.

The factors of 8 are 1, 2, 4 and 8

If side of the square plot is 1 m, the length of fencing material required is $(25 \times 56 + 57 \times 24) = 2768$ m

But 2768 m > 2700 m.

If side of the square plot is 2 m, the length of fencing material required is

$(29 \times 24 + 13 \times 56) = 1464$ m < 2600 m

$\therefore$ For minimum fencing material to be left the side of identical square plot = 2m.

95. $(x+1)(x+2)(x+3)(x+6) = -x^2$

$(x^2 + 7x + 6)(x^2 + 5x + 6) = -x^2$

$x^2\left(x + 7 + \frac{6}{x}\right)\left(x + 5 + \frac{6}{x}\right) = -x^2$

Put $x + \frac{6}{x} = y$

$(y+7)(y+5) = -1$

$y^2 + 12y + 36 = 0$

$\Rightarrow (y+6)^2 = 0$

$\Rightarrow y = -6$

$\therefore$ $x + \frac{6}{x} = -6$

$x^2 + 6x + 6 = 0$

$x = \frac{-6 \pm \sqrt{36 - 4(6)}}{2} = \frac{-6 \pm 2\sqrt{3}}{2} = -3 \pm \sqrt{3}$

96. Let the four numbers be XK, XL, XM and XN,

where X is the common factor of each pair possible pair of numbers and K, L, M, N are prime to each other.

$310 = 2 \times 5 \times 31$

$651 = 31 \times 21 = 3 \times 7 \times 31$

$\therefore$ GCF (310, 651) = 31

which is the highest common factor of all.

97. Let the distance be x

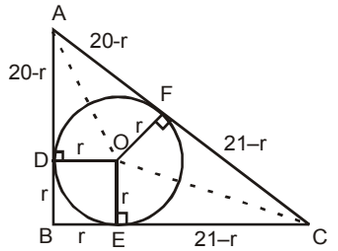
$$\therefore \quad 15 + \frac{x}{4} = \frac{x/2}{7/2} + \frac{x/2}{9/2}$$

Solving we have $x = 15 \times 252$

Total time taken by the second boat

$$= \frac{15 \times 252}{7} + \frac{15 \times 252}{9} = 960 \text{ sec} = 16 \text{ min.}$$

98.



$$AC = \sqrt{AB^2 + BC^2} = 29 \text{ cm}$$

and $(20 - r) + (21 - r) = 29$

or, $2r = 41 - 29$

$\Rightarrow$ $r = 6$ cm

$\Delta OEC \cong \Delta OFC$ (RHS)

$\text{Area}(\square FOEC) = 2 \times \text{Area}(\Delta OEC)$

$$= 2.\frac{1}{2}.15.6 = 90\,\text{cm}^2$$

Similarly, $\Delta AOD \cong \Delta AOF$ (RHS)

$\text{Area}(\square ADOF) = 2 \times \text{Area}(\Delta AOD)$

$$= 2.\frac{1}{2}.14.6 = 84\,\text{cm}^2$$

$$\frac{\text{Area}(\square FOEC)}{\text{Area}(\square ADOF)} = \frac{90}{84} = \frac{15}{14}.$$

99. Letters of the word 'KAKA' can be arranged in

$\left(\frac{4!}{2! \times 2!}\right) = 6$ ways

If we consider the cases where vowels are together, then considering two A's as single entity,

we have $\left(\frac{3!}{2!}\right) = 3$ arrangements.

So, there must be (6 – 3) = 3 arrangements, where vowels are not together.

Therefore, the required probability $= \frac{3}{6} = \frac{1}{2}$.

100. Clearly, $x > 0$

The equation reduces to $2x = x^2 + 2x + 1$

$\Rightarrow$ $0 = x^2 + 1$

Which does not have real roots.

Hence, there are no solutions.

■■