

## Solutions of Mock CAT – 21 2017

Scorecard (proreview.jsp? qsetId=o/JMwwVUIbE=&qsetName=Mock CAT – 21 2017)	Accuracy (AccSelectGraph.jsp? qsetId=o/JMwwVUIbE=&qsetName=Mock CAT – 21 2017)	Time Analysis (TimeAnalysis.jsp? qsetId=o/JMwwVUIbE=&qsetName=Mock CAT – 21 2017)	Qs Analysis (QsAnalysis.jsp? qsetId=o/JMwwVUIbE=&qsetName=Mock CAT – 21 2017)
VRC	DILR		QA

### Sec 1

Directions for questions 1-3: In the following questions, five sentences are given. Of these, four sentences can be logically sequenced to make a coherent paragraph. One of the sentences doesn't fit. Type in the number of the sentence that doesn't fit into the paragraph in the space provided below the question.

#### Q.1

1. I've found the best way to not get too overwhelmed is to not process it too much; I'm walking a fine line writing this.
2. I'm sitting here in the barely settled dust of the last couple of months feeling guilty about my past flippant use of superlatives.
3. I tried to document the moment but the adrenaline flowed so freely that I was shaking uncontrollably.
4. Because while nothing is different, everything is different now.
5. I've been forced to rethink applications of words like "surreal", "life-changing" and "bananas".

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#### Q.2

1. White sneakers look great with nearly everything on nearly everybody, so it's no surprise they're having a fashion moment.
2. Nearly 800,000 Australians buy a pair of sporting shoes in any four-week period.
3. Adidas sold eight million pairs of their iconic Stan Smiths in 2015 (and that doesn't include the lookalikes).
4. This amounts to a staggering 10.4 million pairs sold every year.
5. This ethical footwear company makes great use of cork, Piñatex, recycled PET and paperboard.

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#### Q.3

1. In June, two and a half years into the reign of his father King Salman, he replaced Mohammed bin Nayef as Crown Prince.
2. If he continues to make mistakes the game could go awry, triggering an open power struggle within the House of Saud.
3. Ever since he was named the defence minister of Saudi Arabia in 2015, Mohammed bin Salman has had little patience for the way the kingdom is being ruled.
4. On Sunday, he sprang another surprise by ordering the arrest of senior government ministers, officials and 11 Princes, including the billionaire Alwaleed bin Talal, and the powerful chief of the National Guard, Mutaib bin Abdullah.
5. In recent weeks, he had taken on the Salafi religious establishment.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

Directions for questions 4-6: The following passage consists of a set of three questions. Read the passage and answer the questions that follow.

Sociology students of an undergraduate class in Bengaluru's St. Joseph's college in Shanti Nagar were being taught from a passage about dowry. The students were asked to read a photocopied section of an unidentified book which stated that many "ugly" girls of marriageable age are able to get married only because of dowry! The source for this passage was not mentioned and the students were given a photocopy!

One Rithika Ramesh posted this on her social network page that was shared over 3000 times. One line in the passage states: *"The marriage of an ugly girl, who would have otherwise gone without a partner, is made possible by offering heavy amounts of dowry."*

There are more shockers:

It is a useful and effective method for attracting good, handsome and sometimes unwilling boys for marriage. :

Dowry would help the newly married couple to start afresh. Dowry provides them some basis and foothold for facing hard realities of life. :

Dowry provides some opportunity to meritorious boys of poor classes to go for higher education and make their future. :

Dowry increases the status of women in family. As a woman brings a substantial sum at marriage, she is treated well just for her economic contribution. It affects the love and affection her husband bears for her. A poor girl who does not bring dowry in her marriage does not usually receive the same attention and affection that is bestowed on a rich girl. :

Some people contend that dowry would help people to raise their status in society. If, by paying dowry, marriage of their daughters is made possible to high status groups, there are people waiting for it. This would help them move up in the status ladder. :

Dowry maintains harmony and unity in the family. Some people feel that dowry system should continue but a woman should not be given any share in her father's property. They are scared of disruptions, dissections, jealousy and factions and feuds which daughter's inheritance may lead to. Thus, they want to repeal the Hindu Succession Act 1956. According to this Act, a daughter may claim a share in the ancestral asset, but she does not accept the liabilities. Hence it is better we give dowry, but not a share in property. This will also avoid fragmentation of landholding and help in maintaining family unity and harmony.

As if all this is not reactionary and regressive enough, the passage skirts the reality of the increasing number of dowry deaths of girls whose fathers have already surrendered to dowry demands at the time of marriage.

Q.4

Which of the following, if true, would most strongly challenge the above arguments in favour of dowry?

1 ☐ Dowry takes no cognizance of the ongoing struggles of women.

2 ☐ Dowry can make some women yield to its influences.

3 ☐ Dowry does not give rise to anything reactionary and regressive.

4 ☐ Dowry, with its inherent negative tag, poses ethical challenges for people accepting it.

FeedBack

Bookmark

Answer key/Solution

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Q.5

On the basis of the above passage, what do the given 'shockers' suggest about the nature of dowry?

- 1 ☐ Dowry is an institution unto itself that all of us across generations have nurtured, encouraged, directly and indirectly, actively and passively.
- 2 ☐ Dowry is no longer only a Hindu custom that needs to be observed but is more of a 'cultural practice' that might be followed even in the years to come.
- 3 ☐ Dowry is a stock market where the father of a boy 'invests' in the boy's education or training or both in order to earn heavy 'interest'.
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FeedBack

Bookmark

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Q.6

On the basis of the passage shown to the students, which of the following is factually true?

- 1 ☐ Dowry is a way by which women can have a part in their father's property.
- 2 ☐ Dowry promotes inter-caste, inter religion and inter- state marriage.
- 3 ☐ Dowry helps women attain a better position in the family.
- 4 ☐ Dowry acts as a provident fund for the girls to tackle many financial hazards in future.

FeedBack

Bookmark

[Answer key/Solution](#)

Directions for question 7-9: Each of the following questions consists of a paragraph followed by four summaries. Choose the option that best captures the essence of the paragraph. Type in the option number in the space provided below the question.

**Q.7**

Today, the plant, like the one Baxter worked in for 30 years, stands derelict – a shell that represents a hollowing out not just of the local economy but of culture and hope – as though someone extinguished Baxter’s sun and left the place in darkness. Buildings in the centre of town that were once testament to the industrial wealth produced here stand abandoned. More than 40% of the population now live below the poverty line; 9.1% are unemployed. Cambria County, where Johnstown sits, was once a swing county. Al Gore won it in 2000; George W Bush took it in 2004; it went to Barack Obama in 2008 and Mitt Romney in 2012 – each time by fairly narrow margins. Last year, Donald Trump won it in a landslide.

1. A town, devoid of political will and patronage, is now staring at a bleak future.
2. A town, erstwhile affluent, now stands amidst an economic downturn.
3. A town, devoid of political and social will, has now degraded beyond any point of repair.
4. A town, erstwhile affluent, now has become a living example of the pitfalls of outsourcing.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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**Q.8**

One of the most surprising features of special relativity is that a number of statements and results which we usually think to be absolute turn out to be observer-dependent. In particular, statements about space and time, distances and duration turn out to be relative. For example, in Einstein's theory, simultaneity is a relative concept. Imagine that there are two events which an observer in space station A judges to be simultaneous - say, the explosion of firecracker at one point in space and an alarm clock going off a few miles away. For an observer in space station B, which is moving relative to A, this statement will not necessarily be true: In general, such an observer will come to the conclusion that one of the events happened earlier than the other.

1. The passage discusses the effect of relativity on the observers with an example which states that time and space is not uniform for all.
2. The passage discusses a special feature of relativity which is time constrained in nature.
3. The passage discusses the case of special relativity where observation of a particular event depends on factors such as time and space and relative motion.
4. The passage expresses a salient feature of special relativity according to which time and space often overlap each other and create momentary illusion for the observers, thus creating a dual perception of a single event.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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**Q.9**

In the 1970s, the scholar Robert Ayres observed that building new, extravagantly equipped hospitals in the Third World actually costs lives. His premise was that, for every dollar spent to extend the life of one person in an expensive hospital, many more people could be supplied with basic life-sustaining items, such as food, clean water or housing. Today, 1.2 billion people are living on less than \$2 per day. Yet, Ayres' appeal for basic justice is disturbingly absent from contemporary public discourse. Instead, billions of public dollars are spent daily on high tech medicine. A growing proportion of these subsidies are devoted to advancing the Brave New World of reproductive and genetic technologies. In American states where medical insurers are required to fund fertility treatments, the average ratepayer spends over \$400 per year to subsidize these treatments; this in a country where over 44 million cannot afford even basic health care.

1. More money is being spent on renovating the super multispecialty hospitals whereas a significant number of people are starving and even cannot afford basic health care.
2. More money is being spent on building hospitals for the financially privileged while a significant number of people in this world, including those in American states, cannot afford basic medication.
3. The medical world does not cater to ordinary people anymore instead it has become a business platform which only strives for huge profit and this is a common practice which has taken over the entire world.
4. More money is being spent on building hospitals in third world countries when many people in America, lamentably, are devoid of basic health care.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

Directions for questions 10-15: The following passage consists of a set of six questions. Read the passage and answer the questions that follow.

Artificial Intelligence (which I'll refer to hereafter by its nickname, "AI") is the subfield of Computer Science devoted to developing programs that enable computers to display behaviour that can (broadly) be characterized as intelligent. Most research in AI is devoted to fairly narrow applications, such as planning or speech-to-speech translation in limited, well defined task domains. But substantial interest remains in the long-range goal of building generally intelligent, autonomous agents, even if the goal of fully human-like intelligence is elusive and is seldom pursued explicitly and as such.

Throughout its relatively short history, AI has been heavily influenced by logical ideas. AI has drawn on many research methodologies: the value and relative importance of logical formalisms is questioned by some leading practitioners, and has been debated in the literature from time to time. But most members of the AI community would agree that logic has an important role to play in at least some central areas of AI research, and an influential minority considers logic to be the most important factor in enabling strategic, fundamental advances.

The relations between AI and philosophical logic are part of a larger story. It is hard to find a major philosophical theme that doesn't become entangled with issues having to do with reasoning. Implicatures, for instance, have to correspond to inferences that can be carried out by a rational interpreter of discourse. Whatever causality is, causal relations should be inferable in everyday common sense settings. Whatever belief is, it should be possible for rational agents to make plausible inferences about the beliefs of other agents. The goals and standing constraints that inform a rational agent's behaviour must permit the formation of reasonable plans.

In each of these cases, compatibility with an acceptable account of the relevant reasoning is essential for a successful philosophical theory. But the methods in the contemporary philosophical inventory are too crude to provide anything like an adequate account of reasoning that is this complex and this entangled in broad world knowledge.

Bringing an eclectic set of conceptual tools to the problem of idealized reasoning in realistic settings, and using computers to model and test the theories, research in AI has transformed the study of reasoning—especially of practical, common sense reasoning. This process and its outcome is well documented Russell & Norvig 2010.

The new insights and theories that have emerged from AI are, I believe, of great potential value in informing and constraining many areas of philosophical inquiry. The special case of philosophical logic that forms the theme of this article may provide support for the more general point. Although logic in AI grew out of philosophical logic, in its new setting it has produced new theories and ambitious programs that would not have been possible outside of a community devoted to building full-scale computational models of rational agency.

I imagine that the audience for this entry will consist primarily of philosophers who have little or no familiarity with AI. In writing this survey, I have tried to concentrate on the issues that arise when logic is used in understanding problems in intelligent reasoning and guiding the design of mechanized reasoning systems. Logic in AI is a large and rapidly growing field—I haven't tried to achieve anything like complete coverage. In Section 3 and Section 4 I have tried to provide an overview with some historical and technical details concerning nonmonotonic logic and reasoning about action and change, a topic that is not only central in AI but that should be of considerable interest to philosophers. The remaining sections provide brief and more or less inadequate sketches of selected topics, with references to the primary literature.

Q.10

Primary developmental work conducted within the field of AI can be defined as:

- 1 ☐ broad behavioural practices dominated by logic.
- 2 ☐ narrowed applications which include understanding and conducting clear tasks.
- 3 ☐ a compilation research that try to make computers autonomous agents.
- 4 ☐ creating computers which function spontaneously like human beings.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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Q.11

From your reading of the passage, which of the following correlations can be made non-erroneously?

1 ☐ Entire human species - Overarching goals

2 ☐ Logical primacy - Artificial Intelligence development

3 ☐ Rational activity - Philosophical gamut

4 ☐ Causality - Actuality

FeedBack

Bookmark

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Q.12

Work on AI has opened up new avenues for which age old practices?

1 ☐ Study of day to day reasoning

2 ☐ Study of fundamentals of logic

3 ☐ Study of intricacies of philosophical reasoning

4 ☐ Study of logical imagination

FeedBack

Bookmark

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Q.13

The given passage has been most likely taken from:



- 1 ☐ undergraduate students studying AI.
- 2 ☐ junior teachers teaching AI.
- 3 ☐ science enthusiasts investigating the development of AI.
- 4 ☐ junior researchers working on AI.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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I imagine that the audience for this entry will consist primarily of philosophers who have little or no familiarity with AI. In writing this survey, I have tried to concentrate on the issues that arise when logic is used in understanding problems in intelligent reasoning and guiding the design of mechanized reasoning systems. Logic in AI is a large and rapidly growing field—I haven't tried to achieve anything like complete coverage. In Section 3 and Section 4 I have tried to provide an overview with some historical and technical details concerning nonmonotonic logic and reasoning about action and change, a topic that is not only central in AI but that should be of considerable interest to philosophers. The remaining sections provide brief and more or less inadequate sketches of selected topics, with references to the primary literature.

#### Q.14

People working within the field of AI view successful implementation of AI as:

- 1 ☐ computational agents capable of rational activities.
- 2 ☐ computational agents with higher logical faculties.
- 3 ☐ computational agents with varied information base.
- 4 ☐ computational agents with complex philosophical functions.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

Directions for questions 10-15: The following passage consists of a set of six questions. Read the passage and answer the questions that follow.



Artificial Intelligence (which I'll refer to hereafter by its nickname, "AI") is the subfield of Computer Science devoted to developing programs that enable computers to display behaviour that can (broadly) be characterized as intelligent. Most research in AI is devoted to fairly narrow applications, such as planning or speech-to-speech translation in limited, well defined task domains. But substantial interest remains in the long-range goal of building generally intelligent, autonomous agents, even if the goal of fully human-like intelligence is elusive and is seldom pursued explicitly and as such.

Throughout its relatively short history, AI has been heavily influenced by logical ideas. AI has drawn on many research methodologies: the value and relative importance of logical formalisms is questioned by some leading practitioners, and has been debated in the literature from time to time. But most members of the AI community would agree that logic has an important role to play in at least some central areas of AI research, and an influential minority considers logic to be the most important factor in enabling strategic, fundamental advances.

The relations between AI and philosophical logic are part of a larger story. It is hard to find a major philosophical theme that doesn't become entangled with issues having to do with reasoning. Implications, for instance, have to correspond to inferences that can be carried out by a rational interpreter of discourse. Whatever causality is, causal relations should be inferable in everyday common sense settings. Whatever belief is, it should be possible for rational agents to make plausible inferences about the beliefs of other agents. The goals and standing constraints that inform a rational agent's behaviour must permit the formation of reasonable plans.

In each of these cases, compatibility with an acceptable account of the relevant reasoning is essential for a successful philosophical theory. But the methods in the contemporary philosophical inventory are too crude to provide anything like an adequate account of reasoning that is this complex and this entangled in broad world knowledge.

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Q.15

Which one of the following do you believe should be one of the primary criteria for a superior AI?

1 ☐ Performing detailed and defined tasks

2 ☐ Replicating speech patterns

3 ☐ Formulating rational plans

4 ☐ Replicating rational plans

FeedBack

Bookmark

Answer key/Solution

Directions for questions 16-18: The following passage consists of a set of three questions. Read the passage and answer the questions that follow.

Alan is 20 years old, if you start counting from his desolate and anguish-filled sitcom I'm Alan Partridge, or 25 if you take into account the radio birth of his chat-show Knowing Me Knowing You. Or 26 if you mean the first time the nation heard his voice as a humble sports commentator in the news spoof On the Hour. He's a legendary monster who only gets more relevant. When Nigel Farage appeared on the Brexit boat on the Thames in his double-breasted, gold-buttoned blazer, many noted the eerie similarity to Alan's attire. And now Alan Partridge – Middle England's resentful id – is about to be reborn on the BBC for the new age of Brexit, fronting an hour-long BBC Two special at the end of this year, followed by a new BBC One series in early 2018.

Created by actor Steve Coogan – together with a raft of writers including Richard Herring, Stewart Lee, Armando Iannucci, Peter Baynham, Neil Gibbons and Rob Gibbons – Partridge has grown over the years into a superbly rich and complex character with a feature film, Alan Partridge: Alpha Papa, and a spoof memoir, I, Partridge, which was so good that many wondered why it could not be shortlisted for the Booker prize. Now Alan is returning as the true voice of Brexit, which he naturally espouses in the hardest form possible – and for Remainers this is the final, exquisitely painful insult. Alan has already debated Brexit with former spin-doctor Malcolm Tucker in the pages of the Big Issue, and now the BBC, in a W1A-ish spirit of self-satire, is bringing Partridge back to the corporation's fold as a high-profile Brexiter: because it's exactly the sort of thing that Alan and the BBC would do.

People talk about the phenomenon of the Accidental Partridge, when TV stars are caught in some awful act of celeb faux-modesty. But Brexit is the nation Deliberate Partridge: a defiant stand against the liberal trendy elitists, a bloc of people coming together and declaring that they won't be intimidated by the cosmopolitan liberal good taste which, until now, has declared them to be nothing more than the butt of the joke. More than this – the joke has been turned

on to the liberals. And Alan is the standard-bearer. Or perhaps it is truer to say he represents what Donald Trump called Brexit Plus Plus Plus. Alan is Brexit writ large and cartoonishly unapologetic, extending and metastasising throughout pop culture.

Q.16

What does Alan Partridge being 'Middle England's resentful id' mean within the context of the passage?

- 1 ☐ Alan Partridge represents a disgruntled English populace.
- 2 ☐ Alan Partridge represents a beleaguered English populace.
- 3 ☐ Alan Partridge represents a sardonic English populace.
- 4 ☐ Alan Partridge represents a baneful English populace.

FeedBack

Bookmark

Answer key/Solution

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Q.17

When the author places Alan Partridge as a true Brexiter, he is trying to:

- 1 ☐ make the opposition camp look foolish.
- 2 ☐ vouch for Partridge's excellence.
- 3 ☐ highlight Partridge's relevance as a social satirist.
- 4 ☐ show the dogmatic side of BBC.

FeedBack

Bookmark

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Q.18

From your reading of the passage, how much do you think Brexit has influenced artistic impulses?

- 1 ☐ It has garnered huge momentum for comedians.
- 2 ☐ It has helped to reinvigorate particular strands of popular comedic forms.
- 3 ☐ It has helped blossom newer forms of pop culture motifs.
- 4 ☐ It has helped BBC to dominate the field of arts again.

FeedBack

Bookmark

Answer key/Solution

Directions for questions 19-22: Each of the following questions consists of a set of five sentences. These sentences need to be arranged in a coherent manner to create a meaningful paragraph. Type in the correct order of the sentences in the space provided below the question.

Q.19

1. There is already a marvellous A History Of Reading by Alberto Manguel, but I'm thinking of the whens and whys of bedtime reading in particular.
2. Sounds a lot, but it would turn out to be a brief history.
3. Someone should write a history of reading in bed.
4. Universal literacy isn't that old.
5. How long it's been going on, the difference electricity made, the dawn and demise of privacy, whether taking a book to bed is rarer now, than it was.

FeedBack

Bookmark

Answer key/Solution

Directions for questions 19-22: Each of the following questions consists of a set of five sentences. These sentences need to be arranged in a coherent manner to create a meaningful paragraph. Type in the correct order of the sentences in the space provided below the question.

Q.20

1. "Please madam, can you just cover your hair during prayer time," he asked.
2. She froze in fear as a man in the driver's seat lowered his window.
3. "I said OK, he said thank you, and he drove off. That was it. It was stunning."
4. For all of her adult life, a run-in with the feared enforcers of Saudi Arabia's societal norms would have led to a much harsher outcome.
5. Outside a Riyadh shopping centre last month, Zeina Farhan was walking with her headscarf around her shoulders when the religious police pulled up.

FeedBack

Bookmark

Answer key/Solution

Directions for questions 19-22: Each of the following questions consists of a set of five sentences. These sentences need to be arranged in a coherent manner to create a meaningful paragraph. Type in the correct order of the sentences in the space provided below the question.

Q.21

1. When particles of the same kind that are either at rest or speeding around in a particle accelerator are compared, it turns out that the life-time of unstable particles at rest is significantly shorter.
2. After some time has passed, they decay into certain other elementary particles.
3. Many kinds of elementary particles are unstable.
4. The average time until decay is called the particle's life-time.

5. Experiments of this kind are in excellent agreement with the predictions of special relativity - from the point of view of an external observer, the "inner clock" of such particles slows down when such particles are accelerated to high speeds.

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

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Q.22

1. India may have won the final of the women's Asia Cup hockey tournament against China in a penalty shootout, but it was a fully deserving victory.
2. The triumph came against formidable hurdles, and in the absence of any expectations.
3. Throughout their campaign in Japan, team members played out of their skin to register the win, which has secured them a spot in next year's World Cup emphatically on merit, not as wild-card entrants.
4. Incidentally, India defeated defending champion Japan in the semi-finals.
5. Indian women were never the favourites, going into the tournament ranked 12th in the world and fourth in Asia — behind World No. 8 China, Korea and Japan.

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Directions for questions 23-28: The following passage consists of a set of six questions. Read the passage and answer the questions that follow.

Logicism comes down to this: In the nineteenth century, mathematicians had shown that all of classical mathematics can be defined in terms of, and derived from, arithmetic. Most importantly, Richard Dedekind had shown in 1872 that the real numbers can be defined in terms of rational numbers. Then rational numbers were defined in terms of natural numbers, thus demonstrating that the real numbers can be derived from natural numbers. This is called the *arithmetization of mathematics*. The next step was taken by Giuseppe Peano, based on work by Dedekind, who showed in 1890 that arithmetic can be reduced to five axioms and three undefined concepts. This is the *axiomatization of arithmetic*. After this, all one has to do to reduce mathematics to logic – since mathematics has already been reduced to arithmetic and arithmetic has been reduced to 3 concepts and 5 axioms – is to define Peano's 3 concepts in terms of logical concepts, thus expressing Peano's axioms logically, and then derive Peano's 5 axioms from logical truths, showing that Peano's axioms, and thus all the mathematics based on them, are logical truths. Peano's three undefined concepts are: 0, natural number, and successor. Russell starts by defining natural numbers logically as classes of classes. Specifically, a natural number is the class of all classes containing the same number of things, so the number 1 is the class of all singletons (classes with one member), 2 is the class of all couples, and so on. With this definition, Russell then defines Peano's other two basic concepts logically and derives Peano's axioms from logic.

Put this way, demonstrating logicism is a seemingly simple task. But Russell and Whitehead soon ran into difficulties, namely, contradictions Russell found in the new logic and set theory. The most famous of these is called Russell's paradox. Some sets are members of themselves, others are not. The set of things that are not red is itself not red, so it is a member of itself, but the set of red things is not red, so it is not a member of itself. Since "x is a set that is not a member of itself" seems to be a meaningful predicate, there must be a set of the sets that are not members of themselves that corresponds to the predicate (by the comprehension axiom). But is that set a member of itself? If it is a member of itself, then it isn't. But if it isn't a member of itself, then it is: A contradiction ensues no matter how one answers.

To avoid this and similar paradoxes, Russell's logic, and the logicism based on it, became quite complex, and the ultimate success of this logicism is still a matter of debate. Many believe that you cannot completely reduce mathematics to logic. Others say the final verdict is not yet in. Still others say it can be done. In any case, it is significant and astonishing how much of mathematics Russell and Whitehead demonstrated can be reduced to logic. And if one is willing to tolerate a few pesky contradictions here and there, it absolutely can be done.

Russell's original form of logicism, in his 1903 *Principles of Mathematics*, did not attempt to avoid the paradoxes of the new logic, and so did not contain the complexities Russell later added to his logic to avoid them. It is a straightforward theory that contains all the basic elements of logicism without the complexities. We present this basic logicism, which we call naïve logicism, in Chapter 2. The complex version meant to avoid paradoxes, which occurs in the 1910-13 *Principia Mathematica*, we call restricted logicism.

Q.23

According to the given passage how can we say that real numbers can be defined in terms of natural numbers?

- 1 ☐ Real numbers can be derived from natural numbers and natural numbers can be derived from rational numbers.
- 2 ☐ Real number can be derived from rational numbers and rational numbers can be derived from natural numbers.
- 3 ☐ Real numbers can be expressed in terms of rational numbers and rational numbers can be expressed in terms of natural numbers.
- 4 ☐ Natural numbers can be expressed in terms of rational numbers and rational numbers can be expressed in terms of natural numbers.

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

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Q.24

According to the passage which of the following sentences is correct?

- ☐ 1 In Principles of Mathematics, Russell tried to avoid the paradoxes of new logic (of logicism) but failed.
- ☐ 2 1910-13 Principia Mathematica is called restricted logicism.
- ☐ 3 Russell started defining real numbers logically as classes of classes.
- ☐ 4 According to Peano, arithmetic can be reduced to five axioms.

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

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Q.25

After doing a thematic study of the given passage, what can be said about the aim of the passage?

- ☐ 1 To define logicism and different attributes attached to it
- ☐ 2 To take a vivid look at Russell's works as a mathematician and his achievement in the field of Logicism
- ☐ 3 To discuss the evolution of Mathematics (to logicism) from the 19th century to early 20th century using Russell's work as an introspection
- ☐ 4 To understand the factors which lead to restrictive logicism, the revised version of logicism of 1913-14

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

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Q.26

Which of the following defines the phrase 'pesky contradictions' as used in the given passage?

- ☐ 1 Troublesome contradictions existing in logicism one may have to indulge into while reducing mathematics to logic.
- ☐ 2 Important contradictions existing in logicism one may have to indulge into while reducing mathematics to logic.
- ☐ 3 Difficult contradictions existing in logicism one may have to indulge into while reducing mathematics to logic.
- ☐ 4 Agreeable contradictions existing in logicism one may have to indulge into while reducing mathematics to logic.



FeedBack

Bookmark

Answer key/Solution

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Logicism comes down to this: In the nineteenth century, mathematicians had shown that all of classical mathematics can be defined in terms of, and derive from, arithmetic. Most importantly, Richard Dedekind had shown in 1872 that the real numbers can be defined in terms of rational numbers. Then rational numbers were defined in terms of natural numbers, thus demonstrating that the real numbers can be derived from natural numbers. This is called the *arithmetization of mathematics*. The next step was taken by Giuseppe Peano, based on work by Dedekind, who showed in 1890 that arithmetic can be reduced to five axioms and three undefined concepts. This is the *axiomatization of arithmetic*. After this, all one has to do to reduce mathematics to logic – since mathematics has already been reduced to arithmetic and arithmetic has been reduced to 3 concepts and 5 axioms – is to define Peano's 3 concepts in terms of logical concepts, thus expressing Peano's axioms logically, and then derive Peano's 5 axioms from logical truths, showing that Peano's axioms, and thus all the mathematics based on them, are logical truths. Peano's three undefined concepts are: 0, natural number, and successor. Russell starts by defining natural numbers logically as classes of classes. Specifically, a natural number is the class of all classes containing the same number of things, so the number 1 is the class of all singletons (classes with one member), 2 is the class of all couples, and so on. With this definition, Russell then defines Peano's other two basic concepts logically and derives Peano's axioms from logic.

Put this way, demonstrating logicism is a seemingly simple task. But Russell and Whitehead soon ran into difficulties, namely, contradictions Russell found in the new logic and set theory. The most famous of these is called Russell's paradox. Some sets are members of themselves, others are not. The set of things that are not red is itself not red, so it is a member of itself, but the set of red things is not red, so it is not a member of itself. Since "x is a set that is not a member of itself" seems to be a meaningful predicate, there must be a set of the sets that are not members of themselves that corresponds to the predicate (by the comprehension axiom). But is that set a member of itself? If it is a member of itself, then it isn't. But if it isn't a member of itself, then it is. A contradiction ensues no matter how one answers.

To avoid this and similar paradoxes, Russell's logic, and the logicism based on it, became quite complex, and the ultimate success of this logicism is still a matter of debate. Many believe that you cannot completely reduce mathematics to logic. Others say the final verdict is not yet in. Still others say it can be done. In any case, it is significant and astonishing how much of mathematics Russell and Whitehead demonstrated can be reduced to logic. And if one is willing to tolerate a few pesky contradictions here and there, it absolutely can be done.

Russell's original form of logicism, in his 1903 *Principles of Mathematics*, did not attempt to avoid the paradoxes of the new logic, and so did not contain the complexities Russell later added to his logic to avoid them. It is a straightforward theory that contains all the basic elements of logicism without the complexities. We present this basic logicism, which we call naïve logicism, in Chapter 2. The complex version meant to avoid paradoxes, which occurs in the 1910-13 *Principia Mathematica*, we call restricted logicism.

Q.27

Which of the following best describes the nature of this passage?

- 1 ☐ It is a book review which aims to compare a certain work with similar works written before.
- 2 ☐ It is a newspaper article which has a blog like storytelling pattern.
- 3 ☐ It is a scholarly article which focuses on narrating the evolution of a certain theory.
- 4 ☐ It is a scholarly article which focuses on busting certain myths pertaining to the evolution of a certain paradigm.

FeedBack

Bookmark

Answer key/Solution

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Q.28

What can be inferred from the last paragraph of the given passage?

- ☐ Russell chose to avoid complexities in his book "Principia Mathematica".
- ☐ To avoid paradoxes which were present in Principles of Mathematics, Russell made logicism more complex in Principia Mathematica.
- ☐ The paradoxes made Principles of Mathematics an easy text to comprehend.
- ☐ Russell preferred a straight forward narrative in his teaching over a logically troubling approach.

[Feedback](#)
[Bookmark](#)
[Answer key/Solution](#)

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The wealthiest Americans have grown wealthier since the Great Recession, and many are investing their wealth in art. Especially with bonds and other assets offering rock-bottom yields, the art market — where reports of record-high sales now emerge regularly — the ongoing and yet to come revolution — has an obvious appeal. According to a survey last year by Deloitte and ArtTactic, an art-research firm, 76 percent of art buyers viewed their acquisitions as investments, compared with 53 percent in 2012. And with more collectors viewing art as a financial investment, storage can become an artwork's permanent fate.

Largely hidden from public view, an ecosystem of service providers has blossomed as Wall Street-style investors and other new buyers have entered the market. These service companies, profiting on the heavy volume of deals while helping more deals take place, include not only art handlers and advisers but also tech start-ups like ArtRank. A sort of Jim Cramer for the fine arts, ArtRank uses an algorithm to place emerging artists into people's buckets including "buy now," "sell now" and "liquidate." Carlos Rivera, co-founder and public face of the company, says that the algorithm, which uses online trends as well as an old-fashioned network of about 40 art professionals around the world, was designed by a financial engineer who still works at a hedge fund. The service is limited to 10 clients, each of whom pays \$3,500 a quarter for what they hope will be market-beating insights. It's no surprise that Rivera, 27, who formerly ran a gallery in Los Angeles, is not popular with artists.

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even leaving a warehouse. Buyers can use the database in much the same way a hedge funder uses a Bloomberg terminal.

**Q.29**

Based on your reading of the passage, identify the main topic discussed in the passage.

- 1 ☐ The passage discusses a practice taken up by Uovo to store priceless art.
- 2 ☐ The passage discusses the upcoming trends in business market.
- 3 ☐ The passage discusses the predicament of the artists as what remains is the value of the painting and not the art itself.
- 4 ☐ The passage discusses how Uovo is trying to control buying and selling of art and create a monopoly.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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**Q.30**

Which of the following can be inferred about Uovo based on the above passage?

- 1 ☐ Uovo is a late entrant into an already established art storage business.
- 2 ☐ Uovo might fail in making art tradable.
- 3 ☐ Uovo will verify the quality of the works in its care
- 4 ☐ Uovo's database system is highly complex, which, if lost, will be difficult to retrieve.

[FeedBack](#)[Bookmark](#)

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Q.31

Why does the author give the example of a Norman Rockwell painting?

- 1 ☐ To show that this is how carelessly technology functions
- 2 ☐ To show that the concern for technology, with respect to valuable investments, is not hypothetical
- 3 ☐ To show that man has utterly degraded and even art works, which are thought of as subsidiary, are stolen by him
- 4 ☐ To show that vanishing of artworks makes authors uncomfortable and conscious of their future

Feedback

Bookmark

Answer key/Solution

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Q.32

What could have been the probable reason for Uovo to take up initiative of storing works of art?

- ☐ Because Art is intrinsically related to social value systems.
- ☐ Because Art has become a popular investment vehicle.
- ☐ Because Art is an object of admiration, not one to be turned into a liquid asset.
- ☐ Because Art has the capacity to mobilize populations.

FeedBack

Bookmark

Answer key/Solution

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**Q.33**

Which of the following can be inferred from the passage?

- 1 ☐ This type of trading of art will put artists out of business.
- 2 ☐ This type of trading of art will monopolize certain artists.
- 3 ☐ This type of trading of art will lead to a kind of revolution.
- 4 ☐ This type of trading of art will monopolize certain pieces of art.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)**Q.34**

According to the passage, which of the following is not true about ArtRank?

- 1 ☐ ArtRank by definition has only 10 customers.
- 2 ☐ ArtRank uses a particular way to make people locate the upcoming artists.
- 3 ☐ ArtRank provides storage facilities that are not new.
- 4 ☐ ArtRank is a newly emerged business that aims to meet a marketplace by using an algorithm.

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

## Sec 2

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

In a class, each student studies 4 subjects: Math, Physics, Chemistry and English. In each subject, the students are awarded grades either 1, 2 or 3 depending on their performance in the subject. At the end of the year, each student is given a four-digit CGPA, which is obtained by writing grades obtained in the four subjects, in the given order, from left to right. Also, to take admission in next class, each student needs to choose exactly 3 subjects such that if the grade obtained in the discarded subject is removed from the four-digit CGPA, the three-digit number obtained without altering the original order of the digits (is known as 'best of 3-CGPA') is maximum possible. For example, if the four-digit CGPA of a student is 3231, (s)he will discard the subject in which her/his grade is 2 and thus her/his 'best of 3-CGPA' will be 331; in case, fourdigit CGPA of a student is 3322, s(he) can discard any of two subjects in which her/his grade is 2 as her/ his 'best of 3-CGPA' will be 332 irrespective of the subject discarded. The left most digit of 'best of 3-CGPA' of all students is 3.

**Q.35**

If no two students got the same four-digit CGPA, the number of students in the class cannot be more than

[FeedBack](#)[Bookmark](#)

[Answer key/Solution](#)

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Q.36

If no two students got the same four-digit CGPA, the number of students who had the same 'best of 3-CGPA' cannot be more than

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

In a class, each student studies 4 subjects: Math, Physics, Chemistry and English. In each subject, the students are awarded grades either 1, 2 or 3 depending on their performance in the subject. At the end of the year, each student is given a four-digit CGPA, which is obtained by writing grades obtained in the four subjects, in the given order, from left to right. Also, to take admission in next class, each student needs to choose exactly 3 subjects such that if the grade obtained in the discarded subject is removed from the four-digit CGPA, the three-digit number obtained without altering the original order of the digits (is known as 'best of 3-CGPA') is maximum possible. For example, if the four-digit CGPA of a student is 3231, (s)he will discard the subject in which her/his grade is 2 and thus her/his 'best of 3-CGPA' will be 331; in case, fourdigit CGPA of a student is 3322, s(he) can discard any of two subjects in which her/his grade is 2 as her/ his 'best of 3-CGPA' will be 332 irrespective of the subject discarded. The left most digit of 'best of 3-CGPA' of all students is 3.

Q.37

What can be the maximum possible value of the absolute difference between four-digit CGPA of two students, whose 'best of 3-CGPA's differed by 21?

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

In a class, each student studies 4 subjects: Math, Physics, Chemistry and English. In each subject, the students are awarded grades either 1, 2 or 3 depending on their performance in the subject. At the end of the year, each student is given a four-digit CGPA, which is obtained by writing grades obtained in the four subjects, in the given order, from left to right. Also, to take admission in next class, each student needs to choose exactly 3 subjects such that if the grade obtained in the discarded subject is removed from the four-digit CGPA, the three-digit number obtained without altering the original order of the digits (is known as 'best of 3-CGPA') is maximum possible. For example, if the four-digit CGPA of a student is 3231, (s)he will discard the subject in which her/his grade is 2 and thus her/his 'best of 3-CGPA' will be 331; in case, fourdigit CGPA of a student is 3322, s(he) can discard any of two subjects in which her/his grade is 2 as her/ his 'best of 3-CGPA' will be 332 irrespective of the subject discarded. The left most digit of 'best of 3-CGPA' of all students is 3.

Q.38

How many students had four-digit CGPA starting with 1 but did not have 1 as a digit in his 'best of 3- CGPA'?

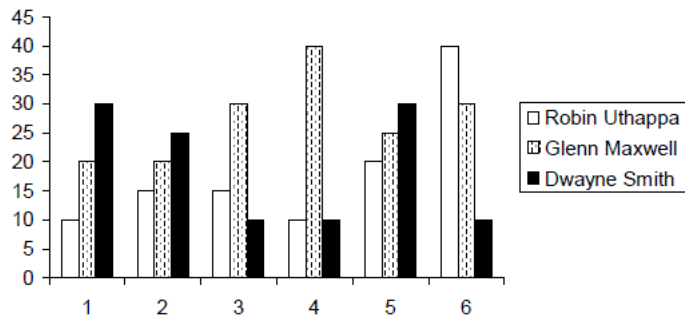
[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

Madras Super Kings (MSK) is a cricket team, which is part of Indian Premier League (IPL). The Bar graph given below represents the scores of top three run



scorers of MSK as a percentage of the total runs scored by MSK in the matches of a series played from Match 1 to Match 6, in the same order. The total score comprises runs scored by the players and run scored in the form of extras', consisting of wide, no balls, etc. Runs scored in the form of extras are not credited to runs of any batsman, but counted in the total score of the team for that match.



**Q.39**

If the total runs scored by MSK in Match 6 was 40% more than that in Match 5, then who among the following MSK's batsmen scored the maximum number of runs in these two matches taken together?

- 1 ☐ Robin Uthappa
- 2 ☐ Glenn Maxwell
- 3 ☐ Dwayne Smith
- 4 ☐ Other than Robin Uthappa, Glenn Maxwell and Dwayne Smith

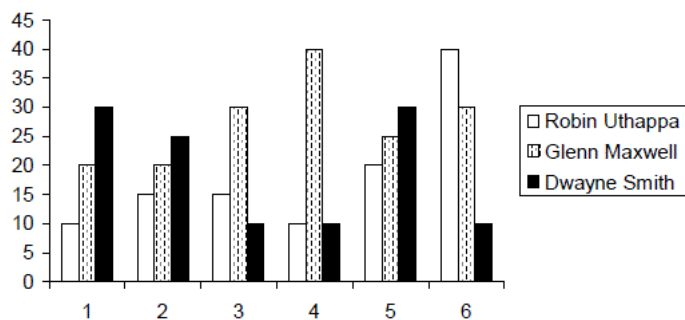
FeedBack

Bookmark

Answer key/Solution

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

Madras Super Kings (MSK) is a cricket team, which is part of Indian Premier League (IPL). The Bar graph given below represents the scores of top three run scorers of MSK as a percentage of the total runs scored by MSK in the matches of a series played from Match 1 to Match 6, in the same order. The total score comprises runs scored by the players and run scored in the form of extras', consisting of wide, no balls, etc. Runs scored in the form of extras are not credited to runs of any batsman, but counted in the total score of the team for that match.



**Q.40**

If the number of runs scored by Robin Uthappa increased by 20% from Match 1 to Match 2, then what was the percentage change in the number of runs scored by Dwayne Smith from Match 1 to Match 2?

- 1 ☐ 16.66% increase
- 2 ☐ 16.66% decrease
- 3 ☐ 33.33% decrease
- 4 ☐ 33.33% increase

FeedBack

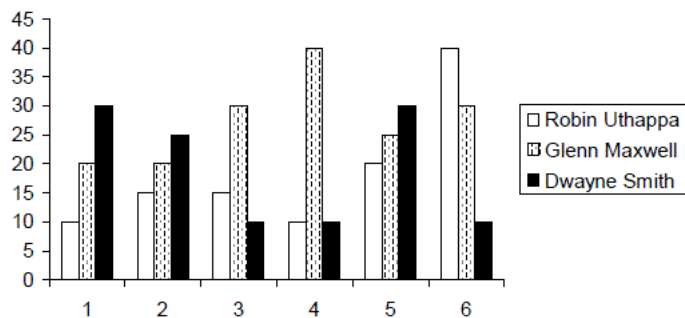
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Answer key/Solution



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

Madras Super Kings (MSK) is a cricket team, which is part of Indian Premier League (IPL). The Bar graph given below represents the scores of top three run scorers of MSK as a percentage of the total runs scored by MSK in the matches of a series played from Match 1 to Match 6, in the same order. The total score comprises runs scored by the players and run scored in the form of extras', consisting of wide, no balls, etc. Runs scored in the form of extras are not credited to runs of any batsman, but counted in the total score of the team for that match.



Q.41

If the number of runs scored by Dwayne Smith increased in every match over that in the previous match, then at least in how many matches was MSK's total score definitely more than that in the previous match?

1 ☐ 5

2 ☐ 2

3 ☐ 3

4 ☐ 4

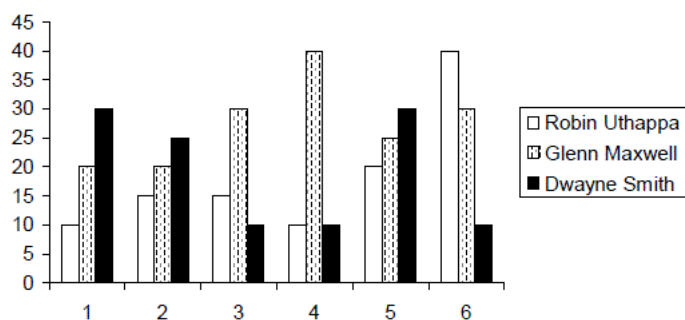
FeedBack

Bookmark

Answer key/Solution

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

Madras Super Kings (MSK) is a cricket team, which is part of Indian Premier League (IPL). The Bar graph given below represents the scores of top three run scorers of MSK as a percentage of the total runs scored by MSK in the matches of a series played from Match 1 to Match 6, in the same order. The total score comprises runs scored by the players and run scored in the form of extras', consisting of wide, no balls, etc. Runs scored in the form of extras are not credited to runs of any batsman, but counted in the total score of the team for that match.



Q.42

In Match 4, the total number of runs scored by MKS was 250, which was 25% more than that in Match 3. What was the absolute difference between maximum possible runs scored in the form of extras in Match 4 and that in Match 3?

1 ☐ 90

2 ☐ 10

3 ☐ 100

4 ☐ 50

FeedBack

Bookmark

Answer key/Solution

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

In a country called Land-Mother, there are total 5 active political parties, which are led by female members. The following table shows the approximate percentage share of valid cast votes for each of the party during 5 consecutive voting parliamentary elections. Voting in the country takes place once every five years. Some of data are missing from the table and are represented by question mark (?).

Name/Year	1990	1995	2000	2005	2010
Jodha	35	30	28	21	20
Meera	30	?	25	32	?
Putli	20	22	?	15	20
Laxmi	?	15	18	?	8
Kamla	0	?	5	12	?

It is also known that the number of valid votes cast in 1990 was 2.5 crores, and it increased at the rate of 5%, 10%, 8% and 12% in 1995, 2000, 2005 and 2010 respectively, over the previous voting year.

Q.43

During the period 1995 to 2010, if the minimum vote share of any party was not less than 5%, then what was the approximate maximum absolute difference between the number of valid votes cast for Meera in 2010 and that in 1995?

- 1 ☐ 65 lacs
- 2 ☐ 1 crore
- 3 ☐ 1.3 crores
- 4 ☐ 1.5 crores

FeedBack

Bookmark

Answer key/Solution

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

In a country called Land-Mother, there are total 5 active political parties, which are led by female members. The following table shows the approximate percentage share of valid cast votes for each of the party during 5 consecutive voting parliamentary elections. Voting in the country takes place once every five years. Some of data are missing from the table and are represented by question mark (?).

Name/Year	1990	1995	2000	2005	2010
Jodha	35	30	28	21	20
Meera	30	?	25	32	?
Putli	20	22	?	15	20
Laxmi	?	15	18	?	8
Kamla	0	?	5	12	?

It is also known that the number of valid votes cast in 1990 was 2.5 crores, and it increased at the rate of 5%, 10%, 8% and 12% in 1995, 2000, 2005 and 2010 respectively, over the previous voting year.

Q.44

For which party leader did the number of valid votes cast decline by maximum number from 2000 to 2005?

- 1 ☐ Jodha
- 2 ☐ Putli
- 3 ☐ Kamla
- 4 ☐ Laxmi

FeedBack

Bookmark

Answer key/Solution

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

In a country called Land-Mother, there are total 5 active political parties, which are led by female members. The following table shows the approximate percentage share of valid cast votes for each of the party during 5 consecutive voting parliamentary elections. Voting in the country takes place once every five years. Some of data are missing from the table and are represented by question mark (?).

Name/Year	1990	1995	2000	2005	2010
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Putli	20	22	?	15	20
Laxmi	?	15	18	?	8
Kamla	0	?	5	12	?

It is also known that the number of valid votes cast in 1990 was 2.5 crores, and it increased at the rate of 5%, 10%, 8% and 12% in 1995, 2000, 2005 and 2010 respectively, over the previous voting year.

**Q.45**

During the period 1995 to 2010, if the minimum vote share of any party was not less than 5%, then what was the minimum value of growth rate of valid votes cast for Kamla from 1995 to 2010?

1 ☐ 5%

2 ☐ 7%

3 ☐ 8%

4 ☐ None of these

FeedBack

Bookmark

Answer key/Solution

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

In a country called Land-Mother, there are total 5 active political parties, which are led by female members. The following table shows the approximate percentage share of valid cast votes for each of the party during 5 consecutive voting parliamentary elections. Voting in the country takes place once every five years. Some of data are missing from the table and are represented by question mark (?).

Name/Year	1990	1995	2000	2005	2010
Jodha	35	30	28	21	20
Meera	30	?	25	32	?
Putli	20	22	?	15	20
Laxmi	?	15	18	?	8
Kamla	0	?	5	12	?

It is also known that the number of valid votes cast in 1990 was 2.5 crores, and it increased at the rate of 5%, 10%, 8% and 12% in 1995, 2000, 2005 and 2010 respectively, over the previous voting year.

**Q.46**

For how many parties did percentage vote share definitely increase or decrease in each parliamentary election from 1995 to 2010 over the previous year?

1 ☐ 1

2 ☐ 2

3 ☐ 3

4 ☐ None of these

FeedBack

Bookmark

Answer key/Solution

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

Moodys, a modeling agency, was on the lookout for new models. It had called 150 candidates for selection. The called models possess some of the attributes out of tall, dark and handsome. The breakup of the candidates with different attributes in that group of 150 is shown below in the given table:

Attributes	Number
Tall and handsome but not dark	9
Dark and handsome but not tall	12
Tall or dark but not handsome	107

Each candidate had at least one of the three attributes out of the mentioned three.

The agency could find only one person who satisfied its criteria i.e., possess all the three given attributes and thus it relaxed the requirements a little. It was also found that for any attribute, the number of candidates who had only that attribute did not exceed one-third of the total number of candidates called.

Q.47

What was the minimum number of candidates who had at least two of the three attributes?

1 ☐ 31

2 ☐ 29

3 ☐ 30

4 ☐ 40

FeedBack

Bookmark

Answer key/Solution

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

Moodys, a modeling agency, was on the lookout for new models. It had called 150 candidates for selection. The called models possess some of the attributes out of tall, dark and handsome. The breakup of the candidates with different attributes in that group of 150 is shown below in the given table:

Attributes	Number
Tall and handsome but not dark	9
Dark and handsome but not tall	12
Tall or dark but not handsome	107

Each candidate had at least one of the three attributes out of the mentioned three.

The agency could find only one person who satisfied its criteria i.e., possess all the three given attributes and thus it relaxed the requirements a little. It was also found that for any attribute, the number of candidates who had only that attribute did not exceed one-third of the total number of candidates called.

Q.48

If the number of candidates who were dark was less than that of those who were tall, then at least how many candidates were dark as well as tall?

1 ☐ 21

2 ☐ 9

3 ☐ 12

4 ☐ 10

FeedBack

Bookmark

Answer key/Solution

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

Moodys, a modeling agency, was on the lookout for new models. It had called 150 candidates for selection. The called models possess some of the attributes out of tall, dark and handsome. The breakup of the candidates with different attributes in that group of 150 is shown below in the given table:

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The agency could find only one person who satisfied its criteria i.e., possess all the three given attributes and thus it relaxed the requirements a little. It was also found that for any attribute, the number of candidates who had only that attribute did not exceed one-third of the total number of candidates called.

**Q.49**

If exactly half of the candidates who were tall were also dark, and exactly half of the candidates who were dark were also tall, then how many candidates were only tall?

1 ☐ 34

2 ☐ 36

3 ☐ 38

4 ☐ 29

FeedBack

Bookmark

Answer key/Solution

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

Moodys, a modeling agency, was on the lookout for new models. It had called 150 candidates for selection. The called models possess some of the attributes out of tall, dark and handsome. The breakup of the candidates with different attributes in that group of 150 is shown below in the given table:

Attributes	Number
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Tall or dark but not handsome	107

Each candidate had at least one of the three attributes out of the mentioned three.

The agency could find only one person who satisfied its criteria i.e., possess all the three given attributes and thus it relaxed the requirements a little. It was also found that for any attribute, the number of candidates who had only that attribute did not exceed one-third of the total number of candidates called.

**Q.50**

If the number of candidates who were tall was twice that of those who had at least two attributes, then at least how many candidates were only dark?

1 ☐ 42

2 ☐ 44

3 ☐ 37

4 ☐ 41

FeedBack

Bookmark

Answer key/Solution

Direction for questions 51 to 54: Answer the following questions based on the information given below.

Ten students - Aboli, Shweta, Eshita, Praveena, Geeta, Seeta, Maya, Megha, Swati and Teena - are sitting around a circular table facing the centre of the table. The distance between any two consecutive students is the same. They were discussing about the marks they obtained in their semester-1 examination. In the examination, there were five papers with maximum marks 100 for each paper. After discussion, the following observations were made about the marks obtained by them and their sitting positions:

(i) Shweta was an immediate neighbour of both Eshita and the student who scored an overall 82% in the five papers put together, which was the lowest marks scored among the 10.

(ii) Geeta and the student who scored 470 in the five papers put together were sitting opposite to each other, and the student who scored 480 sitting immediate right to the student who scored 450.

- (iii) The sum of the total marks of only one of the pair of students who were sitting next to each other was 880, and the sum of the total marks for only two of the pairs of two students sitting next to each other was 930 each.
- (iv) Praveena's total marks were 10 more than Aboli's, but 50 less than Seeta's. Shweta's total marks were 460.
- (v) The average of total marks of Seeta and that of Geeta was 25 less than that the average of total marks of Shweta and the student sitting opposite to her.
- (vi) The student with the lowest marks was sitting opposite to the student with the highest marks, who was sitting next to the student having second highest total marks.
- (vii) Swati was sitting immediate left of Teena and fourth to the right of the student whose total marks were 410, and Megha was sitting between Maya and the student whose total marks were 490.
- (viii) The total marks of each of the ten students was a multiple of 10, and no two of them had the same total marks.

Q.51

What was the total marks of Megha?

FeedBack

Bookmark

Answer key/Solution

Direction for questions 51 to 54: Answer the following questions based on the information given below.

Ten students - Aboli, Shweta, Eshita, Praveena, Geeta, Seeta, Maya, Megha, Swati and Teena - are sitting around a circular table facing the centre of the table. The distance between any two consecutive students is the same. They were discussing about the marks they obtained in their semester-1 examination. In the examination, there were five papers with maximum marks 100 for each paper. After discussion, the following observations were made about the marks obtained by them and their sitting positions:

- (i) Shweta was an immediate neighbour of both Eshita and the student who scored an overall 82% in the five papers put together, which was the lowest marks scored among the 10.
- (ii) Geeta and the student who scored 470 in the five papers put together were sitting opposite to each other, and the student who scored 480 sitting immediate right to the student who scored 450 .
- (iii) The sum of the total marks of only one of the pair of students who were sitting next to each other was 880, and the sum of the total marks for only two of the pairs of two students sitting next to each other was 930 each.
- (iv) Praveena's total marks were 10 more than Aboli's, but 50 less than Seeta's. Shweta's total marks were 460.
- (v) The average of total marks of Seeta and that of Geeta was 25 less than that the average of total marks of Shweta and the student sitting opposite to her.
- (vi) The student with the lowest marks was sitting opposite to the student with the highest marks, who was sitting next to the student having second highest total marks.
- (vii) Swati was sitting immediate left of Teena and fourth to the right of the student whose total marks were 410, and Megha was sitting between Maya and the student whose total marks were 490.
- (viii) The total marks of each of the ten students was a multiple of 10, and no two of them had the same total marks.

Q.52

The sum of total marks for any two pair of students sitting opposite to each other cannot be more than

FeedBack

Bookmark

Answer key/Solution

Direction for questions 51 to 54: Answer the following questions based on the information given below.

Ten students - Aboli, Shweta, Eshita, Praveena, Geeta, Seeta, Maya, Megha, Swati and Teena - are sitting around a circular table facing the centre of the table. The distance between any two consecutive students is the same. They were discussing about the marks they obtained in their semester-1 examination. In the examination, there were five papers with maximum marks 100 for each paper. After discussion, the following observations were made about the marks obtained by them and their sitting positions:

- (i) Shweta was an immediate neighbour of both Eshita and the student who scored an overall 82% in the five papers put together, which was the lowest marks scored among the 10.
- (ii) Geeta and the student who scored 470 in the five papers put together were sitting opposite to each other, and the student who scored 480 sitting immediate right to the student who scored 450 .
- (iii) The sum of the total marks of only one of the pair of students who were sitting next to each other was 880, and the sum of the total marks for only two of the pairs of two students sitting next to each other was 930 each.
- (iv) Praveena's total marks were 10 more than Aboli's, but 50 less than Seeta's. Shweta's total marks were 460.
- (v) The average of total marks of Seeta and that of Geeta was 25 less than that the average of total marks of Shweta and the student sitting opposite to her.
- (vi) The student with the lowest marks was sitting opposite to the student with the highest marks, who was sitting next to the student having second highest total marks.
- (vii) Swati was sitting immediate left of Teena and fourth to the right of the student whose total marks were 410, and Megha was sitting between Maya and the student whose total marks were 490.
- (viii) The total marks of each of the ten students was a multiple of 10, and no two of them had the same total marks.

Q.53

The average of total marks of Geeta and that of Maya is

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

Direction for questions 51 to 54: Answer the following questions based on the information given below.

Ten students - Aboli, Shweta, Eshita, Praveena, Geeta, Seeta, Maya, Megha, Swati and Teena - are sitting around a circular table facing the centre of the table. The distance between any two consecutive students is the same. They were discussing about the marks they obtained in their semester-1 examination. In the examination, there were five papers with maximum marks 100 for each paper. After discussion, the following observations were made about the marks obtained by them and their sitting positions:

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- (iii) The sum of the total marks of only one of the pair of students who were sitting next to each other was 880, and the sum of the total marks for only two of the pairs of two students sitting next to each other was 930 each.
- (iv) Praveena's total marks were 10 more than Aboli's, but 50 less than Seeta's. Shweta's total marks were 460.
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- (vi) The student with the lowest marks was sitting opposite to the student with the highest marks, who was sitting next to the student having second highest total marks.
- (vii) Swati was sitting immediate left of Teena and fourth to the right of the student whose total marks were 410, and Megha was sitting between Maya and the student whose total marks were 490.
- (viii) The total marks of each of the ten students was a multiple of 10, and no two of them had the same total marks.

Q.54

What was the absolute difference between the total marks of Seeta and that of Swati?

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

Saral once wanted to test his students in the subjects that they had learnt from him. So, he conducted five tests – one each on QA, LR, DI, CR and RC. Five students Gautam, Ashish, Nitish, Munish and Tarun participated in all the tests. The student getting highest marks in any test was awarded 5 points, the student getting the second highest marks in any test was awarded 4 points, the student getting the third highest marks in any test was awarded 3 points and so on. Following is known about the outcome of various tests:

- (i) Gautam scored highest points in all the tests put together.
- (ii) Munish scored more points than Tarun in all the tests put together.
- (iii) Each student scored highest marks in at least one test and also scored least marks in at least one test.
- (iv) Ashish did not get the same points in any two of the tests.
- (v) Tarun was not the one who scored highest marks in CR test.
- (vi) In DI test, Munish scored the highest marks and in RC test, he scored the least marks.
- (vii) Gautam and Ashish secured consecutive points in all tests except CR test in which Ashish scored least marks.
- (viii) Tarun scored a total of 13 points in all the tests put together, and scored fourth highest both in DI and RC tests.
- (ix) Nitish scored second highest marks in LR test, and Gautam scored the highest in RC test.
- (x) No two students has scored the same marks in any particular test.

Q.55

How many points did Gautam score in all the tests together?

1 ☐ 18

2 ☐ 17

3 ☐ 16

4 ☐ 19

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)



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

Saral once wanted to test his students in the subjects that they had learnt from him. So, he conducted five tests – one each on QA, LR, DI, CR and RC. Five students Gautam, Ashish, Nitish, Munish and Tarun participated in all the tests. The student getting highest marks in any test was awarded 5 points, the student getting the second highest marks in any test was awarded 4 points, the student getting the third highest marks in any test was awarded 3 points and so on. Following is known about the outcome of various tests:

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- (ii) Munish scored more points than Tarun in all the tests put together.
- (iii) Each student scored highest marks in at least one test and also scored least marks in at least one test.
- (iv) Ashish did not get the same points in any two of the tests.
- (v) Tarun was not the one who scored highest marks in CR test.
- (vi) In DI test, Munish scored the highest marks and in RC test, he scored the least marks.
- (vii) Gautam and Ashish secured consecutive points in all tests except CR test in which Ashish scored least marks.
- (viii) Tarun scored a total of 13 points in all the tests put together, and scored fourth highest both in DI and RC tests.
- (ix) Nitish scored second highest marks in LR test, and Gautam scored the highest in RC test.
- (x) No two students has scored the same marks in any particular test.

Q.56

Who scored third highest marks in LR test?

1 ☐ Ashish

2 ☐ Nitish

3 ☐ Gautam

4 ☐ Munish

FeedBack

Bookmark

Answer key/Solution

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

Saral once wanted to test his students in the subjects that they had learnt from him. So, he conducted five tests – one each on QA, LR, DI, CR and RC. Five students Gautam, Ashish, Nitish, Munish and Tarun participated in all the tests. The student getting highest marks in any test was awarded 5 points, the student getting the second highest marks in any test was awarded 4 points, the student getting the third highest marks in any test was awarded 3 points and so on. Following is known about the outcome of various tests:

- (i) Gautam scored highest points in all the tests put together.
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- (iii) Each student scored highest marks in at least one test and also scored least marks in at least one test.
- (iv) Ashish did not get the same points in any two of the tests.
- (v) Tarun was not the one who scored highest marks in CR test.
- (vi) In DI test, Munish scored the highest marks and in RC test, he scored the least marks.
- (vii) Gautam and Ashish secured consecutive points in all tests except CR test in which Ashish scored least marks.
- (viii) Tarun scored a total of 13 points in all the tests put together, and scored fourth highest both in DI and RC tests.
- (ix) Nitish scored second highest marks in LR test, and Gautam scored the highest in RC test.
- (x) No two students has scored the same marks in any particular test.

Q.57

In how many tests did Munish scored third highest marks?

1 ☐ 0

2 ☐ 1

3 ☐ 2

4 ☐ 3

FeedBack

Bookmark

Answer key/Solution

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

Saral once wanted to test his students in the subjects that they had learnt from him. So, he conducted five tests – one each on QA, LR, DI, CR and RC. Five students Gautam, Ashish, Nitish, Munish and Tarun participated in all the tests. The student getting highest marks in any test was awarded 5 points, the student getting the second highest marks in any test was awarded 4 points, the student getting the third highest marks in any test was awarded 3 points and so on. Following is known about the outcome of various tests:

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- (iv) Ashish did not get the same points in any two of the tests.
- (v) Tarun was not the one who scored highest marks in CR test.
- (vi) In DI test, Munish scored the highest marks and in RC test, he scored the least marks.
- (vii) Gautam and Ashish secured consecutive points in all tests except CR test in which Ashish scored least marks.
- (viii) Tarun scored a total of 13 points in all the tests put together, and scored fourth highest both in DI and RC tests.
- (ix) Nitish scored second highest marks in LR test, and Gautam scored the highest in RC test.
- (x) No two students has scored the same marks in any particular test.

**Q.58**

In how many tests did Gautam score less than 5 points and greater than 1 point?

1 ☐ 1

2 ☐ 2

3 ☐ 3

4 ☐ 4

FeedBack

Bookmark

Answer key/Solution

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

Five Players – Adam, Bolt, Cole, Derek, Frank – belong to five Countries – Brazil, England, France, USA and Jamaica – not necessarily in the same order. Each of them plays exactly one sport from among Cricket, Hockey, Football, Baseball and Boxing, and wears a jersey of a different color from among Yellow, White, Brown, Green and Red. During common wealth game, they visited India and stayed at different places. Four of them stayed in hotels with rating 3 stars, 4 stars, 5 stars and 7 stars, with one player in each type of hotel, while the remaining one player stayed in a sea resort. It is also known that:

- (i) Adam, who does not play cricket, wears yellow colored jersey, and Cole plays Baseball.
- (ii) Derek stayed in a 3 star hotel, but he plays neither Cricket nor does boxing.
- (iii) Frank plays Football and wears red colored jersey, and Bolt does not play Hockey but he wears white colored jersey.
- (iv) For one of the players the initial of his name and the initial of country to which he belongs are two consecutive letters of English alphabets, in any order.
- (v) Frank stayed in a sea resort. Neither Derek nor Frank belongs to England. Bolt and Cole stayed in hotels with rating 5 stars and 7 stars respectively.
- (vi) The player playing Hockey wears green Jersey, and the one who plays Football does not belong to Jamaica, and Bolt belongs to USA.

**Q.59**

What is the color of jersey worn by the boxer?

1 ☐ Yellow

2 ☐ White

3 ☐ Brown

4 ☐ None of these

FeedBack

Bookmark

Answer key/Solution

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

Five Players – Adam, Bolt, Cole, Derek, Frank – belong to five Countries – Brazil, England, France, USA and Jamaica – not necessarily in the same order. Each of them plays exactly one sport from among Cricket, Hockey, Football, Baseball and Boxing, and wears a jersey of a different color from among Yellow, White, Brown, Green and Red. During common wealth game, they visited India and stayed at different places. Four of them stayed in hotels with rating 3 stars, 4 stars, 5 stars and 7 stars, with one player in each type of hotel, while the remaining one player stayed in a sea resort. It is also known that:

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(iv) For one of the players the initial of his name and the initial of country to which he belongs are two consecutive letters of English alphabets, in any order.  
(v) Frank stayed in a sea resort. Neither Derek nor Frank belongs to England. Bolt and Cole stayed in hotels with rating 5 stars and 7 stars respectively.  
(vi) The player playing Hockey wears green Jersey, and the one who plays Football does not belong to Jamaica, and Bolt belongs to USA.

**Q.60****Which sport does the player from France play?**

- 1 ☐ Football
- 2 ☐ Cricket
- 3 ☐ Hockey
- 4 ☐ None of these

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

Five Players – Adam, Bolt, Cole, Derek, Frank – belong to five Countries – Brazil, England, France, USA and Jamaica – not necessarily in the same order. Each of them plays exactly one sport from among Cricket, Hockey, Football, Baseball and Boxing, and wears a jersey of a different color from among Yellow, White, Brown, Green and Red. During common wealth game, they visited India and stayed at different places. Four of them stayed in hotels with rating 3 stars, 4 stars, 5 stars and 7 stars, with one player in each type of hotel, while the remaining one player stayed in a sea resort. It is also known that:

- (i) Adam, who does not play cricket, wears yellow colored jersey, and Cole plays Baseball.  
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(v) Frank stayed in a sea resort. Neither Derek nor Frank belongs to England. Bolt and Cole stayed in hotels with rating 5 stars and 7 stars respectively.  
(vi) The player playing Hockey wears green Jersey, and the one who plays Football does not belong to Jamaica, and Bolt belongs to USA.

**Q.61****Which of the following must be a correct combination of name – country – game – color?**

- 1 ☐ Bolt – USA– Cricket- White
- 2 ☐ Cole – Brazil - Baseball – Brown
- 3 ☐ Adam - England – Boxing – Yellow
- 4 ☐ Data insufficient

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

Five Players – Adam, Bolt, Cole, Derek, Frank – belong to five Countries – Brazil, England, France, USA and Jamaica – not necessarily in the same order. Each of them plays exactly one sport from among Cricket, Hockey, Football, Baseball and Boxing, and wears a jersey of a different color from among Yellow, White, Brown, Green and Red. During common wealth game, they visited India and stayed at different places. Four of them stayed in hotels with rating 3 stars, 4 stars, 5 stars and 7 stars, with one player in each type of hotel, while the remaining one player stayed in a sea resort. It is also known that:

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(v) Frank stayed in a sea resort. Neither Derek nor Frank belongs to England. Bolt and Cole stayed in hotels with rating 5 stars and 7 stars respectively.  
(vi) The player playing Hockey wears green Jersey, and the one who plays Football does not belong to Jamaica, and Bolt belongs to USA.

**Q.62****Identify the country and the game played by the player staying in the 4 star-hotel.**

- 1 ☐ USA and Cricket
- 2 ☐ England and Boxing
- 3 ☐ Brazil and Boxing
- 4 ☐ Data not sufficient

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

In one division there are 3 groups - A, B and C. In the division, there are 9 students - P, Q, R, S, T, U, V, W and X. Each student has a favourite flower from among Rose, Mogra, Marigold, Lily, Carnations, Orchid, Tulip, Sunflower and Chrysanthemum. Number of students in group A is equal to the number of students in group C. P likes Rose, and U likes Mogra. Q likes Lily and is in group B. P, U and X are in the same group and the only members of that group. S and V are in the same group. R likes Tulip whereas T does not like Marigold. W likes Chrysanthemum and is in group C. S is not in group C. S likes Carnations and V likes Orchid.

Q.63  
Who likes Marigold?

- 1 ☐ X
- 2 ☐ U
- 3 ☐ P
- 4 ☐ Q

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

In one division there are 3 groups - A, B and C. In the division, there are 9 students - P, Q, R, S, T, U, V, W and X. Each student has a favourite flower from among Rose, Mogra, Marigold, Lily, Carnations, Orchid, Tulip, Sunflower and Chrysanthemum. Number of students in group A is equal to the number of students in group C. P likes Rose, and U likes Mogra. Q likes Lily and is in group B. P, U and X are in the same group and the only members of that group. S and V are in the same group. R likes Tulip whereas T does not like Marigold. W likes Chrysanthemum and is in group C. S is not in group C. S likes Carnations and V likes Orchid.

Q.64  
Who likes Sunflower?

- 1 ☐ P
- 2 ☐ X
- 3 ☐ T
- 4 ☐ U

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)

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

In one division there are 3 groups - A, B and C. In the division, there are 9 students - P, Q, R, S, T, U, V, W and X. Each student has a favourite flower from among Rose, Mogra, Marigold, Lily, Carnations, Orchid, Tulip, Sunflower and Chrysanthemum. Number of students in group A is equal to the number of students in group C. P likes Rose, and U likes Mogra. Q likes Lily and is in group B. P, U and X are in the same group and the only members of that group. S

and V are in the same group. R likes Tulip whereas T does not like Marigold. W likes Chrysanthemum and is in group C. S is not in group C. S likes Carnation and V likes Orchid.

**Q.65**

How many among the following is/are in group C?

- i) W
- ii) V
- iii) S
- iv) R

1 ☐ 3

2 ☐ 4

3 ☐ 2

4 ☐ 1

FeedBack

Bookmark

Answer key/Solution

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

In one division there are 3 groups - A, B and C. In the division, there are 9 students - P, Q, R, S, T, U, V, W and X. Each student has a favourite flower from among Rose, Mogra, Marigold, Lily, Carnations, Orchid, Tulip, Sunflower and Chrysanthemum. Number of students in group A is equal to the number of students in group C. P likes Rose, and U likes Mogra. Q likes Lily and is in group B. P, U and X are in the same group and the only members of that group. S and V are in the same group. R likes Tulip whereas T does not like Marigold. W likes Chrysanthemum and is in group C. S is not in group C. S likes Carnation and V likes Orchid.

**Q.66**

Which of the following students are in the same group?

1 ☐ R,T,V

2 ☐ R,T,Q

3 ☐ Q,V,W

4 ☐ S,Q,V

FeedBack

Bookmark

Answer key/Solution

## Sec 3

**Q.67**

What is the area (in sq. unit) of the region bounded by the curve  $|x + y| + |x - y| = 10$ ?

1 ☐ 25

2 ☐ 100

3 ☐ 200

4 ☐ 150

FeedBack

Bookmark

Answer key/Solution

**Q.68**

If  $4kx^2 - (k - 2)x + (k - 2) = 0$  has real roots, where  $k$  is a positive integer, then the number of possible values that  $k$  can take is

1 ☐ Zero2 ☐ One3 ☐ Two4 ☐ Three[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)**Q.69**

A shopkeeper spends the same amount to buy two different varieties of rice – one at Rs. 40/kg and the other at Rs. 60/kg. He sells both the varieties of rice at Rs. 45/kg. While selling he uses a faulty weight which weighs 900 grams in place of 1kg. Find the profit made by the shopkeeper.

1 ☐ 3.84%2 ☐ 3.25%3 ☐ 4.16%4 ☐ 4.75%[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)**Q.70**

Find the sum of the digits of  $(100^{10} - 10)$ .

[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)**Q.71**

If  $S_n = a_0 + a_1 + a_2 + \dots + a_n$ , where  $a_n = (-1)^{n+1} (a_{n-1} + 1)$  and  $a_0 = 1$ , find the value of  $S_{299}$ .

1 ☐ 1502 ☐ -2003 ☐ -24 ☐ -150[FeedBack](#)[Bookmark](#)[Answer key/Solution](#)**Q.72**

How many 4-digit numbers divisible by 3 can be formed using digits 0, 1, 2, 3, 4 and 5, without repetition of digits?

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.73

Two numbers A and B are 16% and 45% greater than a third number C. By what percentage is A less than B?

1 ☐ 202 ☐ 16.673 ☐ 254 ☐ None of these
[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.74

A function, for positive integral values of  $n$ , is defined as  $f(n) = \begin{cases} \frac{n-1}{2}, & \text{when } n \text{ is odd} \\ \frac{n-2}{2}, & \text{when } n \text{ is even} \end{cases}$ .

If  $f(f(f(n))) = 15$  and  $n$  is even, then find the number of values that  $n$  can take.

[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

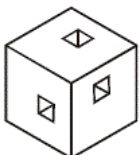
Q.75

ABCD is a trapezium inscribed in a circle and AD is the diameter of that circle. If  $AB = BC = 10$  cm, then find the area (in  $\text{cm}^2$ ) of the trapezium ABCD.

1 ☐  $50\sqrt{3}$ 2 ☐  $75\sqrt{3}$ 3 ☐ 754 ☐ 50
[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.76

The mass of a solid wooden cube of edge 9 unit is 2187 kg. Three shafts, each of dimensions  $1 \times 1 \times 9$ , are cut out from the cube as shown in the figure below. The mass of the remaining solid is





1 ☐ 2106 kg

2 ☐ 2022 kg

3 ☐ 2012 kg

4 ☐ 2016 kg

FeedBack

Bookmark

Answer key/Solution

Q.77

The smallest natural number  $n$  such that  $n!$  is divisible by 1000 is

1 ☐ 20

2 ☐ 3

3 ☐ 10

4 ☐ 15

FeedBack

Bookmark

Answer key/Solution

Q.78

Let  $x = [1 \times 2 \times 4 + 2 \times 4 \times 8 + 3 \times 6 \times 12 + \dots + 10 \times 20 \times 40]$  and  $y = [1 \times 3 \times 9 + 2 \times 6 \times 18 + 3 \times 9 \times 27 + \dots + 10 \times 30 \times 90]$ . The value of  $\frac{x}{y}$  is

1 ☐ 1/729

2 ☐ 1/27

3 ☐ 8/27

4 ☐ 2/3

FeedBack

Bookmark

Answer key/Solution

Q.79

Let  $y = (1!)^2 + (2!)^2 + \dots + (10000!)^2$ , what is the remainder when  $y$  is divided by 1152?

FeedBack

Bookmark

Answer key/Solution

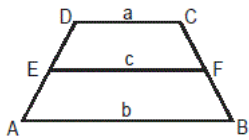
Q.80

If  $a$  and  $b$  are roots of the equation  $x^2 - 7x - 3 = 0$ . What is the value of  $y = \left\{ \frac{(m_{12} - 3m_{10})}{m_{11}} \right\}$  where  $m_n = a^n - b^n$ ?

1 ☐ 12 ☐ 73 ☐ 34 ☐ 5
[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.81

An isosceles trapezium ABCD with parallel sides of length  $a$  and  $b$  is given. A line of length  $c$  is drawn parallel to the sides of length  $a$  and  $b$  such that it divide the trapezium into two equal areas. Then  $a^2, c^2, b^2$  are in

1 ☐ A.P2 ☐ G.P3 ☐ H.P4 ☐ None of these
[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.82

The amount paid by Ruchi to buy some oranges and pears was in the ratio 3 : 5. While for Seema it was 2 : 9. Rate (in Rs./per fruit) for Ruchi was more than that for Seema for both oranges and pears. Seema paid Rs. 90 for all pears, which is exactly the same amount that Ruchi paid for all pears. If Rate (in Rs./per fruit) for each fruit was integer and Ruchi bought two oranges more than Seema, by what amount (in Rs.) was Seema's rate per unit for oranges lower than that of Ruchi's rate per unit?

1 ☐ 52 ☐ 43 ☐ 94 ☐ 7
[FeedBack](#)
[Bookmark](#)
[Answer key/Solution](#)

Q.83

If Least Common Multiple (LCM) of  $16! \times 20!$  and  $18! \times 19!$  is  $\frac{x!y!}{z!}$ , where  $x$  and  $y$  are two digit natural numbers and  $z$  is a single digit natural number. Find  $x + y + z$ .

1 ☐ 382 ☐ 393 ☐ 404 ☐ 41



Q.84

Find the minimum value of  $(a^2 + b^2 + c^2 + d^2 + ab + ac + ad + bc + bd + cd + abc + bcd + acd + abd)$ , if  $abcd = 1$ , where  $a, b, c, d$  are positive real numbers.




Q.85

Arun, Barun and Kiranmala start from the same place and travel in the same direction at speeds of 15, 20 and 30 km per hour respectively. Barun starts two hours after Arun. If Barun and Kiranmala overtake Arun at the same instant, how many hours after Arun did Kiranmala start?

1 ☐ 32 ☐ 3.53 ☐ 44 ☐ 4.5



Q.86

If a function is defined as,  $f(n) = \log_2 3 \times \log_3 4 \times \log_4 5 \times \dots \times \log_{(n-1)} n$ , find the value of  $\sum f(2^k)$  for  $k = 1, 2, 3, \dots, 90$ .




Q.87

There are three purses having fifty and hundred rupees notes. First purse has four hundred and two fifty rupees notes, second purse has eight hundred and six fifty rupees notes and third purse has six hundred and seven fifty rupees notes. If a note is drawn at random and it is found out to be a fifty rupees note, then what is the probability that it is from third purse?

1 ☐ 7/132 ☐ 7/15

3 ☐ 147/3554 ☐ 150/355

FeedBack

Bookmark

Answer key/Solution

Q.88

Ramlal mixed 125 litres of milk with 25 litres of water. He sells 60 litres of this mixture. He again adds 40 litres of water to the remaining mixture and then he sells 26 litres of mixture to a customer. What is the approximate amount (in litres) of pure milk the customer gets?

1 ☐ 152 ☐ 203 ☐ 114 ☐ 25

FeedBack

Bookmark

Answer key/Solution

Q.89

The sets  $P_n$  are defined as  $\{n, n + 1, n + 2, n + 3, n + 4, n + 5, n + 6, n + 7, n + 8\}$ , where  $n = 1, 2, 3, \dots, 520$ . How many of these sets contain a multiple of 17?

FeedBack

Bookmark

Answer key/Solution

Q.90

Golu and Chotu, who are two brothers share a herd of  $x$  cows. They take the cows to the market and sell each cow for Rs.  $x$ . All money is in either Rs.10 notes or Re.1 notes. One at a time they take out Rs.10 notes. The brother who draws first also draws last (for 10 rupee notes). The second brother complains about getting one less Rs.10 note. So the first brother offers him all the Re.1 notes without taking any. The second brother still received a total less than the first brother, so he asks the first brother to write him a cheque to balance things out. What should be the amount (in Rs.) to be paid by cheque?

1 ☐ 62 ☐ 33 ☐ 24 ☐ 4

FeedBack

Bookmark

Answer key/Solution

Q.91

$\Delta ABC$  is an equilateral triangle. A circle with radius  $3R$  is inscribed inside the triangle, also there are three small circles at the three corners, each with radius  $R$  such that they touch the two sides of the triangle and also touch the bigger circle. The length of the median  $AD$  is  $M$ . Find the ratio of the area of  $ABC$  to that of the area covered by the four circles.

1 ☐  $81\sqrt{3} : 4\pi$

2 ☐  $9\sqrt{3}:4\pi$

3 ☐  $81\sqrt{3}:8\pi$

4 ☐ None of these

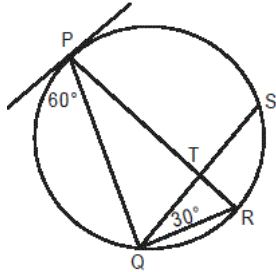
FeedBack

Bookmark

Answer key/Solution

**Q.92**

In the figure given below, PT bisects segment SQ and a tangent to the circle touches the circle at P. PQ makes an angle of  $60^\circ$  with tangent. If angle TQR is  $30^\circ$ , what fraction of the area of the full circle is the area of triangle TQR?



1 ☐  $\frac{\sqrt{3}}{2\pi}$

2 ☐  $\frac{\sqrt{3}}{4\pi}$

3 ☐  $\frac{\sqrt{3}}{8\pi}$

4 ☐  $\frac{3\sqrt{3}}{16\pi}$

FeedBack

Bookmark

Answer key/Solution

**Q.93**

S is set of positive integers less than 50 such that each number in the set when divided by five gives remainder three and has more than two factors. How many odd numbers are there in S?

FeedBack

Bookmark

Answer key/Solution

**Q.94**

There are three tanks A, B and C each of capacity 60 litres. Tank A, B and C contains water up to brim of different colour viz red, green and blue respectively. Tank A has two outlet pipes, each of which can empty the tank in 10 minutes. Tank B has three outlet pipes, each of which can empty the tank in 15 minutes. Tank C has one outlet pipe which can empty the tank in 20 minutes. If all outlet pipes are open and the water is collected in a bigger container, then find the ratio of red, blue and green coloured water in the bigger tank after 3 minutes and 30 seconds.

1 ☐ 4 : 4 : 1

2 ☐ 1 : 1 : 1

3 ☐ 4 : 1 : 4

4 ☐ 1 : 1 : 4

FeedBack

Bookmark

Answer key/Solution

Q.95

There are 60 students in a class which are divided in three groups A, B and C having 15, 20 and 25 students respectively. The average weight of groups of students is in the ratio of 20 : 15 : 12 respectively. Group B is divided into two sub groups viz D and E of equal number of students, and their average weights are in the ratio of 2 : 1 respectively. If all students of group E joined group A, then what is the percentage change in the average weight of group A

FeedBack

Bookmark

Answer key/Solution

Q.96

If  $y^2 f(y) + f(1 - y) = 2y - y^4$ , where  $y$  is a real number, then what is the value of  $f(2) + f(5)$ ?

1 ☐ 252 ☐ 73 ☐ -274 ☐ 0

FeedBack

Bookmark

Answer key/Solution

Q.97

$\alpha$  and  $\beta$  are the roots of the equation  $2x^2 - 3mx + 7m = 0$ . If  $\alpha - \beta > \sqrt{85}$ , what is the range of values that 'm' can take?

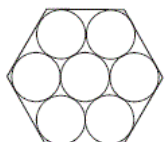
1 ☐  $m < -32/9$  or  $m > 10$ 2 ☐  $m < -34/9$  or  $m > 10$ 3 ☐  $m < -34/9$  or  $m > 8$ 4 ☐  $m < -32/9$  or  $m > 8$ 

FeedBack

Bookmark

Answer key/Solution

Q.98



Seven congruent circles are inscribed in a regular hexagon, as shown above. Find the ratio of length of the radius of the circles to that of the side of the

hexagon.

1 ☐  $\sqrt{3} : 2(1+\sqrt{3})$

2 ☐  $2\sqrt{3} : (1+\sqrt{3})$

3 ☐  $\sqrt{3} : (2+\sqrt{3})$

4 ☐  $2\sqrt{3} : (2+\sqrt{3})$

FeedBack

Bookmark

Answer key/Solution

Q.99

A person P started a business with a capital of Rs. 2,525 and another person Q joined P after some months with a capital of Rs. 1,200. Out of the total profit of Rs. 1,644 at the end of the year, P's share was Rs. 1,212. After how many months did Q join as a partner of P?

1 ☐ 2

2 ☐ 3

3 ☐ 4

4 ☐ 5

FeedBack

Bookmark

Answer key/Solution

Q.100

A group of N workers can complete a certain job in 9 days. They all started working together but on every alternate days starting from the second day, 2 workers are withdrawn from the job, and on every alternate days starting from the third day, one worker is added to the group. If it took 17 days to complete the work and on 17th day two workers worked, find the value of N.

FeedBack

Bookmark

Answer key/Solution