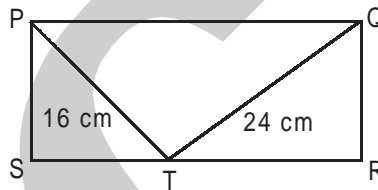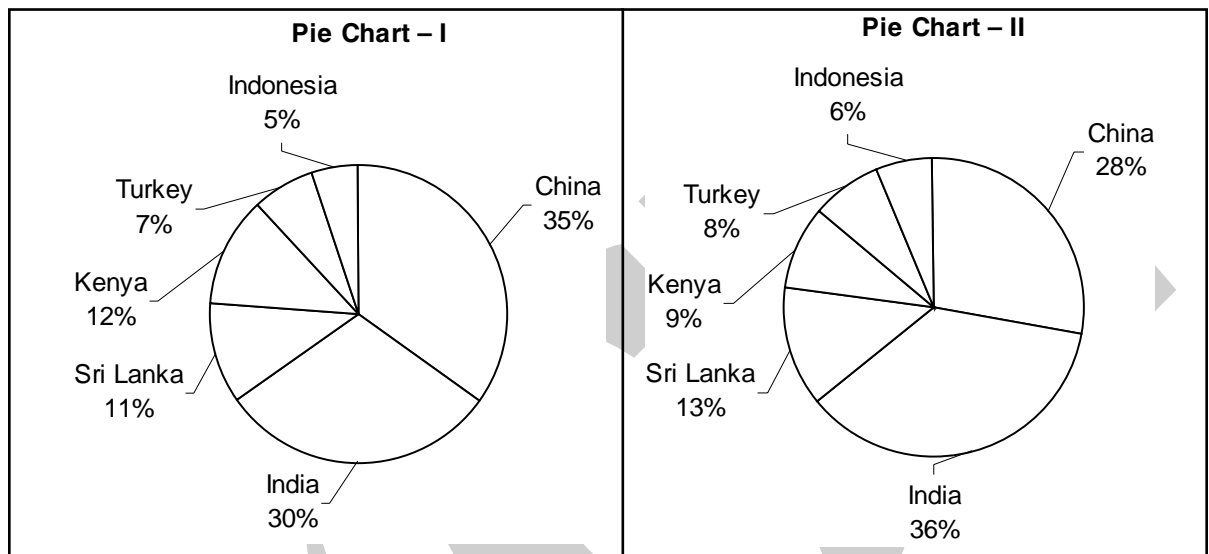# Proctored Mock CAT- 10 2012

Section I

1. $a_1, a_2, a_3, a_4, \ldots, a_{31}$ are in arithmetic progression. If $a_1 + a_7 + a_{13} + a_{19} + a_{25} + a_{31} = 372$, find the value of a_{16}.
    (a) 60   (b) 62   (c) 64   (d) 66

2. In the figure given below, PQRS is a rectangle. If PT = 16 cm, QT = 24 cm and $\angle PTQ = 90°$, what is the area (in cm^2) of the rectangle PQRS?

    (a) 384   (b) 192   (c) 768   (d) None of these

3. Two trains T1 and T2 start from stations A and B towards each other at speeds of 50 km/hr and 30 km/hr respectively. When they meet, it is found that the slower train has travelled 24 km less than the faster train. What is the distance (in km) between the two stations A and B?
    (a) 216   (b) 146   (c) 120   (d) 96

4. A survey was conducted on a group of people comprising 60% men and 40% women. Among men, 116 were married. Among women, 30% were married and 25% of the married women were housewives. If 70% people in the group were married, what was the number of married working women?
    (a) 18   (b) 24   (c) 28   (d) 20

5. The length (in metres) of the diagonals of three adjacent faces of a cuboidal room are $2\sqrt{13}$, $4\sqrt{5}$ and 10. What is half the length (in metres) of the largest possible straight rod that can be placed in the room?
    (a) $2\sqrt{29}$ (b) $2\sqrt{58}$ (c) $\sqrt{29}$ (d) $\sqrt{58}$

Directions for questions 6 to 8: Answer the questions on the basis of the information given below.

Pie Chart-I shows the percentage break-up of the 2.90 million tonnes of tea produced by six countries in the year 2010. Pie Chart-II shows the break-up of the total revenue of $8380 million generated by selling 2.90 million tonnes of tea produced by these countries in the year.

Pie Chart – I	Pie Chart – II

Pie Chart – I:
Indonesia 5%
Turkey 7%
Kenya 12%
Sri Lanka 11%
India 30%
China 35%

Pie Chart – II:
Indonesia 6%
China 28%
Turkey 8%
Kenya 9%
Sri Lanka 13%
India 36%

6. By what percent is the revenue generated per tonne of tea produced by Kenya more/less than that of Indonesia?
    (a) 60 (b) 42.5 (c) 37.5 (d) 31.4

7. What is the approximate difference between the revenue generated (in $ per kg) of tea produced by India and China?
    (a) 1.156 (b) 0.867 (c) 1.011 (d) 1.445

8. If the revenue generated per tonne of tea produced by China, Turkey and Sri Lanka are represented by C, T and S respectively, which of the following is true?
    (a) T > S > C (b) S > T > C (c) S > C > T (d) C > T > S

9. If one of the roots of the equation $2x^2 + (3k + 4)x + (9k^2 - 3k - 1) = 0$ is twice the other, then which of the following can be a value of 'k'?

    (a) $-\dfrac{2}{3}$ (b) $\dfrac{2}{3}$ (c) $-\dfrac{1}{3}$ (d) $\dfrac{1}{3}$

10. A line $x + y = 14$ cuts the curve $y = x^2 + 4x$ at two distinct points. What type of triangle will be formed by joining these two points to a third point (1, 20)?
    (a) Equilateral (b) Isosceles
    (c) Scalene (d) No such triangle is possible

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11. N = 2.xxyxxyxxy…, where at most one of the digits x and y is 0. Which of the following numbers, when multiplied by N, necessarily results in an integer?
(a) 198   (b) 666   (c) 990   (d) 1998

12. The speed of a railway engine is 45 kmph when no bogie is attached to it. It is observed that the reduction in the speed of the engine is directly proportional to the square root of the number of bogies attached to it. If the speed of the train is 9 kmph when 16 bogies are attached, find the maximum number of bogies that can be carried by the engine.
(a) 25   (b) 24   (c) 23   (d) 22

13. The question given below is followed by two statements, A and B. Mark the answer using the following instructions:
Mark (a) if the question can be answered by using both the statements together, but cannot be answered using either statement alone.
Mark (b) if the question can be answered by using either statement alone.
Mark (c) if the question cannot be answered even by using both the statements together.
Mark (d) if the question can be answered by using one of the statements alone, but cannot be answered by using the other statement alone.

Q. In how many days can 16 men and 4 women do a job?
A. A woman is 80% as efficient as a man.
B. Four men work for 8 days on the job. Then seven women work for 4 days to finish the remaining part of the job.

14. A circle cuts a square at 8 distinct points such that each side of the square contains a chord of the circle equal to the length of the radius of the circle. Find the ratio of the area of the circle to that of the square.
(a) $\pi : \sqrt{3}$ (b) $\pi : 3$ (c) $\pi : 2$ (d) $2\pi : 3$

15. What is the unit digit of $7^{14^{21}} + 4^{15^{25}}$?
(a) 3   (b) 5   (c) 7   (d) 9

16. $f(x-4) + 2f\left(\dfrac{1}{x-4}\right) = x^3$, where $x \neq 4$.
Find the value of f(2).
(a) $-\dfrac{45}{4}$ (b) $-\dfrac{25}{6}$ (c) $-\dfrac{45}{7}$ (d) $\dfrac{25}{6}$

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Directions for questions 17 to 19: Answer the questions on the basis of the information given below.

A group of 25 students from various graduation and post graduation courses across four renowned colleges took a Common Analytical Exam in which they were scored out of 100. The table given below shows the break-up of the number of students across graduation and post graduation and also the highest and the lowest scores in each group.

College	Graduation			Post Graduation			Total
	Highest score	Lowest score	No. of students	Highest score	Lowest score	No. of students	
AMS	80	78	2	79	65	4	**6**
PCL	92	56	4	84	84	1	**5**
NDMM	96	61	7	90	90	1	**8**
JIME	85	84	3	89	68	3	**6**
Total			**16**			**9**	**25**

17. At least what percentage of the students in the group scored below 80?
(a) 16%   (b) 32%   (c) 16.67%   (d) 28.11%

18. At most how many students of the group scored more than 72?
(a) 17   (b) 19   (c) 20   (d) 21

19. What is the absolute difference between the maximum and the minimum number of students scoring in the range 66 to 84 (both inclusive)?
(a) 11   (b) 13   (c) 15   (d) 12

20. How many natural numbers are factors of at least one of 6^{14}, 10^{12} and 15^{20}?
(a) 835   (b) 834   (c) 794   (d) 795

21. Avnish counted the digits used to number the pages of a book and found that the total number of digits used was 3441. Find the number of pages in the book.
(a) 1128   (b) 1137   (c) 1413   (d) None of these

22. Mr. X sold two books, one at a loss of 11.11% and the other at a gain of 25%. If the two books had cost him the same, what was his approximate overall gain/loss?
(a) 7% loss   (b) 9% gain   (c) 6% gain   (d) 7% gain

23. ABCD is a cyclic isosceles trapezium where AD and BC are the two parallel sides and the lengths of the sides AB, AD and BC are in the ratio 4 : 4 : 5. What is the ratio AD : AC?
(a) 2 : 5   (b) 2 : 3   (c) 4 : 5   (d) 4 : 7

24. If $\log_x n$ is the average of n and $\log_x \log_x n$, which of the following best describes 'n' for x = 10?
(a) $0 < n < 1$ (b) $1 < n < 10$ (c) $10 < n < 100$ (d) $100 < n < 1000$

25. Find the value of $\dfrac{4}{1+\dfrac{2-\sqrt{5}}{1-\dfrac{10}{1+\dfrac{\sqrt{5}+2}{\sqrt{5}-2}}}}$.

(a) $-4\sqrt{5}$ (b) 8   (c) $5+\sqrt{5}$ (d) None of these

26. A table of 'n' rows and 'n' columns is created such that the value of the cell in the ith row and the jth column is given by $(i + 1) + j$. Some numbers are selected from the table. If it is found that exactly one number has been selected from each row and each column, then the sum of the selected numbers will be equal to

(a) $n^2 + 1$ (b) $\dfrac{n(n+1)}{2}$ (c) $n(n + 2)$ (d) $n(n + 1)$

27. From the first 'n' consecutive natural numbers written on a blackboard, one of the numbers is removed. If the average of the remaining numbers is $32\dfrac{2}{9}$, then find the number removed.

(a) 50   (b) 64   (c) 46   (d) None of these

Directions for questions 28 to 30: Answer the questions on the basis of the information given below.

A company employs two different processes in its production wing. Both the processes require an initial investment of ₹5 lakh each. The bar graph given below shows the running cost for both the production processes. The running cost (in ₹) for both the processes comprises the maintenance cost, the material cost and the labour cost. The production happens in shifts and one shift is of six hours. Even if the target production is achieved before the end of a shift, the company has to bear the complete maintenance cost and the labour cost for that shift.

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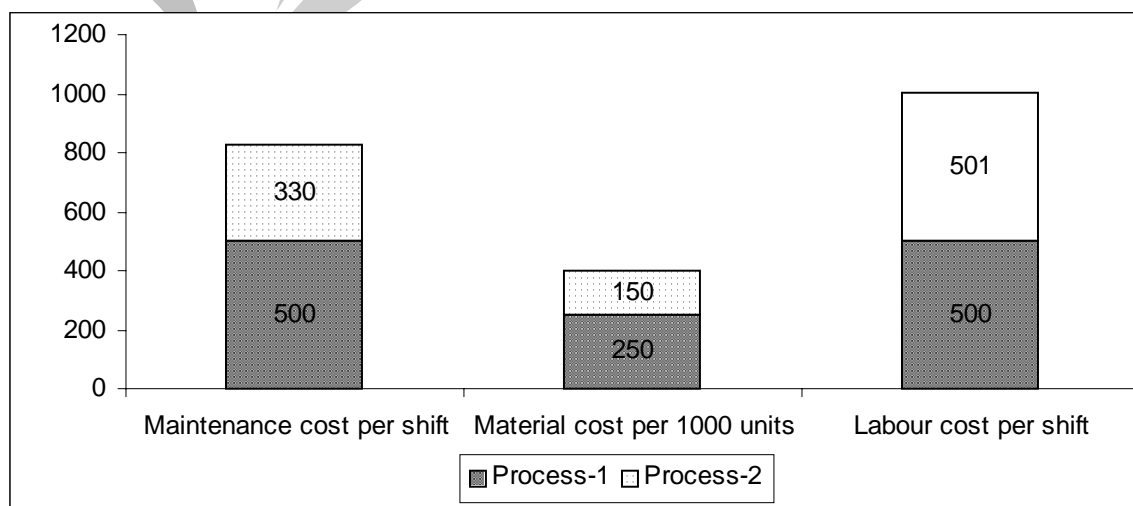
The line graph given below shows the break-up of time taken (in minutes) by each process to complete one cycle resulting in the production of 2 units.
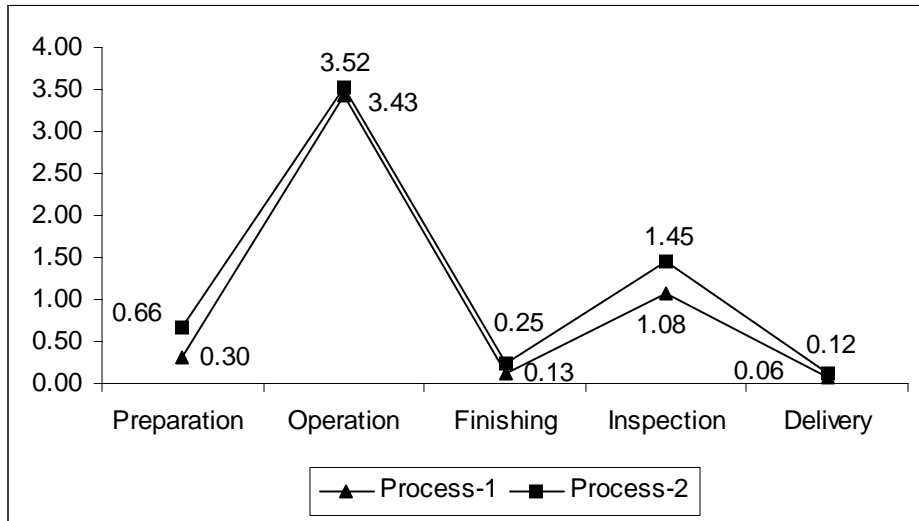
28. For which of the following weekly production targets (in units) would Process-2 be more cost effective?
(a) 288   (b) 400   (c) 500   (d) None of these

29. How much more cost would be incurred by the company if it chooses to use Process-1 over Process-2 to produce 6000 units?
(a) ₹1,050   (b) ₹1,150   (c) ₹1,191   (d) ₹1,200

30. How many hours are required to produce 1800 units using Process-1?
(a) 65   (b) 70   (c) 75   (d) 90

Directions for questions 31 to 33: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Steven Pinker contends, in his *'The Better Angels of Our nature: Why Violence Has Declined',* that we are living in a time in which violence is at an all time low.

Pinker bases his claim on statistical data. For example, the records of 14th century Oxford reveal 110 homicides per 100,000 people while the middle of the 20th century saw London with a murder rate of less than 1 person per 100,000.

Not surprisingly, people have pointed to the fact that modern wars have killed millions of people and that the number of people who die violently is fairly large. Pinker, not surprisingly, makes the obvious reply: the number of violent deaths is higher but the percentage is far lower-mainly because there are so many more people today relative to the past.

As the title suggests, Pinker attributes the change, in part, to people being better at impulse control, considering consequences, and also considering others. Pinker does also acknowledge that states have far more control now than in the past, which tends to reduce crime.

While Pinker makes a good case, it is also reasonable to consider other explanations that can be added to the mix.

The improved technology also means that modern soldiers are far more effective than soldiers in the past which reduces the percentage of the population that needs to be involved in combat, thus lowering the percentage of people killed.

There is also the fact that the nature of competition between human groups has changed. As such, people might be just as violently inclined as ever, only now we have far more avenues into which to channel that violence. So, for example, back in the day an ambitious man might want to become noble and achieve his ends through violence. Today a person with ambitions of conquest might start a business or waste away his life in computer games.

A rather interesting factor to consider is natural selection. Societies tend to respond to violent crimes with violence, often killing such criminals. Wars also tend to kill the violent. As such, centuries of war and violent crime might be performing natural selection on the human species-the more violent humans would tend to be killed, thus leaving those less prone to crime and violence to reproduce more. Crudely put, perhaps we are killing our way towards peace.

31. Which of the following identifies a flaw in the reasoning used by Steven Pinker to assert that the world is becoming a more peaceful place?

   (a) The representation of violence has significantly changed over the years thus rendering any comparison impossible.
   (b) The total number of people killed today is more than the total number of people killed in the past.
   (c) Violence can be represented by action other than those resulting in deaths.
   (d) The percentage of people killed in wars today is less than that in the past.

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32. Which of the following cannot be inferred as a reason for the world being less violent today?

(a) Compared to the past, people are now more considerate of each other.
(b) Compared to the past, violent offences now carry stronger penalties.
(c) Compared to the past, people have more avenues for channelling their aggression and ambition.
(d) Compared to the past, the army needs to have fewer soldiers in combat to achieve the same ends.

33. Which of the following best explains how "we are killing our way towards peace"?

(a) Individuals with a violent streak tend to be involved in activities that get them killed.
(b) Since more people are killed fewer violent people remain and the world thus becomes a less violent place.
(c) Capital punishment eliminates violent individuals and also acts as a strong deterrent.
(d) As individuals with violent tendencies are killed off, they tend to have fewer successors.

Directions for questions 34 and 35: Answer the questions on the basis of the information given below.

Mary, Saina, Sushil, Vijay and Yogeshwar are the best athletes of Khelnagar. They have different ages, heights and weights. It is also known that:
(i)   Saina, who is the youngest, is taller than exactly two athletes.
(ii) Sushil, who is the tallest, is also the lightest among the five athletes.
(iii) Vijay, who is taller than Saina, is the oldest among the five athletes.
(iv) Yogeshwar is lighter than Saina but heavier than Vijay.
(v)   Both Sushil and Mary are older than Yogeshwar.
(vi) Mary is either heavier than Saina or lighter than Vijay.

34. Who can be the shortest and the second youngest athletes respectively?
    (a) Mary and Sushil   (b) Yogeshwar and Sushil
    (c) Yogeshwar and Mary   (d) Mary and Yogeshwar

35. Who cannot be the second oldest and the second heaviest athletes respectively?
    (a) Mary and Saina   (b) Sushil and Vijay
    (c) Mary and Yogeshwar   (d) Sushil and Saina

Directions for question 36 to 38: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

The urgency of slowing down — to find the time and space to think — is nothing new, of course, and wiser souls have always reminded us that the more attention we pay to the moment, the less time and energy we have to place it in some larger context. "Distraction is the only thing that consoles us for our miseries," the French philosopher Blaise Pascal wrote in the 17th century, "and yet it is itself the greatest of our miseries." He also famously remarked that all of man's problems come from his inability to sit quietly in a room alone.

When telegraphs and trains brought in the idea that convenience was more important than content — and speedier means could make up for unimproved ends — Henry David Thoreau reminded us that "the man whose horse trots a mile in a minute does not carry the most important messages." Even half a century ago, Marshall McLuhan, who came closer than most to seeing what was coming, warned, "When things come at you very fast, naturally you lose touch with yourself."

Yet few of those voices can be heard these days, precisely because "breaking news" is coming through on CNN and Debbie is just posting images of her summer vacation and the phone is ringing. We barely have enough time to see how little time we have. And the more that floods in on us the less of ourselves we have to give to every snippet. All we notice is that the distinctions that used to guide and steady us — between Sunday and Monday, public and private, here and there — are gone.

We have more and more ways to communicate, as Thoreau noted, but less and less to say. Partly because we're so busy communicating. And — as he might also have said — we're rushing to meet so many deadlines that we hardly register that what we need most are lifelines.

So what to do? The central paradox of the machines that have made our lives so much brighter, quicker, longer and healthier is that they cannot teach us how to make the best use of them; the information revolution came without an instruction manual. All the data in the world cannot teach us how to sift through data; images don't show us how to process images. The only way to do justice to our onscreen lives is by summoning exactly the emotional and moral clarity that can't be found on any screen.

Maybe that's why more and more people I know, even if they have no religious commitment, seem to be turning to yoga, or meditation, or tai chi; these aren't New Age fads so much as ways to connect with what could be called the wisdom of old age. Two journalist friends of mine observe an 'Internet sabbath' every week, turning off their online connections from Friday night to Monday morning, so as to try to revive those ancient customs known as family meals and conversation.

36. What is the 'central paradox' described in the last paragraph?

    (a) We have too much information but not enough time to understand and appreciate it.
    (b) We need an instruction manual to understand the information revolution.
    (c) We can get everything except the thing we need the most – emotional and moral clarity.
    (d) We can get all the information we need to enrich our lives but no information on how to live our lives.

37. Which of the following best expresses the central idea of the passage?

    (a) The impact of the information revolution on our everyday lives.
    (b) Ways to cope with the information revolution.
    (c) The negative consequences of the information revolution.
    (d) The excesses of the information revolution.

38. Which one of the following is a valid inference from the passage?

    (a) The ability to sit quietly in a room alone is necessary to end all our miseries.
    (b) The information revolution has reduced our ability to concentrate on tasks that are important.
    (c) A lack of distraction is necessary to make meaningful conversations.
    (d) More information does not necessarily lead to more knowledge.

39. Six persons – Alen, Doodle, Ray, Talat, Wako and Wexon – are sitting at the table shown below, marked with positions 1 to 6, in no particular order. Doodle is sitting to the North-West of Wako. Alen is sitting to the South-West of Wexon. Ray is sitting to the North-East of Wako.
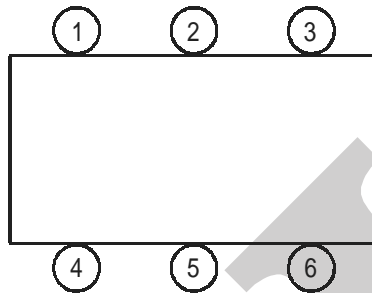
If Position 5 is to the South of Position 2, who is sitting at Position 4?
(a) Talat   (b) Doodle   (c) Alen   (d) Wako

Directions for question 40 to 42: The passage given below is followed by a set of three questions. Choose the most appropriate answer to each question.

Occupy. It is now nearly impossible to hear the word and not think of the Occupy movement. Even as distinguished an expert as the lexicographer and columnist Ben Zimmer admitted as much this week: "occupy," he said, is the odds-on favorite to be chosen as the American Dialect Society's Word of the Year.

It has already succeeded in shifting the terms of the debate, taking phrases like "debt-ceiling" and "budget crisis" out of the limelight and putting terms like "inequality" and "greed" squarely in the center. This discursive shift has made it more difficult for Washington to continue to promote the spurious reasons for the financial meltdown and the unequal outcomes it has exposed and further produced.

To most, the irony of a progressive social movement using the term "occupy" to reshape how Americans think about issues of democracy and equality has been clear. After all, it is generally nations, armies and police who occupy, usually by force. And in this, the United States has been a leader. The American government is just now after nine years ending its overt occupation of Iraq, is still entrenched in Afghanistan and is maintaining troops on the ground in dozens of countries worldwide. All this is not to obscure the fact that the United States as we know it came into being by way of an occupation — a gradual and devastatingly violent one that all but extinguished entire Native American populations across thousands of miles of land.

Yet in a very short time, this movement has dramatically changed how we think about occupation. In early September, "occupy" signaled on-going military incursions. Now it signifies progressive political protest. It's no longer primarily about force of military power; instead it signifies standing up to injustice, inequality and abuse of power. It's no longer about simply occupying a space; it's about transforming that space.

In this sense, Occupy Wall Street has occupied language, has made "occupy" its own. And, importantly, people from diverse ethnicities, cultures and languages have participated in this linguistic occupation — it is distinct from the history of forcible occupation in that it is built to accommodate all, not just the most powerful or violent.

40. Which of the following best expresses the irony mentioned in the third paragraph?

(a) Occupy no longer means just occupying a space, rather it means transforming that space.
(b) The word 'occupy' now denotes a movement towards democracy and equality whereas occupation is usually carried out by armies and nations including the United States itself.
(c) Occupy was traditionally used to mean military occupation; it now signifies peaceful protest.
(d) The United States came into existence by means of occupation and now the occupy movement is being used to destabilize the government.

41. The author of the passage is primarily concerned with:

(a) describing the various meanings of the word 'occupy'.
(b) discussing the various connotations the word 'occupy' has had at different times.
(c) describing the importance of the Occupy Wall Street movement.
(d) describing the impact the Occupy Wall Street movement has had on the word 'occupy'.

42. Which of the following cannot be inferred from the passage?

(a) People belonging to various cultures and ethnicities have participated in the Occupy Wall Street movement.
(b) The author is critical of the actions of the United States government.
(c) The Occupy movement has made it more difficult for Washington to give excuses for the financial meltdown.
(d) The United States has been involved in the military occupation of several countries.

Directions for questions 43 to 45: Answer the questions on the basis of the information given below.

Fourteen people are standing in a queue to buy movie tickets. Ramesh, a 17-year old school boy, is the last person in the queue. It is observed that there are two boys and one girl among any three consecutive persons in the queue. The booking counter opens at 2:45 PM. A boy spends exactly 3 minutes while a girl spends exactly 4 minutes at the counter. The counter is closed for 12 minutes after every sixth person in the queue is done.

43. At what time is Ramesh expected to leave the booking counter?
(a) 3:56 PM   (b) 3:55 PM   (c) 3:54 PM   (d) Cannot be determined

44. If the 4th person in the queue leaves the booking counter at 2:58 PM, at what time will the 10th person in the queue leave the counter?
(a) 3:29 PM   (b) 3:30 PM   (c) 3:31 PM   (d) Cannot be determined

45. If the 7th person in the queue leaves the counter at 3:21 PM, find the number of girls in the queue.
(a) 5   (b) 4   (c) 3   (d) Either (a) or (b)

46. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

Britannica said while its decision to focus on online editions was influenced by the shift in consumer pattern, the ability to update content at a short notice also played a big role. A printed encyclopaedia is obsolete the minute that you print it. Whereas an online edition is updated continuously. At the same time, frequent users of the encyclopaedia said they preferred using the online version more than the print one.

(a) Britannica has to answer thousands of questions each month through chat and email.
(b) For readers, doing a keyword search in an online resource is a lot faster.
(c) Britannica has largely moved away from its encyclopaedia work to focus in recent years on educational software.
(d) Companies across the globe have been trying to boost their online presence in a bid to cash in on the fast-growing market.

47. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

Boo, a journalist with The New Yorker, spent four years following the lives of the residents of Annawadi, a slum near the airport in Mumbai. Her research would have been tough without the aid of Unnati Tripathi, who she credits as her translator and co-interlocutor. It's not often that one hears of people who assist writers with their stories. They are indispensable facilitators who arrange interviews, provide research and act as liaisons and translators.

(a) India has always been a place that guarantees a writer or a foreign journalist a good story.
(b) Mumbai, which is often the first port of call for foreign journalists, is home to a small group of 'fixers'.
(c) For many, being a liaison is a full-time job.
(d) Every writer keen on plumbing the depths of Mumbai's underworld pays a visit to S Hussain Zaidi, the city's best known crime reporter.

48. A paragraph is given below from which the last sentence has been deleted. From the given options, choose the one that completes the paragraph in the most appropriate way.

The investigation of what women do before and after migration shows that in rural India, while seasonal agricultural work is the primary occupation both before and after migration, brick-making becomes the next most popular occupation post migration. This has several negative implications, particularly in relation to gender. Although some survival may be ensured from this form of labour migration, it offers virtually no opportunity for social advancement or economic independence for women.

(a) Most of the work of female migrants is unskilled and skilled manual work.
(b) Among urban migrants, paid domestic work and construction work together account for the occupations of almost half of all women.
(c) Regular work for a private entity is most common for urban migrants.
(d) The rate of female migration has risen in both rural and urban India, even as the rate of male migration has fallen in rural India.

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49. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one.
A. The reasons might not be immediately apparent.
B. In a survey conducted, Obama went from being tied with Romney in trial heats last fall to holding an eight-point lead.
C. Gallup tracking data show Obama's job approval rating very close to where it was in mid-October of 2011—dipping just under water-level in the mid-40s.
D. There are a few surveys that show something closer to 50, but national approval figures may actually overstate the President's position.
E. The turnaround was even faster in the New York Times/CBS News poll, which found Obama trailing Romney by two points in January and up by six this week.

(a) BECAD   (b) BEACD   (c) DCABE   (d) CBADE

50. Five sentences are given below, labeled A, B, C, D and E. They need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the most appropriate one.
A. It's no secret that red meat can be harmful to our health.
B. Now researchers led by An Pan at the Harvard School of Public Health quantify how eating red meat can hasten death.
C. While high in protein, it's also packed with fats that can contribute to heart disease and diabetes and other compounds that can promote cancer.
D. Lead author Pan studied more than 121,000 doctors and nurses and found that a daily serving of red meat boosted the risk of heart disease death by around 19.5%, and the risk of dying from cancer by 13%.
E. And, perhaps more importantly, how substituting it with other forms of protein, such as fish and chicken, can counteract that deadly effect.

(a) BEACD   (b) BDEAC   (c) ACBED   (d) ABECD

51. There are two gaps in the sentence/paragraph given below. From the pairs of words given, choose the one that fills the gaps most appropriately.
Publishers soon discovered that the gentlest and most_____female novelists were tough-minded and _____when their professional integrity was at stake.

(a) refined, meandering   (b) idyllic, unyielding
(c) ladylike, relentless   (d) decorous, genteel

Directions for questions 52 to 54: Answer the questions on the basis of the information given below.

Six students – Amay, Calcy, Imam, Marley, Rudd and Sam – belong to six different countries – Australia, Canada, France, India, Russia and Spain, in no particular order. Each of them applies to two of the six different universities in USA – Arizona, Chicago, Florida, Illinois, Rice and Stanford through a common application form. They also indicate their 1st and 2nd preference of university in the application form. It is also known that:
(i)   For any candidate, the first letters of his/her name, the name of his/her country and the names of his/her preferred universities are distinct.
(ii)   No two candidates choose the same university for their first preference. The same is true for their second preference.
(iii) Rudd, who is from Australia, and Calcy apply to the same two universities. No other pair of two students among the six does the same.
(iv) Florida University is the 1st preference for Imam and the 2nd preference for Marley.
(v)   The 2nd preference of the French student is Chicago University. The 1st preference of the Spaniard is Arizona University.

52. Whose 2nd preference is Stanford University?
     (a) Calcy   (d) Rudd   (c) Imam   (d) Cannot be determined

53. Sam belongs to which country?
     (a) Russia   (b) France   (c) India   (d) None of these

54. Which of the following statements can be true?
     (a) Calcy and Marley make it to Illinois University and Florida University respectively.
     (b) The 2nd preference of Amay is Rice University.
     (c) The Indian student makes it to Rice University.
     (d) None of these

55. Given below are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option.
     1. Judicial over-activism deprives the people of the political experience and the moral education and stimulus that come from fighting the problems in the ordinary way, and correction of their own errors.
     2. Although the doctrine of separation of powers has not been recognised under the Constitution in its absolute rigidity, however the Constitution makers have meticulously defined the functions of various organs of the State.
     3. The legislature, executive and judiciary have to function within their own spheres demarcated in the Constitution.
     4. No organ can usurp the function of another.
     5. While exercise of powers by the legislature and executive is subject to judicial restraint the only check on our own exercise of power is the self imposed discipline of judicial restraint."

     (a) 1, 2 and 3   (b) 2, 3 and 4   (c) 1 and 4   (d) 1, 2 and 5

56. Given below are five sentences or parts of sentences that form a paragraph. Identify the sentence(s) or part(s) of sentence(s) that is/are incorrect in terms of grammar and usage. Then, choose the most appropriate option.
    1. History is replete with examples of the human proclivity to punish a people for the perceived sins of individuals.
    2. Modernity is no hurdle, as Nazi Germany proved towards the Jews, and as Israel, ironically, proves with the Palestinians.
    3. The method to collective punishment has so far proved very effective.
    4. As societies emerge from the dark of backwardness and conflict at the light of civilization, they cannot condone collective punishment.
    5. No nation that aspires for greatness can endorse something so fundamentally unfair.

    (a) 1 and 2　　　　　(b) 1, 3 and 4　　　　　(c) 3, 4 and 5　　　　　(d) 2 and 5

57. The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.

    TAP

    (a) He was busy tapping away at his computer.
    (b) The movie seems to tap into a general sentimentality about animals.
    (c) Richards has been tapped into to replace the retiring chairperson.
    (d) We have this sort of information on tap.

58. The word given below has been used in sentences in four different ways. Choose the option corresponding to the sentence in which the usage of the word is incorrect or inappropriate.

    PIT

    (a) He went down the pit when he left school.
    (b) He had a sudden sinking feeling in the pit of his stomach.
    (c) Lawyers and accountants felt that they were being pitted against each other.
    (d) Smallpox scars had pitted in his face.

59. Four sentences are given below, labeled (a), (b), (c) and (d). Of these, three statements need to be arranged in a logical order to form a coherent paragraph/passage. From the given options, choose the option that does not fit the sequence.

    (a) Medea, daughter of the King of Colchis, has betrayed her country and family out of love for the Greek adventurer Jason, who has brought her back to Greece.
    (b) But, we say, Medea could not help acting as she did; she was overcome by passion, so surely she had no real choice.
    (c) He does not understand the depth of her outrage; her sacrifice and devotion mean little to him.
    (d) Now they have fallen on hard times, and to mend his fortunes Jason has left Medea and their two sons and is to marry the daughter of the King of Corinth.

60. A paragraph is given below. From amongst the four alternative text summaries given for the paragraph, choose the one that best captures the essence of the text.

In itself, the shorter format demeans women. It gives ammunition to opponents of equal pay, who argue that women put in fewer hours and attract less interest than men. And the discrimination is unusually sexist. While most of the twentieth-century Olympic Games did not include women's distance-running events because of similar old-fashioned prejudice, amends were made in the 1980s. Since then, women have competed in events as gruelling as the marathon with no ill effects. In tennis, meanwhile, the influence of the Victorian mind-set is still apparent.

(a) Women tennis players can compete with men on any terms.
(b) There is discrimination against women tennis players which women participating in equally gruelling sports do not face.
(c) There is still some support for the discriminatory idea that women tennis players cannot play longer matches.
(d) Despite proving their mettle in events as gruelling as marathons, women athletes are still discriminated against.

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Answers and Explanations

1	b	2	a	3	d	4	a	5	c	6	c	7	a	8	b	9	c	10	b
11	d	12	b	13	a	14	b	15	b	16	a	17	b	18	d	19	a	20	d
21	b	22	d	23	b	24	b	25	b	26	c	27	a	28	d	29	a	30	c
31	c	32	b	33	d	34	d	35	b	36	d	37	c	38	d	39	c	40	b
41	d	42	a	43	d	44	b	45	a	46	b	47	c	48	a	49	b	50	c
51	c	52	d	53	c	54	a	55	d	56	c	57	c	58	d	59	b	60	c

1. b Let 'd' be the common difference of the given arithmetic progression.

Given, $a_1 + a_7 + a_{13} + a_{19} + a_{25} + a_{31} = 372$.

$\Rightarrow a_1 + (a_1 + 6d) + (a_1 + 12d) + (a_1 + 18d) + (a_1 + 24d) + (a_1 + 30d) = 372$

$\Rightarrow 6a_1 + 90d = 372$

$\Rightarrow a_1 + 15d = 62$

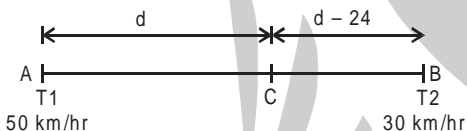$\Rightarrow a_{16} = 62.$　　　　　　$(\because a_{16} = a_1 + 15d)$

2. a
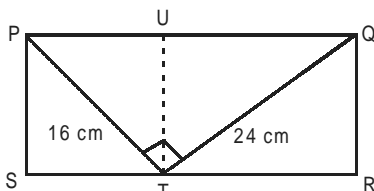
Let us draw a line TU perpendicular to PQ.
$\therefore$ Area of rectangle PQRS = PQ × QR

$= 2 \times \dfrac{1}{2} \times PQ \times TU = 2 \times (\text{area of } \Delta PTQ)$

$= 2 \times \dfrac{1}{2} \times QT \times PT = 2 \times \dfrac{1}{2} \times 24 \times 16 = 384 \text{ cm}^2.$

3. d

Let the two trains T1 and T2 meet at point C.

Then, $\dfrac{d}{50} = \dfrac{d - 24}{30}$.

　　5d　120　3d
$\Rightarrow d = 60$
Hence, the distance between the stations A and B
= d + d − 24 = 60 + 60 − 24 = 96 km.

4. a Let the number of men and women in the group be 'm' and 'f' respectively.

Now, $m = \dfrac{3}{2}f$.

The number of married women $= \dfrac{3}{10}f$

70% of the group was married,

i.e. $\dfrac{7}{10}(m + f) = \dfrac{7}{10} \times \dfrac{5}{2}f = \dfrac{7}{4}f$ was the number of married people.

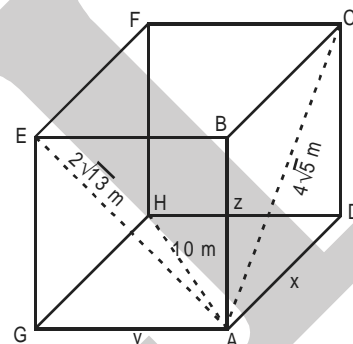The number of married men $= \dfrac{7}{4}f - \dfrac{3}{10}f = \dfrac{29}{20}f = 116$

Therefore, $f = 116 \times \dfrac{20}{29} = 80$.

Hence, the number of married working women
= (100 − 25)% of married women

= 75% of $\dfrac{3}{10}f = \dfrac{3}{4} \times \dfrac{3}{10} \times 80 = 18.$

5. c

Let x, y and z (in metres) be the length, breadth and height of the cuboidal room respectively.

Then, $x^2 + y^2 = 10^2 \Rightarrow x^2 + y^2 = 100$　　　… (i)

$x^2 + z^2 = \left(4\sqrt{5}\right)^2 \Rightarrow x^2 + z^2 = 80$　　　… (ii)

$y^2 + z^2 = \left(2\sqrt{13}\right)^2 \Rightarrow y^2 + z^2 = 52$　　　… (iii)

From (i), (ii) and (iii), we get

$2\left(x^2 + y^2 + z^2\right) = 100 + 80 + 52 = 232$.

$\Rightarrow x^2 + y^2 + z^2 = 116$
The length of the largest rod = The length of the body

diagonal $= \sqrt{x^2 + y^2 + z^2}$

$= \sqrt{116} = 2\sqrt{29}$ m

Hence, half the length of the largest rod $= \sqrt{29}$ m.

6. c Revenue generated from tea produced by Kenya

$= \dfrac{0.09 \times 8380}{0.12 \times 2.9} = \$0.75 \times \dfrac{8380}{2.9}$ per tonne

Revenue generated from tea produced by Indonesia

$= \dfrac{0.06 \times 8380}{0.05 \times 2.9} = \$1.2 \times \dfrac{8380}{2.9}$ per tonne

Hence, revenue generated from tea produced by

Kenya is $\dfrac{1.2 - 0.75}{1.2} \times 100 = 37.5\%$ less than that of

Indonesia.

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7. a Revenue generated from tea produced by India

$$= \frac{0.36 \times 8380}{0.30 \times 2.9} = \$1.2 \times \frac{8380}{2.9} \text{ per tonne}$$

Revenue generated from tea produced by China

$$= \frac{0.28 \times 8380}{0.35 \times 2.9} = \$0.8 \times \frac{8380}{2.9} \text{ per tonne}$$

Hence, the difference

$$= 1.2 \times \frac{8380}{2.9} - 0.8 \times \frac{8380}{2.9}$$

$$= 0.4 \times \frac{8380}{2.9} \approx \$1156 \text{ per tonne or } \$1.156 \text{ per kg.}$$

8. b Revenue generated from tea produced by a country

$$= \frac{y\% \text{ of } 8380}{x\% \text{ of } 2.9} = \$\left(\frac{y}{x}\right)\left(\frac{8380}{2.9}\right) \text{ per tonne}$$

For China, $\frac{y}{x} = \frac{28}{35} = 0.8 = C$,

for Turkey, $\frac{y}{x} = \frac{8}{7} \approx 1.14 = T$

and for Sri Lanka, $\frac{y}{x} = \frac{13}{11} \approx 1.18 = S$.

Hence, $S > T > C$.

9. c Let one of the roots of the given equation be 'α'. Then, the other root will be '2α'.

∴ Sum of the roots $= \alpha + 2\alpha = \frac{-(3k+4)}{2}$

$$\Rightarrow \alpha = \frac{-(3k+4)}{6} \qquad \ldots\text{(i)}$$

and product of the roots $= \alpha \times 2\alpha = \frac{9k^2 - 3k - 1}{2}$

$$\Rightarrow \alpha^2 = \frac{9k^2 - 3k - 1}{4} \qquad \ldots\text{(ii)}$$

From (i) and (ii), we get

$$\left[\frac{-(3k+4)}{6}\right]^2 = \frac{9k^2 - 3k - 1}{4}$$

$$\Rightarrow 72k^2 - 51k - 25 = 0$$

$$\Rightarrow (3k+1)(24k-25) = 0$$

$$\Rightarrow k = -\frac{1}{3} \text{ or } \frac{25}{24}.$$

10. b The points of intersection of the curve and the line are given by:

$x^2 + 4x = 14 - x$

$$\Rightarrow x^2 + 5x - 14 = 0 \Rightarrow (x+7)(x-2) = 0$$

Therefore, x = –7 or 2 and y = 21 or 12.
So the points of intersection are A(–7, 21) and B(2, 12). These two points are joined to a third point C(1, 20).

$$AB = \sqrt{(2+7)^2 + (12-21)^2} = 9\sqrt{2} \text{ units}$$

$$AC = \sqrt{(1+7)^2 + (20-21)^2} = \sqrt{65} \text{ units}$$

$$BC = \sqrt{(1-2)^2 + (20-12)^2} = \sqrt{65} \text{ units}$$

Clearly, ABC forms a triangle as the sum of two sides is greater than the third side.
Since AC = BC, it is an isosceles triangle.

11. d $N = 2.\overline{xxyyxxyy}... \Rightarrow 1000N = 2xxy.\overline{xxyyxxy}...$
Therefore, 999 × N = 2xxy – 2.

$$\Rightarrow N = \frac{2xxy - 2}{999}$$

Hence, N must be multiplied by 1998, as 1998 is a multiple of 999.

12. b Since the speed of the engine decreases by 36 kmph with an addition of 16 bogies,

$$\sqrt{16} \propto 36$$

$$\Rightarrow 4k = 36, \text{ where k is the constant of proportionality}$$

$$\Rightarrow k = 9$$

If the speed of the railway engine decreases by 45 kmph with an addition of 'n' bogies i.e. the engine comes to a halt,

$$\sqrt{n} \propto 45$$

$$\Rightarrow \sqrt{n}\,k = 45, \text{ where k is the proportionality constant}$$

$$\Rightarrow 9\sqrt{n} = 45$$

$$\Rightarrow n = 25$$

Therefore, the speed of the train would be zero if 25 bogies are added. Hence, the engine can carry a maximum of 24 bogies.

13. a Suppose a man takes 'm' days and a woman takes 'w' days to do the job.

Statement A: $\frac{1}{w} = 80\% \text{ of } \frac{1}{m} = \frac{4}{5m}$ …(i)

Hence, statement A alone is not sufficient to answer the question.

Statement B: $\frac{4}{m} \times 8 + \frac{7}{w} \times 4 = 1 \Rightarrow \frac{32}{m} + \frac{28}{w} = 1$ …(ii)
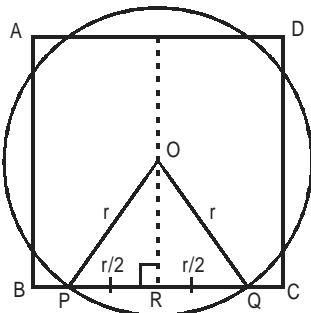
Hence, statement B alone is not sufficient to answer the question.
Combining both the statements A and B, we get

$$32 \times \frac{5}{4w} + \frac{28}{w} = 1 \Rightarrow w = 68 \text{ days}$$

Hence, we can find the value of 'm' and therefore, the number of days required by 16 men and 4 women to do the job.

14. b

Let the radius of the circle with center O be 'r' and ABCD be the square.
Let us drop a perpendicular from the center O on the side BC of the square. This will bisect the chord PQ at R.

Therefore, PR = RQ = $\frac{r}{2}$

and OR = $\sqrt{OP^2 - PR^2} = \frac{\sqrt{3}}{2}r$.

Therefore, the length of the side of the square
= 2 × OR = $\sqrt{3}\,r$.

Hence, the ratio = $\pi r^2 : (\sqrt{3}\,r)^2 = \pi : 3$.

15. b We know that the cyclicity of the unit digit of 7 is 4 and that of 4 is 2.

We can express $7^{14^{21}}$ as 7^{4k+p}.

Now, $4k + p = 14^{21}$.

So the value of $p = \text{Rem}\left[\frac{14^{21}}{4}\right] = \text{Rem}\left[\frac{(2)^{21}}{4}\right]$

$= \text{Rem}\left[\frac{(4)^{10} \times 2}{4}\right] = 0$.

Therefore, the unit digit of $7^{14^{21}} = 7^{4k}$ will be 1.

Similarly, the unit digit of $4^{15^{25}}$ will be 4.

Hence, the unit digit of $(7^{14^{21}} + 4^{15^{25}})$ will be (1 + 4) = 5.

16. a When x – 4 = 2,

$$f(2) + 2f\left(\frac{1}{2}\right) = 6^3 \qquad \ldots(i)$$

When $\frac{1}{x-4} = 2$,

$$2f(2) + f\left(\frac{1}{2}\right) = \left(\frac{9}{2}\right)^3 \qquad \ldots(ii)$$

From (i) and (ii), we get

$$3f(2) = \frac{9^3}{4} - 6^3 = \frac{3^3}{4}(3^3 - 2^5)$$

$$\Rightarrow f(2) = \frac{9}{4}(27 - 32) = -\frac{45}{4}.$$

17. b The minimum number of students scoring below 80 from:
AMS – 1 (Graduation) and 4 (Post Graduation)
PCL – 1 (Graduation) and 0 (Post Graduation)
NDMM – 1 (Graduation) and 0 (Post Graduation)
JIME – 0 (Graduation) and 1 (Post Graduation)
i.e. there are at least 8 such students.

Hence, the percentage = $\frac{8}{25} \times 100 = 32\%$.

18. d The maximum number of students scoring more than 72 from:
AMS – 2 (Graduation) and 3 (Post Graduation)
PCL – 3 (Graduation) and 1 (Post Graduation)
NDMM – 6 (Graduation) and 1 (Post Graduation)
JIME – 3 (Graduation) and 2 (Post Graduation)
i.e. there are at most 21 such students.

19. a The minimum number of students scoring in the range 66 to 84 (both inclusive) from:
AMS – 2 (Graduation) and 1 (Post Graduation)
PCL – 0 (Graduation) and 1 (Post Graduation)
NDMM – 0 (Graduation) and 0 (Post Graduation)
JIME – 1 (Graduation) and 1 (Post Graduation)
i.e. there are at least 6 such students.
Similarly, the maximum number of such students is 17.
Hence, the difference = 17 – 6 = 11.

20. d $6^{14} = 2^{14} \times 3^{14}$; $10^{12} = 2^{12} \times 5^{12}$; $15^{20} = 3^{20} \times 5^{20}$
The number of factors of 6^{14} = (14 + 1)(14 + 1) = 225
The number of factors of 10^{12} = (12 + 1)(12 + 1) = 169
The number of factors of 15^{20} = (20 + 1)(20 + 1) = 441
Among the three, the lowest power of 2 is 12, that of 3 is 14 and that of 5 is 12.
2^{12} has 13, 3^{14} has 15 and 5^{12} has 13 factors and they have 1 as their common divisor.
Hence, the total number of factors = 225 + 169 + 441 – 13 – 15 – 13 + 1 = 795.

21. b From pages 1 to 9, 9 digits were used.
From pages 10 to 99, a total of $2 \times 90 = 180$ digits were used.
From pages 100 to 999, a total of $3 \times 900 = 2700$ digits were used.
There were $3441 - (9 + 180 + 2700) = 552$ digits

remaining, which would have $\dfrac{552}{4} = 138$ pages.

Hence, the total number of pages = 9 + 90 + 900 + 138 = 1137.

22. d Loss of 11.11% = $\dfrac{1}{9}$ implies that when cost price =

₹9, selling price = ₹8.

Gain of 25% = $\dfrac{1}{4}$ implies that when cost price = ₹4,

selling price = ₹5.
Since the two books were equally priced, their cost prices were equal.
Cost price of the two books = $9 \times 4 + 4 \times 9 = $ ₹72
Selling price of the two books = $8 \times 4 + 5 \times 9 = $ ₹77

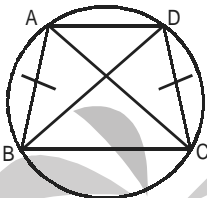Hence, gain percentage = $\dfrac{5}{72} \times 100 \approx 7\%$.

Alternate solution:
Let cost price of each book be ₹x.
Then, selling price of the first book ≈ ₹0.89x and that of the second book = ₹1.25x.

Hence, gain percentage $\approx \dfrac{2.14x - 2x}{2x} \times 100 = 7\%$.

23. b

Let AB = DC = 4k, AD = 4k and BC = 5k.
ABCD is a cyclic quadrilateral. So applying Ptolemy's Theorem,
AB × DC + BC × AD = AC × BD
$\Rightarrow$ AC × BD = $4k \times 4k + 5k \times 4k = 36k^2$
The diagonals of an isosceles trapezium are equal.
So AC = BD = 6k.
Hence, AD : AC = 4k : 6k = 2 : 3.

24. b Since $\log_{10} n$ is the average of n and $\log_{10} \log_{10} n$,

$\log_{10} n = \dfrac{n + \log_{10}\log_{10} n}{2}$.

$\Rightarrow \log_{10} n^2 = \log_{10} 10^n + \log_{10}\log_{10} n$

$\Rightarrow \log_{10} n^2 = \log_{10}(10^n \log_{10} n)$

$\Rightarrow n^2 = 10^n \log_{10} n$ ...(i)

If n < 1, two sides of the equation (i) have opposite signs.

If n > 10, $10^n \log_{10} n > 10^n = \left(\sqrt{10}\right)^{2n} > \left(2^n\right)^2 > n^2$.

So the equation (i) doesn't hold for n < 1 and n > 10. Hence, $1 < n < 10$.

25. b $\dfrac{4}{1 + \dfrac{2-\sqrt5}{1 - \dfrac{10}{1 + \dfrac{\sqrt5 + 2}{\sqrt5 - 2}}}} = \dfrac{4}{1 + \dfrac{2-\sqrt5}{1 - \dfrac{10}{1 + \dfrac{\left(\sqrt5 + 2\right)^2}{\left(\sqrt5\right)^2 - 2^2}}}}$

$= \dfrac{4}{1 + \dfrac{2-\sqrt5}{1 - \dfrac{10}{10 + 4\sqrt5}}} = \dfrac{4}{1 + \dfrac{2-\sqrt5}{\dfrac{4\sqrt5}{10 + 4\sqrt5}}} = \dfrac{4}{1 + \dfrac{2-\sqrt5}{\dfrac{2}{2 + \sqrt5}}}$

$= \dfrac{4}{1 + \dfrac{\left(2-\sqrt5\right)\left(2+\sqrt5\right)}{2}} = \dfrac{4}{1 - \dfrac{1}{2}} = 8$.

26. c One number is selected from each row. Let us say in row one, the number is picked from column j_n, in row two the number is picked from column j_{n-1} and so on.
So all the numbers in the set will be $1 + j_n + 1$, $2 + j_{n-1} + 1$, $3 + j_{n-2} + 1$,…, $i + j_{n-i+1} + 1$,…, $n + j_1 + 1$.
Sum of all the elements of any such set = $(1 + j_n + 1)$ $+ (2 + j_{n-1} + 1) + (3 + j_{n-2} + 1) + … + (i + j_{n-i+1} + 1) + … + (n + j_1 + 1)$ $= (1 + 2 + ... + n) + (j_1 + j_2 + ... + j_n) + $

$\underset{n\,\text{times}}{(1 + 1 + … + 1)} = \sum_{i=1}^{n} i + \sum_{i=1}^{n} j_i + \sum_{i=1}^{n} 1$

Since exactly one number is selected from each column, $j_1, j_2, j_3, …, j_n$ will be 1, 2, 3, …,n (in any order).

Therefore, required sum = $\dfrac{n(n+1)}{2} + \dfrac{n(n+1)}{2} + n = n^2$

$+ 2n = n(n + 2)$.

Alternate solution:
Consider a 1×1 table. The only value in the table is $(1 + 1) + 1 = 3$.
Putting n = 1 in all the options, only n(n + 2) gives the value as 3.

27. a Let a number 'x' be removed from the first n consecutive natural numbers written on the blackboard.

Then, $\dfrac{\dfrac{n(n+1)}{2} - x}{(n-1)} = 32\dfrac{2}{9}$.

We know that the maximum decrease in the average of the first 'n' natural numbers can be caused by removing 'n' and minimum decrease (or maximum increase) in the same average can be caused by removing 1.

Therefore, $\dfrac{\dfrac{n(n+1)}{2} - n}{(n-1)} \le \dfrac{290}{9} \le \dfrac{\dfrac{n(n+1)}{2} - 1}{(n-1)}$

(as $1 \le x \le n$)

$\Rightarrow \dfrac{n}{2} \le 32.22 \le \dfrac{(n+2)}{2}$ $\Rightarrow n \le 64.44 \le (n+2)$

$\Rightarrow$ n = 63 or 64

Since $32\dfrac{2}{9} \times (n-1)$ will be an integer, $(n-1)$ should be a multiple of 9.

Therefore, n = 64.

$\dfrac{\dfrac{n(n+1)}{2} - x}{(n-1)} = 32\dfrac{2}{9}$ $\Rightarrow \dfrac{\dfrac{64 \times 65}{2} - x}{(64-1)} = \dfrac{290}{9}$

$\Rightarrow$ x = 32 × 65 − 290 × 7 = 50.

Alternate solution:

Maximum change in the average can be of $+\dfrac{1}{2}$ or

$-\dfrac{1}{2}$, therefore 'n' should be either 63 or 64. It can also be seen that the average of the first 'n' natural numbers is close to $\dfrac{n}{2}$.

Since $32\dfrac{2}{9} \times (n-1)$ will be an integer, $(n-1)$ should be a multiple of 9.

Therefore, n = 64.

$\dfrac{\dfrac{n(n+1)}{2} - x}{(n-1)} = 32\dfrac{2}{9}$ $\Rightarrow \dfrac{\dfrac{64 \times 65}{2} - x}{(64-1)} = \dfrac{290}{9}$

$\Rightarrow$ x = 32 × 65 − 290 × 7 = 50.

For questions 28 to 30:

Time taken to produce two units by Process-1 = 5 minutes
Time taken to produce two units by Process-2 = 6 minutes
The number of units produced by Process-1 in one shift

$= \dfrac{360}{5} \times 2 = 144$

The number of units produced by Process-2 in one shift

$= \dfrac{360}{6} \times 2 = 120$

Cost for Process-1 per shift, when running at its full capacity

= 500 + $\dfrac{250}{1000} \times 144$ + 500 = ₹1,036

Cost for Process-2 per shift, when running at its full capacity

= 330 + $\dfrac{150}{1000} \times 120$ + 501 = ₹849.

28. d To produce 288, 400 or 500 units, Process-1 would be more cost effective than Process-2.

29. a Cost of producing 6000 units using Process-1

$= 42 \times 500 + \dfrac{250}{1000} \times 6000 + 42 \times 500$ = ₹43,500

Cost of producing 6000 units using Process-2
= 50 × 849 = ₹42,450
Hence, the difference = ₹1,050.

30. c Required time $= \dfrac{5}{2} \times 1800 \times \dfrac{1}{60}$ = 75 hours.

31. c Steven Pinker contends that the world is a less violent place now compared to the past because the percentage of violent deaths in the population is far lower. He bases his argument on statistics of violent actions that result in death. This might not be an adequate representation of violence in society that might lead to consequences other than death. Option (a) is incorrect as the form of representation of violence has no bearing on the amount of violence and the author has presented data that shows that atleast some forms of violence can still be compared. Options (b) and (d) are premises used by the author in the passage.

32. b All the other options are supported by the passage. Option (a) is given by the author in paragraph 4. Refer to the lines *"...to people being better at impulse control, considering consequences, and also considering others."* Option (c) can be found in paragraph 7. Refer to the lines *"...only now we have far more avenues into which to channel that violence."* Option (d) can be inferred from the information given in the paragraph. Refer to the lines *"...modern soldiers are far more effective that soldiers in the past which reduces the percentage of the population that needs*

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to be involved in combat." The passage does not support option (b). It is given that societies tend to respond to violent crimes with violence. We do not know if this response has changed with the times.

33. d   Option (d) is the only one that covers the entire argument. The aspect that the author wishes to highlight is that of natural selection. Options (a), (b) and (c) do not take that into account and are thus incomplete.

For questions 34 and 35:
Let us assume that the oldest person has rank 1 and the one younger to him/her has rank 2 and so on. Similarly, for height, the tallest person has rank 1 and so on; and for weight, the heaviest person has rank 1 and so on.
From statement (i), the rank of Saina in Age is 5 and that in Height is 3. From statement (ii), the rank of Sushil in Height is 1 and that in Weight is 5. From statement (iii), the rank of Vijay in Age is 1 and that in Height is 2. Hence, the ranks of Yogeshwar and Mary in Height are 4 and 5, in no particular order. From statement (v), the rank of Yogeshwar in Age is 4 and the ranks of Sushil and Mary in Age are 2 and 3, in no particular order. From statements (iv) and (vi), the rank of Mary in Weight is either 1 or 4.
Now, two cases are possible.

Case I: The rank of Mary in Weight is 1. Hence, the ranks of Saina, Yogeshwar and Vijay in Weight are 2, 3 and 4 respectively.

Rank	Age	Height	Weight
1	Vijay	Sushil	Mary
2	Mary/Sushil	Vijay	Saina
3	Sushil/Mary	Saina	Yogeshwar
4	Yogeshwar	Yogeshwar/Mary	Vijay
5	Saina	Mary/Yogeshwar	Sushil

Case II: The rank of Mary in Weight is 4. Hence, the ranks of Saina, Yogeshwar and Vijay in Weight are 1, 2 and 3 respectively.

Rank	Age	Height	Weight
1	Vijay	Sushil	Saina
2	Mary/Sushil	Vijay	Yogeshwar
3	Sushil/Mary	Saina	Vijay
4	Yogeshwar	Yogeshwar/Mary	Mary
5	Saina	Mary/Yogeshwar	Sushil

34. d   Mary and Yogeshwar

35. b   Sushil and Vijay

36. d   The central paradox has been described as *"The central paradox of the machines that have made our lives so much brighter, quicker, longer and healthier*

is that they cannot teach us how to make the best use of them." Option (d) best captures it.

37. c   The author is primarily concerned with discussing the negative impact of the information revolution. Only the last paragraph deals with the different ways people have adopted to counter these effects.

38. d   The passage emphasizes that the information revolution has left us with more information than we can effectively use - "All the data in the world cannot teach us how to sift through data…" So knowledge or wisdom is not a concomitant of increased information.

39. c   Doodle is sitting to the North-West of Wako and Ray is sitting to the North-East of Wako. Therefore, Wako must be sitting at Position 5. Then Doodle and Ray will be sitting at Positions 1 and 3 respectively.
Alen is sitting to the South-West of Wexon. Hence, Wexon and Alen must be sitting at Positions 2 and 4 respectively.
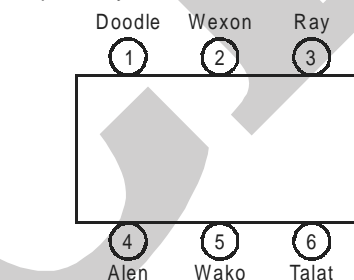
Hence, Alen is sitting at Position 4.

40. b   Option (a) is incorrect as it does not express the element of irony. Option (c) is incorrect as we have no information as to whether the movement is peaceful or not. Option (d) is incorrect as it states 'destabilize the government'. This is too extreme compared to the tone of the passage. Option (b) correctly identifies the irony of the situation.

41. d   Only option (d) completely describes the main idea of the passage. Although options (a) and (b) are also present in the passage, the author uses these ideas to characterize the Occupy Wall Street movement as a 'linguistic occupation'.

42. a   Option (a) cannot be inferred from the passage as the passage states that *"…people from diverse ethnicities, cultures and languages have participated in this linguistic occupation."* Option (b) can be inferred from paragraph 3. Option (c) can be inferred from paragraph 2. Refer to the lines *"It has already succeeded in shifting the terms of the debate, taking phrases like "debt-ceiling" and "budget crisis" out of the limelight and putting terms like "inequality" and "greed" squarely in the center."* Option (d) is also given in paragraph 3.

There were 2 boys and 1 girl among any 3 consecutive persons.

Three cases are possible.

Position from front	Case-I	Case-II	Case-III
1st	G	B	B
2nd	B	B	G
3rd	B	G	B
4th	G	B	B
5th	B	B	G
6th	B	G	B
7th	G	B	B
8th	B	B	G
9th	B	G	B
10th	G	B	B
11th	B	B	G
12th	B	G	B
13th	G	B	B
14th	B	B	G

Note: 'B' represents a boy and 'G' represents a girl.

Since Ramesh is the last person in the queue, Case-III is ruled out.

43. d The time at which Ramesh leaves the booking counter will depend on whether Case-I or Case-II is valid. Since we don't have any further information, it cannot be determined.

44. b **Case-I:** There are 2 girls and 2 boys among the first 4 persons. Then the 4th person leaves the counter after $2 \times 4 + 2 \times 3 = 14$ minutes i.e. at 2:59 PM. Hence, this case is not possible.

   Case-II: There are 3 boys and 1 girl among the first 4 persons. Then the 4th person leaves the counter after $3 \times 3 + 1 \times 4 = 13$ minutes i.e. at 2:58 PM. So this is the case that we need to consider.

   In Case-II, there are 3 girls and 7 boys among the first 10 persons. Also, the booking counter is closed for 12 minutes after the first 6 persons are done. So the 10th person will leave the counter after $3 \times 4 + 7 \times 3 + 12 = 45$ minutes i.e. at 3:30 PM.

45. a **Case-I:** There are 3 girls and 4 boys among the first 7 persons. Then the 7th person leaves the counter after $3 \times 4 + 4 \times 3 + 12 = 36$ minutes i.e. at 3:21 PM. So this case is consistent with the data given in the question.

Case-II: There are 2 girls and 5 boys among the first 7 persons. Then the 7th person leaves the counter after $2 \times 4 + 5 \times 3 + 12 = 35$ minutes i.e. at 3:20 PM. So this case is not valid.

In Case-I, there are 5 girls and 9 boys in the queue.

46. b The paragraph starts by stating that Britannica has focused its decision on online editions due to a shift in consumer pattern – option (b) presents an aspect of consumer behaviour and also follows the penultimate sentence. Option (a) can be ruled out because it presents the impact of the changing consumer pattern on Britannica – and not from the reader's perspective. Option (c) goes beyond the scope of the paragraph which is the encyclopaedia itself and not educational software. Option (d) can be ruled out because the paragraph is about Britannica and not other companies.

47. c Option (a) can be ruled out as it does not flow with the central theme of the paragraph – Boo and the facilitators or writers and facilitators. Option (b) can also be ruled because it deviates from the subjects of the paragraph and places focus on Mumbai. Option (c) is the best answer as it logically flows from the penultimate sentence and adds further information to the line. Option (d) can be ruled out because it goes beyond the scope of the paragraph and it is too specific - there is no indication on Mumbai's underworld being the subject of a writer's story.

48. a The paragraph is about migration of women in India for work. Option (a) is the best answer as it categorises the work that women do – linking with the first sentence of the paragraph. Option (b) can be negated as there is no indication in the paragraph that the author will move on to speak about urban migrants. Option (c) can be rejected again on this basis. Option (d) is ruled out because it discusses male migration which goes beyond the scope of the paragraph.

49. b 'The turnaround' of E has its antecedent in B making BE a mandatory pair. BE as a pair is found in options (a), (b) and (c). 'The reasons' in A have their antecedent in 'the turnaround' of E. This makes BEA a compulsory trio. This is found only in option (b) making it the right choice.

50. c Sentence A introduces the topic of red meat and its impact on health. AC is a mandatory pair because the 'it's' also needs an antecedent. The antecedent is the red meat of A. BE is also a mandatory pair because the antecedent for the pronoun 'it' of E is in the red meat of B. Also, the sentence structure of both B and E is same ('how eating red meat' and 'how substituting it'). Hence, ACBED is correct.

51. c The clue words 'gentlest' and 'tough-minded' are antonymous to each other. The two blanks should follow the same relation. The first part of the sentence aims to define the demeanor and nature of the female novelists and also create grounds for contrast that will come in the later part of the sentence. 'idyllic' which means 'rustic' is eliminated. 'genteel' which means 'refined' does not fit the second blank. 'meandering' is irrelevant. 'ladylike' which means 'well mannered' and 'relentless' which means 'implacable' fit the blanks perfectly.

For questions 52 to 54:
The given information can be tabulated as shown below.

Name	Country	1st Preference	2nd Preference
Calcy		X	Y
Rudd	Australia	Y	X
Imam		Florida	
Marley			Florida
	France		Chicago
	Spain	Arizona	

Amay and Sam cannot be from Spain.
Calcy cannot be from Spain since Rudd and Calcy have the same preferences, and had Calcy been from Spain, the 2nd preference of Rudd would have been Arizona, which is not possible. Therefore, Marley is from Spain.
This implies that Arizona is the 2nd preference for Sam. Arizona can't be any preference for Amay, Rudd and Calcy. Also, it can't be the 2nd preference for Imam, which contradicts statement (iii).
Therefore, Amay is the French student whose 2nd preference is Chicago. This leaves Illinois and Stanford as the only set of preferences possible for Calcy and Rudd. Also, Calcy will be from Russia, Imam from Canada and Sam from India.

Further analysis leads to the final table shown below.

Name	Country	1st Preference	2nd Preference
Calcy	Russia	Ilinois/Stanford	Stanford/Illinois
Rudd	Australia	Stanford/Illinois	Ilinois/Stanford
Imam	Canada	Florida	Rice
Marley	Spain	Arizona	Florida
Amay	France	Rice	Chicago
Sam	India	Chicago	Arizona

52. d Cannot be determined

53. c Sam belongs to India.

54. a It is possible for Calcy and Marley to make it to Illinois and Florida respectively.

55. d Sentence 1 is incorrect because of a lack of parallel structure—'correcting their own errors'. Sentence 2 is incorrect as the 'however' is redundant there. Sentence 5 is incorrect since the subordinate clause ('While exercise of powers by the legislature and executive is subject to judicial restraint') is not followed by a comma.

56. c In sentence 3, the correct expression is 'the method *of* collective punishment'. In sentence 4, the preposition *at* should be replaced by *to* ('from the dark of backwardness and conflict *to* the light of civilization'). The correct expression in sentence 5 should be *aspires to.*

57. c Statement (a) is correct. *Tap away* means to hit somebody/something quickly and lightly repeatedly. Statement (b) is correct. *Tap into* means to make use of a source of energy, knowledge, etc. that already exists. Statement (c) is incorrect as *to tap somebody* is to choose somebody to do a particular job. The correct usage will be "Richards has been tapped to replace the retiring chairperson." Statement (d) is correct. *On tap* means available to be used at any time.

58. d Statement (d) is incorrect. *To pit something* means to make marks or holes on the surface of something. Correct usage should be "Smallpox scars had pitted his face." Statement (c) is correct. *To pit somebody/ something against something* means to test somebody or their strength, intelligence, etc. in a struggle or contest against somebody/something else. *The pit of the stomach* refers to the bottom of the stomach where people say they feel strong feelings, especially fear. Hence, statement (b) is also correct. Pit is also used for a coal mine. He went down the pit (= started work as a miner) when he left school.

59. b Statement (a), (c) and (d) are part of a narrative and also follow the same tense. a-d-c forms a sequence. Statement (b) uses the word 'but' which shows a sense of contrast. This contrast should have basis in one other sentence amongst the given. Hence, statement (b) does not relate to any other sentence in the question.

60. c The passage describes the authors view that women tennis players playing in the 'shorter format' and 'putting in fewer hours' is sexist discrimination based on the assumption that women cannot or should not participate in physically exhausting tasks. Option (c) is the option that comes closest to expressing this.

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