

1. There is an absence of a contrasting keyword like but, although etc. Therefore, the two words for the blanks have to be synonyms here. Plus, both the words apply to the same thing, that is, 'achievement in the field of literature'. Either the achievement would be insignificant or really significant but not both at the same time.  
Magnificent (superb) and irresponsible (careless, negligent) do not share similar meanings (option 1).  
Something which is influential has some degree of significance and not insignificance (option 2).  
Paltry or worthless would be an antonym of significant (option 3).  
Only in option 4 both unimportant and trivial share similarity. Something unimportant is trivial.  
Hence, the correct answer is **option 4**.
2. Grovel is to behave in a servile or demeaning manner. If someone groveled before her, she would not look at them with admiration (option 1) or a positive attitude. Therefore, we are looking for words with negative connotations.  
Options 1 and 4 can be eliminated (fidelity in option 4 means faithfulness).  
Temperance is 'moderation and self-restraint in behaviour or expression'. Not a very negative thought (although impertinence is. It means disrespect). Thus, option 3 can be done away with as well.  
Being indifferent (option 2) is to be apathetic, and have no concern. Her feelings were a blend of apathy and disdain (contempt, dislike).  
Hence, the correct answer is **option 2**.
3. Let us look at the second blank first. One does not maximize decisions (option 1). Plus, one does not need to enact (to make into law or act on stage) real estate, personal or professional decisions (into law!). Again, one can be under an umbrella but not a decision. But, one can face decisions. Therefore, we can eliminate options 1, 2 and 3.  
The simplified guide (option 4) ... a must read for anyone facing ... decisions.  
Hence, the correct answer is **option 4**.
4. If the physicians want to help, they will not have impediments (hurdles, difficulties) to help! Therefore, we can rule out option 4.  
The nerves that once controlled the muscles cannot be detrimental (causing damage or harm, injurious). Even if they were, then instead of being bypassed, they might as well be removed. Option 1 can therefore be ruled out as well.  
Between options 2 and 3, option 2 is better. This is because; the nerves once (upon a time) functioned. Since they no longer function or are damaged, they need to be bypassed.  
Hence, the correct answer is **option 2**.
5. Choices and constraints are antonymous. Therefore, the adjectives required to define these should also be opposites. For example, great choices and zero constraints or fewer choices and many constraints would be logical and consistent. Options 1 and 2 each have almost similar meaning words for both blanks therefore can be eliminated.  
Option 4 has extreme keywords (choking and shocking). There are no clues in the sentence which point to an extreme reaction, anyway.  
Option 3 looks perfect. Users have unlimited choices and minimal constraints.  
Hence, the correct answer is **option 3**.
6. The sentence has opposing clauses. If the reader is least conscious, then the punctuation is good, if there is lack of punctuation or more of it, then, it should make the reader take notice (or if it obstructs or obtrudes). That he or she would if it offends or is glaringly missing or present. That gives us our answer as choice 1.  
To enjoin (option 2) is to forbid (does not fit the context).  
Conceal (option 3) or hide is not suitable either as if there is more or less, it would show and not hide. To efface is to wipe out. Punctuation does not wipe out itself! Obtrude is 'to impose on others without insistence or invitation'.  
Hence, the correct answer is **option 1**.

7. Something that outweighs (be more important than, balance or offset) budget deficits has to be 'raising' demand. A looser fiscal policy should thereby stimulate demand and not just assess (measure), outstrip (surpass) or less importantly, restrain (hold back) demand.  
Although, for the second blank, minimize (option 1) also fits (control in option 3 fits as well), stimulate (3) is the best word for the first blank.  
Hence the correct answer is **option 3**.
8. If the Athenians travelled abroad, they would not ignore or suffer the world. We can thus do away with options 2 and 3.  
One does not require temerity (option 4) or boldness to sit at home.  
Logically, to have the time or leisure to sit at home sounds fine. And the word 'leisure' (option 1) also applies to the other elements of the sentence as well – 'dispute with Socrates, or to travel abroad'.  
Hence, the correct answer is **option 1**.
9. Sentence D begins this short passage.  
Small issues like foxhunting have large symbolic power and that is exemplified in sentences A, C, E and B. Examples usually follow concepts. That eliminates options 2 and 3 (they do not begin with D).  
Sentence B begins with 'and'. And, this conjunction is in addition to sentences A, C and D. That is, sentences A, C and D talk about what foxhunting symbolizes to different people or unions or movements. Sentence B acts as the finale by adding 'and' and saying that it finally symbolizes what (government's weakness) to whom (everybody watching). Therefore, B is the final sentence.  
Hence, the correct answer is **option 1**.
10. Sentence E gives a general introduction of how correspondence was the beginning of royal affairs.  
Sentence C continues the idea by describing what the monarch (the king) usually would do (send gifts after hearing good reports of a neighbouring princess).  
Sentence D further continues it by describing how the princess typically would respond to the king's gifts (the princess names a date and they meet). Therefore, ECD is a sequence. Merolchazzer's case is a case with a 'hitch'. And, that hitch has been pointed out in B (the princess does not give any meeting date). Thus, AB is a mandatory pair.  
Hence, the correct answer is **option 3**.
11. Ham and eggs (sentence C) are palatable foodstuffs (sentence E). The association gives us the pair, CE.  
Sentence D follows CE, as it gives the reason of why ham and eggs share a deathless relationship. That is followed by B- the analogy with men. That (CE DB) helps us eliminate options 1, 3 and 4.  
Sentence A concludes the sequence by giving examples of great friendships.  
Hence, the correct answer is **option 2**.
12. 'The home of Romanticism' (sentence B) refers to Germany.  
Sentence D speaks about the first foreign package holiday tour to Germany and hence begins the chain of idea in the paragraph.  
Sentence B continues it, by giving the reason (Germany being the home of romanticism) for the fascination towards Germany. Thus, DB is a pair.  
Sentence A introduces the idea of Germany's image problem. 'Since' in E refers to the timeline mentioned in A (1930s and 1940s). Therefore, AE is a pair.  
Sentence C ends the passage by mentioning how Germany has started thinking about its image, again.  
Hence, the correct answer is **option 4**.
13. AD is a mandatory pair. The wall (sentence A) does not simply divide ... (but) it (sentence D) actually takes in ... That helps us eliminate option 3.  
The concept of wall is first introduced in sentence B (chilling omission is the gigantic separation wall). Therefore, sentence B begins the paragraph. With that we can eliminate option 4.  
After all, this in 'this wall' of sentence E has to have 'the wall' mentioned prior to sentence E. Options 1 and 2 are close. But, since sentence C is more specific, it should come after AD.  
Hence, the correct answer is **option 2**.
14. The paragraph begins with sentence E. The sentence inserts the idea of the close call the Australians faced.  
Sentence D puts in the facts, capture of Solomon Islands and much of New Guinea, apparently by the Japanese (since we are only talking about these two countries).  
Sentence C continues the idea (Australian military aware of hopeless situation), Australia planning to defend main cities.  
Sentence B substantiates that- it could have been no more than a delaying technique. E concludes as it gives the reason that even if the Japanese were close, why they got deflected. Therefore, we get the sequence as EDCBA.  
Hence, the correct answer is **option 1**.

15. ED is a mandatory pair. The earlier power of the 'editors' in D is referred to as 'mighty fountain pens' in E. Again, 'first' in E has to be followed by 'then' in D to point out a sequence of events.

Between sentences A and C as introductory sentences, A is more suitable. Sentence C should follow B, as 'alliances and agreements' mentioned in B will have to be 'inked and finalized' (sentence C). Therefore, BC is another mandatory pair. B follows ED. It continues with the time sequence – first (E), then (D) and now (B). Therefore, we get AEDBC.

Hence, the correct answer is **option 4**

16. It is easier to arrive at the answer by eliminating the incorrect options. Option 1 can be ruled out. Sentence A says that the celebrations may be premature. Therefore C cannot follow A, as C speaks about 'favourable turn'. If the celebrations are premature, then the favourable hasn't taken place or is yet to take place. Option 2 can be ruled out as well. CE isn't a pair. EC is a mandatory pair.

In sentence E, the author mentions, 'euphoria grips the US capital'. Washington (the US capital) mentioned in C should follow E.

Sentence D should come before sentence A. D follows B (celebrations not found beyond Beltway). And sentence A concludes it by putting across that 'these' celebrations are premature.

Hence, the correct answer is **option 4**.

17. 'Help' used in sentence 1 means 'relieve or ease' and has been used correctly (help your cold = ease your cold).

In option 2, help used with can or cannot means 'to refrain from or avoid' (cannot refrain from the colour of my skin).

In sentence 3, it should be 'help himself to' and not 'help himself with'. 'To help oneself to' is an idiom and means 'to serve' or 'provide oneself with'.

Help in the last sentence (4) means the usual meaning, 'aid, assistance' and the word has been correctly used.

Hence, the correct answer is **option 3**.

18. Reason in sentences 1 and 3 means 'the capacity for logical, rational, and analytic thought or intelligence'. The word has been used correctly in both the sentences. Your stand in beyond all logic or sound sense (1) and there is little reason or logic behind your pompous advice (3) are both fine.

Reason in option 2 means 'the basis or motive for an action, decision, or conviction' and the word has been used correctly here as well.

The final sentence (4) does not require an article (a) immediately before 'reason'. Here, reason means 'good judgement or sound sense' and it not just 'any' good judgement as suggested by 'a reason'!

Hence, the correct answer is **option 4**.

19. This is one of those questions, you should have not attempted if you found 2-3 options close. Option 2 is correct. Although a more frequent use is 'trees are felled or cut', the word 'killed' here is not inappropriate.

In option 3, 'paper over' is a phrasal verb, where the meaning is different than the usual meaning of 'paper'. One of the meanings is 'conceal'. In option 3, it is used to mean 'to downplay (minimize the significance of) differences (among his brothers)' and the phrase has been used correctly.

In option 4, paper is used to mean a report or an official document.

In option 1, article 'the' should be removed. Suggestions look great on paper and not 'on the paper'. 'On paper' is an idiom which means 'in writing' or 'in theory and not in actual performance or fact'.

Hence, the correct answer is **option 1**.

20. Business is a common word which generally is used to mean trade, industry or traffic. In this meaning it has been correctly used in options 1 and 3.

In option 4 business means 'something that involves one personally' and again has been used correctly. It is usually used as in this example, 'it is none of your business.'

Option 1 needs article 'a' (to mean one) to be placed before 'profitable'. The article is required and hence makes the option incorrect.

Hence, the correct answer is **option 2**.

21. In sentence 1, customers don't have to service themselves. Rather, they have to serve themselves.

Service in option 2 means 'intended for use in supplying or serving'. In that use, we have examples like service elevator or service entrance. The same can mean 'something used for maintenance or offering repairs.'

'Servicing the loan' as in option 3 means 'paying interest to clear off debt (loan)' and has been used correctly.

Service in option 4 can mean 'armed forces of a nation' or 'a government branch'.

Hence, the correct answer is **option 1**.

22. Statement D is ruled out because compared to other options it fails to mention which offer of in-laws you will accept.  
Statement C is ruled out because there is no mention of 'cerebral activity' by the author. The author has not scientifically substantiated why some decisions would be no-brainers.  
Statement B can be ruled out as well because; there are 'job offers' from bosses.  
Statement A is correct because certain 'circumstances' have been pointed out when some decisions are obvious.  
Hence, the correct answer is **option 1**.
23. In statements A and B, equal weightage has been given to physical and mental inertia, whereas the author has not done so. The author has emphasized mental inertia in the passage.  
Statement C is too generic.  
Statement D is more complete. D enlists the part of not reacting to tragedies as well. Thus, it more completely captures the gist of the passage.  
Hence, the correct answer is **option 4**.
24. Using the Van prior to purchase is an example for all things that are supposed to be bought. Statement A does not highlight that. It only talks about the Van.  
The 'always' in statement C cannot be accounted for. "Try when feasible", the author says. Therefore, there is no place for 'always'.  
Statement D is similar to A, in the sense that it is more concerned with the Van than just using it as an example to illustrate a concept.  
Statement B has been put forth or worded well. It speaks about the feasibility part and also the part of experiencing before choosing.  
Hence, the correct answer is **option 2**.
25. Service quality or quality level improvement is not the chief discussion point of the passage. Therefore, we can do away with statements A and D.  
The author nowhere says that any cost minimization is bound to lower quality of service. Therefore, statement C can be eliminated as well.  
Statement B rightly suggests determining the primary focus (clear about objectives). It briefly describes how focus on only cost management and ignoring greater invisible costs (opportunity costs) would not be effective.  
Hence, the correct answer is **option 2**.
26. In the last paragraph, the author says, 'no other great buildings approach its simplicity'. He then goes on to describe about the Parthenon, its straight columns and plain capitals and then quips, 'nothing more'. Therefore, Parthenon depicts simplicity, according to the author. The author denies that Greek art is akin to symbolism in the first paragraph (there could be nothing less akin to the ways of symbolism than their beautiful, normal humanity). Thus, option 4 can be eliminated.  
According to the author, decoration is the major part of a Hindu temple (not power of nature). He has not spoken about mysticism with regard to Egyptian temples. Therefore, 1 and 3 can be done away with.  
Hence, the correct answer is **option 2**.
27. In paragraph two, the author emphasizes the 'intellectual' part of Greek art- 'Greek art is intellectual art, the art of men who were clear and lucid thinkers'. In the same paragraph, it is stated, "Nothing in excess, the Greek axiom of art is the dictum of men who would brush aside all obscuring, entangling superfluity ...". Therefore, both options 1 and 3 can be ruled out. Simplicity of form (option 2) has been discussed in the last paragraph (No other great buildings approach its simplicity).  
In paragraph 1, it is stated, "Mysticism on the whole was alien to the Greeks, thinkers as they were." Therefore, mystic spiritualism (option 4) was not part of Greek art.  
Hence, the correct answer is **option 4**.
28. In the passage (paragraph 4), the author states the thought of Egyptian artists, "The Egyptian architects were possessed by the consciousness of the awful, irresistible domination of the ways of nature; they had no thought to give to the insignificant atom that was man." That shows that Egyptian art thought that man was inconsequential before the forces of nature (option 4).  
Option 2 showcases an opposite idea to this and hence is eliminated.  
Since man is insignificant, he cannot be the centre of creation (option 1).  
Option 3 gives the idea that the Greeks had and was not that of the Egyptians.  
Hence, the correct answer is **option 4**.
29. Option 4 states that Greek statues were not symbols rather than explain why. Hence, 4 can be eliminated.  
Options 2 and 3 do not have anything to say about symbolism. They also do not explain why there is little symbolism in Greek art.

In the first paragraph, the author states, "Mysticism on the whole was alien to the Greeks, thinkers as they were. Thought and mysticism never go well together and there is little symbolism in Greek art." The first sentence of paragraph 2 also strengthens this idea that their art is plain since it is intellectual art by clear and lucid thinkers.

Hence, the correct answer is **option 1**.

30. In the last paragraph it is outlined in final sentences of the passage - "They would build what was more beautiful than hill and sea and sky and greater than all these." And, "To the Greek architect man was the master of the world. His mind could understand its laws; his spirit could discover its beauty." The option which summarises these ideas is option 3.

Option 2 is close but it fails to completely explain the viewpoint as option 3 does.

Hence, the correct answer is **option 3**.

31. Option 1 could be a contender for the answer. Option 2 cannot be substantiated from what has been said in the passage. PRIs are not really firmly entrenched (paragraph 1).

Option 3 sums up the idea that lack of political space has interfered in the development of PRIs.

The passage is about Panchayati Raj and without that the idea would be incomplete. Therefore, option 4 can be eliminated right away.

Between options 1 and 3, option 3 is stronger and a better summary. Option 1 is more of a conclusion than a summary.

Hence, the correct answer is **option 3**.

32. Volition is 'free will' or 'conscious choice or decision'. Circumscribe means 'restrict'. The final paragraph of the passage talks about the volition of PRIs being further restricted by a plethora of centrally sponsored schemes (in addition to state-level decisions put on them). Because of this, local institutions have less power to plan according to their needs. This 'weakening' has been highlighted in option 1.

Option 4 is not correct as there is no reformulation.

According to the passage, empowerment of Panchayat system has not been happening, therefore option 3 can be eliminated.

Option 2 is inappropriate as there is nothing about 'increasing demands' to match local contributions. Schemes don't work due to lack of local contribution.

Hence, the correct answer is **option 1**.

33. According to the first paragraph the inter-state and union-state layers are free of this dilemma. Therefore options 3 and 4 do not apply here.

The dilemma is about how much autonomy should the Panchayat get. It is not about wresting power from Union (option 1) or taking it away and giving it to union. The dilemma is about power given to Panchayats to manage the 'local' affairs. That has been correctly pointed out in option 2.

Hence, the correct answer is **option 2**.

34. In the first paragraph, the author states - "The flaw has many causes. But all of them are rooted in an historical anomaly, that while the dynamics of federalism and democracy have given added strength to the rights given to the States in the Constitution, they have worked against the rights of panchayats." Federalism has been ensured at the state level but not at the level of Panchayat.

Option 3 states this idea.

Options 1 and 4 do not deal with the Panchayats and are therefore eliminated.

Even option 2 does not speak about the flaw at the intra-state level and should be eliminated as well.

Hence, the correct answer is **option 3**.

35. In the second paragraph, the author states, "Indian federalism is now more real than it used to be..." The same paragraph speaks about "spurt given to a multi-party democracy" and "with single-party dominance becoming a thing of the past at the Union level, governments can be formed at that level only by multi-party coalitions in which State-level parties are major players". All these signify that there is real distribution of power between Union and State level parties (option 4).

Options 1 and 2 are too specific.

Option 3 is inappropriate because Panchayati Raj level has not become real as yet.

Hence, the correct answer is **option 4**.

36. Guides (option 3) may or may not be available and rules need not be read (option 2) by families (they do not work there).

The author nowhere states that the straddlers miss the 'mom and pop orthodoxy' although their job is different. Straddlers are thrown into a system which is foreign to them- "In Corporate America, where the rules are based on notions foreign to working-class people, a Straddler can get lost" (paragraph 3). They grow up in a different environment and work in an entirely different one (option 1).

Hence, the correct answer is **option 1**.

37. Breakdown of family relationships (option 4) is too farfetched.

So is the part of professional arrogance (option 2). Although they show two ends of the spectrum (Thucydides and arches), there is no extreme viewpoint. Organic cultural capital goes out of scope where this question is concerned.

The author here is interested in pointing out the differences which cropped up due to education. Thucydides denotes the intellectual or learned part whereas arches indicate the worker class. The difference, as aptly indicated by option 3 is evolving social transformation. The child cannot relate to the parent where the environment is the same because the socially he has evolved due to education.

Hence, the correct answer is **option 3**.

38. Paragraph 2 states-

'Limbo folk may prefer brie (a kind of cheese) to Kraft slices ...' indicates difference in food habits (option 1).

'They might not be in church on Sunday.' indicates that the children may not keep up with some central religious practices (option 2).

In paragraph 1, the author says, 'with one foot in the working-class, the other in the middle class, people like me are Straddlers, at home in neither world, living a limbo life' which indicates that they are stuck in between (option 3).

Only option 4 has not been stated directly in the passage.

Hence, the correct answer is **option 4**.

39. Refer to paragraph 4. The author shows through various examples how dinner table talks revolve around the environment of their parents, corporate, doctors etc. Therefore, children have known that environment since the beginning and are comfortable with the intellectual and social part of it. That eliminates options 1 and 2.

Enlightenment (option 3) happens because of the kind of environment and upbringing. So, we can rule out option 3 as well.

Straddlers are not exposed to this kind of environment as they hail from blue-collar families. Therefore, option 4 is false – straddlers are not born in 'cultural capital' and hence bright kids don't develop into Straddlers.

Hence, the correct answer is **option 4**.

40. In the fifth paragraph, the author points out, "Resolving conflicts head-on and speaking your mind doesn't always work, no matter how educated the Straddler is". That indicates that diplomacy (option 1) is definitely not in.

Options 3 and 4 have not been talked about in the passage.

In the final paragraph, the author states, "Children of the working-class are brought up in a home in which conformity; obedience and intolerance for back talk are the norm- the same characteristics that make a good factory worker". That is, they comply with the orders and that is given in option 2.

Hence, the correct answer is **option 2**.

41. 'Not false' is true. From the first paragraph, the concept of jet propulsion (option 1) was visualised by French engineer Lorin and not Frank Whittle and Hans von Ohain.

Supersonic airplanes were first introduced in 1947, and supersonic fighters and bombers became operational in the 1950s, which is much after the Second World War (option 2).

And since they came around in 1947, manned flight in supersonic airplanes happened earlier than 1950s (option 3).

Therefore, options 1, 2 and 3 are false.

In the first paragraph, the author says, "The progress from the first flights of liquid propellant rocket and jet-propelled aircraft in 1939 to the first faster-than-sound (supersonic) manned airplane (the Bell X-1) in 1947 happened in less than a decade." This was remarkably fast.

Hence, the correct answer is **option 4**.

42. The author mentions super-jumbo jets (option 4) at the end of the fourth paragraph. So, that is part of the paragraph and does not represent the whole of it.

Option 3, "use of computer automation" is also very specific. It does not represent the complete idea.

Stealth aircrafts (option 1) have been talked about in the third paragraph and not fourth.

The paragraph introduces the idea of development of size in aircraft and ends the paragraph with the description of future double-decked superjumbo passenger jet. Therefore, the central theme of the paragraph is to describe the growing size of aircrafts.

Hence, the correct answer is **option 2**.

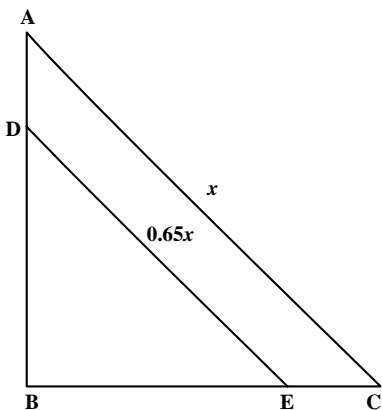
43. Yes, a V-22 is capable (option 1) of winged flight (so is a standard airplane).

It does have an excellent payload (option 3) and a higher range (option 4).

But, a standard aircraft does not take off vertically (a helicopter does) and hence that is the most noteworthy difference.

Hence, the correct answer is **option 1**.

44. In the third paragraph, the author points out, "The new free-flight concept will probably supplement the existing air traffic control system by computers on each plane to map the altitude, route, weather and other planes; and a decade from now; there will be no use of radar any more". Therefore, the author is speaking about technology (computers on board) which will help aircrafts navigate on their own, thereby rendering radars useless.  
The author does not speak about this in terms of enemy detection or range of radar. So, we can do away with options 1, 2 and 4.  
Hence, the correct answer is **option 3**.
45. The author cites two reasons for the decline in the fifth paragraph. One is lack of collective vision that had driven us in the past. (It does not continue to drive us today; therefore option 2 can be eliminated.)  
The second is a need for a more aggressive pool of airplane design talents which is in spite of a multibillion dollar a year industry. This idea has been summed up in option 3.  
Options 1 and 4 have not been stated as reasons for the decline.  
Hence, the correct answer is **option 3**.
46. Options 3 and 4 can be easily ruled out. They are discussed much after the talk on secularization of the liberal arts.  
The choice between options 1 and 2 may be a wee bit difficult. Firstly, as the author mentions in the fourth paragraph, "Student life obviously became more secular when it moved out from the monasteries into the bustling towns." The environment changed. The second reason is cited as, "More important than environment was the fact that most students, even though they entered the clergy, had secular goals." And thirdly, the next paragraph puts this as a reason – "This being so, the curriculum of the liberal arts became more sophisticated and more divorced from religion." Yes, the students used it as a base to study law and medicine and even ecclesiastical studies. But this happened because the influence of religion became less. The reason is given in option 1.  
Hence, the correct answer is **option 1**.
47. In the first paragraph, the author says, "With the opening of positions in law, government, and the church, education became a means for advancement not only in income but also in status." Therefore, options 3 and 4 both apply here, albeit option 3 would apply less because; 'love of learning' hasn't been mentioned.  
Option 1 is the best answer as it takes care of both these aspects (income and status).  
Option 2 can be easily eliminated in lieu of the above information.  
Hence, the correct answer is **option 1**.
48. From the third paragraph, "not only were all twelfth-century teachers except professionals and craftsmen in church orders, but in northern Europe students in schools had clerical status and looked like priests." That shows that church influence played a major role. And the fourth paragraph starts as, "Despite all this, twelfth-century education was taking on many secular qualities in its environment, goals, and curriculum." Therefore, despite the influence, the education was donning secular qualities, a concept which is highlighted in option 4.  
Option 1 is incorrect in lieu of paragraph 3. They were on church's orders.  
Option 2 applies to European schools.  
Even if the term cleric had different implication, that does not make the schools secular (option 3).  
Hence, the correct answer is **option 4**.
49. It has been clearly given in the first paragraph as, "Eloquent testimony to the profit motive behind much of twelfth-century education was the lament of a student of Abelard around 1150 that "Christians educate their sons. ... for gain, in order that the one brother, if he be a clerk, may help his father and mother and his other brothers." That is, the education was for material gain (option 2).  
Options 1 and 3 do not apply.  
Option 4 can come close, but there is mention of profit motive rather than exploitation and therefore, option 2 is appropriate.  
Hence, the correct answer is **option 2**.
50. Theology was the 'queen of science', but as it is cited in the fourth paragraph, "very few people went for it". Thus, option 2 can be ruled out.  
From paragraph 1, even the not-so-wealthy turned to education. The author cites two examples in this regard. Therefore, option 3 can be eliminated.  
Option 4 goes against the idea depicted in the passage. Clergy's influence although present did not rise.  
Option 1 totals the idea of the move towards secularization of education in the twelfth century.  
Hence, the correct answer is **option 1**.
51. Since DE is parallel to AC,  $\triangle ABC$  is similar to  $\triangle DBE$  by AAA rule of similarity,  
i.e.  $\triangle ABC \sim \triangle DBE$



When two triangles are similar, the ratio of their areas is equal to the ratio of squares of their corresponding sides.

$$\therefore \frac{\text{Area}(\triangle ABC)}{\text{Area}(\triangle DBE)} = \left(\frac{AC}{DE}\right)^2 = \left(\frac{1}{0.65}\right)^2$$

$$\therefore \text{Area}(\triangle DBE) = (0.65)^2 \times \text{Area}(\triangle ABC)$$

$$\therefore \text{Area}(\triangle DBE) = 0.4225 \times 34 = 14.365$$

Hence, **option 4**.

52.

Year	Initial number of huts	Number of huts destroyed	Number of huts rebuilt	Total Number of huts after rebuilding
2001	$n$	$\frac{n}{2}$	$n$	$\frac{3n}{2}$
2002	$\frac{3n}{2}$	$\frac{3n}{4}$	$\frac{3n}{2}$	$\frac{9n}{4}$
2003	$\frac{9n}{4}$	$\frac{9n}{8}$	$\frac{9n}{4}$	$\frac{27n}{8}$
2004	$\frac{27n}{8}$	$\frac{27n}{16}$	$\frac{27n}{8}$	$\frac{81n}{16}$

Let the number of huts at the beginning of 2001 be  $n$ .

From the table, it is clear that only option 3 is satisfied as per the above table.

Hence, **option 3**.

53. Since  $a = 6b = 12c$  and  $2b = 9d = 12e$

$$\therefore a : b : c = 12 : 2 : 1 \text{ and } b : d : e = 18 : 4 : 3$$

$$\therefore a : b : c : d : e = 108 : 18 : 9 : 4 : 3$$

$\therefore a = 108k; b = 18k; c = 9k; d = 4k$  and  $e = 3k$  where ' $k$ ' is an integer

$$\text{Option 1 is: } \left(\frac{a}{27}, \frac{b}{e}\right) = (4k, 6)$$

$$\text{Option 2 is: } \left(\frac{a}{36}, \frac{c}{e}\right) = (3k, 3)$$

$$\text{Option 3 is: } \left(\frac{a}{12}, \frac{bd}{18}\right) = (9k, 4k^2)$$

$$\text{Option 4 is: } \left(\frac{a}{6}, \frac{c}{d}\right) = \left(18k, \frac{9}{4}\right)$$

The 4<sup>th</sup> option contains  $\frac{9}{4}$ , which is not an integer.

Hence, **option 4**.

54.  $a, a + 2, a + 4$  are prime numbers.

Now, all prime numbers greater than 3 are of the form  $6k \pm 1$ , where  $k$  is some natural number.

$$\text{When } a = 6k + 1, \text{ then } a + 2 = (6k + 1) + 2 = 6k + 3$$

$$= 3(2k + 1), \text{ which is not prime since it is a multiple of 3}$$

$$\text{When } a = 6k - 1, \text{ then } a + 4 = (6k - 1) + 4 = 6k + 3$$

$$= 3(2k + 1), \text{ which is again not prime}$$

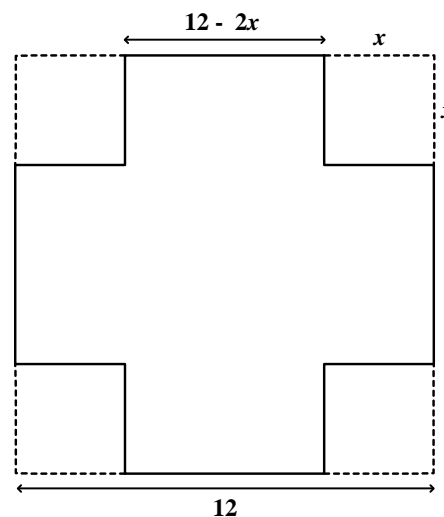
So, the only possible values of  $a$  that remain are the prime numbers which are less than or equal to 3; i.e. 2 and 3.

When  $a = 2$ ,  $a + 2$  and  $a + 4$  are obviously not prime numbers

When  $a = 3$ ,  $a + 2 = 5$  and  $a + 4 = 7$ , which satisfies the required condition

Hence, **option 1**.

55. When the tin sheet is cut across its corners as shown in the figure, the box formed will have a height of  $x$  inches and its base will be a square of side  $(12 - 2x)$  inches.



$$\text{Let the volume of the box, } V = (12 - 2x)^2 \times x$$

$$= 4x^3 - 48x^2 + 144x$$

For  $V$  to be maximum,  $\frac{dV}{dx}$  should be 0.

$$\text{i.e. } 12x^2 - 96x + 144 = 0$$



$\therefore 12(x - 6)(x - 2) = 0$   
 $\therefore x = 2$  or  $x = 6$

However,  $x$  cannot be 6 as the length of the side is  $(12 - 2x)$ .

$\therefore x = 2$

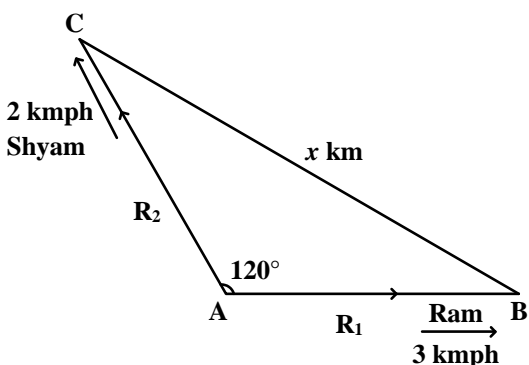
Hence, **option 4**.

Alternatively,

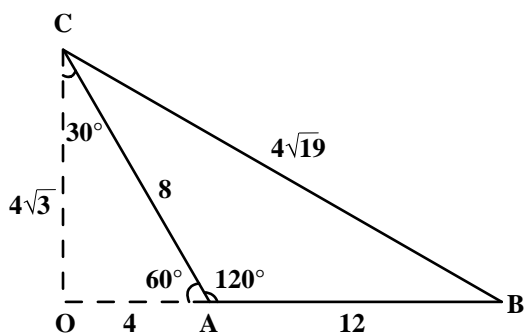
Since  $V = (12 - 2x)^2 \times x = [2(6 - x)]^2 \times x = 4x(6 - x)^2$ ,  
 Substituting values of  $x$  from 1 to 5, we get  $V$  maximum when  $x = 2$  (i.e.  $V = 128$ )

Hence, **option 4**.

56.



After 4 hours,  
 Distance travelled by Ram,  $AB = 4 \times 3 = 12$  km  
 Distance travelled by Shyam,  $AC = 4 \times 2 = 8$  km  
 Ram's return path =  $BC + CA = (x + 8)$  km  
 Shyam's return path =  $CB + BA = (x + 12)$  km  
 Now dropping perpendiculars from C and A to form the right triangle AOC,



In  $\Delta AOC$ ,  
 $OA = AC \sin 30^\circ = 8 \times 1/2 = 4$

$OC = AC \sin 60^\circ = 8 \times \frac{\sqrt{3}}{2} = 4\sqrt{3}$

$\therefore BC = \sqrt{((4\sqrt{3})^2 + 16^2)}$

$BC = \sqrt{304}$

$BC = 4\sqrt{19}$

Time by taken by Ram to travel

$= \frac{BC + CA}{3} = \frac{4\sqrt{19} + 8}{3}$  ... (i)

Time by taken by Sham to travel

$= \frac{BC + BA}{2} = \frac{4\sqrt{19} + 12}{2}$  ... (ii)

$\therefore$  Time interval between the two reaching point A is (i) subtracted from (ii)

$\frac{2\sqrt{19} + 10}{3}$

Hence, **option 2**.

57. Option 1: False

$\therefore (y - x)$  is equal to an even integer when  $x = 2$  and  $y = 6$

Option 2: False

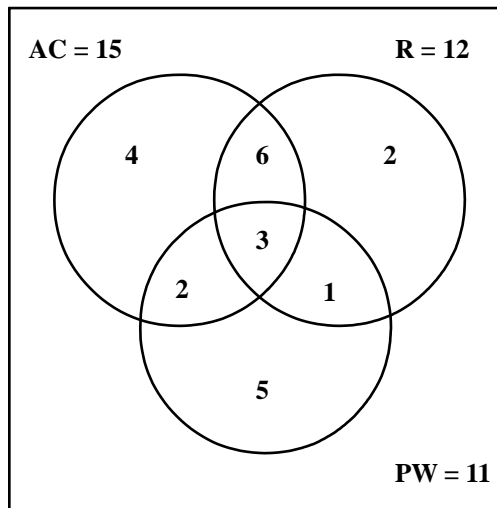
$\therefore xy$  is an even integer whenever  $x = 2$  and  $y = 6$

Option 3: False

$\therefore (x + y)/x$  is an even integer when  $x = 3$  and  $y = 6, 9, 15, 21, 27 \dots$  and so on. (i.e. Taking any value of  $x$  and then taking  $y$  as a multiple of that  $x$  will work.)

Hence, **option 4**.

58.



Here, AC - Air Conditioning, R - Radio and PW - Power Windows

From the given conditions, we have the above Venn diagram.

When we add up all the values in the Venn diagram, we get  $(15 + 5 + 1 + 2) = 23$  cars.  
 $\therefore 2$  (i.e.  $25 - 23$ ) cars don't have any of the three options.  
 Hence, **option 4**.

59. Now, we have,

$$x = \frac{n^2 + 2\sqrt{n}(n + 4) + 16}{n + 4\sqrt{n} + 4}$$

$$= \frac{n^2 + 2n\sqrt{n} + 8\sqrt{n} + 16}{(\sqrt{n} + 2)^2}$$

$$= \frac{n\sqrt{n}(\sqrt{n} + 2) + 8(\sqrt{n} + 2)}{(\sqrt{n} + 2)^2}$$

$$= \frac{(n\sqrt{n} + 8)(\sqrt{n} + 2)}{(\sqrt{n} + 2)^2}$$

$$\therefore x = \frac{n\sqrt{n} + 8}{\sqrt{n} + 2}$$

When  $n = 36$ ,

$$x = \frac{36 \times 6 + 8}{6 + 2} = \frac{8(27 + 1)}{8} = 28$$

When  $n = 72$ ,

$$x = \frac{432\sqrt{2} + 8}{6\sqrt{2} + 2} = \frac{4(54\sqrt{2} + 1)}{3\sqrt{2} + 1} = \frac{309.42}{5.24} \approx 59$$

Only the option 3 includes both these values.  
 Hence, **option 3**.

60. We have,

$$13x + 1 < 2z \quad \dots (i)$$

$$z + 3 = 5y^2 \quad \dots (ii)$$

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

$$13x + 1 < 2(5y^2 - 3)$$

$$\therefore 13x + 1 < 10y^2 - 6$$

$$\therefore x < (10y^2 - 7)/13$$

For  $y = 1$ , we get  $x < 3/13$

$$\therefore x < y$$

For  $y = 2$ , we get  $x < 33/13$

$\therefore x$  could be greater than or less than  $y$ .  
 $\therefore$  None of the given options are necessarily true.

Hence, **option 4**.

61. Consider a number  $n = 10$ , then  $\sqrt{n} \approx 3.16$

A: We have a divisor 2 which is greater than 1 and less than 3.16.  
 B: We have a divisor 5 which is greater than 3.16 but less than 10.

$\therefore$  Both statements A and B are true.

Also, as a rule, any composite number which is not a perfect square has at least one factor less than  $\sqrt{n}$  and another factor more than  $n$ , such that their product is  $n$ .

$\therefore$  Both statements are true.

Hence, **option 4**.

62.  $|b| \geq 1$  and  $x = -|a|b$

Consider the case when  $b$  is negative:

i.e. say  $b = -k$ , where  $k \geq 1$   
 Then,  $x = -|a|b = -|a| \times (-k) = |a|k$   
 $\therefore xb = -|a|k^2$   
 $\therefore a - xb = a + |a|k^2$

Now,

If  $a > 0$ , then  $a - xb = a + |a|k^2 > 0$  since all the terms will be positive

If  $a < 0$  (say  $a = -2$ ), then  $a - xb = -2 + 2k^2 \geq 0$ , since  $2k^2 \geq 2$  as  $k \geq 1$

However, if  $a = 0$ , then  $a - xb = 0 + 0 = 0$

Hence, when  $b$  is negative,  $a - xb \geq 0$

Now, consider the case when  $b$  is positive:

i.e. say  $b = +k$ , where  $k \geq 1$   
 Then,  $x = -|a|b = -|a| \times (k) = -|a|k$   
 $\therefore xb = -|a|k^2$

This is the same value of  $xb$  as we got in the previous case. Hence, the same conclusions will hold.

$\therefore$  For all cases,  $a - xb \geq 0$

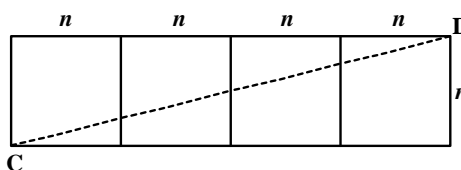
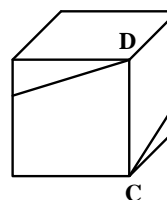
Hence, **option 2**.

63. The equivalent spacing between two consecutive turns

$$= \frac{\text{Height of the cylinder}}{\text{Number of turns}} = \frac{h}{n}$$

Hence, **option 1**.

64. If the cube is cut open as shown in the figure below, a rectangle with sides  $4n$  and  $n$  is obtained.



The string is the diagonal along this rectangle, with length,  $\sqrt{n^2 + (4n)^2} = n\sqrt{17}$   
 $\therefore$  The length of the string is  $n\sqrt{17}$   
Hence, **option 2.**

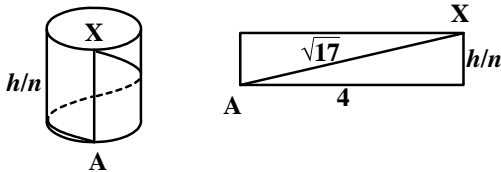
65. The string tied on the cylinder and the cube is of the same length ( $n\sqrt{17}$ )

Now, we cut the cylinder horizontally such that each turn of the string is now on a separate cylinder. On opening up one of the  $n$  cylinders, we get a rectangle whose length is equal to the circumference of the cylinder and whose breadth is equal to  $h/n$ . The string will be the diagonal of the rectangle.

Cylinder's circumference =  $2 \times \pi \times r = 2 \times \pi \times 2/\pi = 4$  units

The string has encircled the cylinder  $n$  times, thus the length used in 1 turn

$$\frac{n\sqrt{17}}{n} = \sqrt{17}$$



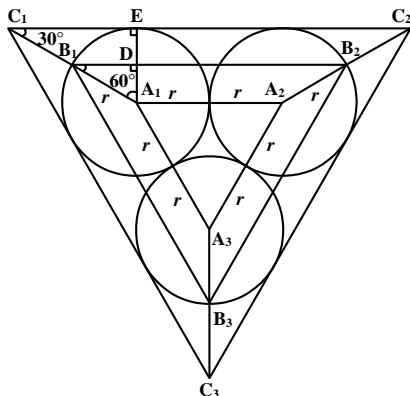
From the above figure,

$$(\sqrt{17})^2 = \left(\frac{h}{n}\right)^2 + 4^2$$

$$\therefore h = n$$

Hence, **option 3.**

66. The radius of each circular park =  $r$



$$A_1 B_1 = A_1 E = r$$

Distance travelled by A =  $a = 3 \times 2r = 6r$

$\Delta A_1 B_1 D$  is a right angle triangle and the symmetry of the figure shows that  $\angle A_1 B_1 D = 30^\circ$  and  $\angle B_1 A_1 D = 60^\circ$

$$\therefore B_1 D = \frac{\sqrt{3} r}{2}$$

$$\therefore B_1 B_2 = 2r + 2 \times \frac{r\sqrt{3}}{2} = r(2 + \sqrt{3})$$

$$\therefore \text{Distance travelled by B} = b = 3r(2 + \sqrt{3})$$

Similarly,  $\Delta A_1 C_1 E$  is a right angle triangle with  $\angle A_1 C_1 E = 30^\circ$  and  $\angle C_1 A_1 E = 60^\circ$

$$\therefore C_1 E = \sqrt{3} r$$

$$\therefore C_1 C_2 = 2r + 2r\sqrt{3} = 2r(1 + \sqrt{3})$$

$$\therefore \text{Distance travelled by C} = c = 6r(1 + \sqrt{3})$$

$$\therefore b - a = 3\sqrt{3}r \text{ and } c - b = 3\sqrt{3}r$$

Hence, **option 1.**

67. Time taken by A to travel through distance =  $(A_1 A_2 + A_2 A_3 + A_3 A_1)$

$$= \frac{2r}{20} + \frac{2r}{30} + \frac{2r}{15} = \frac{3r}{10}$$

Distance travelled by B in the same time,

$$= \frac{3r}{10} \times (10\sqrt{3} + 20) = 3r(2 + \sqrt{3}) = b$$

$\therefore$  B travels a full round in the same time as A. Thus, B will be at  $B_1$ .

For C, time taken to traverse through  $C_1 C_2$

$$= \frac{2r(\sqrt{3} + 1)}{\frac{40}{3}(\sqrt{3} + 1)} = \frac{3r}{20}$$

$$\text{Time remaining for C} = \left(\frac{3}{10} - \frac{3}{20}\right)r = \frac{3r}{20}$$

Now, distance travelled by C in this time

$$= \frac{3r}{20} \times \frac{40}{3}(1 + \sqrt{3}) = 2r(1 + \sqrt{3}) = C_2 C_3$$

$\therefore$  C will be at  $C_3$ .

Hence, **option 3.**

68. Given that

$$u^2 : v^2 : w^2 = \text{Area A} : \text{Area B} : \text{Area C} \quad \dots(i)$$

$\therefore$  The area of an equilateral triangle is proportional to the square of its side,

$$\therefore \text{Area A} : \text{Area B} : \text{Area C}$$

$$= (A_1 A_2)^2 : (B_1 B_2)^2 : (C_1 C_2)^2 \quad \dots(ii)$$

From (i) and (ii),

$$u : v : w = A_1 A_2 : B_1 B_2 : C_1 C_2$$

$$\therefore 2u : 2v : 2w = 2(A_1 A_2) : 2(B_1 B_2) : 2(C_1 C_2)$$

$$= (A_1 \text{ to } A_3) : (B_1 \text{ to } B_3) : (C_1 \text{ to } C_3)$$

Thus, C and A would be at  $C_3$  and  $A_3$  respectively when B reaches  $B_3$ .

Hence, **option 2.**

69. Let  $S = 1 + \frac{4}{7} + \frac{9}{7^2} + \frac{16}{7^3} + \frac{25}{7^4} + \dots$  ... (i)

Dividing (i) by 7, we get,

$$\frac{S}{7} = \frac{1}{7} + \frac{4}{7^2} + \frac{9}{7^3} + \frac{16}{7^4} + \frac{25}{7^5} + \dots$$
 ... (ii)

Subtracting (ii) from (i)

$$\frac{6S}{7} = 1 + \frac{3}{7} + \frac{5}{7^2} + \frac{7}{7^3} + \frac{9}{7^4} + \dots$$
 ... (iii)

Dividing (iii) by 7

$$\frac{6S}{49} = \frac{1}{7} + \frac{3}{7^2} + \frac{5}{7^3} + \frac{7}{7^4} + \dots$$
 ... (iv)

Subtracting (iv) from (iii)

$$\frac{36S}{49} = 1 + 2\left(\frac{1}{7} + \frac{1}{7^2} + \frac{1}{7^3} + \dots\right) = 1 + \frac{2 \times \frac{1}{7}}{1 - \frac{1}{7}}$$

$$= 1 + \frac{2}{6} = \frac{4}{3}$$

$$\therefore \frac{36S}{49} = \frac{4}{3}$$

$$S = \frac{4}{3} \times \frac{49}{36} = \frac{49}{27}$$

Hence, **option 3**.

70.  $n = 1, 2, 3, \dots, 96$  and  $Tn = \{n, n + 1, n + 2, n + 3, n + 4\}$

$n$  could be either  $6k$  or  $6k + 1$  or  $6k + 2$  or  $6k + 3$  or  $6k + 4$  or  $6k + 5$ .

When  $n = 6k$ , then set  $Tn$  will definitely contain a multiple of 6 as it contains  $n$

When  $n = 6k + 5$ , then set  $Tn$  will contain a multiple of 6 as it contains  $n + 1 = 6k + 6$

When  $n = 6k + 4$ , then set  $Tn$  will contain a multiple of 6 as it contains  $n + 2 = 6k + 6$

When  $n = 6k + 3$ , then set  $Tn$  will contain a multiple of 6 as it contains  $n + 3 = 6k + 6$

When  $n = 6k + 2$ , then set  $Tn$  will contain a multiple of 6 as it contains  $n + 4 = 6k + 6$

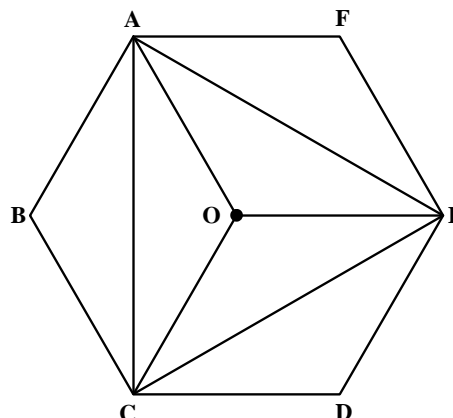
However, for every  $n = 6k + 1$ , the set  $Tn$  will not contain any multiple of 6

There will be 16 such sets for  $k = 0$  to 15, for which  $Tn$  will not contain a multiple of 6

$$\therefore (96 - 16) = 80 \text{ sets contain multiples of 6}$$

Hence, **option 1**.

71. ABCDEF is a regular hexagon, join centre O with vertices A, C and E.



In quadrilateral AFEO, diagonal EA divides it into two equal area triangles.

i.e. Area ( $\Delta AFE$ ) = Area ( $\Delta AOE$ )

Similarly, Area ( $\Delta ABC$ ) = Area ( $\Delta AOC$ )

And, Area ( $\Delta CDE$ ) = Area ( $\Delta COE$ )

$$\therefore \frac{\text{Area}(\Delta ACE)}{\text{Area}(\text{Hexagon } ABCDEF)} = \frac{3}{6} = \frac{1}{2}$$

Hence, **option 2**.

72.  $x^3 + 3x^2 + 4x + 5 = 0$  ... (i)  
 $x^3 + 2x^2 + 7x + 3 = 0$  ... (ii)

Equating equations (i) and (ii), we get,

$$x^2 - 3x + 2 = 0$$

$$\therefore (x - 1)(x - 2) = 0$$

$$\therefore x = 1 \text{ or } x = 2$$

Since both  $x = 1$  and  $x = 2$ , do not satisfy either (i) or (ii), there exists no common roots for equations (i) and (ii).

Hence, **option 1**.

73.  $\left(1 - \frac{1}{n}\right) < x \leq \left(3 + \frac{1}{n}\right)$  where  $n$  is a positive integer

If  $n = 1$ , then  $0 < x \leq 4$

As the value of  $n$  increases from 1 to infinity, the range of  $x$  approaches  $(1 < x \leq 3)$ .

So, the lower limit of  $x$  increases from almost 0 (to almost 1), while the higher limit decreases from 4 (to 3).

Thus, the lowest possible limit of  $x$  will be  $> 0$  and the highest possible limit will be  $\leq 4$ .

$$\therefore \text{For all range of } n, 0 < x \leq 4$$

Hence, **option 3**.

74.

$$\frac{1}{3} \log_3 M + 3 \log_3 N = 1 + \log_{0.008} 5 \quad \dots (i)$$

Consider the RHS of (i):

$$1 + \log_{0.008} 5$$

$$= 1 + \frac{\log 5}{\log 0.008}$$

$$= 1 + \frac{\log\left(\frac{10}{2}\right)}{\log\left(\frac{8}{1000}\right)}$$

$$= 1 + \frac{\log 10 - \log 2}{\log 8 - \log 1000} = 1 + \frac{\log 10 - \log 2}{3 \log 2 - 3 \log 10}$$

$$= 1 + \frac{\log 10 - \log 2}{-3(\log 10 - \log 2)} = 1 - \frac{1}{3} = \frac{2}{3} \quad \dots (ii)$$

Consider the LHS of (i):

$$\frac{1}{3} \log_3 M + 3 \log_3 N$$

$$= \log_3 M^{1/3} + \log_3 N^3 = \log_3 (M^{1/3} N^3) \quad \dots (iii)$$

Equating equations (ii) and (iii), we get,

$$\log_3 (M^{1/3} N^3) = \frac{2}{3}$$

$$\therefore M^{1/3} N^3 = 3^{2/3}$$

Cubing both sides, we get,

$$M \times N^9 = 9$$

$$\therefore N^9 = \frac{9}{M}$$

Hence, **option 2**.

75. Case 1: To pay 78 paise using minimum number of coins:

78 = 1(50) + 2(10) + 4(2), i.e. a total of 7 coins were used

Case 2: To pay 69 paise using minimum number of coins:

69 = 1(50) + 1(10) + 1(5) + 2(2), i.e. a total of 5 coins were used

Case 3: To pay 101 paise using minimum number of coins:

101 = 1(50) + 1(25) + 2(10) + 3(2), i.e. a total of 7 coins were used

∴ Minimum coins used were 7 + 5 + 7 = 19 coins

Hence, **option 1**.76. Let radius of the circle be  $r$ , a side of the equilateral triangle be  $a$ , and a side of the square be  $x$ .

The circumference/perimeter of the circle, triangle and square are equal. Hence,

$$2\pi r = 3a = 4x = k$$

$$\therefore r = \frac{k}{2\pi}, \quad a = \frac{k}{3}, \text{ and } x = \frac{k}{4}$$

The areas of the circle, triangle and square are  $c$ ,  $t$ ,  $s$  respectively. Hence,

$$c = \pi r^2 = \frac{\pi k^2}{4\pi^2} = \frac{k^2}{4\pi}$$

$$t = \frac{\sqrt{3}}{4} a^2 = \frac{\sqrt{3}}{4} \times \frac{k^2}{9} = \frac{k^2}{12\sqrt{3}}$$

$$s = x^2 = \frac{k^2}{16}$$

$$\therefore \frac{1}{\pi} > \frac{1}{4} > \frac{1}{3\sqrt{3}}$$

$$\therefore c > s > t$$

Hence, **option 3**.

77.  $4^1 \bmod 6 = 4$

$4^2 \bmod 6 = 4$

$4^3 \bmod 6 = 4$

$4^4 \bmod 6 = 4$

That is,  $4^n$  ( $n$  being any positive integer) when divided by 6, will always give the remainder 4.Hence, **option 4**.

78.  $5x + 19y = 64$  where  $x, y \in \mathbb{I}$

This means that the values of  $x$  have an interval of 19 between each other and the values of  $y$  will have an interval of 5 between each other.Now, there are 2 possible cases;  $y$  could either be positive or negative:

Case 1:

When  $y = 1$ , then  $x = 9$ When  $y = 6$ , then  $x = -10$ When  $y = 11$ , then  $x = -29$  and so onYou will notice that the values of  $y$  are in intervals of 5 and that of  $x$  are in intervals of 19.Generally speaking, when  $y$  is positive and its unit's digit is either 1 or 6, we will get integral values of  $x$ .

Case 2:

When  $y = -4$ , then  $x = 28$ When  $y = -9$ , then  $x = 47$ Again, the values of  $y$  are in intervals of 5 and that of  $x$  are in intervals of 19.That is, when  $y$  is negative and when  $y$ 's unit's digit is either 4 or 9, we will get integral values of  $x$ .

Now, let's evaluate the options:

Option 1: "no solution for  $x < 300$  and  $y < 0$ " is False.

∴ According to Case 2, we should get integral values of  $x$  when  $y$  is  $-4, -9$  or  $-14$  and so on.

Option 2: "no solution for  $x > 250$  and  $y > -100$ " is

False.

According to Case 2, we should get integral values of  $x$  when  $y$  is  $-99, -94, -74$  or  $-69$  etc.

Now, when  $y = -74, x = 294$

∴ A solution exists.

Option 3: "a solution for  $250 < x < 300$ " is True.

∴  $y = -74, x = 294$  is a possible solution

Option 4: "a solution for  $-59 < y < -56$ " is False.

∴ From Case 2, when  $y$  is negative, we will get integral values of  $x$  only when  $y$ 's unit's digit is either 4 or 9.

Hence, **option 3**.

79. From the second table,

$$g^2 = g * g = h$$

$$g^3 = h * g = f$$

$$g^4 = f * g = e$$

Hence, **option 1**.

80.  $f \oplus [f * \{f \oplus (f * f)\}]$

Using the simplification rule, start from the innermost bracket.

$$f * f = h$$

$$f \oplus h = e$$

$$f * e = f$$

$$f \oplus f = h$$

Hence, **option 4**.

81.  $a^{10} = a \dots$  (since,  $a * a = a$ )

$$f^{10} = (f^2)^5 = h^5 = h * (h^2)^2 = h * e^2 = h * e = h$$

$$g^9 = g * (g^2)^4 = g * h^4 = g * e = g$$

$$e^8 = e \quad (\text{since } e^2 = e)$$

$$\begin{aligned} \therefore \{a^{10} * (f^{10} \oplus g^9)\} \oplus e^8 &= \{a * (h \oplus g)\} \oplus e \\ &= \{a * f\} \oplus e = a \oplus e = e \end{aligned}$$

Hence, **option 1**.

82. Case 1: When the 2<sup>nd</sup> letter is  $m$ :

The 1<sup>st</sup> letter can be any of the 5 vowels.

The 3<sup>rd</sup> letter will be any of the 4 remaining vowels (i.e. different from the 1<sup>st</sup> one).

Number of possible 3 letter combinations =  $5 \times 4 = 20$

Case 2: When the 2<sup>nd</sup> letter is  $n$ :

The 1<sup>st</sup> letter can be any of the 5 vowels.

The 3<sup>rd</sup> letter will be either  $e$  or  $u$ .

Number of possible 3 letter combinations =  $5 \times 2 = 10$

Case 3: When the 2<sup>nd</sup> letter is  $p$ :

The 1<sup>st</sup> letter can be any of the 5 vowels.

The 3<sup>rd</sup> letter will be the same as the 1<sup>st</sup> letter.

Number of possible 3 letter combinations =  $5 \times 1 = 5$

∴ Total number of possible 3 letter combinations

$$= 20 + 10 + 5 = 35$$

Hence, **option 4**.

83. Case 1: The 2<sup>nd</sup> letter is  $m$  and the 3<sup>rd</sup> letter is  $e$ :

The 1<sup>st</sup> letter may be any of the 4 remaining vowels (i.e. different from  $e$ )

Number of possible 3 letter combinations = 4

Case 2: The 2<sup>nd</sup> letter is  $n$  and the 3<sup>rd</sup> letter is  $e$ :

The 1<sup>st</sup> letter may be any of the 5 vowels.

Number of possible 3 letter combinations = 5

Case 3: The 2<sup>nd</sup> letter is  $p$  and the 3<sup>rd</sup> letter is  $e$ :

The 1<sup>st</sup> letter will be the same as the 3<sup>rd</sup> letter.

Number of possible 3 letter combinations = 1 (i.e. 'epe')

∴ Total number of possible 3 letter combinations

$$= 4 + 5 + 1 = 10$$

Hence, **option 3**.

84. Case 1: Lines within Zones

Within every zone there will be  $3 + 3 + 3 = 9$  lines

∴ Total number of phone lines within each zone for all 4 zones together =  $9 \times 4 = 36$

Case 2: Lines connecting different Zones

Let Zone 1 have towns A, B and C.

A will be connected to 9 towns of the other 3 zones, each through a single direct line.

Similarly, B and C will also be connected to 9 different towns.

∴ The number of direct lines from Zone 1 to other

towns (in Zones 2, 3 and 4) =  $3 \times 9 = 27$

For Zone 2, we must only count the number of lines to Zones 3 and 4 (lines between Zone 1 and Zone 2 have already been considered.)

∴ The number of lines from the 3 towns of Zone 2 to

other towns (in Zones 3 and 4) =  $3 \times 6 = 18$

Now, for Zone 3, we should only count the number of lines to Zone 4 (lines to Zones 1 and 2 have already been considered.)

∴ The number of direct lines from the 3 towns of Zone 3 to the 3 towns in Zone 4 =  $3 \times 3 = 9$

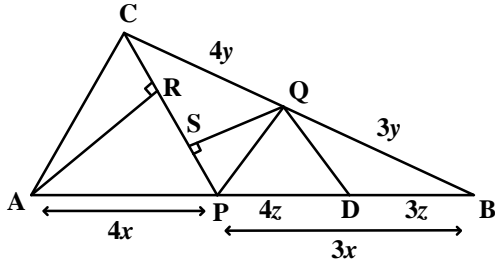
∴ Total number of direct telephone lines

$$= 36 + 27 + 18 + 9 = 90$$

Hence, **option 2**.

85. In  $\triangle ABC$ ,  $PQ$  is parallel to  $AC$ ,  
 $BP : AP = BQ : QC = 3 : 4$   
 In  $\triangle PBC$ ,  $QD$  is parallel to  $CP$ ,  
 $BD : DP = BQ : QC = 3 : 4$

The given figure may be depicted as follows:



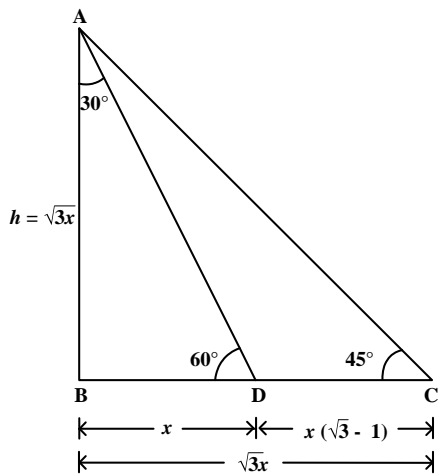
Let  $AP = 4x$  and  $PB = 3x$   
 Since  $DB : PD = 3 : 4$ ,

$$\therefore PD = \frac{4}{7} \times 3x = \frac{12x}{7}$$

$$\therefore AP : PD = 4x : \frac{12x}{7} = 7 : 3$$

Hence, **option 3.**

86. Let  $x$  be the distance from the later position of the car and the tower (i.e. when the angle of elevation was  $60^\circ$ ).



Since the triangle formed (i.e.  $\triangle ABD$ ) is a  $30^\circ$ - $60^\circ$ - $90^\circ$  triangle, we have, height of the tower,  $h = x\sqrt{3}$

Now, since the triangle formed by the initial position of the car (i.e.  $\triangle ABC$ ) is an isosceles triangle,  $AB = BC$

i.e.  $BC = x\sqrt{3}$   
 $\therefore DC = x\sqrt{3} - x = x(\sqrt{3} - 1)$

Time taken to travel distance  $DC$  is 10 minutes, thus,

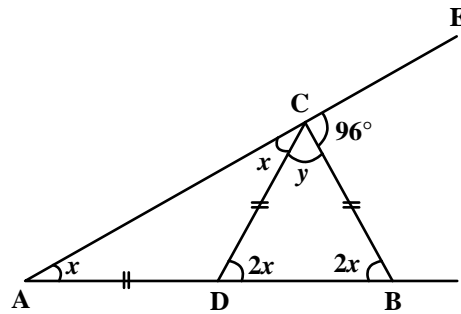
$$\text{Speed } s = \frac{x(\sqrt{3} - 1)}{10}$$

Time taken to travel distance

$$x = \frac{x}{\frac{x(\sqrt{3} - 1)}{10}} = \frac{10}{\sqrt{3} - 1} = 5(\sqrt{3} + 1)$$

Hence, **option 1.**

87.  $\because AD = DC$ ,  
 $\therefore \angle DAC = \angle DCA = x$   
 $\therefore \angle CDB = \angle DAC + \angle DCA = 2x$



$\because DC = BC$   
 $\therefore \angle CDB = \angle CBD = 2x$

Also,  
 $x + y = 180^\circ - 96^\circ = 84^\circ \dots (i)$   
 $y + 4x = 180^\circ \dots (ii)$

Solving (i) and (ii), we get,  
 $x = 32^\circ$   
 $\therefore \angle DBC = 2x = 64^\circ$   
 Hence, **option 3.**

88.  $ax^2 + bx + 1 = 0 \dots (i)$   
 For equation (i) to have real roots,  $b^2 - 4a \geq 0$   
 i.e.  $a \leq b^2/4 \dots (ii)$

If  $b = 4$ , equation (ii) is satisfied by,  $a = 1, 2, 3, 4$   
 $\therefore 4$  equations are possible.

If  $b = 3$ , equation (ii) is satisfied by  $a = 1, 2$   
 $\therefore 2$  equations are possible.

If  $b = 2$ , equation (ii) is satisfied by  $a = 1$   
 $\therefore 1$  equation is possible.

If  $b = 1$ , equation (ii) is not satisfied.  
 Thus, total number of possible equations = 7  
 Hence, **option 2.**

89.  $y - x = z - y \dots (i)$   
 $2y = x + z \dots (i)$   
 $xyz = 4 \dots (ii)$

It is known that Arithmetic Mean (A.M.) is greater than or equal to Geometric Mean (G.M.)  
 i.e.  $A.M. \geq G.M.$

Hence,  $\frac{x + y + z}{3} \geq (xyz)^{1/3}$  ... (iii)

From (i), (ii) and (iii), we get  $\frac{3y}{3} \geq 4^{1/3}$

$\therefore y \geq 2^{2/3}$

$\therefore$  The minimum value of  $y$  is  $2^{2/3}$ .

Hence, **option 2**.

90. From the digits 0, 1, 2, ..., 9, there are 4 digits that can create confusion are 1, 6, 8 and 9  
 Numbers with 0 in unit's place cannot be counted because reversing them will give an invalid code.

**Codes for which confusion can arise:**

Possible number of digits in ten's place = 4

Possible number of digits in unit's place, such that the 2 digits are distinct = 3

Total number of ways =  $4 \times 3 = 12$

However, the numbers 69 and 96 do not create confusion when written upside down.

$\therefore$  Total number of ways for codes for which confusion can arise =  $12 - 2 = 10$

**Total codes possible with digits from 0 to 9:**

Possible number of digits in ten's place = 9 (0 cannot be used)

Possible number of digits in one's place, such that the 2 digits are distinct = 9

Total number of all possible codes =  $9 \times 9 = 81$

$\therefore$  Number of codes with no confusion =  $81 - 10 = 71$

Hence, **option 3**.

91. Let the areas of the  $n$  squares formed from the original square be:

$A_1, A_2, A_3, A_4, A_5, \dots, A_n$

Also, let  $A_1 + A_2 + A_3 + A_4 + A_5 + \dots + A_n = A$  ... (i)

Where,  $A$  will be the area of the original square.

Now, if  $A = a^2$  (where  $a$  is a side of the square), then the area of the largest circle which can be drawn in it will have an area of  $\pi(a/2)^2 = \pi/4 \times a^2 = \pi/4 \times A$

$\therefore$  Area of the maximum circle which can be cut from a square of area  $A$  is  $\frac{\pi A}{4}$

Case 1: When the cloth is cut using the 2<sup>nd</sup> process

The area of the scrap material will be:

Area of square - Area of the single maximum circle

$$= A - \left(\frac{\pi A}{4}\right) = \frac{A}{4}(4 - \pi)$$

Case 2: When the cloth is cut using the 1<sup>st</sup> process

The sum of the areas of the maximum circles that can be cut out from the  $n$  squares

$$= \frac{\pi}{4}A_1 + \frac{\pi}{4}A_2 + \frac{\pi}{4}A_3 + \dots + \frac{\pi}{4}A_n$$

$$= \frac{\pi}{4}(A_1 + A_2 + A_3 + \dots + A_n) = \frac{\pi}{4}A$$

Also, the sum of the areas of the  $n$  squares = Area of the original square =  $A$

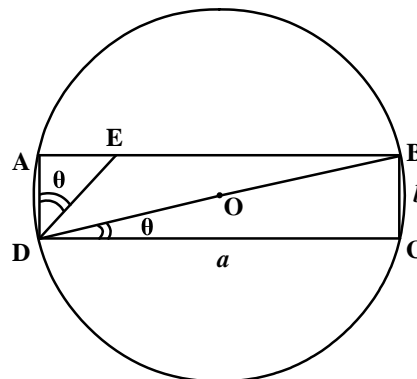
$\therefore$  Area of the scrap material will be:

$$A - \frac{\pi}{4}A = (4 - \pi)$$

From Cases 1 and 2, it is clear that the ratio of scrap left in the 1<sup>st</sup> process to the 2<sup>nd</sup> process is 1 : 1.

Hence, **option 1**.

92. Let  $r$  be the radius of the circle and let  $a$  and  $b$  be the length and breadth of the rectangle ABCD respectively.



$$\frac{\pi r^2}{ab} = \frac{\pi}{\sqrt{3}}$$

$$\sqrt{3} r^2 = ab \dots\dots\dots(i)$$

In  $\triangle DBC$ ,

$$\tan \theta = \frac{BC}{DC} = \frac{b}{a} \dots\dots\dots(ii)$$

In  $\triangle DAE$ ,

$$\tan \theta = \frac{AE}{AD} = \frac{AE}{b} \dots\dots\dots(iii)$$

From (ii) and (iii),

$$\frac{AE}{AD} = \frac{b}{a}$$

In  $\triangle DBC$ ,

$$4r^2 = a^2 + b^2$$

$$4r^2 = a^2 + \frac{3r^4}{a^2}$$

$$a^4 - 4r^2a^2 + 3r^4 = 0$$



$$a^4 - 3r^2a^2 - r^2a^2 + 3r^4 = 0$$

$$a^2(a^2 - 3r^2) - r^2(a^2 - 3r^2) = 0$$

$$a^2 = r^2 \text{ and } a^2 = 3r^2$$

$$\therefore a = r \text{ and } a = \sqrt{3}r$$

$$\text{When } a = \pm r, \text{ then } b = \pm \sqrt{3}r;$$

$$\text{When } a = \pm \sqrt{3}r, \text{ then } b = \pm r$$

$\therefore$  The required ratio is either  $1 : \sqrt{3}$  or  $\sqrt{3} : 1$ .

However, only the former is present in the options.

Hence, **option 1**.

93.  $\log_{10} x - \log_{10} \sqrt{x} = 2 \log_x 10 \quad \dots (i)$

Consider LHS of (i)

$$\log_{10} x - \frac{1}{2} \log_{10} x = \frac{1}{2} \log_{10} x$$

Equating the LHS and the RHS, we get,

$$\log_{10} x = 4 \log_x 10$$

$$\therefore \log_{10} x = \log_x 10^4$$

$$\text{Now, let } \log_{10} x = \log_x 10^4 = y$$

$$\therefore 10^y = x \text{ and } x^y = 10^4$$

Solving these two equations, we get,

$$y = \pm 2$$

$$\therefore x = 10^2 = 100 \text{ or } x = 10^{-2} = 1/100$$

Hence, **option 2**.

94. Any number that gives a remainder of 3 when divided by 7 will be of the form  $7k + 3$ .

Since we only need two-digit numbers,  $k$  will range from 1 to 13 {where  $7(1) + 3 = 10$  and  $7(13) + 3 = 94$ }

$$\text{Sum of all these numbers} = \sum_{k=1}^{13} 7k + 3$$

$$= 13 \times 3 + 7(1 + 2 + \dots + 13)$$

$$= 39 + \frac{7 \times 13 \times 14}{2}$$

$$= 39 + 637 = 676$$

Hence, **option 2**.

95. In  $\Delta ACT$ ,

$$\therefore \angle ACT = 50^\circ \text{ and } \angle ATC = 30^\circ,$$

$$\therefore \angle CAT = 100^\circ$$

Applying the Alternate Segment theorem,

$$\angle ABC = 50^\circ$$

Since  $\angle CAT$  is the external angle of  $\Delta ABC$ , the sum of  $\angle ABC$  and  $\angle BCA$  is  $100^\circ$ ,

$$\therefore \angle BCA = 50^\circ$$

$\therefore \angle BOA = 100^\circ$  ( $\because$  angle subtended by an arc at the centre is twice the angle subtended by the same arc on the circumference)

Hence, **option 1**.

- 96.

$$\log m + \log \left( \frac{m^2}{n} \right) + \log \left( \frac{m^3}{n^2} \right) + \log \left( \frac{m^4}{n^3} \right) + \dots + \log \left( \frac{m^n}{n^{n-1}} \right)$$

$$= \log \left[ \frac{m \times m^2 \times m^3 \times \dots \times m^n}{1 \times n \times n^2 \times \dots \times n^{n-1}} \right]$$

$$= \log \left[ \frac{m^{1+2+3+4+\dots+n}}{n^{0+1+2+3+\dots+(n-1)}} \right]$$

$$= \log \left[ \frac{m^{\frac{n(n+1)}{2}}}{n^{\frac{n(n-1)}{2}}} \right]$$

$$= \log \left[ \frac{m^{(n+1)} \cdot n^{\frac{n}{2}}}{n^{(n-1)} \cdot n^{\frac{n}{2}}} \right]$$

Hence, **option 4**.

97. Area and perimeter of square  $S_1$  is  $a^2, 4a$  respectively.

$$\text{Now, the side of } S_2 \text{ will be } \frac{a\sqrt{2}}{2} = \frac{a}{\sqrt{2}}$$

$$\text{Thus, the area and perimeter of } S_2 = \frac{a^2}{2}, \frac{4a}{\sqrt{2}}$$

$$\text{The side of } S_3 \text{ will be } \frac{a}{2\sqrt{2}} \times \sqrt{2} = \frac{a}{2}$$

$$\text{Thus, area and perimeter of } S_3 = \frac{a^2}{4}, \frac{4a}{(\sqrt{2})^2}$$

$$\text{Similarly, the area and perimeter of } S_4 = \frac{a^2}{8}, \frac{4a}{(\sqrt{2})^3}$$

$\therefore$  The required ratio

$$4a + \frac{4a}{\sqrt{2}} + \frac{4a}{(\sqrt{2})^2} + \frac{4a}{(\sqrt{2})^3} + \dots = \frac{4a + \frac{4a}{\sqrt{2}} + \frac{4a}{2} + \frac{4a}{2\sqrt{2}} + \dots}{a^2 + \frac{a^2}{2} + \frac{a^2}{4} + \frac{a^2}{8} + \dots}$$

$$= \frac{4a \left( 1 + \frac{1}{\sqrt{2}} + \frac{1}{(\sqrt{2})^2} + \frac{1}{(\sqrt{2})^3} + \dots \right)}{a^2 \left( 1 + \frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots \right)}$$

$$= \frac{4a \left( \frac{1}{1 - \frac{1}{\sqrt{2}}} \right)}{a^2 \left( \frac{1}{1 - \frac{1}{2}} \right)} \quad \{ \text{For a G.P. } S_\infty = \frac{a}{1-r} \}$$

$$= \frac{4a \left( \frac{\sqrt{2}}{\sqrt{2}-1} \right)}{a^2 \times 2}$$

$$= \frac{4a \times \sqrt{2}(\sqrt{2} + 1)}{2a^2} = \frac{2(2 + \sqrt{2})}{a}$$

Hence, **option 3**.

- 98.** The expression MDCCLXXXVII is expanded as,  
 $1000 + 500 + 100 + 100 + 50 + 10 + 10 + 10 + 5 + 1 + 1$   
 $= 1787$

Hence, **option 2**.

- 99.** The expression MCMXCIX is expanded as,  
 $1000 + (1000 - 100) + (100 - 10) + (10 - 1)$   
 $= 1000 + 900 + 90 + 9$   
 $= 1999$

Hence, **option 1**.

- 100.** Option (a): MCMLXXV  
 $= 1000 + (1000 - 100) + 50 + 10 + 10 + 5$   
 $= 1000 + 900 + 50 + 25 = 1975$

Option (b): MCMXCV  
 $= 1000 + (1000 - 100) + (100 - 10) + 5$   
 $= 1000 + 900 + 90 + 5 = 1995$

Option (c): MVD  
 $= 1000 + (500 - 5) = 1000 + 495 = 1495$

Option (d): MVM  
 $= 1000 + (1000 - 5) = 1000 + 995 = 1995$

Options (b) and (d) give 1995.  
Hence, **option 3**.

**101.**

	Runs	Catches Taken	Catches Dropped
Chirag	35	0	2
Biplah	50	2	$x + 2$
Aakash	50		$x$

From Statement A

We get the table as shown above :

∴ We do not know the number of catches taken by Aakash.

∴ Statement A alone is not sufficient.

Statement B does not give any information about the runs scored.

∴ Statement B alone is not sufficient.

After combining both the statements, we get,

Number of catches taken by Aakash =  $x + 1$

∴ If  $x = 1$  then Aakash is man of the match since he has dropped fewer catches.

If  $x > 1$  then Aakash will be the man of the match as he has taken more catches.

Hence, **option 4**.

- 102.** From statement A,  
Neither A nor D were among the first 2 which means that D gets either 3<sup>rd</sup> or the 4<sup>th</sup> rank.  
∴ D did not get the 4<sup>th</sup> rank.  
∴ D gets the 3<sup>rd</sup> rank and A gets the 4<sup>th</sup> rank.  
∴ B didn't get the 2<sup>nd</sup> rank.  
∴ B gets the 1<sup>st</sup> rank and C gets the 2<sup>nd</sup> rank.  
∴ Statement A alone is sufficient.

From statement B,  
B gets either the 1<sup>st</sup> or the 2<sup>nd</sup> rank.

We know that B did not get the 2<sup>nd</sup> rank.  
∴ B gets the 1<sup>st</sup> rank and C gets the 2<sup>nd</sup> rank.  
∴ D didn't get the 4<sup>th</sup> rank.  
∴ D gets the 3<sup>rd</sup> rank and A gets 4<sup>th</sup> rank.  
∴ Statement B alone is sufficient.  
∴ The question can be answered using either statements alone.  
Hence, **option 3**.

- 103.** From statement A,

Let there are  $x$  members in the club.

$$\therefore \frac{600}{(x - 5)} = \frac{600}{x} = 10$$

$$\therefore x = 20$$

$$\therefore \text{Contribution per head} = \frac{600}{20} = \text{Rs. } 30$$

∴ Statement A alone is sufficient.

From statement B,

We get there were at least 20 members in the club and each one paid no more than Rs. 30.

The different possibilities for can be :

$$30 \text{ members} \times 20 \text{ rupees} = \text{Rs. } 600$$

$$40 \text{ members} \times 15 \text{ rupees} = \text{Rs. } 600$$

$$60 \text{ members} \times 10 \text{ rupees} = \text{Rs. } 600 \text{ and so on.}$$

∴ Statement B alone is not sufficient.

Hence, **option 1**.

- 104.** Let the present age of father =  $f$  years

The present age of mother =  $m$  years

The present age of the kid =  $k$  years

$$\therefore f + n = 4(k + n) \quad \dots(i)$$

$$\therefore m + n = 3(k + n) \quad \dots(ii)$$

Equation (i) - equation (ii)

$$\therefore f - m = k + n \quad \dots(iii)$$

Equation (i) + equation (ii)

$$\therefore f + m + 2n = 7k + 7n = 7(k + n) \quad \dots(iv)$$

From statement A,

$$f - m = 10$$

Substituting in equation (iii), we get,

$$k + n = 10$$

∴ The combined age of the parents after  $n$  years

$$= 7(k + n)$$

$$= 7 \times 10 = 70 \text{ years}$$

∴ Statement A alone is sufficient.

From statement B,

$$k + n = 2k$$

$$n = k \quad \dots(v)$$

Substituting equation (v) in equation (iii), we get,

$$f - m = 2n$$

Substituting equation (v) in equation (iv), we get,

$$f + m = 14n - 2n$$

$$f + m = 12n$$

∴ The value of  $n$  is not known .

∴ We cannot find the combined age of parents.

∴ Statement B alone is not sufficient.

Hence, **option 1**.

**105.** 70% have VCD Players.

∴ 30% do not have VCD Players.

75% have microwave ovens.

∴ 25% do not have microwave ovens.

80% have ACs.

∴ 20% do not have ACs.

85% have washing machines.

∴ 15% do not have washing machines.

∴  $30 + 25 + 15 + 20 = 90\%$  of employees do not have at least 1 gadget.

∴ Minimum percentage of employees who has all the four gadgets

$$= 100 - 90 = 10\%$$

Hence, **option 3**.

*Alternatively,*

Minimum percentage of employees which possess both VCDs and Microwaves

$$= 70\% + 75\% - 100\%$$

$$= 45\%$$

Minimum percentage of employees which possess both ACs and Washing machines

$$= 80\% + 85\% - 100\%$$

$$= 65\%$$

∴ Minimum percentage of employees which possess all the four gadgets

$$= 45\% + 65\% - 100\%$$

$$= 10\%$$

Hence, **option 3**.

**106.** Let's organize the information given in a tabular form.

Using first two statements, we have,

Wife	Husband	Number of kids
		2 kids
Shanthi		No kids
Sridevi		

Anil, Raj and Sunil have kids.

∴ Raman is the husband of Shanthi.

∴ Joya came before Shanthi and met Anita on the Venue.

∴ Anita reached the venue first, Joya reached second, Shanthi reached third and Sridevi reached last.

Wife	Husband	Number of kids
Anita		
Joya		2 kids
Shanthi	Raman	No kids
Sridevi		

As Sunil reached the last with his only kid, Sunil is the husband of Sridevi.

∴ Anil is not the husband of Joya.

∴ Raj is Joya's husband and Anil is Anita's husband.

Wife	Husband	Number of kids
Anita	Anil	At least 1 kid
Joya	Raj	2 kids
Shanthi	Raman	No kids
Sridevi	Sunil	1 kid

From the table we can see that Shanthi arrived third.

Hence, **option 1**.

**107.** Referring the solution given in the first question of the set we get that, out of the given choices, Sunil and Sridevi is the correct pair.

Hence, **option 2**.

**108.** The daughters of Anita and Sridevi go to the same school.

Referring the table given in the solution of the first question of the set we get that,

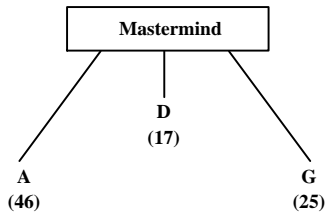
Anita's husband is Anil and Sridevi's husband is Sunil.

∴ Sunil and Anil is the correct answer.

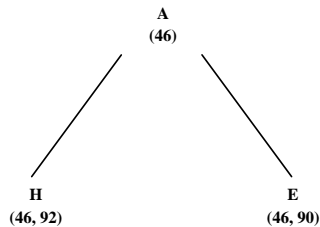
Hence, **option 3**.

**109.** Raj's family consists of two kids for certain.  
Anil has at least one kid, and hence, could be having exactly one kid also.  
Hence, **option 2.**

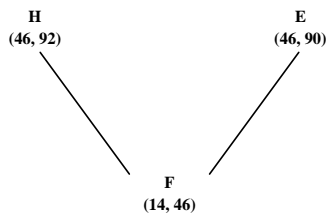
**110.** A, D and G each one has only one wrong answer and no blank answers.  
∴ They must have obtained the key from the mastermind directly.  
∴ A introduced 46 as the wrong answer, D introduced 17 as the wrong answer and G introduced 25 as the wrong answer.



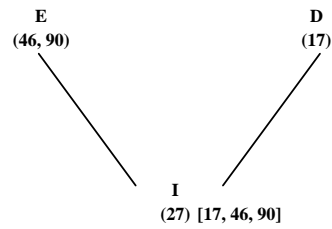
H and E must have obtained the key from A as they got 46 as the wrong answer.  
∴ H further introduced 92 as the wrong answer and E introduced 90 as the wrong answer.



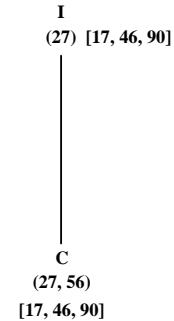
F must have obtained the key from H and E and found that answers 92 and 90 did not match. He left these blank and introduced 14 as the wrong answer in addition to 46 (which was the same answer though wrong) for H and E.



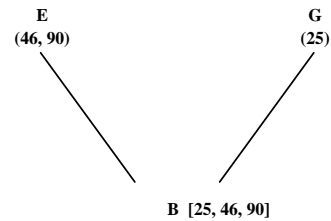
I must have obtained the key from D and E. Answers 17, 46, 90 didn't match and he left these as blank. He also introduced 27 as the wrong answer.



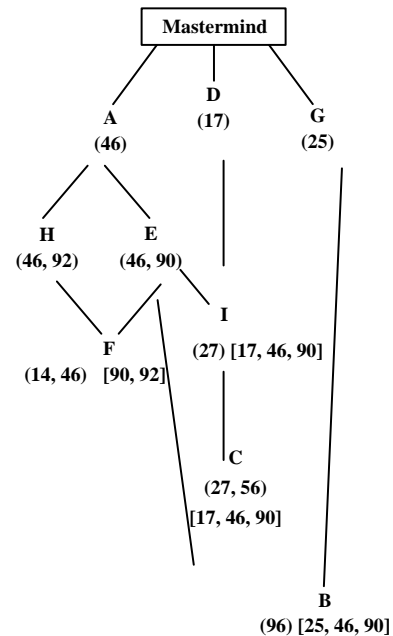
C must have obtained the key from I and introduced 56 as the wrong answer.



B must have obtained the key from E and G. Answers 25, 46, 90 didn't match and he left these blank. He also marked 96 as the wrong answer.



∴ Combining all the above diagrams we get:



From the flowchart, we see that A and D have only 1 source (mastermind).  
 Even C has only one source.  
 Only B has 2 sources E and G.  
 Hence, **option 2**.

**111.** C obtained the key from I who obtained it from D and E. E obtained it from A.  
 ∴ Four people were needed: A, D, E and I.  
 Hence, **option 3**.

**112.** From the flow chart above it is clear that, G and H were not the sources to anyone.  
 Hence, **option 4**.

*Alternatively,*

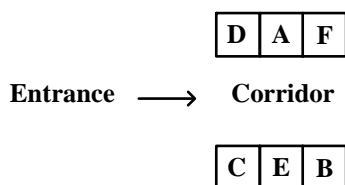
G got question number 25 wrong and none of the other nine people got the same question number wrong.

Similarly, H got question number 92 wrong and none of the other nine people got the same question number wrong.  
 ∴ G and H were sources to none of the nine.  
 Hence, **option 4**.

**113.** From the flowchart we get that, statement 3 is the only true statement.  
 Hence, **option 3**.

**114.** A, D and G had the same source (Mastermind).  
 E and H had the same source (A).  
 Hence, **option 4**.

**115.**



From the data given we can figure out that A, F and D have offices on the left side of the corridor and B, E and C have offices on the right side of the corridor.  
 ∴ E cannot occupy the corner office.  
 ∴ E occupies an office in the middle of the right corridor.  
 ∴ F cannot sit opposite E and A has to occupy an office before F.  
 ∴ F occupies an office at far end of the left side of the corridor.  
 ∴ D and C have to be at the beginning of the corridor.  
 ∴ A has to be in the middle of the left corridor and B has to be at the far end of the right corridor.

The arrangement of offices will be as shown in the figure above:  
 If E sits in his office and faces the corridor, C's office is to his left.  
 Hence, **option 3**.

**116.** From the arrangement given in the solution of the first question of the set we get that,  
 E's office faces A's office.  
 Hence, **option 4**.

**117.** Only A is F's neighbour.  
 Hence, **option 1**.

**118.** D was trying to direct the person to B's office as B's office is last on the right side of the corridor.  
 Hence, **option 2**.

**119.**

Coming	Leaving	Present in the Lounge
JC	—	JC
SS and SM	—	JC, SS, SM
DG	—	JC, SS, SM, DG
—	SM	JC, SS, DG
—	SS	JC, DG
JP and VR	—	JC, DG, JP, VR
—	JC, DG	JP, VR
DG	—	JP, VR, DG
—	VR	JP, DG
PK	—	JP, DG, PK
—	PK	JP, DG
—	JP, DG	—

The information can be organised in a tabular form as shown above.

JC arrives first in the lounge, followed by SS and SM.  
 ∴ DG must have followed them as SM met him before he left.

SM leaves after DG comes followed by SS.

JP and VR enter to find JC and DG sitting in the lounge.

JC leaves with DG, after meeting JP and VR.

DG comes back on his second visit to the lounge finding P and VR still sitting in the lounge.

VR leaves the lounge, and only JP and DG are left behind in the lounge.

PK enters the lounge and finds only JP and DG sitting in the lounge.

PK leaves, which means that JP and DG must be the last two faculty members to leave the lounge.

Between JP and DG, DG entered the lounge first.

Hence, **option 2**.

120. DG was sitting with JC when JP entered the lounge.  
Hence, **option 3**.

121. VR met JC, DG and JP in the lounge on Friday.  
Hence, **option 2**.

122. JP and DG were the last two faculty members to leave the lounge.  
Hence, **option 4**.

123.

Thursday	Friday
Congress	BJP
SP	BSP
	CPM

- ∴ Route BD cannot be used on Thursday.
- ∴ BJP has to take out its procession on Friday.
- ∴ Route DE is common to BJP and Congress.
- ∴ Congress should take out its procession on Thursday.
- ∴ Route AB is common to SP and BJP.
- ∴ SP should take out its procession on Thursday.
- ∴ BSP and CPM have to take out their processions on Friday.
- ∴ Congress procession can be allowed only on Thursday.

Hence, **option 1**.

124. From the explanation given in the solution of the first question we get that, Congress takes out a procession on Thursday and BSP on Friday.

∴ Only option 4 is not true.

Hence, **option 4**.

125. Number of countries with birth rate less than 34 = 32 (as birth rate of Philippines is 34)

Number of countries with birth rate equals to 34 = 4 (Including Philippines)

Amongst these 4 countries, there are 3 countries with equal death rates (equal to 10).

Those 3 countries are Thailand, Philippines and Colombia.

This means that all these 3 countries get the same rank of 33.

Hence, **option 2**.

126. Spain has a birth rate of 18 and a death rate of 8.  
Other countries with a birth rate of 18 and a death rate more than 8 = 2 ... (i)  
Taiwan has a birth rate of 26 and a death rate of 5.  
Other countries with birth rate of 26 and death rate less than 5 = 0 ... (ii)

Countries with birth rate more than 18 and less than 26 = 7 ... (iii)

∴ Countries ranking below Spain and above Taiwan = equation (i) + equation (ii) + equation (iii) = 9

Hence, **option 1**.

127. Philippines ranks 33 (calculated earlier). There are 3 countries at rank 33.

Turkey with birth rate of 34 and death rate of 12 has a rank of 36.

Among countries with a birth rate of 36, Venezuela has the lowest death rate and hence ranks 37th.

Hence, **option 4**.

128. Countries in Asia must be ranked above at least Upper Volta in Africa.

∴ Afghanistan is excluded.

Countries must also be ranked below Ecuador.

∴ Countries from Japan to Burma are also excluded.

Only 8 countries, from Iran to Iraq in the list, meet the requirement.

Hence, **option 1**.

129. Required proportions are:

$$\text{For 1996} = \frac{189}{561} = 0.337$$

$$\text{For 1997} = \frac{209}{587} = 0.356$$

$$\text{For 1998} = \frac{215}{645} = 0.333$$

$$\text{For 1999} = \frac{220}{660} = 0.333$$

∴ Chaidesh's export of tea as a proportion of tea produced during the period 1996-1999 was highest in the year 1997.

Hence, **option 2**.

130. Availability of Tea = Production - Export

$$\therefore \text{Per Capita availability} = \frac{\text{Production} - \text{Export}}{\text{Total population}}$$

$$\therefore \text{Total population} = \frac{\text{Production} - \text{Export}}{\text{Per capita availability}}$$

$$\text{Population in 1995} = \frac{421 - 207}{487} = \frac{214}{487} = 0.44$$

$$\text{Population in 1996} = \frac{561 - 189}{464} = \frac{372}{464} = 0.8$$

$$\text{Population in 1997} = \frac{587 - 209}{510} = \frac{378}{510} = 0.74$$

$$\text{Population in 1998} = \frac{660 - 220}{556} = \frac{440}{556} = 0.79$$

Hence, **option 1**.

- 131.** Tea production is constantly increasing and the area under cultivation is decreasing.

$$\text{Tea productivity} = \frac{\text{Production of Tea}}{\text{Area under cultivation}}$$

∴ Production of tea is maximum in the year 1999, also the area under cultivation is the least in 1999.

∴ Tea productivity is the maximum for the year 1999.

Hence, **option 1**.

- 132.** The two companies that are excluded from the graph 3 are B and D.

$$\therefore \text{Operating Profit of B} = \left(\frac{-4.2}{100} \times 240\right) = -10.08$$

$$\therefore \text{Operating Profit of D} = \left(\frac{-2.1}{100} \times 250\right) = -5.25$$

Average operating profit of B and D in F.Y. 2001-2002

$$= \frac{-10.08 - 5.25}{2} = -7.6 \text{ crore}$$

Hence, **option 1**.

*Alternatively,*

The two companies that are excluded from the third chart are B and D. These companies had a negative profitability in the year 2001-02.

∴ Only answer possible is **option 1**.

- 133.**

$$\text{Operating Profit} = \frac{\text{Profitability}}{100} \times \text{Operating Income}$$

$$\text{Operating Profit for A} = \left(\frac{7.5}{100} \times 190\right) = 14.25$$

$$\text{Operating Profit for C} = \left(\frac{15}{100} \times 200\right) = 30$$

$$\text{Operating Profit for E} = \left(\frac{17.5}{100} \times 200\right) = 35$$

$$\text{Operating Profit for F} = \left(\frac{9}{100} \times 220\right) = 19.8$$

Hence, **option 3**.

*Alternatively,*

Among the given choices, the operating profit is almost same for all but the profitability is the highest for E.

∴ E should have the highest operating profit in 2002-03.

- 134.** Let us analyse each of the given statement.

Consider option 1:

The company with the third-lowest profitability in 2001-02 is A and the company showing the lowest operating income in 2002-03 is also A.

∴ Option 1 is true.

Consider option 2:

From graph 1 we can conclude that the combined operating income both the years is highest for D.

Approximate operating profit for D (2002-03)

$$= \left(\frac{1.20}{100} \times 275\right) = 2.75$$

From the 3<sup>rd</sup> graph, the operating profits for companies are above 15. These four companies are A, C, E and F.

∴ We have to compare operating profits for D and B.

$$\begin{aligned} \therefore (\text{Operating Profit})_B &= \left(\frac{2.5}{100} \times 225\right) \\ &> (\text{Operating Profit})_D \end{aligned}$$

∴ D shows the lowest operating profit.

∴ Option 2 is also true

Consider option 3:

Company with higher operating income in 2001-02 than in 2002-03 is just one which is B.

B shows higher profitability in 2002-03 than in 2001-02.

∴ Option 3 is also true.

Consider option 4:

Companies with profitability between 10% and 20% in 2001-02 are A, C and E.

Operating income of C is more than 200 crores in 2002-03.

∴ Option 4 is not true.

Hence, **option 4**.

- 135.** Companies with profitability exceeding 10% in F.Y.2002-03 are C and E.

The operating profits of C and E are 30 and 35 respectively from the earlier question

$$\therefore \text{Average operating profit} = \frac{30 + 35}{2} = 32.5 \text{ crore}$$

Hence, **option 4**.

- 136.** The first statement is incorrect as November rainfall is below 100 cm in location 7.

The second statement is incorrect as the September rainfall does not exceed 50 cm in location 1.

The third statement is correct as March rainfall is lower than September rainfall in each location.

Hence, **option 3**.

137. The first statement is incorrect as April rainfall exceeds March rainfall in all the locations.

The third statement is incorrect as November rainfall is lower than March rainfall in location 7 only and not in location 6.

The fourth statement is incorrect as April rainfall is less than 200 cm in locations 1, 2 and 3 as well.

The second statement is the only one that is correct as peak rainfall occurs in April only in locations 6 and 7.

Hence, **option 2**.

138. Total time taken by the FRG team = 10.58 + 10.85 + 10.95 + 10.63 = 43.01

∴ 10.63 is the time taken by Tomas (CZE) who joins the FRG team.

Total time taken by the USA team = 10.78 + 10.75 + 10.94 + 10.36 = 42.83

Extra time taken by FRG team

= 43.01 - 42.83

= 0.18

Hence, **option 1**.

139. Score of First rank holder = 8905

Score of second-highest rank holder = 8897

To get the bronze, Daley has to score one more than that scored by Torsten who scores 8880.

Required Score 2

= 8881 - (3003 + 582)

= 8881 - 3585

= 5296

Hence, **option 2**.

140.

	Score 2	High Jump	Pole Vault
Tomas	5169	1.91	4.7
Torsten	5234	2.1	5.1
Jurgen	5223	2.0	4.9
Siegfried	5250	2.05	4.8
Grigory	5196	2.08	4.9
Steve	5163	2.04	5.0

Score 2 includes high jump, pole vault and long jump.

Score 2 of Michael Smith = 5274 (7th rank)

Michael's score in High Jump is 1.97 and in Pole Vault is 4.9

Scores of six competitors less than 5274 are tabulated as shown above.

Michael may or may not have out jumped Tomas, as Michael's score in pole vault and high jump are higher than those of Tomas.

Michael must have out jumped Torsten as his score in pole vault and high jump are lower than that of Torsten and also Michael scores higher than Torsten.

By similar logic, Michael must have out jumped Jurgen, Grigory and Steve as Michael's corresponding scores in pole vault and high jump are lower than those of Grigory and Steve.

∴ These are at least 4 competitors whom Michael Smith must have out jumped.

Hence, **option 4**.

141. WPI of cement in 2002-03 = 104

Operating cost of cement can be calculated as below:

	WPI in 2002 - 03	Weights	Cost
Limestone	105	20 %	21
Power	108	25 %	27
Wages	105.3	15 %	15.795
Total Cost			63.795

∴ Operating Profit per bag of cement

$$= \frac{104 - 63.795}{104} \times 100 = 38.7 \%$$

Hence, **option 3**.

142. WPI of steel in 2002-03 = 105.5

	WPI in 2002 - 03	Weights	Cost
Iron ore	106	25 %	26.5
Power	108	30 %	32.4
Wages	105.3	10 %	10.53
Total Cost			69.43

∴ Operating Profit per bag of steel in 2002-03

$$= \frac{105.5 - 69.43}{105.5} \times 100 = 34.2 \%$$

∴ Profit percentage of a steel manufacturer in 2002-03 is less than the profit percentage of a cement manufacturer in 2002-03.

Hence, **option 2**.

143. Power experiences a continuous price rise.

Cement shows a decline from 1994-95 to 1995-96.

Wages show a decline from 1998-99 to 1999-2000.

Limestone shows a decline from 1996-97 to 1997-98.

Hence, **option 1**.

144. Steel and limestone declined twice each.

Timer and wages declined once each.

Hence, **option 4**.



**145.** Option 1 is true because from 1901 to 2001, the number of states where females outnumber males is either five or less than that.

Option 2 is true because from 1961 to 1971 this number changes from 4 to 1.

Option 4 is true because there are at least four states that have more females than males for all the censuses prior to 1971.

For four years from 1971 to 2001 this number remains 1.

∴ Option 3 is false.

Hence, **option 3**.

**146.** Increase in the sex ratio in Punjab =  $874 - 832 = 42$

Increase in the sex ratio in HP =  $970 - 884 = 86$

Increase in the sex ratio in Assam =  $932 - 919 = 13$

Increase in the sex ratio in J&K =  $900 - 882 = 18$

Increase in the sex ratio in Kerala =  $1058 - 1004 = 54$

Hence, **option 2**.

**147.** Decline in sex ratio in Bihar =  $1061 - 921 = 140$

Decline in sex ratio in Goa =  $1091 - 960 = 131$

Decline in sex ratio in TN =  $1044 - 986 = 58$

Decline in sex ratio in Orissa =  $1037 - 972 = 65$

∴ The sharpest decline in the sex ratio over the period 1901-2001 was registered in Bihar.

Hence, **option 3**.

**148.** By observing the graph, we can conclude that Rice, Onion, Egg and Chillies have shown increase from 1996 to 2002 whereas Edible Oil and Dal have shown decrease in their respective prices.

∴ The required answers are 4 and 2.

Hence, **option 3**.

**149.** Onion in 1997-99, Chillies in 1998-00, Egg in 2000-02, Dal in 1998-00 and Rice in 1999-01 have shown a decline in two or more consecutive years.

Hence, **option 4**.

**150.** Onion in 1998-00 and Egg in 1997-99 have shown a price increase immediately after a price decline. Even Edible Oil, Dal, Rice and Chillies have shown this property, but more than once.

Hence, **option 4**.