

CAT 1999 Actual Paper

Answers and Explanations

1	a	2	d	3	b	4	a	5	c	6	c	7	b	8	c	9	c	10	b
11	c	12	a	13	b	14	d	15	a	16	d	17	a	18	c	19	b	20	a
21	b	22	d	23	c	24	b	25	b	26	a	27	d	28	c	29	d	30	d
31	c	32	b	33	c	34	a	35	c	36	b	37	d	38	a	39	b	40	a
41	d	42	d	43	b	44	c	45	d	46	b	47	a	48	d	49	a	50	c
51	c	52	b	53	d	54	a	55	a	56	a	57	a	58	b	59	c	60	a
61	b	62	a	63	d	64	d	65	a	66	c	67	b	68	c	69	c	70	c
71	d	72	b	73	c	74	a	75	d	76	b	77	a	78	c	79	c	80	b
81	c	82	a	83	b	84	b	85	d	86	a	87	a*	88	*d	89	d	90	b
91	b	92	c	93	d	94	b	95	d	96	a	97	d	98	d	99	c	100	c
101	c	102	a	103	b	104	a	105	b	106	c	107	a	108	a	109	b	110	d
111	b	112	d	113	a	114	b	115	a	116	d	117	b	118	a	119	b	120	c
121	d	122	d	123	a	124	d	125	c	126	a	127	b	128	c	129	b	130	a
131	c	132	c	133	b	134	d	135	a	136	d	137	b	138	d	139	c	140	b
141	a	142	a	143	b	144	b	145	a	146	c	147	d	148	b	149	c	150	b
151	c	152	a	153	d	154	a	155	c	156	d	157	c	158	c	159	a	160	b
161	d	162	d	163	c	164	c	165	d										

	Question number	Total questions	Total attempted	Total correct	Total wrong	Net Score	Time Taken
EU + RC	1 to 55	55					
QA	56 to 110	55					
CR + DI + DS	111 to 165	55					
Total		165					

1. a (a) ADBC is the correct answer choice. AD is a closely-connected pair. A introduces the shift from functional model in organization theory to a political model and D defines the political model.
 'Thus' in B and 'At the extreme' in C carry the discussion on the political model further, and C ends by highlighting that the organization structure develops unrelated to functional requirements, in the extreme case.
 (b) CBAD also has the linked pair AD, but the overall flow of thoughts is not logical. Starting with A and ending with C takes us logically from rejection of one model to discussion on another, as in ADBC.
 (c) DBCA: Though DBC flows smoothly, A at the end is out of place.
 (d) ABDC: B intrudes between A and D as we cannot talk of 'analysis of power resources' in B, unless we have defined the political model in D first.
2. d (d) BDCA is the correct answer choice.
 BD is a mandatory pair, as the pronoun 'this' delicate balance in D refers to nature's delicate balance in B. The 'also' in C guides us towards the analogy between institutions and nature, both requiring a system of checks and balances. And A ends by stating that group decision-making is not necessarily the answer because groups can also function like individuals.
 (a) CDAB and (c) CABD: The 'also' in C disqualifies it as a contender for the introductory sentence.
 (b) BCAD: Though C can also follow B smoothly, D at the end is then totally out of place.
3. b (b) CADB is the correct answer choice.
 C makes a good introductory sentence as it introduces Bennis and his predicament. A, B and D all use pronouns: 'he', 'him', 'his' and 'himself', all referring to Bennis.
4. a (a) DCBA is the correct answer choice.
 D introduces the intention of the person 'to stage a gastric attack' and the rest explain the sequence of events: D: I ... asked for shampoo mixture ...
 C: 'Then' feigns gastric attack and asks for some medicine.
 B: uses shop-telephone to inform the Consulate of his location (probably he also informs the Consulate of his gastric attack).
 A: 'With that', swallows the shampoo to induce actual gastric attack.
 The reason for the author's intention, however, remains unclear.
 (b) DACB also correctly starts with D, but A cannot follow D as he cannot swallow the shampoo mixture in A, until he gets it from the pharmacist in C.
 (c) BDAC and (d) BCDA. B can possibly start the paragraph, but A cannot come directly after D.
5. c (c) EDACB is the correct answer choice.
 DA is a mandatory pair, as 'in the early 1990s' in D links chronologically with 'since then' in A links chronologically with 'in the early 1900s' in D. Furthermore, D refers to 'such tests' and, therefore cannot start the paragraph.
 CB also emerges as a closely-linked pair. 'In other words' in B summarizes succinctly the idea introduced in C.
 Other options do not meet all the above requirements and hence do not flow logically from start to finish.
6. c (c) is the correct answer choice.
 All three airlines have reduced their fares to make up for this loss in increased volumes. This decision is obviously based on the general belief or assumption that air travellers in India are price-conscious. If there is a market research study that shows exactly that, then it would add credence to the general belief.
 (a) The general belief relates reduced fares to increased volumes, not to increased profitability. It is possible to increase profitability by cutting costs, even if volumes do not increase. Hence, the cause – and – effect relationship between reduced fares and increased volumes is not directly supported by this statement.
 (b) and (d) are irrelevant and do not in any way support or weaken the general belief.
7. b (b) is the correct answer choice
 Apparently McNeill is a Westerner who is doing some sort of research on the role of the Brahmin priest in ancient Indian society. From the way his thoughts are evolving in the passage (recite–memorize–dissemination–duplicated), McNeill can only understand the role of a Vedic priest by drawing a direct analogy between the Vedic priest, whom he does not understand except superficially, and a recorded audio cassette, which is an essential and ubiquitous item in McNeill's world.
 (a) and (d) are more or less stated in the passage, so there is no inference involved. '... practice of reciting Vedas was essential ...' means that it was an obligation and '... when the Vedas had not yet been written down ...' means Vedic hymns had not been scripted.
 (c) also is less of an inference and more of a surmise.
8. c (c) is the correct answer choice.
 The arrangement emerges somewhat like this:-
 Premise – I: If developed country, then social security for the elderly.
 Premise – II: No social security for the elderly in India, as it is not a developed country and also the traditional support - "joint family system" - for them is vanishing.
 Conclusion: Therefore, working people in India must save for their old age.
 (c) announces the good news for Indian working people:
 'India will become a developed country in the future,' implying social security for the elderly, thereby weakening the conclusion.
 (a) and (b) indicate some encouraging future trends, but do not obviate the necessity for Indian working people to save for their old age.
 (d) Strengthens the conclusion, rather than weakening it.
9. c (c) is the correct answer choice.
 The surmise or hypothesis in the passage implies that: biodiversity is inversely proportional to educational performance, with poverty playing no role in this relationship.
 (d) merely confirms the inverse relationship, at all levels of poverty.
 (a) relates good education performance with high levels of poverty, regardless of biodiversity (variety of flora). It is, therefore, irrelevant.
 (b) and (c) also support the inverse relationship

between biodiversity and educational performance, but each reserves a role for poverty in this relationship. (c) summarizes better, hence (c).

10. b (b) is the only option that explains how reducing taxes will broaden the tax base. If taxes on cigarettes (which constitute 90% of the revenues) are reduced, the prices of cigarettes will come down, thereby increasing the demand for cigarettes. More the cigarette smokers, the broader the tax base. Options (a) and (c) mention peripheral matters. (d) is talking about increasing duties (taxes) whereas the last sentence of the paragraph has only looked at "reducing taxes".

11. c (c) is the correct answer choice. (a) undermines Mathews' theory by showing how population need not follow geometric rate of growth and (b) undermines it by showing how food need not follow arithmetic rate of growth. (d) undermines his theory by pointing out that the inability of our planet to support the growing human population need not lead to disastrous consequences for humans. There are ways that these can be averted. (c) is the only option that does not undermine his theory. It also does not support his theory by referring to the different rates of growth in human and natural systems, but merely asserts that these rates of growth remain constant and cannot be changed.

12. a (a) is the correct answer choice. The picture that emerges from the passage is:

Year	Production (in tonnes)	% increase over previous year
1970 – 71	6,089	—
1997 – 98	5,830	—
1998 – 99	8,079	38.58%

This shows that the average production has remained well below 6,000 tonnes in the previous years. The significant increase of over 2,000 tonnes in 1998–99 was achieved by using all possible productivity enhancing measures.

If all areas have been properly irrigated, if all unproductive coffee bushes have been replaced, if intensive refilling and improved agricultural practices have been used — how much more can be done?

Obviously, the target of 10,000 tonnes (about 70% increase over average of less than 6000 tonnes) is unrealistic, as explained by option (a). Options (b) and (c) also indirectly contribute to making the target of 10,000 tonnes unrealistic. But (a) contributes MOST. (d), on the other hand, supports the target as realistic, by placing faith in the soundness of the target-selling produces.

13. b (b) is the correct answer choice. The first sentence of the passage asserts that: Intelligence of animals is proportionate to the extent of their socializing. Then the passage gives examples of how animals are effective when they are in their own social group and ineffective when they are alone. This is exactly what is given in option (b). (a) and (c) are partly stated in the passage, but do not convey the central message.

(d) cannot be inferred as the passage does not compare the behaviour of elephants and beavers with the behaviour of bees and ants.

14. d (d) is the correct answer choice. It is an example of doing the right thing, 'at the wrong time.'

In (d), telling a long story could be entertaining or interesting, but not when others have heard it many times before. The intention in (b) and (c) contradicts the definition of an unseasonable man. (a) is irrelevant.

15. a (a) is the correct answer choice. It is also an example of doing the right thing, 'at the wrong time.'

In (a), getting a higher bidder is helpful to the salesman, but not when he has just closed a deal. He will only curse himself and you. (d) is a matter of choice, not unseasonableness. (b) may be undesirable, but not unseasonable. There is nothing unseasonable about (c) either.

16. d (d) is the correct answer choice. The question relates to choosing the correct pronoun case: Subjective (we) or objective (us). The answer to the question 'who had left before he arrived?' is 'we', not 'us': 'We' is the subject of the verb 'had left' and the referent of the relative pronoun 'who,' which is also in the subjective case.

(b) and (c) are incorrect because they use 'Us' the objective case. They also have other obvious errors. (a) Uses the correct pronoun case (We), but incorrectly places both verbs 'had left' and 'had arrived' in the past perfect tenses. For indicating that one event has occurred in the past before another, the former should be placed in past perfect tense, while the latter in simple past tense.

17. a (a) is the correct answer, as it corrects all the errors in the original sentence. Other options do not. Redundancy:

(i) 'rose up': 'rise' includes the idea of upward motion. (ii) 'in her opinion, she thought': use either 'in her opinion' or 'she thought'.

Idiom (iii) 'passed on': Bills are always 'passed' in Parliament. 'Pass on' is a phrasal verb and has its own uses.

18. c (c) is the correct answer choice. This question tests you for parallelism. There are two possible parallel structures:

(i) Mr Pillai, X and Y, will be ... (phrase X and Y placed in apposition).

(ii) Mr Pillai, who is X and also Y, will be ... (use of who-clause)

There are also other ways to express the same idea but with different shades of meaning/emphasis:

(iii) Since Mr Pillai is X and Y, he will be ... (two main clauses joined by 'some' as a conjunction).

(iv) Being X and Y, Mr Pillai will be ... (use of participial clause).

Answer choice (c) matches with (i) above. Other choices do not match with any of the other possible grammatical structures.

19. b (b) is the correct answer choice.
This question tests you for use of the correct verb tense. Possible constructions could be:
(i) At the beginning of this decade, X took a giant stride ...
(ii) Use present perfect, when we talk of a period of time extending from a point in the past and completion of an action 'since' then, as seen from today's perspective.
(b) matches with (ii) above and correctly uses the present perfect tense. The phrase 'at the beginning of this decade' is merely placed in opposition to inform us about the 'advent of cable television,' and does not in any way affect the structure of the sentence.
20. a (a) is the correct answer choice.
The main verb 'made great sacrifices' in the main clause is modified by both participial clauses to explain the sacrifices she made:
(i) 'moving house on three occasions'.
(ii) 'severing the thread ... to make him understand the need to persevere.'
In (b) and (c), 'severed' (simple past tense) is used parallel with 'made', thereby producing two parallel main clauses. This is not grammatically incorrect, but changes the intended meaning, which was to highlight 'severing of the thread ...' as a 'sacrifice' the mother made.
(d) uses 'severing' correctly, but incorrectly replaces 'him' referring to Mencius by 'them.'
21. b (b) is the correct answer choice.
The question tests you for the correct positioning of the adverbial phrase 'in two weeks.' Since this phrase relates to 'putting together a programme,' it should be positioned closest to the verb phrase it modifies. The possible positions are examined below:
(i) 'You've put together (in two weeks) a programme ...'
[Incorrect. Adverb cannot come between the verb and its object.]
(ii) 'You've put together a programme (in two weeks) that solves ...'
[Incorrect. Here the adverb cannot separate the noun 'program' and the relative pronoun. 'that', which modifies it.]
(iii) '(in two weeks) you've put together a programme ...'
[Correct. The adverbial phrase is close to the verb it modifies and is not intrusive in this position.]
In (a) and (c), the intended meaning changes. It appears that 'the problem is solved in two weeks,' rather than 'the programme being put together in two weeks'.
(d) is incorrect as the adverbial phrase 'in two weeks' should be cordoned off by two commas, and introduction of "only" changes the meaning.
22. d (d) is the correct answer choice.
The question tests you for the correct idiomatic structure to be used with the verb 'proclaim.' 'Proclaim,' unlike 'claim,' cannot be followed by a to-infinitive. It should be followed by a that-clause in this case. Therefore, (d) is correct, while (a) and (c) are incorrect. Though (b) correctly uses the that-clause, the present continuous tense 'are saving' changes the meaning. The simple present tense 'save' is appropriate here to

- indicate a general sense. Furthermore, 'less' itself is a comparative (little → less → least) and need not be replaced by the double comparative 'lesser,' which is used only in certain standard idiomatic phrases, such as, 'the lesser of the two evils.'
23. c (c) is the correct answer choice.
The question tests you for the correct use of passive voice and the positioning of adverbs. First, 'end' cannot be the doer of the action: 'would delay,' but it should correctly be at the receiving end: 'would be delayed (passive voice).' Second, both the adverbs 'otherwise' and 'only' are required for the intended meaning to emerge clearly. Third, these adverbs should be positioned closest to the verb they modify. What better place than to be sandwiched between the auxiliary verb and the main verb: 'Would be otherwise only delayed.'
24. b (b) is the correct answer choice: This answer emerges from para 2, second sentence: "... WTO was a product of a series of trade-offs between principal actors and groups." The important players were essentially the United States; Europeans; countries like Canada and other middle and smaller trading partners; and the developing countries, which continued negotiations as part of the Uruguay Round till the 1990s. The Tokyo Round of the 1970s was an attempt at a 'constitutional reform' of the GATT, while what the important players eventually settled for in the WTO was the evolution of a rules-based system through multiple negotiations which obviously required time.
(a): Though it is mentioned in para 1 that 'the US government wanted to put off the Tokyo Round of the 1970s to the future', but it is clear from para 2 that other important players also first wanted to evolve a rules-based system through negotiations before agreeing to anything binding on them.
(c) is factually incorrect in light of para 3, and as such has no relevance to the non-formation of WTO in the 1970s. (d) is incomplete as 'the Tokyo Round negotiation was an attempt at constitutional reform of GATT,' and not related to formation of a new organization, WTO, as such.
25. b (b) is the summary of what is discussed in the second paragraph and emerges from the last sentence of the paragraph. (a), (c) and (d) are also stated in the second paragraph but as individual considerations that went into the formulation of the WTO package. (b) sums it up succinctly.
26. a (a) is the correct answer choice.
In paragraph 3, the passage defines 'legal development' as 'the promotion of the technical legal values of consistency, clarity and effectiveness. And these values were achieved in the WTO through (a) consistency: integrating under one roof the agreements signed under GATT.
(b) Clarity: removing ambiguities about the powers of constructing parties to make certain decisions.
(c) Effectiveness: eliminating grandfather rights exceptions and defects in dispute settlement procedure.
Option (a) only covers how the value of consistency was achieved, option (c) relates to the value of

effectiveness, but omits the word 'eliminating' and option (d) relates to the value of clarity, but omits the word 'removing'. This omissions render these options incomplete, and hence disqualifies them as possible correct answers. Thus, option (a) 'partly' (as in the question stem) answers the question how technical legal values were promoted in the WTO. Option (b) is an observation, not a step.

27. d (d) is the correct answer choice
The question stem alludes to the 'teleological method of interpretation,' whereby action of member states were evaluated against the accomplishment of community goals. (paragraph 4, lines 7 and 8). The other choices (a), (b) and (c) do not touch this main point.
28. c (c) is the correct answer choice. The 'benefits of international trade' (para 2, lines 11 and 12) refer to 'the export gains' (para 2, line 14) as brought out in option (c). Whereas option (b) only talks about the export gains and option (d) only about a rule-based system. (a) is a misleading choice.
29. d (d) is the correct answer choice.
Since 'the doctrine of mutual recognition handed down (by the European Court and Justice) in the case Cassis de Dijon was a key turning point,' and 'the court is recognized as a major player in European integration', join these together and you get option (d) as the correct option (para 4, lines 3 to 5). Options (a), (b) and (c) are also mentioned in para 4, but are not directly related to the Cassis de Dijon case as such.
30. d (d) is the correct answer choice.
All the three issues raised in options (a), (b) and (c) are arguments against abstract art, as discussed in para 2.
31. c (c) is the correct answer choice.
It echoes the words in para 1, lines 7 and 8. 'Something they can relate to and understand immediately without too much thought'. (a), (b) and (d) are peripheral observations.
32. b (b) is the correct answer choice.
This can be inferred from para 3, lines 6 and 7. 'If he had used representational images and colour, much of the emotional content would have been lost and the piece (Guernica) would not have caused the demand for justice that it did.' (c) is a shocking choice. (d) is not true at all. (a) is just the background for the painting.
33. c (c) is the correct answer choice and directly emerges from para 3, last two lines. (a) may be an isolated opinion. (b) and (d) are irrelevant to the question.
34. a (a) is the correct answer choice.
Para 4 discusses how each deals with 'reality' on canvas:-
(i) Representational artist: What he sees with his eyes – he reproduces on canvas.
(ii) Abstract artist: What he feels about what his eyes see – he interprets on canvas.
Option (b) is incorrect as nowhere in the passage

does the author talk about one being superior to the other. The author's point of view is that the critics of abstract art fail to see its merit, both forms are different and have their own merits.

Options (c) and (d) are irrelevant to the question asked. (c) is refuted in the passage and (d) is rather a tall claim. (a) is a lopsided observation.

35. c (c) is the correct answer choice.
The concept that because humans can perceive the world around them, they are the 'revealers' of reality, has been highlighted in the second para: '... that man is the means by which things are manifested'. — 'With each of our acts, the world reveals to us a new face'. Option (a), though implicit in the passage, is not the central point of the author.
Option (b) and (d) talk of the unity of nature, but it is not relevant to the central idea of the passage.
36. b (b) is the correct answer choice. Refer para 3, lines 4 - 6 especially the fifth line.
37. d (d) is the correct answer choice.
The author distinguishes between perception and creation in the following manner:-
i) Perception: Man, the subject, is essential as 'revealer' of objects around him but not essential to the existence of the objects.
In other words, if there is no object, there is nothing for men to perceive or 'reveal', but object can exist whether man is there to perceive it or not.
(ii) creation: Man creates in order to feel essential in the world around him. So, it is the creative activity that is essential, not man's creations (paintings, writing, etc.)
All other options are either irrelevant or do not capture the essence of the meaning.
38. a (a) is the correct answer.
The writer is the creator (subject) of the 'literary work' (object). To the writer, the very act of writing is essential, not his literary work. On the other hand, the reader (subject) is essential as the revealer of this literary work/the object of someone else's creation. But the reader is not essential to the existence of this literary work, which can exist even if there is no one to read it. This is how the dialectic of perception and creation manifests itself in the art of writing. Only option (a) captures the essence.
39. b (b) is the correct answer choice, because the writer makes us (readers) essential as revealers of what is written in the writer's literary work (the created object which is now part of the world around us). Can be inferred from para 2. (a), (c) and (d) are not accurate inferences from the passage.
40. a (a) is the correct answer choice.
The nation-state was expected to guarantee the happiness of individuals in the name of (para 1, lines 2 and 3):-
– Modernization in the West [not development in the West, as in option (c).]
– Socialism in the Eastern Bloc [not modernization in the Eastern Bloc, as in option (d).]
– Development in the Third World (as in option (a), not socialism in the Third World, as in option (b).]

41. d (d) is the correct answer choice.
Para 3 highlights that demands of communities and groups for recognition of their identities can be viewed:
(i) positively: as liberation movements, against oppression and injustice.
(ii) negatively: as militant action, when the search and assertion for their identity can result in intolerance of others.
Options (a), (b) and (c) together cover the full group. Hence, (d) all of these is the correct answer.
42. d (d) None of the above is the correct answer. Choice as option (a), (b) and (c) are all true about the nature of identity as per the author.
Option (a) – para 5, line 1
Option (b) – para 6, line 1
Option (c) – para 5, line 2
43. b (b) is the correct answer choice, as emerges from the last two lines of para 1: ‘the state can use its powerful resources to reject the demand of its communities; it may even go so far as genocide to ensure that order prevails’. Other options are not correct as per para 1, which on the contrary, discusses the failures of the nation state.
44. c (c) is the correct answer choice, as nowhere has the author said that the nation state represents the demands of communities within it. On the contrary, para 1, lines 6 and 7 state: ‘Distributed by the claims of communities within it, the nation state tries to repress their demands ...’
Option (a), (b) and (d), on the other hand, are true about the nation state as per para 1.
45. d (d) The primary purpose of this passage is to compare the Western ‘strategic culture’ with that of Asians and highlight the ‘cultural divide’, rather than a technical one. Options (a) and (c) deal with technical issues of war, whereas option (b) deals with the issue of morale. Only option (d) supports the ‘cultural divide’. Paras 7-8 reveal some of the reasons for America’s defeat at Vietnam.
46. b (b) is the correct answer choice, and is the metaphor for the western way of war, as opposed to ‘a stealthy archer’, which embodies the eastern way of war (last but one para, lines 7 and 8).
Options (a) (para 2, line 1), (c) (para 5, line 4 and 5) and (d) (para 4, line 1 to 3) all describe the ‘Asian’ way of war.
47. a (a) is the correct answer choice.
Sun-tzu believed in ‘subduing an adversary without fighting (para 4, lines 1 to 3), and not through actual combat, as stated in option (a).
Other options: (b) is stated at para 5, lines 1 and 2; (c) and (d) are stated in last but one para, lines 1 and 2, where it is stated that both Sun-tzu and Clausewitz had similar views on (c) and (d).

48. d (d) is the correct answer choice.
The important differences in the concept of war of Clausewitz and Sun-tzu are summarized below:

		Clausewitz	Sun-tzu
(i)	Structure	Massed Battle in an open area	Persistent indirect attacks to weaken enemy through isolation, poor morale and disunity
(ii)	Time	Finite extent of time, say, few months	Long drawn-out, over several years
(iii)	Sequence of War	Fixed course with a beginning, a middle and an end.	No fixed sequence. But use full might of the army in a final quick and clean operation, when enemy has been considerably weakened

- Option (a) is incorrect, as both were opponents of militarism, of turning the war over to the generals.
Option (b) is incorrect, as both were sophisticated as strategic theorists.
Option (c) does highlight a difference, but (d) is far more comprehensive.
49. a (a) is the correct answer choice, and directly emerges from the last para, last two lines.
Option (b) and (c) are nonsensical.
As regards option (d), ‘bows and arrows’ metaphorically represent the Asian way of war, not literally.
50. c (c) is the correct answer choice, as it captures the essence of the passage: difference in strategic culture between the West and Asia leading to America’s failure to understand the Asian culture of war. (a) and (b) are minor reasons. (d) is doubtful. The ninth para and specifically lines 1-3 deal with this aspect.
51. c (c) BADC is the correct answer choice.
B connects up well with 1 to introduce the topic: ‘Use of Humour in Advertising’. There are ‘two grounds’ why an ad can be ineffective. ‘At times’ in A and ‘Again’ in D guide the reader to the “two grounds.” B–A–D are, hence, logically connected. 1-B is a good pair because ‘making people laugh’ is qualified further in B.
52. b (b) DBAC is the correct answer choice.
1. places focus on a “mud hump” and D describes “the hump is alive ...”. Hence, 1D is a mandatory pair.
BA is another mandatory pair. B talks about ‘the proportion of soldiers to workers’ and A talks about ‘unsettling the balance’.
A–C–6 are also connected. C talks about ‘restoring of fortunes’ by the ‘queen termite laying eggs on a as-required basis’ to make up the losses. And 6 wonders at this ‘mysterious ability’ of the queen termite.

53. d (d) BDCA is the correct answer choice. 'these years' in B connects to 'three to five years' in 1. Then 'this correlation' in D connects to what is elaborated in B. C then talks about 'the reason' for this correlation, which is elaborated in A: 'a large vocabulary and a sense of grammar and sentence structure,' and is summed up in 6 as: "comprehension of language is high. Hence, we get 1-BDCA-6.
54. a (a) DACB is the correct answer choice. 1 introduces the topic: 'High-powered outboard motors (OBM) ... threats to ... Beluga whales'. D takes us back to the low-powered 'first OBMs' ... in the early 1930s'. 'With these' in A refers to the first OBMs' in D and not to 'high powered OBMs' in 1, as the context makes clear later. Hence, A follows D rather than 1. This rules out option (b) and (c). C brings us back to the present, contrasting ('however') the ineffectiveness of 'much more powerful engines' of today with the effectiveness of 'the first OBMs' of the early 1930s. B and 6 then explain the reason for the ineffectiveness of today's high-powered OBMs: the 'avoidance strategy' of the Beluga whales. Hence, 1 - DACB - 6 flows logically as explained above.
55. a (a) BADC is the correct answer choice. The paragraph is trying to say that science textbooks and other scientific writings do not present the advance of science in the correct historical perspective and thereby present science as 'a series of individual discoveries and inventions ... (6)'. 'Those misconstructions' in B connects it with 1, leading to BADC as the correct answer choice. B is followed by A, which tells us why science textbooks are arranged as they are and D praises 'this technique of presentation' as 'unexceptionable as pedagogy.' 'But' in C contrasts with D and guides the reader to the incorrect 'impression that is likely to follow.' This impression is elaborated in 6.
56. a The difference between two integers will be 1, only if one is even and the other one is odd. $4x$ will always be even, so $17y$ has to be odd and hence, y has to be odd. Moreover, the number $17y$ should be such a number that is 1 less than a multiple of 4. In other words, we have to find all such multiples of 17, which are 1 less than a multiple of 4. The first such multiple is 51. Now you will find that as the multiples of 17 goes on increasing, the difference between it and its closest higher multiple of 4 is in the following pattern, 0, 3, 2, 1, E.g. $52 - 51 = 1$, $68 - 68 = 0$, $88 - 85 = 3$, $104 - 102 = 2$, $120 - 119 = 1$, $136 - 136 = 0$. So the multiples of 17 that we are interested in are 3, 7, 11, 15. Now since $x \leq 1000$, $4x \leq 4000$. The multiple of 17 closest and less than 4000 is 3995 (17×235). And incidentally, 3996 is a multiple of 4, i.e. the difference is 4.

This means that in order to find the answer, we need to find the number of terms in the AP formed by 3, 7, 11, 15, ... 235, where $a = 3$, $d = 4$. Since we know that $T_n = a + (n - 1)d$
 $\Rightarrow 235 = 3 + (n - 1) \times 4$
Hence, $n = 59$.

Alternate Solution:

$$4x - 17y = 1 \text{ and } x \leq 1000$$

so $17y + 1 \leq 4000$ i.e. $y \leq 235$ and moreover every 4th value of y with give value of x .

$$\text{So number of values} = \frac{235}{4} \approx 58$$

Hence, total number of terms will be $58 + 1 = 59$.

57. a $(ab)^2 = ccb$, the greatest possible value of 'ab' to be 31. Since $31^2 = 961$ and since $ccb > 300$, $300 < ccb < 961$, so $18 < ab < 31$. So the possible value of ab which satisfies $(ab)^2 = ccb$ is 21. So $21^2 = 441$, $\therefore a = 2, b = 1, c = 4$.

58. b **Note:** $342 = 7^3 - 1$. On further simplification we get,

$$= \frac{(7^3)^{28}}{342} = \frac{343^{28}}{342} = \frac{(342 + 1)^{28}}{342} = \frac{342N + 1}{342}$$

Hence, remainder = 1.

59. c The answer is ${}^{10}C_2 \times 11 + {}^{11}C_2 \times 10 = 45 \times 11 + 55 \times 10 = 1045$.

60. a At least 1 and at most n are to be selected

$$\Rightarrow {}^{2n+1}C_1 + {}^{2n+1}C_2 + \dots + {}^{2n+1}C_n = 63$$

$$\Rightarrow \frac{1}{2}(2^{2n+1} - 2) = 63$$

$$\Rightarrow n = 3$$

61. b $18 \propto \sqrt{9}$

$$42 \propto \sqrt{x}; \text{ Here } x = \text{number of compartments}$$

$$\frac{18}{42} = \frac{\sqrt{9}}{\sqrt{x}}$$

Simplifying, $x = 49$, but this is with reference to maximum speed. Hence, number of compartments would be one less in order to run i.e. 48.

62. a Let x be the fixed cost and y the variable cost. Then,

$$17500 = x + 25y \quad \dots (i)$$

$$30000 = x + 50y \quad \dots (ii)$$

Solving the equation (i) and (ii), we get

$$x = 5000, y = 500$$

Now if the average expense of 100 boarders be 'A'. Then

$$100 \times A = 5000 + 500 \times 100$$

$$\Rightarrow A = \text{Rs. } 550.$$

63. d Men 40% Women 60%
 Out of 40% men, 75% earn more than Rs. 25,000.
 Hence, 30% of the company (men) earn more than Rs. 25,000.
 But, in all 45% of the employees earn more than Rs. 25,000.
 Hence, among women 15% earn more than Rs. 25,000 and the remaining (60 - 15)% earn less than or equal to Rs. 25,000.

$$\text{Therefore, the fraction of women} = \frac{45}{60} = \frac{3}{4}.$$

64. d $|r - 6| = 11 \Rightarrow r - 6 = 11, r = 17$
 or $-(r - 6) = 11, r = -5$
 $|2q - 12| = 8 \Rightarrow 2q - 12 = 8, q = 10$
 or $2q - 12 = -8, q = 2$

$$\text{Hence, minimum value of } \frac{q}{r} = \frac{10}{-5} = -2.$$

65. a Use the method of simulation, viz. take any sample values of x and verify that n is both odd as well as a perfect square.

Alternate solution:

$$\begin{aligned} \text{Let } x &= (a - 1) a (a + 1) (a + 2) \\ &= (a^2 - 1) a(a + 2) \\ &= a^4 + 2a^3 - a^2 - 2a \\ n = x + 1 &= a^4 + 2a^3 - a^2 - 2a + 1 \\ &= (a^2 - a + 1)^2 \end{aligned}$$

66. c Let 'a' be the percentage of people who favoured exactly one proposal, 'b' be the percentage of people who favoured exactly by two proposals and 'c' be the percentage of people who favoured exactly three proposals.

$$a + b + c = 78 \quad \dots (i)$$

$$a + 2b + 3c = 100 \quad \dots (ii)$$

$$(ii) - (i) \text{ implies } b + 2c = 22$$

$$\text{Since } c = 5, b = 12$$

$$\text{Required percentage} = b + c = 12 + 5 = 17\%.$$

67. b If there are n numbers, the function h has to be performed one time less.

68. c Let the radius of the outer circle be $OQ = x$.

$$\text{Hence, perimeter of the circle} = 2\pi x$$

$$\text{But } OQ = BC = x \text{ (diagonals of the square } BQCO)$$

$$\text{Perimeter of } ABCD = 4x$$

$$\text{Hence, ratio} = \frac{2\pi x}{4x} = \frac{\pi}{2}.$$

69. c Test the boxes labelled — Red and White.
 Now if the ball is Red, label the box — Red
 Now the box which has the label White is either Red or Red and White.

However, it cannot be Red.

Hence, it is Red and White.

The last box is White.

70. c The square root is 111111111.

71. d According to the given conditions, either Mrs Border or Mrs Dennis can sit to the right of Mr Abraham. It can't be Mrs. Elmer as she sat two places to the right of Mrs. Border.

72. b At 7.30 a.m., Navjivan Express is at 50 km from A at the same time, Howrah-Ahmedabad Express is at 20 km from B.

Hence, distance between the trains at 7.30 a.m. is 30 km.

$$\text{Relative speed} = 50 + 40 = 90 \text{ kmph}$$

$$\text{Hence, time left} = \frac{30}{90} = \frac{1}{3} \text{ hr} = 20 \text{ min.}$$

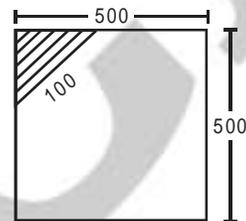
73. c Following rule should be used in this case: The perimeter of any polygon circumscribed about a circle is always greater than the circumference of the circle and the perimeter of any polygon inscribed in a circle is always less than the circumference of the circle.

Since the circle is of radius 1, its circumference will be 2π . Hence, $L1(13) > 2\pi$ and $L2(17) < 2\pi$.

$$\text{So } \{L1(13) + 2\pi\} > 4\pi.$$

$$\text{Hence, } \frac{\{L1(13) + 2\pi\}}{L2(17)} \text{ will be greater than 2.}$$

74. a



Area of shaded region

$$= \frac{1}{2} \times \frac{100}{\sqrt{2}} \times \frac{100}{\sqrt{2}} = 2,500 \text{ sq m}$$

Area of a Δ is maximum when it is an isosceles Δ .

$$\text{So perpendicular sides should be of length } \frac{100}{\sqrt{2}} \text{ m.}$$

For questions 75 to 77:

75. d It is given that $Q > P$ and $R > S$.

$$Q \ P \ R \ S$$

$$4 \ 2 \ 3 \ 1$$

$$2 \ 1 \ 4 \ 3$$

The distribution of coins can be of two types in both the cases, S gets an odd number.

76. b P Q R S

$$1 \ 3 \ 4 \ 2$$

$$2 \ 4 \ 3 \ 1$$

Clearly, Q gets more coins than S in both the cases.

77. a R S Q P

$$4 \ 2 \ 3 \ 1$$

$$4 \ 1 \ 3 \ 2$$

$$4 \ 3 \ 2 \ 1$$

Looking at the possible distribution of coins, we find that option (a) is not always true.

For questions 78 to 80:

Place of worship	Number of flowers before offering	Number of flowers offered	Number of flowers left
1	$(15/8)y$	y	$(7/8)y$
2	$(7/4)y$	y	$(3/4)y$
3	$(3/2)y$	y	$y/2$
4	y	y	0

Starting from the fourth place of worship and moving backwards, we find that number of flowers before

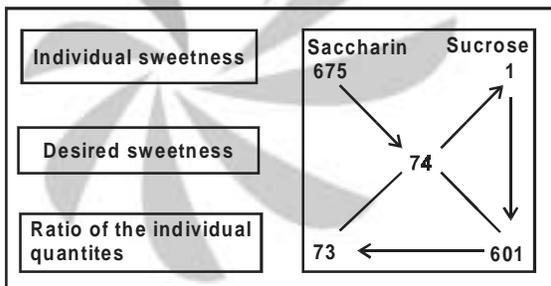
entering the first place of worship is $\frac{15}{8}y$.

78. c Hence, number of flowers before doubling = $\frac{15}{16}y$
(but this is equal to 30)
Hence, $y = 32$

79. c The minimum value of y so that $\frac{15}{16}y$ is a whole number is 16.
Therefore, 16 is the minimum number of flowers that can be offered.

80. b For $y = 16$, the value of $\frac{15}{16}y = 15$.
Hence, the minimum number of flowers with which Roopa leaves home is 15.

81. c If the mixture is to be made 100 times as sweet as glucose, its sweetness should be 74. The ratio in which saccharin and sucrose be mixed to get the above level of sweetness is given by the following alligation table.



In other words, it means to achieve the given level of sweetness, you need to add 601 g of sucrose to 73 g of saccharin. Hence to 1 g of saccharin, the amount

of sucrose to be added is $\frac{601}{73} = 8.23$ g.

82. a $\frac{[(0.74) + (1.000)2 + (1.7)3]}{6} = 1.31$.

For questions 83 and 84:

D, a lawyer is married to A, a housewife.
C, an accountant is married to F, a lecturer.
E is not a housewife.
Hence, E is an architect and B is a housewife.
Also, any lady is neither an architect nor an accountant

A	Lawyer	Male
B	Housewife	Female
C	Accountant	Male
D	Housewife	Female
E	Architect	Male
F	Lecturer	Female

83. b 84. b

For questions 85 and 86:

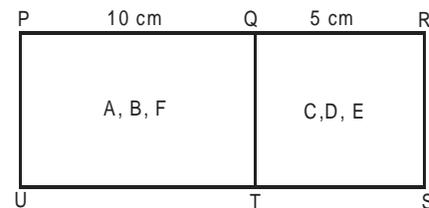
Let the positions from left to right be marked 1 to 7
A and G take up positions 6 and 7
B takes up position 4.
C and D are in places 1 and 5, so that they are as far as possible.
E and F are in positions 2 and 3.

1	2	3	4	5	6	7
C/D	E/F	F/E	B	D/C	A/G	G/A

85. d

86. a

For questions 87 & 88:



87. *a The sides of the rectangle PRSU are $PR = 15$ cm and $RS = 10$ cm.

\therefore Its diagonal = $\sqrt{15^2 + 10^2} = \sqrt{325} \approx 18$ cm.

Given that the minimum distance between any pair of points formed by taking one from A, B and F and the other from C, D and E is $10\sqrt{3} = \sqrt{300} \approx 17$ cm, which is close to the length of the diagonal of PRSU. This implies that each of A, B and F are close to one of the vertices P or U and each of C, D and E are close to one of the vertices S or R.

Note that all the three points in one of the rectangles PQTU and QRST will be close to the same vertex (or else the minimum distance between one of these points and one of the three in the other rectangle will be less

than $10\sqrt{3}$ cm). Also, the points (A, B, F) and (C, D, E) have to be diagonally opposite as maximum distance between two vertices on same side is 15 cm.

Option (a): The closest two points of the given six points have to be any two out of A, B, F or any two out of C, D, E (since they are closest to the same vertex). Therefore, (F, C) cannot be the closest pair of points as they are diagonally opposite.

Option (b): It is definitely false as A and B are close to the same vertex, while F and C are close to diagonally opposite vertices.

Option (c): It is possible but not necessary that the closest pair of points among the six given points is (C, D), (D, E) or (C, E). The other possibilities are (A, B), (B, F) or (A, F).

88. *d The maximum possible distance between the pairs (C, D), (D, E) or (C, E) is the length of the diagonal of the rectangle QRST, i.e. $\sqrt{10^2 + 5^2} = 5\sqrt{5}$ cm.

Since $AB > AF > BF = 6\sqrt{5}$ cm, the closest pair of points of the given six points will be from the set (C, D, E). As $CD > DE > CE$, so (C, E) will be the pair of closest points.

***Note:** There is slight inconsistency regarding the information given in the question. If $BF = 6\sqrt{5} \approx 13.4$ cm, then A, B and F cannot be close to the same vertex as the length of the diagonal of rectangle PQTU is 14 cm approximately. This in turn will contradict the fact the minimum distance between any point of A, B, F and the other from C, D, E is $10\sqrt{3}$ cm.

A likely possibility is that the information regarding minimum distance between any point of (A, B, F) and the other from (C, D, E) is specific to question no. 87 only.

89. d The graph $F(x)$ represents the function $F(x) = |x|$, where x is any real number. The graph of $F_1(x)$ represents the function $F_1(x) = -x$, where x is any real number. None of the given relationships are satisfied by these two functions.

Alternate solution:

$F_1(-2) = 2 = F(2)$ and $F_1(2) = -2$. But $F(2) = 2$. So the correct option is (d).

90. b

$$F(x) = \begin{cases} 0 & \text{when } x \geq 0 \\ x & \text{when } x < 0 \end{cases} \text{ and } F_1(x) = \begin{cases} -x & \text{when } x > 0 \\ 0 & \text{when } x \leq 0 \end{cases}$$

Therefore, replacing x by $(-x)$ in above functions, we get

$$F(-x) = \begin{cases} 0 & \text{when } x \leq 0 \\ -x & \text{when } x > 0 \end{cases} \text{ and } F_1(-x) = \begin{cases} x & \text{when } x < 0 \\ 0 & \text{when } x \geq 0 \end{cases}$$

Clearly, $F_1(x) = F(-x)$, hence, option (b) is the correct choice.

Alternate solution:

$F_1(-2) = 0 = F(2)$ and $F_1(2) = -2 = F(-2)$.

So the correct option is (b), i.e. $F_1(x) = F(-x)$.

91. b $F(x) = \begin{cases} 0 & \text{when } x \leq 0 \\ -x & \text{when } x > 0 \end{cases}$ and $F_1(x) = \begin{cases} x & \text{when } x < 0 \\ 0 & \text{when } x \geq 0 \end{cases}$

Therefore, replacing x by $(-x)$ in above functions, we get

$$F(-x) = \begin{cases} 0 & \text{when } x \geq 0 \\ x & \text{when } x < 0 \end{cases} \text{ and } F_1(-x) = \begin{cases} -x & \text{when } x > 0 \\ 0 & \text{when } x \leq 0 \end{cases}$$

Clearly, $F_1(x) = F(-x)$, hence, option (b) is the correct choice.

Alternate solution:

$F_1(-2) = -2 = F(2)$ and $F_1(2) = 0 = F(-2)$.

So the correct option is (b), i.e. $F_1(x) = F(-x)$

92. c $F(x) = \begin{cases} 1-x & \text{when } 0 \leq x < 2 \\ 1 & \text{when } -2 < x < 0 \end{cases}$ and

$$F_1(x) = \begin{cases} -1-x & \text{when } -2 < x < 0 \\ -1 & \text{when } 0 \leq x < 2 \end{cases}$$

Therefore, replacing x by $(-x)$ in above functions, we get

$$F(-x) = \begin{cases} 1+x & \text{when } -2 < x < 0 \\ 1 & \text{when } 0 \leq x < 2 \end{cases} \text{ and}$$

$$F_1(-x) = \begin{cases} -1+x & \text{when } 0 \leq x < 2 \\ -1 & \text{when } -2 < x < 0 \end{cases}$$

$$\therefore -F(-x) = \begin{cases} -1-x & \text{when } -2 < x < 0 \\ 1 & \text{when } 0 \leq x < 2 \end{cases}$$

$$= \begin{cases} -1-x & \text{when } -2 < x < 0 \\ -1 & \text{when } 0 \leq x < 2 \end{cases} = F_1(x)$$

Hence, option (c) is the correct option.

Alternate solution:

$F_1(2) = -1 = F(2)$ and $F_1(-2) = 1 = F(-2)$.

So the correct option is (c), i.e. $F_1(x) = -F(-x)$.

93. d Let $m = 1$. So, option (a) will give the answer as V_m and option (c) will give the answer as V_1 . Both of these cannot be the answers as V_m and V_1 are the amount of volume filled.

Let $m = 2$. So, option (b) will give the answer as $2(1 - V_2)$ and option (d) will give the answer as $2(1 - V_1)$. Now consider option (b).

Actual empty volume $> 2(1 - V_2)$. Therefore, for this situation $m(1 - V_1)$ is the only possible answer.

94. b Let $m = 1$ and $n = 1$. Option (a) gives the answer as $\frac{1}{4}$ and option (d) gives the answer as 'greatest integer

less than or equal to $\frac{1}{2}$ '. So, both of these cannot be

the answer. Option (b) gives the answer as 'smallest

integer greater than or equal to $\frac{1}{2}$ ' and option (c)

gives the answer as 1. But the actual answer can be greater than 1 as the volume of the vessel is 2 l. Hence, (b) is the answer.

95. d The ideal approach is to pick up the options one by one.

Option (a) – Let S1 and S2 be two sequences of positive numbers. After change of sign, S1 will consist of negative numbers while S2 remains unchanged. Clearly, the members of S1 would be less than that of S2. Hence, option (a) is not correct.

Option (b) - Let S1 and S2 be two sequences of positive numbers. After change of sign, S1 will consist of negative numbers while S2 remains unchanged. Clearly, G would remain in S2 itself. Hence, option (b) is not correct.

Option (c) – If S1 and S2 had same sign, say positive initially, then the largest number of S1 and S2 would be in S2. Then after the change of sign, every member of S1 will be negative and therefore, less than every member of S2. This implies that the largest number would remain in S2. Hence, option (c) is not correct.

96. a The elements of S1 are in the order : $a_1 < a_2 < a_3 < a_4 < \dots < a_{24}$

The elements of S2 are in the order: $a_{25} > a_{26} > \dots > a_{49} > a_{50}$

Even if a_{24} and a_{25} are interchanged, the elements of S1 continues to be in ascending order. However, nothing can be concluded about the elements of S2.

97. d Since every element of S1 is less than or equal to each member of S2, L will be in S1 and G in S2.

For some i ($1 \leq i \leq 24$), $a_i = L$ and for some j ($25 \leq j \leq 50$), $a_j = G$.

Every other element of S1 is greater than a_i and every other member of S2 is less than a_j .

Therefore, to make every element of S1 greater than or equal to that of S2, we need to add a minimum of $(a_j - a_i) = G - L$.

For questions 98 to 100:

$f(x,y) = |x+y|$ – – – This is always positive

$F(f(x,y)) = -f(x,y) = -|x+y|$ – – – This is always negative

$G(f(x,y)) = -F(f(x,y)) = -(-|x+y|) = |x+y|$ – – – This is always positive

98. d $F(f(x,y))G(f(x,y)) = -|x+y|^2$

and $G(f(x,y)).G(f(x,y)) = |x+y|^2$

From the choices, we observe that:

Option (a): LHS of the expression is $-|x+y|^2$, which is always non positive. RHS of the expression

is $|x+y|^2$, which is always non negative. The only situation when LHS is equal to RHS is when each is equal to zero. Hence, (a) is not necessarily true.

Option (b): The given expression can be written as

$$-|x+y|^2 > |x+y|^2 \quad \text{or} \quad 0 > 2|x+y|^2.$$

This implies that $0 > |x+y|$, which is not true. Hence, (b) is not true.

Option (c): $F(f(x,y))G(f(x,y)) = -|x+y|^2$

and $G(f(x,y)).G(f(x,y)) = |x+y|^2$

These two expressions can be equal if $|x+y| = 0$. Hence, (c) is not necessarily true.

Option (d): $F(f(x,y)) + G(f(x,y)) + f(x,y)$

$$= -|x+y| + |x+y| + |x+y| = |x+y|$$

$$f(-x,-y) = |(-x) + (-y)| = |-x-y| = |-(x+y)| = |x+y|$$

Therefore, the two expressions are equal.

99. c $f(G(f(1,0)), f(F(f(1,2))), G(f(1,2)))$

$$= f(G(f(1,0)), f(3, -3))$$

$$= f(G(f(1,0)), 0) = f(-1, 0) = 1.$$

100. c The option (c) yields x^2 .

$$-F(f(x,x)) \cdot G(f(x,x)) \div \log_2 16$$

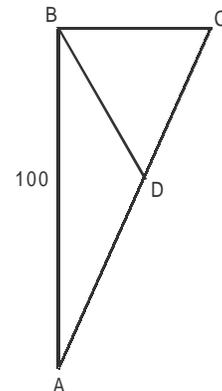
$$= -(-2x \cdot 2x) \div \log_2 16$$

$$= \frac{4x^2}{\log_2 2^4} = x^2$$

101. c The final point is (6, 6). The previous point is (6, 2) and the one before is (4, 2).

102. a Two instructions are needed, one parallel to the X-axis and the other parallel to the Y-axis. i.e. WALKX(-x) and WALKY (-y)

103. b



Since $AD = DC$, the distance travelled is same for the two stretches.

Hence, the average speed

$$\begin{aligned} &= \frac{\text{Total distance travelled}}{\text{Total time taken}} = \frac{2AD}{\frac{AD}{45} + \frac{AD}{55}} \\ &= \frac{(2 \times 45 \times 55)}{(45 + 55)} = 49.5 \text{ kmph.} \end{aligned}$$

104. a Now, since X and Y reach C at the same time.

$$\begin{aligned} \therefore \frac{100 + BC}{61.875} &= \frac{AC}{49.5} \\ \Rightarrow \frac{100 + \sqrt{AC^2 - 100^2}}{61.875} &= \frac{AC}{49.5} \\ \Rightarrow AC &= 105 \text{ m} \end{aligned}$$

Note: Instead of solving above equation, one can verify value of AC by using of options.

105. b In this triangle, $AD = DC = BD = \frac{105}{2} = 52.5 \text{ km}$

106. c Distance between A and B = $(35 \times 2) + (45 \times 2) = 160 \text{ km}$.
Distance covered by Aditi in each speed segment
 $= \frac{160}{3}$

Hence, total petrol consumed

$$= \left(\frac{160}{3} \times \frac{1}{16} \right) + \left(\frac{160}{3} \times \frac{1}{24} \right) + \left(\frac{160}{3} \times \frac{1}{16} \right) = 8.9 \text{ l}$$

107. a For minimum petrol consumption, Zoheb should drive at 40 kmph, petrol consumption = $\frac{160}{24} = 6.67 \text{ l}$.

For questions 108 to 110:

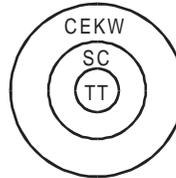
Game	Opening balance	Player's pick		Dealer's pick		Closing balance
		Debit (-)	Credit (+)	Debit (-)	Credit (+)	
1	0	0	8	16	0	-8
2	-8	0	10	0	10	12
3	12	0	6	6	0	12
4	12	0	8	16	0	4

108. a Hence, we see that the maximum gain is Rs. 12

109. b Since the maximum negative that Ghosh Babu goes into is -8, he should begin with at least Rs. 8, so that he does not have to borrow any money at any point.

110. d From the above table it is evident that in four games, Ghosh Babu makes a profit of Rs. 4. Hence, if the final amount left with Ghosh Babu is Rs. 100, the initial amount that he had would be Rs. 96.

111. b (b) ACB is the correct answer choice. as it forms a valid syllogism.



CEKW = Companies that employ knowledge workers
SC = Software companies
TT = Tara Tech

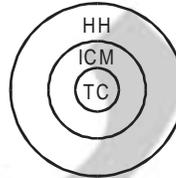
The premises state that all software companies employ knowledge workers and Tara Tech is a software company. Therefore, Tara Tech employs knowledge workers.

(a) ABC is invalid, because if Tara Tech employs knowledge workers, it cannot definitely be concluded that it is a software company.

(c) CDB is invalid, because if only some software companies employ knowledge workers, Tara Tech may not be among them.

(d) ACE introduces a fourth term. 'Companies that employ only knowledge workers' and, therefore, violates the very definition of a syllogism, which must have 3 and only 3 terms.

112. d (d) BAC is the correct answer choice, as it forms a valid syllogism.



TC = Instances of traffic congestion

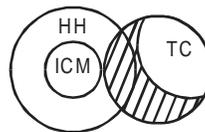
ICM = Instances of increase in carbon monoxide in the environment.

HH = Instances that are hazardous to health.

The premises state that increase in carbon monoxide is hazardous to health and traffic congestion increases carbon monoxide in the environment. Therefore, traffic congestion is hazardous to health.

(a) CBA is invalid, because if TC and ICM are both separately hazardous to health (HH), no definite relationship between TC and ICM necessarily follows.

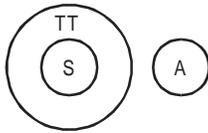
(b) BDE is invalid, because the some TC that are not ICM need not necessarily be free of any hazard to health (HH): they could possibly pollute the environment with other noxious gases.



The shaded portion shows those some TC that are not ICM, but could possibly be hazardous to health (HH).

(c) CDE is invalid, because the conclusion E is a negation of one of the premises C. Another check reveals the TC is the middle term, which appears in both the premises C and D, and E, therefore, should not appear in the conclusion E, as per the basic definition of a syllogism.

113. a (a) CEA is the correct answer choice, as it forms a valid syllogism.



Figures S = Sweets
TT = Tasty things
A = Apples

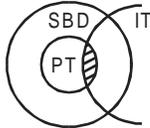
Sweets are a subset of tasty things. Apples are not tasty things. As apples are not a part of the main set of tasty things, they can also not be a part of the subset of sweets.

(b) BDC is invalid, because the set of some A that are S and the set of some A that are not TT may have no relationship with each other (disjoint sets).

(c) CBD is invalid, because some A that are S are definitely TT, but we have no knowledge of the remaining A, and hence can reach no conclusion about them.

(d) EAC is invalid, because if all A are neither S nor TT, we cannot establish a definite relationship between S and TT.

114. b (b) BAE is the correct answer choice, as it forms a valid syllogism.



PT = Polluted towns
SBD = Things that should be destroyed
IT = Indian towns or towns in India.

The shaded portion are those IT which are polluted (PT) and hence should be destroyed (SBD).

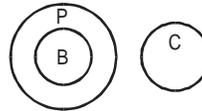
The premises state that polluted towns should be destroyed and that some towns in India are polluted. The 'some' in statement E refers to the polluted Indian towns that should be destroyed.

(a) BDE is invalid, because with B and D as premises, the only valid conclusion that follows is C. Town Meghana should be destroyed. 'Town Meghana' cannot be simply replaced by 'Some town in India,' as in E.

(c) ADE is invalid, because the syllogism has more than 3 terms. The term SBD does not appear in the premises A and D, but appears in the conclusion E as a new and fourth term.

(d) CDB is invalid, because we can't talk of all PT in the conclusion B, when we only have information about Town Meghana in both the premises C and D. In deductive reasoning, we cannot proceed from specific cases to general cases. It would, however, be valid to conclude that 'some polluted towns should be destroyed.'

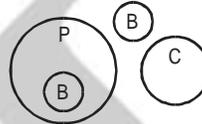
115. a (a) ACB is the correct answer choice, as it forms a valid syllogism.



P = Patriots
C = Criminals
B = Bundledas

Since patriot and criminal are two distinct sets, what is patriot, cannot be criminal. Therefore, if Bundledas is a patriot, Bundledas cannot be a criminal.

(b) ABC is invalid, because if no P is C and B is not C, we cannot be definite that B is not P.

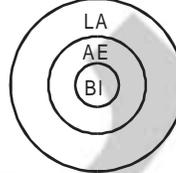


Bundledas (B) may be a patriot (P) or not. Nothing definite can be concluded.

(c) ADE is invalid, on similar lines as explained in the case of (b).

(d) ABE is invalid, because the syllogism has four terms: patriots, criminals, Bundledas and Bogusdas.

116. d (d) ACD is the correct answer choice, as it forms a valid syllogism.

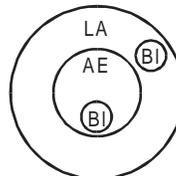


BI = Balaram
AE = Anteaters
LA = Creatures who like ants

Anteaters like ants and Balaram is an anteater. Therefore, Balaram likes ants.

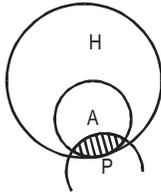
(a) DCA is invalid. Just because Balaram likes ants and he is also an anteater, it does not logically follow that all anteaters like ants. It would, however, be valid to conclude that 'some anteaters like ants.'

(b) ADC is invalid, because if Balaram like ants, we cannot definitely conclude that Balaram is an anteater, as evident from the Venn diagram.



(c) ABC is invalid, because it has four terms: Anteaters, creatures who like ants, boys and Balaram. Furthermore, E: 'Balaram may eat ants' is a tautologous statement and can never feature in a valid syllogism. A 'may' statement implies 'may not' and is always true (tautologous), and can always stand on its own, without any supporting premises. Hence, such a statement is of no use to a student of logic, who is concerned with the process of reasoning, arriving at a definite conclusion from definite information given in the premises.

117. b (b) ABE is the correct answer choice, as it forms a valid syllogism.



H = Handsome people
A = Actors
P = Popular people

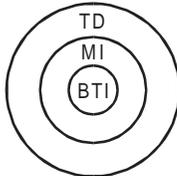
The shaded portion are some popular people who are actors and hence are handsome people.

All actors are handsome and some of those actors are also popular. Therefore, some who are popular are also handsome.

(a) ACD is invalid, as there are four terms: actors, handsome people, Ram and popular actors. Furthermore, just because Ram is handsome does not definitely mean that he is an actor, let alone 'a popular actor'.

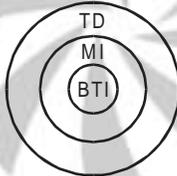
(c) and (d) are similarly invalid as option (a), because they each have four terms.

118. a (a) ABC is the correct answer choice, as it forms a valid syllogism.



BTI = BTI
MI = Modern Industry
TD = Thing that is technology-driven.
All modern industries are technology-driven.
BTI is a modern industry
Therefore, BTI is technology-driven.

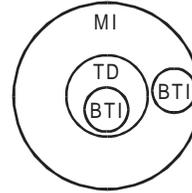
(b) ABD is invalid, although it is similar to the correct option ABC.



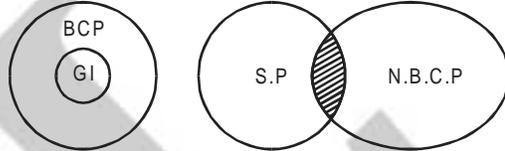
It is invalid simply because the statement D: 'BTI may be technology-driven, is a tautologous statement (that is, it is always true, regardless of what the premises say).

(c) BCA is invalid. Just because BTI is a modern industry and it is technology-driven, it does not mean that all MI are TD. It would, however, be valid to conclude that 'Some MI are TD'.

(d) EBC is invalid, because if BTI is a modern industry, we cannot definitely conclude that it is technology-driven, as evident from the Venn diagram.



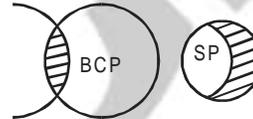
119. b (b) ABE is the correct answer choice, as it forms a valid syllogism.



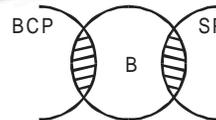
GI = Golmal islanders
BCP = Blue-coloured people
SP = Smart people
NBCP = Not blue-coloured people

Those smart people who are not blue-coloured people (shaded portion) are definitely not Golmal islanders.

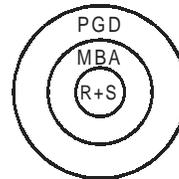
(a) BCD is invalid, because there is no connection between some babies that are BCP and the some SP who are not BCP.



(c) CBD is invalid, because there need not necessarily be any relationship between the some B that are BCP and the some B that are SP.



120. c (c) AEB is the correct answer choice, as it forms a valid syllogism.



R + S = Ram and Sita
PGD = People in great demand
MBA = MBA

As all MBAs are in great demand and Ram and Sita belong to the set of MBAs, Ram and Sita are also in great demand.

(a) ABE is invalid because R + S need not be MBAs, just because both are in great demand.

(b) ECD makes no sense.

(d) EBA is invalid. Just because R + S are MBAs and in great demand does not mean that 'all MBAs are in great demand'. It would, however, be valid to conclude the 'some MBAs are in great demand'.

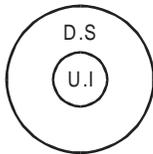
121. d The main statement clearly states that if the orangutan (O) belongs to the set of not angry (NA), he cannot belong to the set of frowns (F). Also, O must belong to either of the two sets.

CB states that O is not F and is NA. And DA states that O is not NA and is F. Therefore, both CB and DA are logically valid.

122. d The main statement clearly states that Ravana (R) is either a demon (D) or a hero (H). He has to be at least one of the two, and if he is one, he cannot be the other.

DB states that R is not H but is D. And CA states that R is not D but is H. Therefore, both DB and CA are logically valid.

123. a The question statement clearly states that whenever Rajeev uses the Internet, he dreams about spiders. However, this does not mean that he dreams about spiders only when he uses the Internet. Therefore, using the Internet is only one possible condition for Rajeev to dream about spiders. Thus, the Venn diagram for the question will be:



Where,

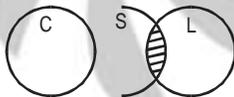
UI → Uses Internet

DS → Dreams of spiders

Answer choice (a) AD states that Rajeev did not dream about spiders, and hence he did not use the Internet. This logically follows the above Venn diagram. If the main set does not occur, the subset will also not occur. Thus, AD is the right option.

124. d P = I talk to my professors
Q = I do not need to take a pill for headache.
Therefore, both AB($P \Rightarrow Q$) and CD($\text{neg } Q \Rightarrow \text{neg } P$) are logically consistent, not BA and DC.
(d) 'AB and CD' is the correct answer choice.

125. c (c) 'A and D' is the correct answer choice



Statement A is valid:

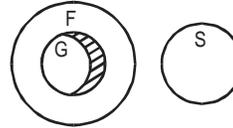
The shaded portion represents those some sphinxes that laugh and, therefore, are not cowboys as no cowboys laugh.

Statement B is invalid.

All G are F.

Some G are not S.

∴ Some S are not F.



F = Florescent things

G = Ghosts

S = Singers

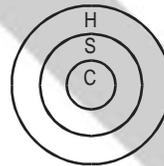
The valid conclusion is: Some F(shared position) are not S. (V) and not the converse: Some S are not F. (X) (The some ghosts who are not singers (in shaded portion) are also the 'some florescent things that are not singers')

Statement C is invalid:

All C are S.

All S are H.

∴ Some H are not C.



C = Cricketers

S = Those who swear

H = Those who are hanged

The valid conclusion is:

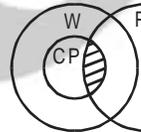
All C are H (✓) and not its negation: Some H are not (C) (x)

Statement D is valid.

Some CP are P.

All CP are W.

∴ Some W are P.



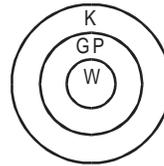
CP = Crazy people

W = Wrestlers

P = Pianists

The shaded portion represents those some pianists who are crazy people and are, therefore, wrestlers. And conversely, they are those some wrestlers who are pianists.

126. a (a) 'C and D' is the correct answer choice.
Statement A is invalid: The valid conclusion would be 'All W are K', rather than its converse, 'All K are W'.



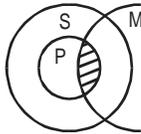
K = Knights

GP = Good People

W = Warriors

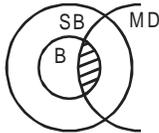
Statement B is invalid, because it has four terms: footballers, ministers, tough people and players.

Statement C is valid: The 'some M' that are P are also S. (shaded position).



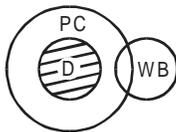
S = Snacks
P = Pizzas
M = Meals

Statement D is valid: The 'some MD' that are B are also SB. (shaded portion).



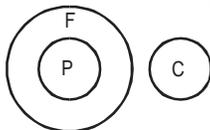
SB = Sloth bears
B = Barkers
MD = Musk deer

127. b (b) B only is the correct answer choice. Statement A is invalid, as 'No WB are PC' cannot be validly concluded. What can, however, be validly concluded is that 'Some PC (which are all D in shaded position) are not WB'.



D = Dinosaurs
PC = Prehistoric creatures
WB = Water buffaloes

Statement B is valid as evident from the Venn diagram

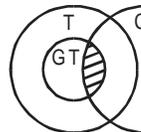


F = Frank creatures
P = Politicians
C = Crocodiles
P is a subset of F.

F and C are disjoint sets.

As the main set F can never intersect with C, the subset D will also never intersect or coincide with C. Statement C is invalid: No valid conclusion can follow from two negative premises, as negatives have the effect of separating one term from the others. Statement D is invalid, as the 'Some GI Joes' who like bananas need not be monkeys.

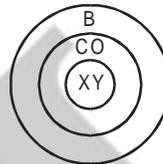
128. c (c) 'C and B' is the correct answer choice. Statement A is invalid because it has four terms:
a. Earthquakes
b. Things that cause havoc
c. Landslides
d. Things that cause landslides
Statement B is valid as the 'Some C' which are GT are also T (shaded portion).



T = Transparent
GT = Glass things
C = Curios

As all glass things (GT) are transparent (T), those curios (C) that are GT are definitely T.

Statement C is valid:

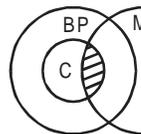


B = Brittle things
CO = Clay objects
CO is a subset of B.
XY is a subset of CO.
Therefore, XY is also a subset of B.

Thus, all XY are also brittle. Statement D is invalid.

No valid conclusion can follow from two negative premises, as negatives have the effect of separating one term from the other.

129. b (b) C is the only correct answer choice. Statement A is invalid. MD need not necessarily be among the some actors who are pretty. Statement B is invalid, as the third segment is not a conclusion logically deduced using both the first and second segments. In fact, the conclusion can directly be deduced from the second segment alone. Another way to check for this error is to see whether the middle term 'Cops', that appears in the premises also appears in the conclusion. Here, 'Cops' appears in all three segments and option (b) is therefore, not a valid syllogism. Statement C is valid. Those 'Some men', who are cops are also brave people (shaded portion).



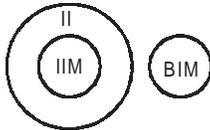
BP = Brave people
C = Cops
M = Men

C is a subset of BP
Some M is C.

Therefore, those M that are C, are also BP.

Statement D is invalid, MS may still be pretty without being an actor.

130. a (a) 'A and B' is the correct answer choice. A and B are both valid: 'No IIMs are BIMs' or its converse, 'No BIMs are IIMs' are both equally valid.

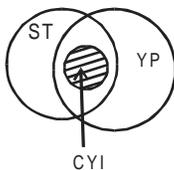


II = Institutes in India.
IIMs is a subset of II.
No II is a BIM

As the mainset II can never intersect with the disjoint set BIM, the subset IIM will also never intersect or coincide with BIM.

C and D are both invalid: The 'Some IIMs' and the 'Some BIMs' need not have any relationship between them, just because they are not in India.

131. c (c) Only C is the correct answer choice.
Statement A is invalid. We cannot conclude about 'all YP', but only about 'Some YP' (shaded portion) who are, incidentally, 'all CY'.

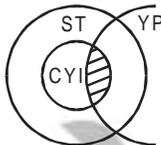


CYI = Citizens of Yes Islands
ST = People who speak only the truth
YP = Young people

Statement B is invalid, because it has four terms:

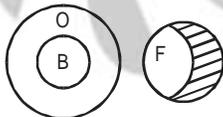
- Citizens of Yes Islands
- People who speak only the truth
- Things that are in the Atlantic
- Yes Islands

Statement C is valid. The 'Some YP' who are CYI also are people who speak only the truth. (shaded portion)



Statement D is invalid, because the 'some people' and the 'some CYI' need not have any relationship between them, just because both speak only the truth.

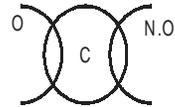
132. c (c) C only is the correct answer choice.
Statement A is invalid, as the some fish that are viviparous need not be mammals.



Statement B is invalid. We can validly conclude that the 'Some fish (shaded portion)' that are not oviparous are definitely not birds as well. But, based on this, we cannot conclude that 'Some fish are birds', as we have no knowledge about the 'remaining fish'.

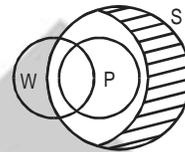
Statement C is valid, as we can validly conclude that the 'Some C' which are inside the circle O cannot be

mammals. But nothing definite can be said about the 'Some C' which are outside the circle O.



Statement D is invalid, because the 'Some C', which are V and the 'Some C', which are M, need not have any relationship between them, as evident from the Venn diagram.

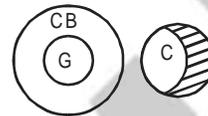
133. b (b) B only is the correct answer choice.



Statement A is invalid, as no definite relationship between P and W can be established.

Note: 'Many' is translated as 'Some' to convert the statement in standard form.

The 'Some S (shared portion)' are not W, but some other S could be W, as shown in the Venn diagram above.



Statement B is valid, as the 'Some C (shaded portion)' that do not climb bean stalks cannot be giants.

G = Grants
C = Children

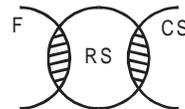
CB = Creatures which climb beanstalks

C is invalid, the 'Some penguins' that live in snowdrifts need not be explorers.

D is invalid, as Amar is the tallest among the three, but it is not clear how the heights of Akbar and Anthony are compared.

Note: This is not a 'Categorical' syllogism comprising statements, as such. All S is P, No S is P, Some S is P and some S is not P. It is a 'relational' syllogism comprising relational statements that normally feature in analytical reasoning. Be alert: CAT examiner is in the habit of jumbling up questions to throw you off gear.

134. d (d) 'C and D' is the correct answer choice.



Statement A is invalid: The 'Some F' who are RS and the 'Some RS' who can catch snakes need not have any relationship between them.

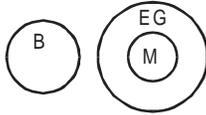
CS = People who catch snakes

RS = Rocket scientists

F = Farmers

Note: 'Many' or 'a few' are both translated as 'some' to convert the statements in the standard form.

Statement B is invalid. Poonam need not be among the some kangaroos that are made of teak.



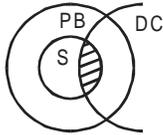
Statement C is valid. No matadors can be bulls because the former eat grass, while the latter do not.

EG: Creatures that eat grass

M: Matadors

B: Bulls

Statement D is valid. The some PB (shaded portion) are in effect the 'Some skunks' that drive Cadillacs.



DC: Creature that drive Cadillacs

PB: Polar bears

S: Skunks

135. a From the graph, we know the percentage growth in sales are:

	Previous sales	Current sales	Difference	Percentage
1995-96	100	250	150	150%
1996-97	250	300	50	20%
1997-98	300	290	-10	-3.33%
1998-99	290	680	390	134.5%

It is but obvious from the above table that the maximum percentage increase relative to previous year occurred in 1995-96.

Alternative method:

The sales witnessed highest growth in 1995-96 and it

was equal to $\frac{250 - 100}{100} \times 100 = 150\%$.

136. d From the graph, we can again calculate the growth in profits.

The highest percentage growth in net profit relative to the previous year was achieved in 1995-96.

Alternative method:

The net profit witnessed highest growth in 1995-96

and it was equal to $\frac{4.5 - 2.5}{2.5} \times 100 = 80\%$.

137. b

	Net profit	Net sales	Ratio
1994-95	2.5	100	0.025
1995-96	4.5	250	0.02
1996-97	6	300	0.02
1997-98	8.5	290	0.03
1998-99	12	680	0.018

The profitability is maximum for 1997-98.

138. d It may be seen that profitability does not follow a fixed pattern as the first three statements try to generalize the profitability. They are not applicable.

139. c Total trade with a region is defined as: The sum of exports and imports from that region, from the pie charts for 1997-98, we have the following sectors occupying maximum area.

	Country	Exports	Imports	Trade
H	OPEC	3397.9	9379.2	12795.1
G	East Europe	3397	7748	11145.9
K	Others	407.79	339.79	747.58
A	USA	6456	3670	10126

H – OPEC has the maximum trade.

140. b From the pie chart, the region having lowest trade is K.

1% of imports + 1% of exports

∴ Indian exports are 1% of 3397.9 which is roughly 340 million USD.

141. a

	Imports to India	Exports from India	Trade deficit
A	3670.11	6456.01	-2785.9
B	2038.95	2038.74	0.21
C	4893.48	4757.06	136.42
D	2446.74	2038.74	408
E	2038.95	2038.74	0.21
F	815.58	1019.37	-203.79
G	7748.01	3397.9	4350.11
H	9379.17	3397.9	5981.27
I	5709.06	6795.8	-1086.74
J	1631.16	1698.95	-67.79

So, we see that region H has highest trade deficit of approximately \$6,000 million or \$6 billion.

142. a From the pie chart for 1997-98, we get that USA which is a region A has the lowest trade deficit. (9% of imports – 19% of total exports)

$$\left(\frac{9}{100} \times 40779 - \frac{19}{100} \times 33979 \right)$$

= \$- 2785.9 million.

143. b The exports for 8 months = \$21436 million

$$\text{exports for 12 months} = \frac{21436 \times 12}{8} = \$32,154 \text{ million.}$$

From the pie chart, we know that the exports have increased from three regions A, G and H as follows.

	Country	1998-99	1997-98
A	USA	7395.4	6456
G	East European countries	3858.5	3397.9
H	OPEC	3215.4	3397.9

The maximum percentage increase is therefore from region A.

144. b India's total trade deficits are as follows.

	Imports	Exports	Deficit
1997-98	40779	33979	6800
1998-99	42189	32154	10035

$$\text{Percentage growth rate} = \frac{10035 - 6800}{6800} \times 100 = 47.6\%$$

145. a The price changes for each commodity are as follows.

	Ending	Beginning	Difference	Percentage
Arhar	2125	1700	425	25
Pepper	19275	18525	750	4
Sugar	1435	1440	5	-0.3
Gold	3820	4250	330	7.8

The highest price change from the graph and the above is definitely for Arhar.

146. c The price volatility for each individual.

	Highest price	Lowest price	Difference	Average price	PV
Arhar	2300	1500	800	1900	0.42
Pepper	19500	17350	2250	18425	0.12
Sugar	1500	1410	90	1455	0.062
Gold	4300	3800	480	4050	0.12

The price volatility for sugar is least, hence answer choice is (c).

Note: Average price can be calculated by highest price, lowest price, ending and beginning price.

147. d Let us assume Mr X invested Rs. 100 in each commodity.

	Price increase percentage	Income on Rs. 100
Arhar	25	25
Pepper	4	4.0
Sugar	-0.3	-0.3
Gold	-7.8	-7.8
		21.5

∴ His income is Rs. 21.5 on Rs. 100.

$$\therefore \frac{21.5}{100} \times 100 = 21.5\% \text{ profit}$$

148. b As per the table in question 146, the maximum PV is around 40%.

149. c Bangladesh has highest drinking water facility and hence can not be dominated by any country. Similarly Philippines has highest sanitation facilities and hence cannot be dominated.

150. b Statement A > Statement B only if statement A has higher percentage in total coverage for both drinking water and sanitation facilities taken independently and not as a total of the two facilities.

Thus, only statement B and statement D are
 India > China
 (81 > 67 and 29 > 24)
 India > Nepal
 (81 > 63 and 29 > 18)
 Also China > Nepal (67 > 63 and 24 > 18)

151. c Let the urban population be x and rural population be y. From the sanitation column, we have
 $0.7x + 0.14y = 0.29(x + y)$
 $0.41x = 0.15y$

$$\therefore x = \frac{15}{41}y$$

\therefore Percentage of rural population

$$= \frac{y}{x+y} \times 100 = \frac{y}{\frac{15}{41}y + y} \times 100$$

$$= \frac{41}{56} \times 100 = 73.2\%$$

152. a In the same way as the previous questions, we can find percentage of rural population for Philippines, Indonesia and China.

P	50%
I	66.66%
C	79.8%

Thus, $P < I < C$

153. d India is not on coverage frontier because
 (i) it is below Bangladesh and Philippines for drinking water.
 (ii) for sanitation facilities it is below Philippines, Sri Lanka, Indonesia and Pakistan.

For questions 154 and 155:

The disparity for the coverage of rural sector is as follows.

	Rural sector	Urban sector
I	65	15
B	52	20
C	49	23
P	47	5
P	20	4
I	22	6
S	-5	20
N	51	30

Note: Disparity = (Percentage denoting drinking facilities coverage - Percentage denoting sanitation coverage),

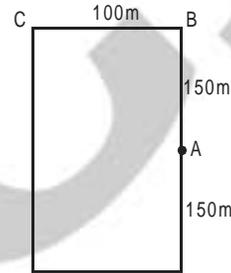
For example, rural sector of India = $79 - 14 = 65\%$
 Thus, as it can be seen from the table, in rural sector the country with most disparity is India ($79 - 14 = 65\%$). And the country with least disparity in urban sector is Philippines ($92 - 88 = 4\%$)

154. a 155. c

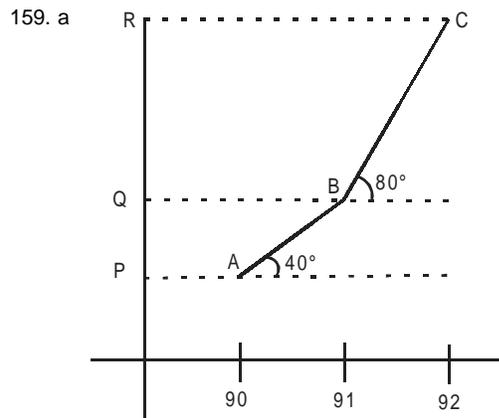
156. d Statement I gives the weight of the heaviest and lightest members of the class but no indication as to the number of students in the class or the total weight of the students is there. The second statement is also inconclusive, making our answer choice as (d).

157. c Statement I gives the thickness of the wall which is of no use to find the volume of the tank since we do not know the radius of the sphere. Statement II gives us the answer as the volume of water displaced is equal to the volume of the immersed tank. So to find the exact storage volume of the tank both the statements are needed.

158. c Statement I by itself does not solve the problem but it does tell us about the shape of the field. However, it fails to give information about the points A, B and C as to whether they be at the end of the field, etc. This data is given by the second statement, from which it is known that



The polygon has the length = $150 \times 2 = 300$ m and the breadth = 100 m and also that it is a rectangle (from A). Thus, the maximum distance is the diagonal length of the rectangle.



$$\text{Ratio of revenues} = \frac{RQ}{QP}$$

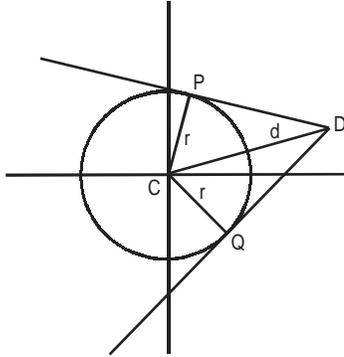
Since in a line graph, the years are uniformly spaced

$$\Rightarrow \frac{RQ}{QP} = \frac{\tan 80^\circ}{\tan 40^\circ}$$

So the ratio can be determined from statement I alone.

Statement II is immaterial because we intend to find the ratio and not absolute figures.

160. b

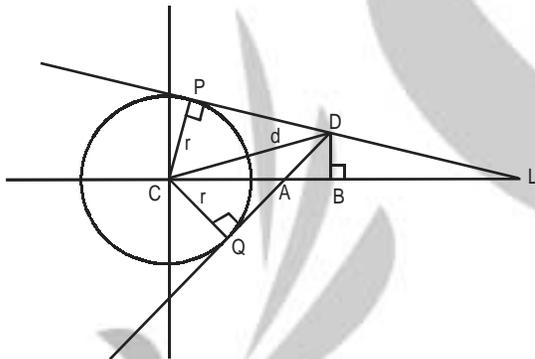


r and d are given

From **statement I**, when co-ordinates of D are given, only one pair of tangents can be drawn onto the given circle from D . So angle made by x -axis for each can be found out.

Hence, statement I alone is sufficient.

Consider **statement II**. Let the x -axis bisect the tangent QD , i.e. $QA = AD$.



Here $QA = \frac{1}{2}QD = \frac{1}{2}\sqrt{d^2 - r^2}$. So using trigonometric ratios in right $\triangle CQA$, we can determine $\angle CAQ$.

Therefore, $\angle DAB$ is equal to $\angle CAQ$ (vertically opposite angles).

Consider the other tangent DP . Let it intersect x -axis at point L .

$\angle CDQ$ can be determined using trigonometric ratios (as two of the sides are given in right $\triangle CDQ$). Also,

$\angle CDQ$ is equal to $\angle CDP$ (since the two right $\triangle CQD$ and $\triangle CPD$ are congruent). Drop a perpendicular DB on x -axis. In right $\triangle DBL$, we can

find $\angle BDL = 180^\circ - (\angle ADB + \angle CDQ + \angle CDP)$

$= 180^\circ - 2\angle CDQ - \angle ADB$. Applying angle sum property of triangle, we can determine $\angle DLB$.

Hence, statement II alone is sufficient.

161. d Statement I when used to solve the sum gives us the same equation as the second substituted in to the first equation.

$$kdx + key = kf$$

$$\therefore k(dx + ey) = kf$$

as $k \neq 0$, $dx + ey = f$ which is same as second equation.

So it is of no use as we get infinite solutions and not a unique one.

Statement II gives us the following equations.

$$x + y = c$$

$$2x + 2y = f.$$

These are two linear equations in x and y , such that

$$\frac{1}{2} = \frac{1}{2} \neq \frac{c}{f}$$

As $\frac{c}{f} \neq \frac{1}{2}$ (Given), the system will have no solution.

As the data given in both the statements is inconsistent, the question cannot be answered.

162. d

A	B	C
1 + 1	1 + 1 + 2	1 + 1
3	3	2

Statement I: As C added up two numbers correctly, he is not a mathematician. However, from the given information, it is not necessary that any person who adds up two numbers incorrectly is a mathematician. Therefore, A or B may or may not be mathematicians. Hence, statement I alone is not sufficient.

Statement II: If a mathematician makes a mistake in a sum, the error is $+1$ or -1 . But it doesn't imply that if a person makes an error of $+1$ or -1 , he is a mathematician.

Hence, statement II alone is not sufficient.

Even on combining the two statements, we cannot conclude anything concrete.

163. c From I, we know A and B passed the examination.

From II, we know the condition that among C and D at least one passed (or both passed) is false.

Therefore, it is obvious that both C and D have failed. Thus, both statements are necessary to find the answer.

164. c **Statement I:** Given that x satisfies the equation,

$$\log_2 x = \sqrt{x}$$

$$\therefore x = 2^{\sqrt{x}}$$

This equation is satisfied by the values $x = 4$ and 16 . Hence, statement I alone is not sufficient.

Statement II: Nothing concrete can be concluded from the fact that $x \leq 10$ km.

Hence, statement II alone is not sufficient.

Combining statements I and II, we get a unique value of $x = 4$ km.

165. d Statement I gives us the number of white flowers. But we know that a white seed gives both red or white flowers. Thus, proving statement II, gives the number of red flowers. But both black and white seeds give red flowers, again providing no solutions.