INDEPENDENT CAT PREPARATION / ORIGINAL MOCK

CAT 2026 Prediction Paper 07

Answer key & worked solutions

68 questions · 120 minutes · Maximum 204 marks

This is an original practice paper informed by recent CAT patterns and the forecast in this study. It is not the official CAT 2026 paper and does not claim to reproduce unreleased questions. Its difficulty has not been calibrated on a candidate cohort.

SECTION	QUESTIONS	TIME	MARKS
Verbal Ability & Reading Comprehension	24	40 minutes	72
Data Interpretation & Logical Reasoning	22	40 minutes	66
Quantitative Ability	22	40 minutes	66

Correct answer: +3. Incorrect MCQ: –1. Incorrect TITA or unanswered question: 0. Each MCQ has exactly one correct option. TITA answers are whole numbers.

Design reference: IMS CAT 2025 exam analysis and the instructions of the official CAT 2026 mock (released 6 November 2026). The 24/22/22 structure, four-question RC passages and four- or five-question DILR sets inform this mock. Original contexts and exact question allocations are authoring choices. Method and source limitations: validation.html. Practice profile: IIM Indore lean.

Quick answer key

V01 C	**V02** A	**V03** B	**V04** D	**V05** D	**V06** B
V07 A	**V08** C	**V09** A	**V10** C	**V11** D	**V12** B
V13 B	**V14** D	**V15** C	**V16** A	**V17** C	**V18** A
V19 B	**V20** D	**V21** 3412	**V22** 4312	**V23** 1	**V24** 5
D01 2	**D02** D	**D03** 4	**D04** B	**D05** B	**D06** 800
D07 D	**D08** 2010	**D09** 1350	**D10** B	**D11** 14	**D12** D
D13 16	**D14** C	**D15** 7	**D16** B	**D17** 8	**D18** C
D19 3	**D20** D	**D21** 0	**D22** A	**Q01** B	**Q02** 40
Q03 D	**Q04** A	**Q05** 5	**Q06** C	**Q07** C	**Q08** 25
Q09 A	**Q10** 45	**Q11** D	**Q12** 21	**Q13** 31	**Q14** B
Q15 104	**Q16** A	**Q17** 215	**Q18** C	**Q19** B	**Q20** D
Q21 D	**Q22** A				

VARC · 24 questions

RC 1 · Ordinary lives in official records

Historians often complain that the past speaks with the voices of the powerful. Archives keep the records that institutions needed: tax rolls, court proceedings, property deeds, the correspondence of officials. People who owned little, wrote little and rarely went to court appear mostly as names in lists, if they appear at all. A history built from such material, critics argue, will inevitably describe the world as administrators saw it.

The complaint is fair, but it can be pushed too far. Records made for one purpose can be read for another. A court case about a stolen coat was created to decide guilt, yet witnesses describe where they slept, what they ate, which neighbours they trusted and how they spoke to one another. Inventories drawn up to settle debts reveal the furniture of rooms that no one thought worth describing. Historians who read such documents against the grain treat them less as statements of fact than as accidental windows.

The method has its own hazards. Testimony given in court was shaped by fear, by the questions asked and by the clerk who wrote it down, often translating speech into formal language. An inventory lists what creditors could sell, not what a household valued. The ordinary life that emerges is therefore filtered twice, first by the institution's purpose and then by the historian's choice of what counts as revealing. There is a risk, too, of treating the vivid exception, the case that happened to be recorded in detail, as typical of lives that left no trace.

Some historians respond by counting rather than quoting. Thousands of inventories, taken together, can show how common certain possessions became, even if no single inventory tells us what its owner felt. Others turn to sources that institutions did not create: songs, objects, the layout of houses, the wear on tools. Each source answers some questions and ignores others. A house plan shows how space was divided, but not who slept where.

What these approaches share is a recognition that silence in the archive is not the same as absence in the past. The task is not to fill the silence with invention, nor to accept it as proof that nothing worth knowing happened, but to work patiently at its edges, reading each document with attention to why it was made and to what it could not help recording.

V01. Which of the following best states the author's position? MCQ

A. Because archives record mainly the powerful, the lives of ordinary people cannot be studied.
B. Court records are the most reliable source for the daily lives of the poor.
C. Although archives favour institutional perspectives, careful reading and other kinds of sources can recover parts of ordinary lives if their distortions are kept in view.
D. Historians should stop quoting individual documents and rely only on counting them.

Answer: C. Although archives favour institutional perspectives, careful reading and other kinds of sources can recover parts of ordinary lives if their distortions are kept in view.

The author concedes the bias of archives, describes ways of reading and supplementing them, and warns about their filters. The second option ignores this, the third conflicts with the hazards of testimony, and counting is one approach among several.

V02. The author would most likely regard a historian who generalises about a whole social group from one richly detailed court case as MCQ

A. risking the error of treating a well-documented exception as typical.
B. using the only method available for studying ordinary people.
C. reading the document strictly for the purpose for which it was made.
D. rightly assuming that court testimony is free of distortion.

Answer: A. risking the error of treating a well-documented exception as typical.

The third paragraph warns against treating the vivid, well-recorded case as typical of lives that left no trace. Other methods exist, such a historian is reading beyond the document's purpose, and testimony is said to be shaped by fear and clerks.

V03. According to the passage, an inventory drawn up to settle debts MCQ

A. shows how the household's members felt about their possessions.
B. records what creditors could sell rather than what the household valued.
C. is less useful than court testimony for every historical question.
D. was written to describe rooms that observers found interesting.

Answer: B. records what creditors could sell rather than what the household valued.

The third paragraph states the first option directly. The fourth paragraph says no single inventory reveals feelings, inventories are not ranked below testimony, and the rooms they reveal were ones no one thought worth describing.

V04. In the passage, reading a document “against the grain” means MCQ

A. rejecting any document produced by an institution.
B. correcting the spelling and language of old records.
C. reading documents in the order in which they were filed.
D. using it as evidence of things its makers did not set out to record.

Answer: D. using it as evidence of things its makers did not set out to record.

The phrase describes treating records made to decide guilt or settle debts as accidental windows on daily life. The passage does not reject institutional records, correct their language or discuss filing order.

RC 2 · After the bleaching

When sea temperatures stay unusually high for several weeks, reef-building corals expel the microscopic algae that live in their tissues and supply most of their food. The corals turn white, a condition called bleaching. Bleached corals are not dead; if temperatures fall soon enough, they can take up algae again and recover. If the heat lasts, many starve.

Recovery after a severe bleaching event depends on more than the survival of individual colonies. New corals begin as larvae that drift in the water before settling on a hard surface. A reef that has lost most of its adult corals may still recover if larvae arrive from healthier reefs nearby and if the surfaces where they settle are not smothered by seaweed. On reefs where fishing has removed the fish that graze on seaweed, the algae can spread across the dead coral skeletons, leaving larvae nowhere to settle. Grazing fish, in effect, keep the reef’s surfaces open for its next generation. The heat that bleached the reef is then followed by a second, slower injury.

This is why the people who manage reefs pay attention to local conditions they can influence, even though they cannot control ocean temperatures. Protecting grazing fish, reducing the run-off of nutrients that feed seaweed, and limiting damage from anchors and construction all improve the odds that a reef will regain its corals between heat events. Some reefs with such protection have recovered much of their coral cover within a decade.

The difficulty is that the interval between severe heat events is shrinking. A reef that needs ten to fifteen years to recover will not do so if serious bleaching returns every five or six years. Local protection then changes the rate of decline rather than preventing it. Some scientists have proposed more active help, such as breeding heat-tolerant corals and transplanting them, but these projects work at the scale of hectares while reefs extend over thousands of square kilometres.

None of this makes local management pointless. Reefs that keep their grazers and clear water lose less and recover faster, which buys time and preserves the supply of larvae on which other reefs depend. But it does change what success means. A manager who protects a reef well may still watch it decline. The decisive variable lies elsewhere, in the emissions that drive the warming of the seas.

V05. The passage mainly argues that MCQ

A. bleaching kills corals at once, so recovery depends entirely on transplanting new colonies.
B. breeding heat-tolerant corals will soon allow reefs to recover across their whole extent.
C. seaweed is the main cause of coral bleaching.
D. local protection helps reefs survive and recover from bleaching but cannot by itself offset increasingly frequent heat events.

Answer: D. local protection helps reefs survive and recover from bleaching but cannot by itself offset increasingly frequent heat events.

The passage values local management for slowing decline and aiding recovery while placing the decisive cause in warming. Bleached corals can recover, breeding projects are described as too small in scale, and seaweed is a second injury, not the cause of bleaching.

V06. Which reef would the author expect to recover most slowly after severe bleaching? MCQ

A. A reef with many grazing fish and clear water that has lost most of its adult corals.
B. A reef where grazing fish have been heavily fished and nutrient run-off is high.
C. A reef close to several healthy reefs that supply larvae.
D. A reef where anchoring and construction have been banned.

Answer: B. A reef where grazing fish have been heavily fished and nutrient run-off is high.

Loss of grazers lets seaweed cover the surfaces larvae need, and nutrient run-off feeds that seaweed. The second reef may still recover if larvae arrive; the third and fourth reefs have conditions the passage links to faster recovery.

V07. According to the passage, bleached corals MCQ

A. can recover if the high temperatures end soon enough.
B. are already dead by the time they turn white.
C. expel their algae when the water becomes too cold.
D. recover only if they are transplanted by scientists.

Answer: A. can recover if the high temperatures end soon enough.

The first paragraph says bleached corals are not dead and can take up algae again if temperatures fall in time. Bleaching follows high, not low, temperatures, and transplanting is a separate proposal.

V08. By saying that the situation “does change what success means”, the author implies that

MCQ

A. local management should be abandoned in favour of transplanting heat-tolerant corals.
B. managers can stop any decline if they protect grazing fish.
C. a well-managed reef should be judged by how far it slows decline and sustains larvae, not only by whether its coral cover grows.
D. success should be measured by the number of heat-tolerant corals bred.

Answer: C. a well-managed reef should be judged by how far it slows decline and sustains larvae, not only by whether its coral cover grows.

The sentence follows the point that protection buys time and preserves larvae even when a reef declines. The passage calls management worthwhile, denies that it can prevent decline, and treats breeding programmes as limited in scale.

RC 3 · When museums give back

For much of the last two centuries, museums in a few wealthy cities acquired objects from across the world. Some were bought, some were given, and many were taken during wars or under colonial rule, when the people who made or owned them had little power to refuse. Today requests for the return of such objects are common, and museums that once treated their collections as permanent increasingly negotiate their departure.

Museums have long defended their holdings with an argument about access. A great collection, they said, allows visitors to see the cultures of the world side by side, and objects held in well-equipped institutions are protected from loss. Visitors who could never travel to every region of origin can compare traditions in a single afternoon. The argument assumes that the most important audience for an object is the general public of the city where it now sits, and that preservation is best judged by the standards of conservation laboratories.

Those who request returns question both assumptions. For many communities an object is not primarily a specimen to be viewed but a participant in ceremonies, a record of ancestry or a sign of authority. Its absence is felt as an ongoing loss, not a historical fact. Preservation may also mean use: a mask that is danced or a textile that is worn may be cared for in ways that a laboratory would regard as risky but that keep its meaning alive.

Returns do not settle every question. Communities and states may disagree about who should receive an object, and a returned object may be displayed in a national museum rather than restored to the use for which it was made. Some curators worry that returns will empty galleries; experience so far suggests that the effect is gradual, and that collaboration often follows, with loans, shared research and joint exhibitions.

The deeper change is in how ownership is understood. A purchase recorded in a museum’s files was once

treated as the end of an object's story. Increasingly it is treated as one episode, to be judged in the light of how the object was obtained and of what it still means to the people from whom it came. Museums that accept this view do not stop caring for objects; they share the decision about what care should mean.

V09. The passage is mainly concerned with MCQ

A. how claims for the return of museum objects challenge assumptions about audience, preservation and ownership.
B. proving that every object in large museums was obtained by force.
C. arguing that returned objects should always be placed in national museums.
D. describing the techniques used in conservation laboratories.

Answer: A. how claims for the return of museum objects challenge assumptions about audience, preservation and ownership.

The passage examines the access argument, the counter-arguments of claimants and the changing idea of ownership. It says only that many objects were taken, notes national display as a complication, and mentions laboratories only in passing.

V10. The museums' traditional argument about access assumes that MCQ

A. objects should be used in ceremonies so that their meaning stays alive.
B. the communities that made objects are best placed to conserve them.
C. the public of the city where an object is held is its most important audience.
D. returns lead to loans, shared research and joint exhibitions.

Answer: C. the public of the city where an object is held is its most important audience.

The second paragraph states this assumption explicitly. The other options describe the claimants' view or the observed results of returns, not the museums' argument.

V11. According to the passage, experience of returns so far suggests that MCQ

A. returned objects are always restored to their original use.
B. communities and states usually agree about who should receive an object.
C. museums stop caring for the objects that remain with them.
D. galleries are not emptied quickly, and collaboration often follows a return.

Answer: D. galleries are not emptied quickly, and collaboration often follows a return.

The fourth paragraph reports a gradual effect followed by loans, research and exhibitions. It notes that returned objects may go to national museums and that claimants may disagree, and nothing suggests museums stop caring for objects.

V12. Which statement best reflects how the passage describes the changing view of a purchase recorded in a museum's files? MCQ

A. It is still regarded as settling ownership once and for all.
B. It is increasingly seen as one episode in an object's history, to be judged by how the object was obtained.
C. It is treated as proof that the museum obtained the object fairly.
D. It is considered irrelevant to any account of the object's history.

Answer: B. It is increasingly seen as one episode in an object's history, to be judged by how the object was obtained.

The final paragraph contrasts the old view of a purchase as the end of the story with the newer view of it as one episode open to judgement. The other options restate the old view or exaggerate the new one.

RC 4 · Counting what services produce

Measuring productivity in a factory seems straightforward: count the cars or shirts produced and divide by the hours worked. When output rises faster than hours, productivity has grown. For much of the economy, however, there are no cars or shirts to count. What is the output of a hospital, a school or a law firm?

Statisticians have often answered by measuring what is spent. If a hospital's budget rises, its output is assumed to rise in proportion. This makes productivity growth invisible by construction: if output is defined as inputs, output per input cannot change. Other approaches count activities, such as operations performed or pupils taught. These are better, but they can mislead. A hospital that cures a condition in a single visit instead of three will appear to produce less, and a school that teaches the same number of pupils better will appear unchanged.

The problem matters because services form a large and growing share of modern economies. Some economists argued decades ago that services suffer from a cost disease: a string quartet needs as many musicians and minutes as it did a century ago, while its players' wages rise in line with those in industries that do become more productive. Services therefore become relatively more expensive. The argument is powerful, but it depends partly on how output is measured. A recording can bring the quartet to millions of listeners, and remote consultations let one doctor see more patients. Whether these count as productivity gains depends on whether the measure captures what people value.

Better measurement usually means asking what a service is for. Health care is for health, so output might be measured by improvements in patients' conditions, adjusted for how severe those conditions were. Education is for learning, so output might reflect what pupils can do as a result. Such measures are difficult to construct and open to dispute, since outcomes depend on many things a service does not control. Yet the alternative is to judge services by their budgets or their busyness, which tells us little about whether they are getting better.

The choice of measure is not merely technical. A government that judges hospitals by procedures performed will reward procedures; one that judges them by outcomes will reward health. What is counted tends to become what is pursued.

V13. Which of the following best summarises the passage? MCQ

A. Services cannot become more productive, as the cost-disease argument proves.
B. Because services lack countable products, their productivity is hard to measure, and the measures chosen shape both conclusions and behaviour.
C. Hospital budgets are the most accurate available measure of hospital output.
D. Factories measure productivity poorly because they ignore quality.

Answer: B. Because services lack countable products, their productivity is hard to measure, and the measures chosen shape both conclusions and behaviour.

The passage covers the measurement problem, how the cost-disease conclusion depends on measurement, and the behavioural effect of measures. It treats the cost disease as debatable, criticises budget-based measures and does not fault factory measures.

V14. If a school's output is measured by the number of pupils taught, a school that improves its teaching without changing its enrolment would MCQ

A. appear more productive because its budget would rise.
B. appear less productive because it would need fewer lessons.
C. be shown to suffer from the cost disease.
D. appear to produce no more than before.

Answer: D. appear to produce no more than before.

The second paragraph says a school teaching the same number of pupils better will appear unchanged under an activity count. Budgets and lesson counts are different measures, and the cost disease is not shown by this case.

V15. The author mentions recordings of a string quartet in order to MCQ

A. show that live music has become cheaper over time.
B. prove that the cost-disease argument is entirely mistaken.
C. suggest that whether a service gains in productivity depends on how its output is defined.
D. illustrate how statisticians measure services by their budgets.

Answer: C. suggest that whether a service gains in productivity depends on how its output is defined.

The example follows the remark that the cost-disease argument depends partly on measurement. The author calls the argument powerful, says nothing about live music becoming cheaper, and discusses budget measures elsewhere.

V16. Which of the following best illustrates the point made in the final paragraph? MCQ

A. Police units judged by the number of arrests make more arrests for minor offences without reducing crime.
B. A factory increases its output by adding a night shift.
C. A hospital's budget rises because of general inflation.
D. A school adopts a new textbook chosen by its teachers.

Answer: A. Police units judged by the number of arrests make more arrests for minor offences without reducing crime.

The final paragraph says that what is counted becomes what is pursued. Arrest counts rewarding arrests rather than safety fit exactly; the other situations involve no measure that changes behaviour.

V17. Choose the best summary.

Some public libraries now lend more than books: drills, sewing machines, telescopes and even cake tins. The idea can look like a departure from the library's purpose, but it follows an old logic. Libraries have always pooled resources that individuals use occasionally and cannot easily afford to own. A drill, like an encyclopaedia, spends most of its life idle in a single household. Lending objects also brings different people into the building, some of whom then discover its other services. The practical obstacles are real: tools break, need checking and occupy space. Yet libraries that manage these obstacles report that such collections are heavily used, which suggests a need that shops and private ownership were not meeting. MCQ

A. Libraries that lend tools have abandoned their original purpose of lending books.
B. Tools wear out quickly, so libraries should not lend them.
C. Lending objects extends the library's old role of pooling things people use only occasionally, and despite practical costs it appears to meet a real need.
D. Most households own drills that they rarely use.

Answer: C. Lending objects extends the library's old role of pooling things people use only occasionally, and despite practical costs it appears to meet a real need.

The paragraph presents object lending as continuous with pooling, admits practical costs and points to strong use. The second option reverses the argument, the third ignores the evidence of demand, and the fourth is a detail.

V18. Choose the best summary.

Reintroducing large predators to landscapes from which they disappeared is often justified by their effects on other species. Wolves, for example, may reduce grazing by deer near rivers, allowing trees to regrow and changing the habitat for birds and insects. Such cascades are real in some places, but they are harder to demonstrate than popular accounts suggest. Rivers change for many reasons, deer numbers respond to hunting and weather, and the predator's effect varies from valley to valley. This does not weaken the case for reintroduction, which can rest on the value of the species itself. It does suggest caution about promising dramatic ecological transformations that may not occur everywhere. MCQ

A. Reintroduced predators can have wide ecological effects, but these vary and are hard to prove, so the case for them should not rest on promises of dramatic change.
B. Wolves always cause trees to regrow along rivers by reducing deer grazing.
C. Reintroducing predators is unjustified because their effects cannot be demonstrated.
D. Hunting and weather matter more than predators in every ecosystem.

Answer: A. Reintroduced predators can have wide ecological effects, but these vary and are hard to prove, so the case for them should not rest on promises of dramatic change.

The correct summary keeps the qualified acceptance of cascades and the call for caution about promises. The second option overstates, the third contradicts the paragraph's support for reintroduction, and the fourth generalises a detail.

V19. Choose the best position for the missing sentence.

Sentence: Without that limit, an opening offer would carry no information at all.

In many markets, buyers and sellers do not reveal their true limits at the start of a negotiation. (1) A seller opens high and a buyer opens low, and both expect to move towards each other. (2) Yet the opening offer still matters, because each side assumes the other cannot stray too far from reality without losing credibility. (3) A seller who asks ten times the usual price is not really bargaining; such an offer tells the buyer that no sale is intended, or that the seller does not understand the market. (4) Opening offers therefore work as anchors only within a range that both sides regard as plausible, which is why experienced negotiators study typical prices before they begin. MCQ

A. Position (1)
B. Position (3)
C. Position (2)
D. Position (4)

Answer: B. Position (3)

"That limit" refers to the constraint of credibility introduced just before (3); the sentence then explains why the constraint matters, and the next sentence gives the extreme example. At the other positions no limit has yet been mentioned, or the conclusion has already been drawn.

V20. Choose the best position for the missing sentence.

Sentence: The newcomers, in other words, had changed the soil before anyone was watching.

Earthworms are often treated as a sign of healthy soil. (1) In parts of northern North America, however, forests developed without them after the last ice age, and their floors are covered by a thick layer of slowly decaying leaves. (2) Worms introduced by anglers and gardeners consume that layer within a few years. (3) Native plants that depend on the leaf layer for moisture and shelter decline, and some ground-nesting birds lose cover. By the time ecologists began to study these changes, the leaf layer had already vanished from large areas. (4) Restoring it is difficult, because the worms cannot be removed once they are established. MCQ

A. Position (1)
B. Position (2)
C. Position (3)
D. Position (4)

Answer: D. Position (4)

The sentence restates the point that the leaf layer had vanished before ecologists began studying it, so it belongs at (4). At earlier positions the newcomers' effects and the late arrival of study have not yet been described.

V21. Arrange the sentences and enter their numbers without spaces.

1. Air trapped in the gaps between the fibres is a poor conductor of heat.
2. A loose weave holds more of that still air, so it can insulate better than a tight one.
3. Why does a woollen jumper keep you warm even though it is full of tiny holes?
4. The answer depends less on the wool itself than on the way it is knitted. TITA

Answer: 3412

3 poses the question and 4 begins the answer by pointing to the knitting. 1 explains the role of air in the gaps, and 2, with "that still air", draws the practical consequence.

V22. Arrange the sentences and enter their numbers without spaces.

1. Some fail because they are toxic, others because they do not work in people as they did in cells or animals.
2. The few that succeed must therefore pay for the many that do not, which helps explain the high price of new medicines.
3. Most of them never reach the market.
4. Each year pharmaceutical companies test thousands of compounds that look promising in the laboratory. TITA

Answer: 4312

4 introduces the compounds; 3's "Most of them" refers to them. 1 gives the reasons for failure, and 2 concludes with the consequence for prices.

V23. Four sentences form a coherent paragraph. Enter the odd sentence number.

1. Ice skating became a popular winter pastime in several European cities in the nineteenth century.
2. Glaciers store a large share of the world's fresh water as ice.
3. In many mountain regions their summer melt feeds rivers during the driest months.
4. As glaciers shrink, that melt first increases and then declines.
5. Communities downstream may therefore enjoy a temporary surplus of water before facing shortages. TITA

Answer: 1

Sentences 2, 3, 4 and 5 trace glacier melt and its effect on water supply. Sentence 1 concerns a winter pastime and has no link to that argument.

V24. Four sentences form a coherent paragraph. Enter the odd sentence number.

1. A password that is long and random is hard for an attacker to guess.
2. It is also hard for its owner to remember, which tempts people to reuse it on many sites.
3. Reuse means that a leak from one careless website can expose accounts elsewhere.
4. Password managers address this by remembering a different random password for each site.
5. Early computers stored their data on punched cards and magnetic tape. TITA

Answer: 5

Sentences 1–4 develop the trade-off between strong passwords and memory and its solution. Sentence 5 is about historical storage media.

DILR · 22 questions

Eight friends at a round table

Eight friends A, B, C, D, E, F, G and H sit around a circular table at eight equally spaced seats, all facing the centre.
B sits directly opposite A.
C sits immediately clockwise of B.
D and E sit next to each other.
F does not sit next to A, and H does not sit next to B.
G sits two seats clockwise of D, with exactly one person between them.

Any additional condition or change in a question applies only to that question.

D01. How many different seating arrangements satisfy all the conditions? (Arrangements that are rotations of each other count as the same.) TITA

Answer: 2

Number the seats 1 to 8 clockwise with A in seat 1. B is in seat 5 (opposite A) and C in seat 6. G is two seats clockwise from D, D and E are neighbours, and F and H avoid the stated neighbours. Exhaustive placement leaves two seatings (seats 1 to 8, clockwise):
ADEGBCFH
AGHFBCED

Fixing A removes rotations; the two listed seatings remain.

D02. Which of the following pairs sit next to each other in every possible arrangement? MCQ

A. G and H
B. E and F
C. C and G
D. A and D

Answer: D. A and D

Number the seats 1 to 8 clockwise with A in seat 1. B is in seat 5 (opposite A) and C in seat 6. G is two seats clockwise from D, D and E are neighbours, and F and H avoid the stated neighbours. Exhaustive placement leaves two seatings (seats 1 to 8, clockwise):
ADEGBCFH
AGHFBCED

A and D are neighbours in both seatings; the other pairs are neighbours in at most one.

D03. Counting clockwise from A, how many people sit strictly between A and C? TITA

Answer: 4

Number the seats 1 to 8 clockwise with A in seat 1. B is in seat 5 (opposite A) and C in seat 6. G is two seats clockwise from D, D and E are neighbours, and F and H avoid the stated neighbours. Exhaustive placement leaves two seatings (seats 1 to 8, clockwise):
ADEGBCFH
AGHFBCED

C is always in seat 6, so seats 2 to 5 hold four people.

D04. If E sits immediately clockwise of D, who sits opposite G? MCQ

A. C
B. H
C. E
D. F

Answer: B. H

Number the seats 1 to 8 clockwise with A in seat 1. B is in seat 5 (opposite A) and C in seat 6. G is two seats clockwise from D, D and E are neighbours, and F and H avoid the stated neighbours. Exhaustive placement leaves two seatings (seats 1 to 8, clockwise):
ADEGBCFH
AGHFBCED

Only ADEGBCFH has E immediately clockwise of D; G is in seat 4 and H is opposite.

D05. If F sits opposite D, who sits immediately clockwise of A? MCQ

A. D
B. G
C. E
D. H

Answer: B. G

Number the seats 1 to 8 clockwise with A in seat 1. B is in seat 5 (opposite A) and C in seat 6. G is two seats clockwise from D, D and E are neighbours, and F and H avoid the stated neighbours. Exhaustive placement leaves two seatings (seats 1 to 8, clockwise):
ADEGBCFH
AGHFBCED

Only AGHFBCED has F opposite D; there G is next clockwise from A.

Output and defects at four plants

Four plants K, L, M and N together produced 2,100 units last month. Plant M produced 400 units. L produced 25% more units than K, and N produced as many units as K and M together.
The defect rates were 5% at K, 4% at L, 7.5% at M and 2.5% at N (defect rate = defective units as a percentage of the plant's output).

Any additional condition or change in a question applies only to that question.

D06. How many units did plant N produce? TITA

Answer: 800

K produced k units, L 1.25k, M 400 and N k + 400. The total gives 3.25k + 800 = 2100, so k = 400.
Plant | Output | Defect rate | Defective units
K | 400 | 5% | 20
L | 500 | 4% | 20
M | 400 | 7.5% | 30
N | 800 | 2.5% | 20

N = k + 400 = 800 units.

D07. Which plant produced the largest number of defective units? MCQ

A. K
B. L
C. N
D. M

Answer: D. M

K produced k units, L 1.25k, M 400 and N k + 400. The total gives 3.25k + 800 = 2100, so k = 400.
Plant | Output | Defect rate | Defective units
K | 400 | 5% | 20
L | 500 | 4% | 20
M | 400 | 7.5% | 30
N | 800 | 2.5% | 20

Defective units were 20, 20, 30 and 20; M is highest.

D08. How many non-defective units did the four plants produce in all? TITA

Answer: 2010

K produced k units, L 1.25k, M 400 and N k + 400. The total gives 3.25k + 800 = 2100, so k = 400.
Plant | Output | Defect rate | Defective units
K | 400 | 5% | 20
L | 500 | 4% | 20
M | 400 | 7.5% | 30
N | 800 | 2.5% | 20

Defective units total 90, so 2100 – 90 = 2010 were non-defective.

D09. Each defective unit is reworked at a cost of ₹15. What is the total rework cost, in rupees? TITA

Answer: 1350

K produced k units, L 1.25k, M 400 and N k + 400. The total gives 3.25k + 800 = 2100, so k = 400.
Plant | Output | Defect rate | Defective units
K | 400 | 5% | 20
L | 500 | 4% | 20
M | 400 | 7.5% | 30
N | 800 | 2.5% | 20

90 defective units × ₹15 = ₹1,350.

D10. Which of the following is closest to the overall defect rate of the four plants together? MCQ

A. 3.8%
B. 4.3%
C. 4.0%
D. 4.6%

Answer: B. 4.3%

K produced k units, L 1.25k, M 400 and N k + 400. The total gives 3.25k + 800 = 2100, so k = 400.
Plant | Output | Defect rate | Defective units
K | 400 | 5% | 20
L | 500 | 4% | 20
M | 400 | 7.5% | 30
N | 800 | 2.5% | 20

Overall the rate is 90/2100 = 4.29%, which rounds to 4.3%.

Six tasks of a project

A project consists of six tasks. Each task can start only after all the tasks it needs have finished; tasks that do not depend on each other can run at the same time, and enough staff are available for this.

Task | Duration (days) | Can start only after
A | 3 | —
B | 5 | —
C | 2 | A
D | 4 | A, B
E | 6 | C
F | 3 | D, E

Any additional condition or change in a question applies only to that question.

D11. What is the minimum number of days needed to complete the project? TITA

Answer: 14

Earliest finish times, taking each task as soon as all its predecessors finish:
Task | Days | Needs | Earliest finish | Spare days
A | 3 | — | 3 | 0
B | 5 | — | 5 | 2
C | 2 | A | 5 | 0
D | 4 | A, B | 9 | 2
E | 6 | C | 11 | 0
F | 3 | D, E | 14 | 0
The longest chain A–C–E–F takes 14 days. Spare days are the most a single task can slip without delaying completion.

The chain A–C–E–F takes 3 + 2 + 6 + 3 = 14 days.

D12. Which of the following tasks can be delayed by 2 days without delaying the completion of the project? MCQ

A. E
B. C
C. A
D. B

Answer: D. B

Earliest finish times, taking each task as soon as all its predecessors finish:
Task | Days | Needs | Earliest finish | Spare days
A | 3 | — | 3 | 0
B | 5 | — | 5 | 2
C | 2 | A | 5 | 0
D | 4 | A, B | 9 | 2
E | 6 | C | 11 | 0
F | 3 | D, E | 14 | 0
The longest chain A–C–E–F takes 14 days. Spare days are the most a single task can slip without delaying completion.

B finishes on day 5 but D need not start until day 7, so B has 2 spare days. A, C and E lie on the longest chain.

D13. If task E takes 8 days instead of 6, what is the minimum number of days needed for the project? TITA

Answer: 16

Earliest finish times, taking each task as soon as all its predecessors finish:
Task | Days | Needs | Earliest finish | Spare days
A | 3 | — | 3 | 0
B | 5 | — | 5 | 2
C | 2 | A | 5 | 0
D | 4 | A, B | 9 | 2
E | 6 | C | 11 | 0
F | 3 | D, E | 14 | 0
The longest chain A–C–E–F takes 14 days. Spare days are the most a single task can slip without delaying completion.

The chain A–C–E–F becomes 3 + 2 + 8 + 3 = 16 days.

D14. Shortening which one of the following tasks by one day shortens the whole project by one day? MCQ

A. D
B. None of these tasks
C. E
D. B

Answer: C. E

Earliest finish times, taking each task as soon as all its predecessors finish:
Task | Days | Needs | Earliest finish | Spare days
A | 3 | — | 3 | 0
B | 5 | — | 5 | 2
C | 2 | A | 5 | 0
D | 4 | A, B | 9 | 2
E | 6 | C | 11 | 0
F | 3 | D, E | 14 | 0
The longest chain A–C–E–F takes 14 days. Spare days are the most a single task can slip without delaying completion.

Only E lies on the longest chain among the options; B and D have spare days.

Coins in five boxes

Five boxes P, Q, R, S and T together contain 36 coins. Each box contains at least 2 coins, no two boxes contain the same number of coins, and no box contains exactly 4 coins.
P contains more coins than Q but fewer than R.
R contains twice as many coins as T.
S contains an odd number of coins.
Q and T together contain 9 coins.

Any additional condition or change in a question applies only to that question.

D15. What is the largest possible number of coins in box S? TITA

Answer: 7

R = 2T and Q + T = 9, with every box holding a different number of at least 2 coins and no box holding exactly 4. Checking all cases leaves:
P | Q | R | S | T
8 | 2 | 14 | 5 | 7
8 | 3 | 12 | 7 | 6
10 | 2 | 14 | 3 | 7
10 | 3 | 12 | 5 | 6

The feasible values of S are 5, 7, 3 and 5; the largest is 7.

D16. Which box always contains the second-highest number of coins? MCQ

A. S
B. P
C. Q
D. T

Answer: B. P

R = 2T and Q + T = 9, with every box holding a different number of at least 2 coins and no box holding exactly 4. Checking all cases leaves:
P | Q | R | S | T
8 | 2 | 14 | 5 | 7
8 | 3 | 12 | 7 | 6
10 | 2 | 14 | 3 | 7
10 | 3 | 12 | 5 | 6

R is always highest and P is second in every feasible distribution.

D17. If S contains more coins than T, how many coins does P contain? TITA

Answer: 8

R = 2T and Q + T = 9, with every box holding a different number of at least 2 coins and no box holding exactly 4. Checking all cases leaves:
P | Q | R | S | T
8 | 2 | 14 | 5 | 7
8 | 3 | 12 | 7 | 6
10 | 2 | 14 | 3 | 7
10 | 3 | 12 | 5 | 6

Only (8, 3, 12, 7, 6) has S above T, so P holds 8 coins.

D18. How many different distributions of coins satisfy all the conditions? MCQ

A. 8
B. 5
C. 4
D. 6

Answer: C. 4

R = 2T and Q + T = 9, with every box holding a different number of at least 2 coins and no box holding exactly 4. Checking all cases leaves:
P | Q | R | S | T
8 | 2 | 14 | 5 | 7
8 | 3 | 12 | 7 | 6
10 | 2 | 14 | 3 | 7
10 | 3 | 12 | 5 | 6

Four distributions remain.

Truth-tellers and liars

Each of five people A, B, C, D and E is either a truth-teller, who always tells the truth, or a liar, who always lies. They make these statements:
A: “B is a liar.”
B: “C and D are of the same type.”
C: “Exactly two of us five are liars.”
D: “A is a truth-teller.”
E: “D is a liar.”

Any additional condition or change in a question applies only to that question.

D19. How many of the five are liars? TITA

Answer: 3

Test all 32 assignments: a truth-teller's statement must be true and a liar's false. Two assignments survive:
A truth-teller, B liar, C liar, D truth-teller, E liar
A liar, B truth-teller, C liar, D liar, E truth-teller
C's claim that exactly two are liars is false in both, since each has three liars.

Both consistent assignments have exactly three liars.

D20. Who is certainly a liar? MCQ

A. A
B. B
C. D
D. C

Answer: D. C

Test all 32 assignments: a truth-teller's statement must be true and a liar's false. Two assignments survive:
A truth-teller, B liar, C liar, D truth-teller, E liar
A liar, B truth-teller, C liar, D liar, E truth-teller
C's claim that exactly two are liars is false in both, since each has three liars.

C is a liar in both assignments; each of the others is a truth-teller in one of them.

D21. If A is a truth-teller, how many of B, C and E are truth-tellers? TITA

Answer: 0

Test all 32 assignments: a truth-teller's statement must be true and a liar's false. Two assignments survive:
A truth-teller, B liar, C liar, D truth-teller, E liar
A liar, B truth-teller, C liar, D liar, E truth-teller
C's claim that exactly two are liars is false in both, since each has three liars.

With A truthful, B, C and E are all liars, so the answer is 0.

D22. If E is a truth-teller, which of the following must be true? MCQ

A. B is a truth-teller
B. D is a truth-teller
C. A is a truth-teller
D. C is a truth-teller

Answer: A. B is a truth-teller

Test all 32 assignments: a truth-teller's statement must be true and a liar's false. Two assignments survive:
A truth-teller, B liar, C liar, D truth-teller, E liar
A liar, B truth-teller, C liar, D liar, E truth-teller
C's claim that exactly two are liars is false in both, since each has three liars.

E truthful leaves only the assignment in which A, C and D lie and B and E tell the truth.

QA · 22 questions

Q01. The difference between the compound interest and the simple interest on a sum for 2 years at 10% per annum is ₹150. What is the sum, in rupees? MCQ

A. 12000
B. 15000
C. 18000
D. 16500

Answer: B. 15000

For two years the difference equals P × r², where r = 0.10. So P × 0.01 = 150 and P = ₹15,000. The extra interest is interest earned on the first year's interest.

Q02. Pipe A fills a tank in 20 hours and pipe B in 30 hours; outlet C alone empties the full tank in 15 hours. A and B are opened together on an empty tank, and after 4 hours C is also opened. How many more hours are needed to fill the tank? TITA

Answer: 40

A and B fill 1/20 + 1/30 = 1/12 of the tank per hour, so after 4 hours one third is full. With C open the net rate is 1/12 − 1/15 = 1/60 per hour. The remaining two thirds take (2/3)/(1/60) = 40 hours.

Q03. A carpenter makes chairs and tables. Each chair needs 2 hours of cutting and 1 hour of polishing; each table needs 3 hours of cutting and 4 hours of polishing. One week he used exactly 70 hours of cutting and 60 hours of polishing. How many tables did he make? MCQ

A. 12
B. 8
C. 14
D. 10

Answer: D. 10

Let c chairs and t tables be made. Cutting gives 2c + 3t = 70 and polishing gives c + 4t = 60. From the second equation c = 60 − 4t; substituting gives 120 − 8t + 3t = 70, so 5t = 50 and t = 10, with c = 20 chairs.

Q04. In triangle ABC, D lies on AB and E on AC with DE parallel to BC and AD : DB = 2 : 3. The trapezium DBCE has area 84 cm². What is the area of triangle ABC, in cm²? MCQ

A. 100
B. 96
C. 105
D. 120

Answer: A. 100

Triangle ADE is similar to ABC with ratio AD/AB = 2/5, so its area is 4/25 of ABC. The trapezium is the remaining 21/25 of ABC. Hence ABC = 84 × 25/21 = 100 cm².

Q05. Two runners start together from the same point of a 400 m circular track and run in opposite directions at 6 m/s and 4 m/s. Up to the first moment when both are again at the starting point together, at how many distinct points of the track do they meet? TITA

Answer: 5

They meet every 400/(6 + 4) = 40 seconds. The lap times are 200/3 s and 100 s, so both are first back at the start after 200 seconds, the least common multiple. In those 200 seconds they meet 5 times, at 240, 80, 320, 160 and 0 metres along the faster runner’s path: 5 distinct points.

Q06. A invested ₹50,000 for the full year in a business, and B invested ₹80,000 for part of the year. Of the annual profit of ₹1,50,000, A received ₹90,000. For how many months was B’s money invested? MCQ

A. 6
B. 4
C. 5
D. 8

Answer: C. 5

Profit is shared in proportion to capital × time. A’s share of 90,000 out of 1,50,000 means A : B = 3 : 2. A contributed 50,000 × 12 = 6,00,000 rupee-months, so B contributed 4,00,000, which is 80,000 × 5. B invested for 5 months.

Q07. What is the units digit of 3^2027 × 7^2026? MCQ

A. 1
B. 7
C. 3
D. 9

Answer: C. 3

Units digits of powers of 3 cycle 3, 9, 7, 1; since 2027 leaves remainder 3 on division by 4, 3^2027 ends in 7. Powers of 7 cycle 7, 9, 3, 1; 2026 leaves remainder 2, so 7^2026 ends in 9. The product ends in the units digit of 63, which is 3.

Q08. What is the maximum value of $-2x^2 + 12x + 7$ over all real x? TITA

Answer: 25

The vertex of the parabola is at $x = -12/(2 \times -2) = 3$. Substituting gives $-18 + 36 + 7 = 25$, the greatest value because the leading coefficient is negative.

Q09. What is the sum of all real numbers x that satisfy $|2x - 5| = x + 2$? MCQ

A. 8
B. 7
C. 6
D. 1

Answer: A. 8

If $2x - 5 \geq 0$, then $2x - 5 = x + 2$ gives $x = 7$, which satisfies $x \geq 2.5$. If $2x - 5 < 0$, then $5 - 2x = x + 2$ gives $x = 1$, which satisfies $x < 2.5$ and makes $x + 2$ positive. The solutions are 1 and 7, so their sum is 8.

Q10. A vessel contains 80 litres of milk. Twenty litres are drawn out and replaced with water, and this is done once more. How many litres of milk are now in the vessel? TITA

Answer: 45

Each operation keeps 60/80 = 3/4 of the milk present. After two operations the milk left is $80 \times (3/4)^2 = 45$ litres.

Q11. If $\log_3(x - 2) + \log_3(x + 6) = 2$, what is the value of x? MCQ

A. 7
B. 4
C. 5
D. 3

Answer: D. 3

The equation means $(x - 2)(x + 6) = 9$, so $x^2 + 4x - 21 = 0$, giving $x = 3$ or $x = -7$. The logarithms need $x > 2$, so $x = 3$.

Q12. What is the area, in square units, of the triangle with vertices (1, 2), (7, 5) and (3, 10)? TITA

Answer: 21

By the shoelace formula the area is half of $|1(5 - 10) + 7(10 - 2) + 3(2 - 5)| = |-5 + 56 - 9| = 42$, which is 21 square units.

Q13. How many zeros are there at the end of 125! (125 factorial)? TITA

Answer: 31

Trailing zeros come from factors $10 = 2 \times 5$, and 5s are scarcer. The number of 5s is $\lfloor 125/5 \rfloor + \lfloor 125/25 \rfloor + \lfloor 125/125 \rfloor = 25 + 5 + 1 = 31$.

Q14. A's salary is 20% more than B's. B's salary then rises by 20% and A's by 10%. By what percentage is A's new salary greater than B's new salary? MCQ

A. 8
B. 10
C. 12.5
D. 15

Answer: B. 10

Take B = 100, so A = 120. The new salaries are 120 for B and 132 for A. A's new salary exceeds B's by 12/120 = 10%.

Q15. A function satisfies f(0) = 4 and f(x + 1) = f(x) + 2x + 1 for every whole number x. What is f(10)? TITA

Answer: 104

The increments 2x + 1 for x = 0 to 9 are the first ten odd numbers, whose sum is $10^2 = 100$. So f(10) = f(0) + 100 = 104; in general $f(n) = n^2 + 4$.

Q16. Two circles of radii 9 cm and 4 cm touch each other externally. What is the length, in cm, of a direct common tangent between their points of contact? MCQ

A. 12
B. 13
C. 10
D. 11

Answer: A. 12

The centres are 9 + 4 = 13 cm apart. A direct common tangent has length $\sqrt{(d^2 - (r_1 - r_2)^2)} = \sqrt{(169 - 25)} = \sqrt{144} = 12$ cm.

Q17. In how many ways can a committee of 4 be chosen from 6 men and 5 women if it must include at least 2 women? TITA

Answer: 215

All committees number C(11, 4) = 330. Those with no woman number C(6, 4) = 15, and those with exactly one woman number 5 × C(6, 3) = 100. The required number is 330 − 115 = 215.

Q18. The average age of a family of six is 25 years, and its youngest member is 4 years old. What was the average age of the family just before the youngest member was born? MCQ

A. 24.8
B. 26
C. 25.2
D. 25

Answer: C. 25.2

The total age now is 150 years. Four years ago the other five members were 4 years younger each, a total of 150 − 4 − 5 × 4 = 126 years. Their average was then 126/5 = 25.2 years.

Q19. What is the value of $\log_2 3 \times \log_3 4 \times \log_4 5 \times \ldots \times \log_{63} 64$? MCQ

A. 5
B. 6
C. 7
D. 64

Answer: B. 6

Write each factor as a ratio of natural logarithms: log_k(k + 1) = ln(k + 1)/ln k. In the product every intermediate logarithm cancels, leaving ln 64/ln 2 = $\log_2 64$ = 6.

Q20. How many ordered pairs (x, y) of positive integers satisfy 3x + 5y = 101? MCQ

A. 6
B. 8
C. 5
D. 7

Answer: D. 7

We need 101 – 5y to be a positive multiple of 3. Since 101 ≡ 2 and 5y ≡ 2y (mod 3), y ≡ 1 (mod 3). With 5y < 101 the values are y = 1, 4, 7, 10, 13, 16 and 19, giving 7 pairs.

Q21. An infinite geometric progression has sum 24, and the sum of the squares of its terms is 192. What is its first term? MCQ

A. 16
B. 8
C. 18
D. 12

Answer: D. 12

With first term a and ratio r, a/(1 – r) = 24 and $a^2/(1 - r^2) = 192$. Dividing the second by the first gives a/(1 + r) = 8. So 24(1 – r) = 8(1 + r), r = 1/2 and a = 24 × 1/2 = 12.

Q22. A cyclist and a runner leave town A at the same time for town B, 36 km away, at 18 km/h and 9 km/h respectively. The cyclist rests for 20 minutes at B and then rides back towards A at the same speed. How far from A, in km, do they meet? MCQ

A. 26
B. 24
C. 27
D. 25

Answer: A. 26

The cyclist reaches B after 2 hours and leaves again after 2 hours 20 minutes. By then the runner has covered 9 × 7/3 = 21 km, leaving a gap of 15 km. They close it at 18 + 9 = 27 km/h, taking 15/27 = 5/9 hour, in which the runner covers 5 km more. They meet 26 km from A.