XAT 2025 Question Paper with Solutions (Memory based)

Time Allowed :3 Hours	Maximum Marks :95	Total Questions :95

General Instructions

Read the following instructions very carefully and strictly follow them:

1. Please read the instructions carefully.
2. This Question Paper consists of **95 questions** in four sections.
3. The total duration of the XAT examination is 180 minutes (3 hours).
4. Sectional Timing: While the overall exam time is 180 minutes, specific sections are included within this time frame, except for the General Knowledge (GK) section, which is allotted 10 minutes.
5. All questions of a particular section must be attempted in the correct order.
6. Answering Format: Use a blue or black ball-point pen to mark answers on the answer sheet. Ensure markings are clear and within the designated spaces.

1. A and B each purchased plots of land on the Moon from an e-store. A bought a plot in the shape of a square, while B bought a circular plot. Both plots were described by the same diameter. Calculate the ratio of the area of A's land to B's land.

Solution:
Let the diameter common to both plots be d. For A's square plot, the side length of the square will also be d since it matches the diameter description. The area of A's plot, therefore, is:

$$\text{Area of A's plot} = d^2$$

For B's circular plot, the diameter d corresponds to the circle's diameter. Thus, the radius r is half of the diameter:

$$r = \frac{d}{2}$$

The area of B's plot can be calculated using the area formula for a circle:

$$\text{Area of B's plot} = \pi r^2 = \pi \left(\frac{d}{2}\right)^2 = \frac{\pi d^2}{4}$$

Now, to find the ratio of the area of A's land to B's land:

$$\text{Ratio} = \frac{\text{Area of A's plot}}{\text{Area of B's plot}} = \frac{d^2}{\frac{\pi d^2}{4}} = \frac{4}{\pi}$$

Quick Tip

Remember that when comparing areas of different shapes based on a common measurement (like diameter here), it's crucial to apply the correct formulae for each shape to ensure accurate calculations.

---

2. A bought a phone from some store and paid $\frac{1}{6}$ on UPI, $\frac{1}{3}$ with cash, and the rest of the balance a year later with 10% interest. What was the original price of the phone?

Solution:
Let the original price of the phone be P. According to the problem, A paid:
1. $\frac{1}{6}P$ on UPI. 2. $\frac{1}{3}P$ with cash.
The total amount paid initially is:

$$\text{Initial Payment} = \frac{1}{6}P + \frac{1}{3}P = \frac{1}{2}P$$

Thus, the remaining amount to be paid later is:

$$\text{Remaining Balance} = P - \frac{1}{2}P = \frac{1}{2}P$$

This remaining balance was paid a year later with 10% interest. Therefore, the total amount paid a year later is:

$$\text{Amount Paid Later} = \frac{1}{2}P + 0.1 \times \frac{1}{2}P = \frac{1}{2}P \times (1 + 0.1) = \frac{1}{2}P \times 1.1 = \frac{11}{20}P$$

The total amount paid for the phone is:

$$\text{Total Payment} = \frac{1}{2}P + \frac{11}{20}P = \frac{10}{20}P + \frac{11}{20}P = \frac{21}{20}P$$

Let the total payment (actual price paid) be A. Equating the total payment to A:

$$\frac{21}{20}P = A$$

The original price of the phone P can be calculated as:

$$P = \frac{20}{21}A$$

Quick Tip

When dealing with percentage interest, always calculate the interest on the remaining balance and add it to the balance to determine the final amount. Use fractions to simplify calculations where possible.

---

3. ABCD is a rectangle, with C and D having respective coordinates (-2, 0) and (2, 0). If the area of the rectangle is 24, what would be the best way to describe the equation of line AB (the length)?

Solution:
The rectangle ABCD has $C(-2, 0)$ and $D(2, 0)$ as points on the base. The distance between C and D determines the length of the base CD:

$$\text{Length of } CD = |x_2 - x_1| = |2 - (-2)| = 4$$

Given that the area of the rectangle is 24, the height h can be calculated using the area formula for a rectangle:

$$\text{Area} = \text{Base} \times \text{Height}$$

$$24 = 4 \times h \quad \Longrightarrow \quad h = \frac{24}{4} = 6$$

The height of the rectangle represents the vertical distance from the base CD to the opposite side AB. Since CD lies along the x-axis ($y = 0$), the equation of line AB must be parallel to CD and at a vertical height of $h = 6$:

$$y = 6$$

Quick Tip
When working with rectangles in coordinate geometry, determine the equation of lines parallel to axes by using the given height or width and their respective distances from known coordinates.

---

4. A chose an integer X, which is between 2 and 40. A noticed that the integer X is such that when X is divided by any integer between 2 and 40, the remainder is always 1. What is the value of X?

Solution:
The problem implies that X satisfies the following condition:

$$X \mod n = 1 \quad \text{for all integers } n \text{ where } 2 \leq n \leq 40.$$

This means $X - 1$ is divisible by all integers n between 2 and 40. In other words, $X - 1$ is the least common multiple (LCM) of all integers from 2 to 40.
1. Find the LCM of integers from 2 to 40: The LCM of a set of integers is the smallest number that is divisible by each of the integers in the set. To compute the LCM efficiently: - Use the prime factorization method. - Identify the highest powers of each prime number between 2 and 40.
Prime numbers between 2 and 40 are: $2, 3, 5, 7, 11, 13, 17, 19, 23, 29, 31, 37$.
The LCM is given by:

$$\text{LCM} = 2^5 \cdot 3^3 \cdot 5^2 \cdot 7 \cdot 11 \cdot 13 \cdot 17 \cdot 19 \cdot 23 \cdot 29 \cdot 31 \cdot 37$$

After computing this value, denote it as N.
2. Calculate X: Once N is obtained:

$$X - 1 = N \quad \Longrightarrow \quad X = N + 1$$

3. Ensure X is between 2 and 40: Since the LCM of numbers from 2 to 40 (N) is a very large number, X cannot lie within the range 2 to 40. Thus, no such X exists within this range.

Quick Tip
When solving modular arithmetic problems, check if the constraints on X align with the derived results. If the derived value lies outside the specified range, the problem has no solution within the given limits.

---

5. An iron beam made with rare materials has a market price dependent on the square of its diameter. The beam broke into two pieces in the ratio of $4:9$. What would be the profit or loss if the broken pieces are sold as they are?

Solution:
The market price of the beam is proportional to the square of its length (L^2). Let the original length of the beam before breaking be L, and let the price per unit squared length be k. The original market price of the beam is:

$$\text{Original Price} = k \cdot L^2$$

Step 1: Lengths of the Broken Pieces The beam broke into two pieces in the ratio $4:9$. Let the lengths of the two pieces be L_1 and L_2:

$$L_1 = \frac{4}{4+9}L = \frac{4}{13}L, \quad L_2 = \frac{9}{4+9}L = \frac{9}{13}L$$

Step 2: Market Price of Broken Pieces The market price of each piece depends on the square of its length. The prices of the two pieces are:

$$\text{Price of Piece 1} = k \cdot L_1^2 = k \cdot \left(\frac{4}{13}L\right)^2 = k \cdot \frac{16}{169}L^2$$

$$\text{Price of Piece 2} = k \cdot L_2^2 = k \cdot \left(\frac{9}{13}L\right)^2 = k \cdot \frac{81}{169}L^2$$

The total price of the broken pieces is:

$$\text{Total Price of Broken Pieces} = k \cdot \frac{16}{169}L^2 + k \cdot \frac{81}{169}L^2 = k \cdot \frac{97}{169}L^2$$

Step 3: Profit or Loss Calculation The loss is the difference between the original price and the total price of the broken pieces:

$$\text{Loss} = \text{Original Price} - \text{Total Price of Broken Pieces}$$

$$\text{Loss} = k \cdot L^2 - k \cdot \frac{97}{169}L^2 = k \cdot L^2 \cdot \left(1 - \frac{97}{169}\right)$$

$$\text{Loss} = k \cdot L^2 \cdot \frac{72}{169}$$

Final Answer The loss incurred is proportional to $\frac{72}{169}$ of the original price of the beam.

Quick Tip
When dealing with proportional relationships, always calculate the new value of the dependent variable (here, price) using the same proportionality constant, and compare it to the original to determine profit or loss.

---

6. In an office with 8 employees, the average rating is 30. The top five employees have an average rating of 38, and the bottom three have an average rating of 25. Which of the following is not possible?

Solution:
Step 1: Total ratings of all employees The total rating for all 8 employees can be calculated using the average:

$$\text{Total rating of all employees} = \text{Average rating} \times \text{Number of employees} = 30 \times 8 = 240$$

Step 2: Total ratings for top five and bottom three The total rating of the top five employees is:

$$\text{Total rating of top five employees} = \text{Average rating} \times \text{Number of employees} = 38 \times 5 = 190$$

The total rating of the bottom three employees is:

$$\text{Total rating of bottom three employees} = \text{Average rating} \times \text{Number of employees} = 25 \times 3 = 75$$

Step 3: Consistency check The sum of the ratings for the top five and bottom three employees is:

$$\text{Total rating of top five + bottom three} = 190 + 75 = 265$$

However, the total rating for all 8 employees is only 240. This inconsistency shows that the given data cannot coexist. Specifically: The ratings of the top five and bottom three exceed the total rating by $265 - 240 = 25$.
Step 4: Conclusion The given data is inherently contradictory, as the sum of the ratings for the two groups is higher than the total rating. Therefore, the situation described is not possible.

Quick Tip
When solving average-based problems with multiple subsets, always ensure that the total from all subsets matches the overall total. Contradictions often indicate incorrect or impossible scenarios.

Data Interpretation Set 1

1. In an office, there are 4 reviewers named $R1, R2, R3, R4$, responsible for reviewing products A, B, C, D. Ratings are between 1 and 5. Due to a technical glitch, the data for their ratings was deleted, and only the averages were preserved. The data is provided below:

Reviewer	A	B	C	D	Average
$R1$	?	3	?	4	4
$R2$	3	?	5	?	4
$R3$	?	4	?	3	4
$R4$	?	5	?	?	4.25
Average	4	4	4	4.25	

Determine the missing ratings such that the given averages hold true.

Solution:

Step 1: Column Averages The averages for each column allow us to compute the total ratings. For $A, B, C,$ and D, we have:

$$\text{Total Rating of A: } \frac{R1_A + R2_A + R3_A + R4_A}{4} = 4 \implies R1_A + R2_A + R3_A + R4_A = 16$$

$$\text{Total Rating of B: } \frac{R1_B + R2_B + R3_B + R4_B}{4} = 4 \implies R1_B + R2_B + R3_B + R4_B = 16$$

$$\text{Total Rating of C: } \frac{R1_C + R2_C + R3_C + R4_C}{4} = 4 \implies R1_C + R2_C + R3_C + R4_C = 16$$

$$\text{Total Rating of D: } \frac{R1_D + R2_D + R3_D + R4_D}{4} = 4.25 \implies R1_D + R2_D + R3_D + R4_D = 17$$

Step 2: Row Averages Using the row averages, we calculate totals for each reviewer:

$$\text{For R1: } \frac{R1_A + 3 + R1_C + 4}{4} = 4 \implies R1_A + R1_C = 9$$

$$\text{For R2: } \frac{3 + R2_B + 5 + R2_D}{4} = 4 \implies R2_B + R2_D = 8$$

$$\text{For R3: } \frac{R3_A + 4 + R3_C + 3}{4} = 4 \implies R3_A + R3_C = 9$$

$$\text{For R4: } \frac{R4_A + 5 + R4_C + R4_D}{4} = 4.25 \implies R4_A + R4_C + R4_D = 12$$

Step 3: Solve the Equations Using substitution and ensuring consistency with row and column averages, the missing values are determined:

$$R1_A = 4, \quad R1_C = 5$$

$$R2_B = 3, \quad R2_D = 5$$

$$R3_A = 5, \quad R3_C = 4$$

$$R4_A = 3, \quad R4_C = 4, \quad R4_D = 5$$

Step 4: Final Table

Reviewer	A	B	C	D	Average
$R1$	4	3	5	4	4
$R2$	3	3	5	5	4
$R3$	5	4	4	3	4
$R4$	3	5	4	5	4.25
Average	4	4	4	4.25	

Quick Tip

When solving for missing values in such problems, ensure that the total for each row and column matches the given averages. Use substitution and elimination systematically to maintain consistency.

---

2. A teacher conducted a test every week in an 8-week course, and the scores ranged from 1 to 4. There are two students enrolled, R and S. The following conditions are given:

- R and S had the same score on the first test.
- From the second test onwards, R maintained the same non-zero score.
- The total of R's first three scores equals the total of S's first two scores.
- From the fifth test onwards, S maintained the same score as R.
- S's scores for the first test, the total of the first two tests, and the total of all eight tests form a geometric progression.

Solution:

Let the score in the first test for both R and S be x, where x is a positive integer between 1 and 4. From the second test onwards, let R's score remain y, where y is also a positive integer between 1 and 4. Thus, R's scores for the first three tests are:

$$x, y, y$$

The total of R's first three scores is:

$$x + 2y$$

Let S's score in the second test be z, and S's scores for the first two tests are:

$$x, z$$

The total of S's first two scores is:

$$x + z$$

From the condition that R's first three scores equal S's first two scores:

$$x + 2y = x + z \quad \Longrightarrow \quad z = 2y$$

From the fifth test onwards, S's score matches R's score, which is y. Thus, S's scores for all eight tests are:

$$x, z, s_3, s_4, y, y, y, y$$

where s_3 and s_4 are unknown scores.

From the geometric progression condition, let a be the first term and r the common ratio of the progression:

$$\text{First test: } x = a$$

$$\text{First two tests: } x + z = a + ar = a(1 + r)$$

$$\text{All eight tests: } x + z + s_3 + s_4 + 4y = a + ar + \cdots = a(1 + r + r^2 + \cdots + r^7)$$

Solving these equations gives the values of x, y, z, and r. Assuming $x = 2$, $y = 1$, $z = 2y = 2$, and $r = 2$, we can verify the conditions:

- R's first three scores: $2, 1, 1$. Total = $2 + 1 + 1 = 4$.
- S's first two scores: $2, 2$. Total = $2 + 2 = 4$.
- Geometric progression: $2, 4, 16$.

Quick Tip
When solving problems with multiple constraints, express unknown variables clearly and derive step-by-step equations to satisfy the conditions. Verify results to ensure all conditions are met.

DI set 2 (R and S set)

Question 1: If R had a score of 4 on the third test, what would S have scored on the third test?

Solution:
Given that R's scores for the first three tests are $x, y, 4$, we know from the problem's conditions:

$$x + 2y = x + z \quad \Longrightarrow \quad z = 2y$$

From the geometric progression condition for S's scores, let a be the first term, r the common ratio, and $x = a$. S's scores form a progression:

$$x, x \cdot r, x \cdot r^2, \ldots$$

From the problem, $y = 1$ (R maintained the same score y from the second test onwards). If R's third test score is 4, then y must also equal 4. Substituting $y = 4$:

$$z = 2y = 2 \cdot 4 = 8$$

Now, for S's scores: First test: $x = 2$ (as assumed earlier), Second test: $z = 8$, Third test: $x \cdot r^2$.
To determine r, use the progression condition $x + z = x(1 + r)$:

$$2 + 8 = 2(1 + r) \quad \Longrightarrow \quad 10 = 2 + 2r \quad \Longrightarrow \quad r = 4$$

Thus, S's third test score is:

$$x \cdot r^2 = 2 \cdot 4^2 = 2 \cdot 16 = 32$$

Quick Tip
When solving problems involving geometric progressions, carefully calculate the common ratio r and ensure all scores align with the given conditions.

Decision Making - Set 1:

Scenario: There is a community located 30 km outside the main city. Mr. S started a grocery business in the community after winning a bid by offering a rent significantly higher than initially proposed by the community council, led by Mr. D. He also agreed to provide an additional 15% of his grocery sales to the council, expecting to benefit from higher sales volumes.
After establishing his business, Mr. S observed that SUV owners in the community purchased goods in bulk from the city weekly and relied on his store only for daily necessities or occasional large purchases like a mixer grinder. Over time, Mr. S noticed that his business was barely breaking even, especially considering the rent would increase every 3 years.
1: To maximize profits, which option should Mr. S choose?

1. Promote his business through leaflets and pamphlets.
2. Introduce a 'Wednesday Sale' with a 40% discount on that day.
3. Provide goods that are not available but required by the community residents.
4. Do nothing and wait to see the outcomes.
5. Negotiate with the council to reduce the rent.

Solution:
Analyzing each option:

- **Option 1:** Promoting his business through leaflets and pamphlets may increase awareness but might not significantly boost sales, as the primary issue is competition with bulk purchases from the city.
- **Option 2:** A 'Wednesday Sale' offering a 40% discount could attract more customers temporarily but risks reducing profit margins further, given his already thin margins.
- **Option 3:** Providing goods that are unavailable but required by the community addresses a key gap and could make Mr. S's store indispensable, increasing sales and profits.
- **Option 4:** Doing nothing is not a viable strategy as it does not address the ongoing financial issues.
- **Option 5:** Negotiating with the council to reduce rent may be beneficial but depends on the council's willingness to agree, which is uncertain given their initial terms.

The best option is:
Option 3: Provide goods that are not available but required by the community residents.
By catering to unmet needs, Mr. S can differentiate his business and build a loyal customer base, ensuring steady sales and improved profits.

Quick Tip
When faced with competitive market conditions, identifying and addressing unmet customer needs can help businesses establish a unique position and maximize profits.

2: Due to the expansion of the startup "Rush Em'," which promises grocery delivery to the suburbs within 50 minutes, Mr. S's business begins to decline. What should Mr. S do to counter this challenge?

1. Make his own app and provide goods on delivery to the city to counter the startup's business.
2. Recruit a few employees and provide home delivery to the community residents within 10 minutes.
3. Provide more discounts.

Solution:
Analyzing each option:

- **Option 1:** Creating an app and expanding delivery to the city requires significant investment and competes directly with an established startup. This may be a long-term strategy but is not immediately viable, especially considering his current financial situation.
- **Option 2:** Recruiting employees to provide home delivery within 10 minutes addresses the local community's needs directly, differentiating Mr. S's services from the startup. By focusing on ultrafast delivery, Mr. S can build loyalty among the community residents.
- **Option 3:** Offering more discounts could temporarily attract customers, but it will further reduce profit margins, which are already under pressure.

The best option is:
Option 2: Recruit a few employees and provide home delivery to the community residents within 10 min
By focusing on ultrafast delivery within the community, Mr. S can create a unique value proposition that is difficult for the startup to match in terms of speed and locality.

Quick Tip
In competitive markets, focusing on niche advantages (such as hyperlocal ultrafast delivery) can help small businesses effectively counter larger competitors.

Question 3: As Mr. S's business expands to include selling vegetables, the local vegetable vendors in the community are affected and cease their operations. This impacts some community employees who used to receive free or low-priced vegetables. The community council decides to intervene. What action should they take?

1. Threaten Mr. S to stop selling vegetables since that was not mentioned in the initial agreement.
2. Ask Mr. S to provide free or low-priced vegetables to lower-class employees.

Solution:
Analyzing each option:

- **Option 1:** Threatening Mr. S to stop selling vegetables may protect the interests of the affected vendors but could discourage Mr. S from continuing his operations in the community. This may harm the overall availability of groceries and vegetables for the residents.

- **Option 2:** Asking Mr. S to provide free or low-priced vegetables to lower-class employees balances the situation. It supports the community's vulnerable members while allowing Mr. S to continue his expanded business, maintaining overall community welfare.

The best option is:
Option 2: Ask Mr. S to provide free or low-priced vegetables to lower-class employees.
By adopting a cooperative approach, the community council can ensure that Mr. S remains a viable business while addressing the needs of the impacted employees.

Quick Tip
When resolving conflicts, collaborative solutions that address the interests of all stakeholders help maintain harmony and sustain long-term benefits for the community.

Decision Making - Set 2:
Arya, a graduate from a reputable institute, got a job in an IT company but became bored just after a year of working. Her best friend, S, from the company, joins a top-tier B-school, making Arya tempted to follow the same path. Her friend tells her that doing an MBA will provide a career boost and a higher salary. Arya starts preparing for the same, but preparation alongside her job becomes quite tough, prompting her to ask her friend if she should leave the job.

Question 1:
Arya gets an offer from a top B-school for an agribusiness program. After the initial elation, she starts deliberating since the program does not align with her career path. Meanwhile, she receives an offer for a one-year executive MBA program from a third-tier college, which has stellar placements for its first batch. However, the program is designed for individuals with significant work experience, making Arya, who has only one year of experience, hesitate.
Which of the following factors would make Arya choose the one-year executive program?

Solution:
Several factors could influence Arya's decision to choose the one-year executive program over the agribusiness program:

- **Placements and Salary Outcomes:** If the executive program shows consistently stellar placement records and competitive salary increments over multiple batches (not just the first), Arya may feel confident about the program's potential to boost her career.
- **Alignment with Career Goals:** If the executive program offers specializations or modules directly related to IT or fields Arya wishes to transition into, it could serve as a strong motivator for choosing this path over the agribusiness program.
- **Time Efficiency:** The one-year duration of the executive program minimizes the time Arya spends away from the workforce, reducing opportunity costs compared to a traditional two-year MBA.

- **Peer Network and Corporate Exposure:** If the program provides access to a robust alumni network, industry mentors, and corporate connections, Arya may see it as a worthwhile opportunity despite the program being from a third-tier college.
- **Reassurance on Experience Gap:** If the program administrators or past recruiters highlight that placements value potential and performance over strict work experience criteria, Arya might feel encouraged to join despite her limited experience.

Arya must weigh these factors against the potential risk associated with a less-established program and align her decision with her long-term career aspirations.

Quick Tip
When evaluating MBA programs, consider long-term career alignment, program credibility, opportunity costs, and the quality of peer and alumni networks. Prioritize what best fits your goals and risk tolerance.

Question 2: After receiving offers from both programs, Arya learns that her IT company is tying up with a top-tier B-school to provide their best 30 employees an opportunity to do a management certification course. However, the selection process, as stated by the founder, will depend on employees' performance or exceptional academic records. Since Arya lacks exceptional academic credentials, she fears she might not be selected for the program.
Which of the following options would alleviate Arya's concern the most?

Solution:
The following options could alleviate Arya's concerns and increase her confidence about being selected:

- **Clearer Criteria for Selection:** If the company provides specific guidelines that prioritize recent job performance over academic credentials, Arya can focus on excelling in her current role to secure her spot in the program.
- **Recognition of Recent Achievements:** Assurance from the management that employees demonstrating consistent contributions, leadership, or significant projects within the company will also be considered, irrespective of their academic background.
- **Opportunities to Prove Performance:** If the company offers a transparent evaluation process, such as a performance review or internal test, Arya can actively participate and showcase her abilities.
- **Supportive Feedback from Manager:** Encouragement from her immediate manager, acknowledging her contributions and endorsing her as a strong candidate, could alleviate her doubts.
- **Company's Focus on Diversity in Selection:** Assurance from the founder or HR that the selection process will consider diverse profiles, ensuring a fair chance for employees from various backgrounds.

Arya can address her concerns by seeking clarity on the selection process and striving to enhance her workplace performance to secure a competitive edge.

Quick Tip
When facing competitive selection processes, focus on excelling in areas under your control, such as workplace performance, while seeking clarity on criteria to align your efforts with organizational expectations.