



M-CAT GRAND FINALE

Sample Paper

(Based on the new exam pattern)



TOTAL MARKS
100



QUESTIONS
50



DURATION
60 mins

Instructions for Student:

- Read the question carefully before answering.
- Each question has 4 options (A, B, C & D).
- Choose one correct option as your answer from the 4 options.
- **New Exam Pattern:**
 1. Each question will carry 1, 2, or 4 marks, depending on its difficulty level.
 2. **Negative Marking:** Additional marks will be deducted for every incorrect answer (0.25 marks for a 1-mark question, 0.5 marks for a 2-mark question, and 1 mark for a 4-mark question).
 3. The Assessment Round score will be included in the Grand Finale score using a weighted average method. 30% of the Assessment Round and 70% of the Grand Finale score.
 4. New Method to Calculate Marks for Grand Finale Awards.

	Assessment Round	Grand Finale
Actual Marks	60	80
Weightage	30%	70%
Marks After Weighted Average Rule	$60 \times 30/100 = 18$	$80 \times 70/100 = 56$
Final Marks for Grand Finale Awards	$18 + 56 = 74$	

- On the answer sheet blacken the correct option against the corresponding question number.
- **Use pencil to mark your answer.**
- If you wish to change your answer, erase the previous mark completely.

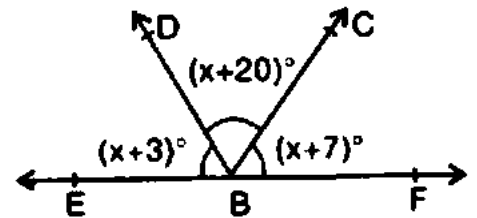
All The Best !

SECTION 1: Concept Check

1. The value of $[(-12) \times (-3) \times (-25)] \div [(-1) \times (-6) \times (-5)]$ is _____. (1m)
- 10
 - 30
 - 30
 - 40
2. What will be the sign of the product of multiplication of 23 negative integers and 88 positive integers? (1m)
- - +
 - Can't say
 - Data is insufficient
3. Which of the following can be the sides of a triangle? (1m)
- 4.5 cm, 3.5 cm, 6.4 cm
 - 2.5 cm, 3.5 cm, 6.0 cm
 - 2.5 cm, 4.2 cm, 8.0 cm
 - 2.5 cm, 4.2 cm, 9.0 cm
4. What is the product of a fractional number and its reciprocal? (1m)
- 0
 - same number
 - 1
 - undefined

5. In the given figure, find the value of x . (1m)

- 40°
- 50°
- 60°
- 80°



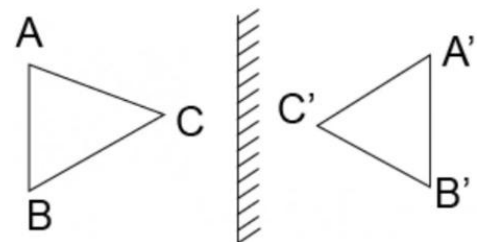
6. Which list of integers is in order from the least to the greatest? (1m)

- 42, -39, -4, 40, 41
- 42, 41, 40, -39, -4
- 4, -39, 40, 41, -42
- 41, 40, -4, -39, -42

7. The two figures are mirror images of each other. (1m)

Choose the CORRECT option.

- Both triangles are equal.
- Both triangles are similar.
- Both (a) and (b) are correct.
- None of the above



8. Which of the following is TRUE? (1m)

a. $\frac{5}{-8} > \frac{-20}{32}$

b. $\frac{5}{-8} = \frac{-20}{32}$

c. $\frac{5}{-8} < \frac{-20}{32}$

d. None of these

9. What is the value of $9x^2 + 4y^2 - 2xy$ when $x = 5$ and $y = 3$? (1m)

- a. 236
- b. 231
- c. 256
- d. 286

10. What is the ratio of the area of a semicircle to the area of the circle it is derived from? (1m)

- a. 1:1
- b. 1:2
- c. 2:1
- d. 1:4

SECTION 2: Applied Mathematics

11. ABC is an isosceles triangle with $AB = AC$ and AD is its altitude. Which the following statements is CORRECT? (2m)

- a. $\angle B > \angle C$
- b. $\angle B < \angle C$
- c. $\angle B = \angle C$
- d. None of these

12. Read the statements P and Q and choose the correct option. (2m)

P: Every fraction is a rational number.

Q: Every rational number is a fraction.

- a. P is true and Q is false.
- b. P is false and Q is true.
- c. Both P and Q are true.
- d. Both P and Q are false.

13. One of the sides and the corresponding height of a parallelogram are 5 cm and 7 cm respectively. What is the area of the parallelogram? (2m)

- a. 12 cm²
- b. 20 cm²
- c. 16 cm²
- d. 35 cm²

14. Find the value of $\left\{\left(\frac{1}{3}\right)^{-3} - \left(\frac{1}{2}\right)^{-3}\right\} \div \left(\frac{1}{4}\right)^{-3}$ (2m)

a. $\frac{19}{64}$

b. $\frac{64}{19}$

c. $\frac{27}{16}$

d. $\frac{16}{27}$

15. The absolute value of $-25 + 10 + 44 - 66$ is _____. (2m)

- a. 37
- b. -37
- c. 145
- d. -145

16. When a number is reduced by 40, it becomes 60% of itself. Find the number. (2m)

- a. 100
- b. 30
- c. 20
- d. 50

17. Find the value of $3\frac{4}{7} \times 2\frac{2}{5} \times 1\frac{3}{4}$ (2m)

- a. 1
- b. 5
- c. 10
- d. 15

18. Evaluate: $\left[-\frac{17}{18} \times (-3) \times \frac{180}{30}\right]$ (2m)

- a. -17
- b. 17
- c. -13
- d. 13

19. Express the algebraic expression $x - x^8 + x^2 - 1.7x^{10} + 1.4x^8 - 7.8x^2 + 4 - 9x$ in ascending order of exponent. (2m)

- a. $4 - 8x - 6.8x^2 + 0.4x^8 - 1.7x^{10}$
- b. $-1.7x^{10} + 0.4x^8 - 6.8x^2 - 8x + 4$
- c. $4 - 6.8x - 8x^2 + 0.4x^8 - 1.7x^{10}$
- d. $-1.7x^{10} + 0.4x^8 - 6.8x^2 + 8x + 4$

20. If two complementary angles are in the ratio 11:7, then what is the measure of both the angles? (2m)

- a. $13^\circ, 5^\circ$
- b. $25^\circ, 65^\circ$
- c. $55^\circ, 35^\circ$
- d. $65^\circ, 35^\circ$

21. What is the value of $\left(9^{\frac{4}{3}} \div 81^{\frac{2}{3}}\right) \times 3^{\frac{3}{2}}$? (2m)

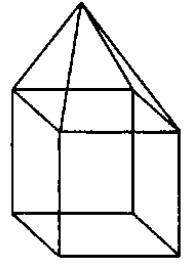
- a. 3
- b. $3^{\frac{3}{2}}$
- c. $3^{\frac{4}{2}}$
- d. $3^{-\frac{3}{2}}$

22. Solve for x: $x: \frac{6x-2}{9} + \frac{3x+5}{18} = \frac{1}{3}$ (2m)

- a. $\frac{1}{3}$
- b. $\frac{2}{3}$
- c. $\frac{3}{5}$
- d. $\frac{8}{3}$

23. How many external/exposed faces are there in the given solid shape? (2m)

- a. 8
- b. 9
- c. 10
- d. 11



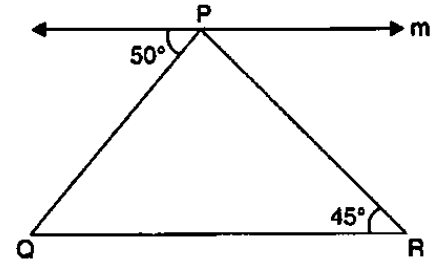
24. What is the degree of $(6x^5 - 7x^8 + 3x^4 + 2x^3 - 1)$? (2m)

- a. 8
- b. 5
- c. 4
- d. 3

25. In the following figure, line $m \parallel$ side QR . (2m)

What is the measure of $\angle QPR$?

- a. 80°
- b. 85°
- c. 75°
- d. 70°



SECTION 3: Case-Based Mathematics

26. Naresh reads $\frac{3}{8}$ of a book. He finds that there are still 125 pages left to be read. What is the total number of pages in the book? (2m)

- a. 100
- b. 200
- c. 300
- d. 400

27. 15 chocolates are to be divided amongst 3 gift boxes. Which of the following equations can be used to find the number of chocolates, r , in each box? (2m)

- a. $r + 3 = 15$
- b. $15 + r = 3$
- c. $3r = 15$
- d. $\frac{3}{r} = 15$

28. The working hours in an office are 8:30 am to 4:00 pm with a 60-minute break for lunch. Find the ratio of time spent on work to the time spent for lunch. (2m)

- a. 8:30
- b. 2:17
- c. 6:1
- d. 13:2

29. A pole is bent at a height of 5 m from the ground and its top touches the ground at a distance of 12 m from the base of the pole. Find the original height of the pole. (2m)

- a. 20 m
- b. 36 m
- c. 18 m
- d. 25 m

30. Sunil wrote an equation as $\frac{m}{5} = 4$. Ravi wrote a statement for Sunil's equation. Which of the following can be Ravi's statement if he has written correctly? (2m)
- One-fifth of m is 4
 - One-fifth of a number is 5
 - One-fourth of m is 4
 - One-fourth of a number is 4
31. Mohan bought a table for ₹ 5000 and sold it for ₹ 6400. What is the percentage of profit made by him? (2m)
- 17%
 - 24%
 - 16%
 - 28%
32. Shriya multiplies a number p by 6. She then divides the result by 5 and adds 8 to it. The final result is equal to 4 minus twice the original number. What is the value of p? (2m)
- $\frac{3}{4}$
 - $\frac{3}{6}$
 - $-\frac{5}{4}$
 - $\frac{5}{6}$
33. What is the simple interest if Sam borrows ₹ 25,000 for 12 years at a rate of interest 10% p.a.? (2m)
- ₹ 40,000
 - ₹ 30,000
 - ₹ 50,000
 - ₹ 60,000
34. An artist is creating a pattern out of geometric shapes on cardboard. Out of the different shapes used, 25% are squares, 20% are rectangles, 30% are circles and 25% are triangles. If there are 60 shapes in total, how many squares, rectangles, circles and triangles did the artist use? (2m)
- 15, 12, 16, 18
 - 12, 18, 20, 15
 - 15, 12, 18, 15
 - 12, 18, 20, 12
35. In a box, there are 14 orange balls, x white balls and 6 pink balls. A ball is drawn from the box at random. If the probability of getting a white ball is found to be $\frac{1}{3}$ then how many white balls are there in the box? (2m)
- 15
 - 6
 - 9
 - 10
36. In a survey of 500 girls, it was found that 220 like milk, 150 like coffee and 130 like tea. If one girl is chosen at random, then which of the following statements is INCORRECT? (2m)
- The probability that the chosen girl likes tea is $\frac{13}{50}$
 - The probability that the chosen girl does not like coffee is $\frac{7}{10}$
 - The probability that the chosen girl dislikes milk is $\frac{2}{5}$
 - The probability that the chosen girl likes coffee is $\frac{3}{10}$

Answer questions 37–38 based on the information given below:

The prices (in ₹) of 15 products sold by a businessman are:

₹ 450, ₹ 220, ₹ 280, ₹ 220, ₹ 350, ₹ 600, ₹ 560, ₹ 1000, ₹ 280, ₹ 370, ₹ 450, ₹ 560, ₹ 280, ₹ 220, ₹ 600

37. Find the median of the data. (2m)

- a. ₹ 220
- b. ₹ 350
- c. ₹ 370
- d. ₹ 450

38. What is the mode of the given data? (2m)

- a. ₹ 220
- b. ₹ 280
- c. ₹ 450
- d. Both (a) and (b)

39. A farmer has some cows and goats. The number of goats is 4 more than twice the number of cows. If there are 46 goats, how many cows does the farmer have? (2m)

- a. 18
- b. 21
- c. 24
- d. 26

40. In a school quiz, 5 marks are awarded for every correct answer, while 2 marks are deducted for every incorrect answer. Meera attempted all the questions and scored 26 marks. If she answered 6 questions correctly, how many questions did she answer incorrectly? (2m)

- a. 2
- b. 3
- c. 4
- d. 5

41. Rohan already has ₹ 200 in his savings box. He decides to put the same amount of money into the box every week. He does this for 6 weeks.

If the amount saved each week is represented by x , which expression shows the total amount in his savings box? (2m)

- a. $200 + 6x$
- b. $206x$
- c. $200x + 6$
- d. $6x - 200$

42. Riya reads $\frac{1}{4}$ of a book on Monday, $\frac{2}{5}$ on Tuesday, and $\frac{1}{10}$ on Wednesday. She still has 30 pages left to read. How many pages are there in the book? (2m)

- a. 100
- b. 120
- c. 150
- d. 180

43. A rectangular hall is 15 m long and 10 m wide. A rectangular carpet measuring 8 m $\times$ 5 m is placed in the centre of the hall. The remaining floor is covered with wooden flooring. (2m)
If the wooden flooring costs ₹ 120 per m², what will be the total cost of flooring the remaining area?
- ₹ 9,600
 - ₹ 10,800
 - ₹ 12,000
 - ₹ 13,200
44. Luna is measuring ingredients for a science experiment. She uses 7 hundredths of a litre of one water and 8 thousandths of a litre of oil. What is the total amount of liquid she used? (2m)
- 0.0078
 - 0.078
 - 0.78
 - 78
45. A shopkeeper divides his monthly profit between personal savings and household expenses in the ratio 2:5. If he spends ₹ 7,500 on household expenses, how much does he save? (2m)
- ₹ 2,000
 - ₹ 3,000
 - ₹ 3,500
 - ₹ 5,000

SECTION 4: Challenger's Section

46. Which of the following statements are correct? (4m)
- Statement I: A square has both line symmetry and rotational symmetry of order more than 1.**
Statement II: When a die is cut horizontally, the cross-section obtained is a square.
- Statement I is true and Statement II is false
 - Statement I is false and Statement II is true
 - Both Statement I and Statement II are true
 - Both Statement I and Statement II are false
47. **Statement I: A scientist observes a group of cells. Their number becomes 10 times the previous number at each stage. If there are 10 cells initially, the number of cells after 4 stages is 10^4 .**
Statement II: A machine makes 2^3 toys in one hour. In 2 hours, it makes 2^4 toys. (4m)
- Statement I is true and Statement II is false
 - Statement I is false and Statement II is true
 - Both Statement I and Statement II are true
 - Both Statement I and Statement II are false
48. A merchant purchases two watches for the same cost. He sells one watch for 25% more than its cost and the other for 15% less than its cost. Consider the following statements: (4m)
- (i) The total selling price is greater than the total cost price.
(ii) The cost price of the two watches is the same.
(iii) The merchant earns more on the first watch than he loses on the second watch.
(iv) The total selling price is less than the total cost price.
- Only (i) and (iii) are correct.
 - Only (ii) and (iv) are correct.
 - Only (i), (ii) and (iii) are correct.
 - Only (iii) and (iv) are correct.

49. Read the following statements and choose the correct option. (4m)

Statement I: A triangular garden has two equal sides. If one of its angles is 50° , the other two angles are 65° each.

Statement II: A triangle with three equal sides also has three equal angles.

- a. Statement I is true and Statement II is false
- b. Statement I is false and Statement II is true
- c. Both Statement I and Statement II are true
- d. Both Statement I and Statement II are false

50. The numbers u and v satisfy: (4m)

$u : v = 3 : 5$ and $u + v = 64$.

If $w = \frac{1}{4} + 1\frac{3}{4}$

What is the value of $u + v - w$?

- a. 61
- b. 62
- c. 63
- d. 64

