MOCK: 2025 **JINDAL SCHOOL, BARBIL** **MM: 80**

X **STANDARD MATHEMATICS (041)** **TIME: 3 Hrs**

General Instructions:

Read the following instructions very carefully and strictly follow them:

1. This question paper has 5 sections A-E

2. Section A has 20 MCQs carrying 1 mark each.

3. Section B has 5 questions carrying 02 marks each.

4. Section C has 6 questions carrying 03 marks each.

5. Section D has 4 questions carrying 05 marks each.

6. Section E has 3 case based integrated units of assessment (04 marks each) with sub parts of the values 1, 1 and 2 marks each respectively.

7. All questions are compulsory. However internal choice in 2 questions of 5 marks, 2 questions of 3 marks and 2 questions of 2 marks have been provided. An internal choice has been provided in 2 marks questions of section E.

8. Draw neat figures wherever required. Take $\pi = \frac{22}{7}$,wherever required if not stated.

SECTION-A 1×20

This section comprises of Multiple-Choice Questions (**MCQ**s) of **1** mark each. Select the correct option (Question **1** to Question **18**):

1. The greatest number which divides both 83 and 138, leaving remainders 5 and 8 respectively, is: [1]

(a) 13 (b) 65 (c) 26 (d) 39

2. What is the sum of the root of a quadratic polynomial $ax^2 + bx + c$ [1]

(a) $-\frac{b}{a}$ (b) $\frac{b}{a}$ (c) $\frac{c}{a}$ (d) NOT

3. The zeroes of the quadratic polynomial $x^2 + kx + k, k \neq 0$, [1]

(a) cannot both be positive (b) cannot both be negative

(c) are always unequal (d) are always equal

4. If the lines given by $3x + 2ky = 2$ and $2x + 5y + 1 = 0$ are not parallel, then k has to be

(a) $= \frac{15}{4}$ (b) $\neq \frac{15}{4}$ [1]

(c) any rational number (d) any rational number having 4 as denominator

5. The points A (9,0), B (9, -6), C (-9,0) and D (-9,6) are the vertices of a [1]

(a) Square (b) Rectangle (c) Parallelogram (d) Trapezium

6. The 4th term from the end of the A.P. −8, −5, −2, …, 49 is [1]

(a) 37 (b) 40 (c) 1 (d) 43

7. A quadratic polynomial whose zeroes are $\frac{2}{5}$ and $-\frac{1}{5}$ is [1]

(a) $25x^2 + 5x - 2$ (b) $5x^2 - 2x + 1$ (c) $5x^2 + 2x - 1$ (d) $25x^2 - 5x - 2$

8. A point (x, y) is at a distance of 5 units from the origin. How many such points lie in the third quadrant? [1]

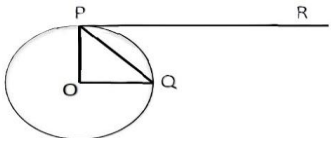
(a) 0 (b) 1 (c) 2 (d) Infinitely Many

9. In Δ ABC, DE ∥ AB. If AB = a, DE = x, BE = b and EC = c. Then x expressed in terms of a, b and c is: [1]

(a) $\frac{ac}{b}$ (b) $\frac{ac}{b+c}$ (c) $\frac{ab}{c}$ (d) $\frac{ab}{b+c}$

10. If O is centre of a circle and Chord PQ makes an angle 50° with the tangent PR at the point of contact P, then the angle subtended by the chord at the centre is [1]

(a) 130^0 (b) 100^0



(c) 50^0 (d) 30^0

11. If $\triangle ABC \sim \triangle PQR$ such that $3AB = 2PQ$ and $BC = 10$ cm, then length QR is equal to [1]

(a) 10 (b) 15 (c) $\frac{20}{3}$ (d) 30

12. If $3\cot A = 4$, where $0° < A < 90°$, then $\sec A$ is equal to [1]

(a) $\frac{5}{4}$ (b) $\frac{4}{3}$ (c) $\frac{5}{3}$ (d) $\frac{3}{4}$

13. (sec A + tan A) (1 – sin A) equals: [1]

(a) $\sec A$ (b) $\sin A$ (b) $\text{cosec}\, A$ (d) $\sec A$

14. If a pole 6 m high casts a shadow 2 √3m long on the ground, then the Sun's elevation is [1]

(a) 60^0 (b) 45^0 (c) 30^0 (d) 90^0

15. The curved surface area of a cone having height 24 cm and radius 7 cm, is [1]

(a) 528 cm^2 (b) 1056 cm^2 (c) 550 cm^2 (d) 500 cm^2

16. The distribution below gives the marks obtained by 80 students on a test: [1]

Marks	Less than 10	Less than 20	Less than 30	Less than 40	Less than 50	Less than 60
No. of students	3	12	27	57	75	80

The modal class of this distribution is:

(a) 10-20 (b) 20-30 (c) 30-40 (d) 50-60

17. Two dice are thrown together. The probability of getting the difference of numbers on their upper faces equals to 3 is: [1]

(a) $\frac{1}{9}$ (b) $\frac{2}{9}$ (c) $\frac{1}{6}$ (d) $\frac{1}{12}$

18. A card is drawn at random from a well-shuffled pack of 52 cards. The probability that the card drawn is not an ace is: [1]

(a) $\frac{1}{13}$ (b) $\frac{9}{13}$ (c) $\frac{4}{13}$ (d) $\frac{12}{13}$

Assertion-Reason Based Questions

DIRECTIONS: In the question number **19** and **20**, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**.

Choose the correct option:

(A) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A)

(B) Both assertion (A) and reason (R) are true and reason (R) is not the correct explanation of assertion (A)

(C) Assertion (A) is true but reason (R) is false.

(D) Assertion (A) is false but reason (R) is true

19. Assertion(A): Total Surface area of the top is the sum of the curved surface area of the hemisphere and the curved surface area of the cone. [1]

Reason(R): Top is obtained by joining the plane surfaces of the hemisphere and cone together.

20. Assertion(A): The probability that a leap year has 53 Sundays is $\frac{2}{7}$ [1]

Reason(R): The probability that a non-leap year has 53 Sundays is $\frac{5}{7}$

SECTION-B

2× 5

Questions Number **21** to **25** are Very Short Answer (VSA) type questions of **2** marks each.

21. Check whether 12^n can end with the digit 0 for any natural number n. [2]

22. (A) Show that the points $(-3,-3), (3,3)$ and $(-3\sqrt{3}, 3\sqrt{3})$ are the vertices of an isoscele triangle. [2]

OR

(B) Prove that $A(4,3), B(6,4), C(5,6)$ and $D(3,5)$ are the vertices of a square ABCD. [2]

23. A boat goes 30 km upstream and 44 km downstream in 10 hours. It goes 40 km upstream and 55 km downstream in 13 hours. Find the speed of the boat in still water and that of the stream. [2]

24. Calculate the mode of the following data: [2]

Class:	0-10	10-20	20-30	30-40
Frequency:	5	10	30	20

25. (A) If $\tan\theta + \sec\theta = m$, then prove that $\sec\theta = \frac{m^2+1}{2m}$ [2]

OR

(B) If $\sin A = 35$ and $\cos B = \frac{12}{13}$, then find the value of $(tan\ A\ +\ tan\ B)$. [2]

SECTION-C

3× 6

Questions Number **26** to **31** are Short Answer (SA) type questions of **3** marks each.

26. Show that $\sqrt{3}$ is irrational. [3]

27. If $ad \neq bc$, then prove that the equation $(a^2 + b^2)\,x^2 + 2(ac + bd)x + (c^2\ +\ d^2) = 0$ has no real roots. [3]

28. (A) In what ratio does the point $\left(\frac{11}{22}, y\right)$ divide the line segment joining the points $P(2,-2)$ and $Q(3,7)$? Also find the value of y. [3]

OR

(B) The area of a triangle is 5 sq. units. Two of its vertices are (2, 1) and (3, –2). If the third vertex is $\left(\frac{7}{2}, y\right)$, find the value of y. [3]

29. (A) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ\ =\ 2\angle OPQ$. [3]

OR

(B) Prove that the tangents drawn at the ends of a diameter of a circle are parallel. [3]

30. Prove that the lengths of two tangents drawn from an external point to a circle are equal. [3]

31. Two different dice are thrown together. Find the probability that the numbers obtained

(i) have a sum less than 7 [1]

(ii) have a product less than 16 [1]

(iii) is a doublet of odd numbers. [1]

SECTION-D 5× 4

Questions number **32** to **35** are Long Answer (LA) type questions of **5** marks each.

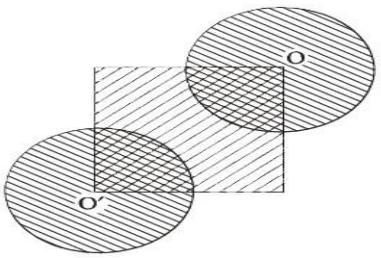
32. (A) If the ratio of the sum of the first n, terms of two A.Ps is $(7n + 1) : (4n + 27)$, then find the ratio of their 9th terms. [5]

OR

(B) Solve the equation for $x : -4 + (-1) + 2 + \ldots + x = 437$. [5]

33. In the given figure, the side of square is 28 cm and radius of each circle is half of the length of the side of the square where O and O′ are centres of the circles. [5]

Find the area of shaded region.



34. From a point on a bridge across the river, the angles of depressions of the banks on opposite sides of the river are 30° and 60° respectively. If the bridge is at a height of 4 m from the banks, find the width of the river. [5]

35. (A) The following table shows the ages of the patients admitted in a hospital during a year: [5]

Age (years)	5-15	15-25	25-35	35-45	45-55	55-65
Number of Patients	6	11	21	23	14	5

Find the mode and mean of the data given above.

OR

(B) The median of the following distribution is 545. If the sum of all frequencies is 100, then find the values of x and y. [5]

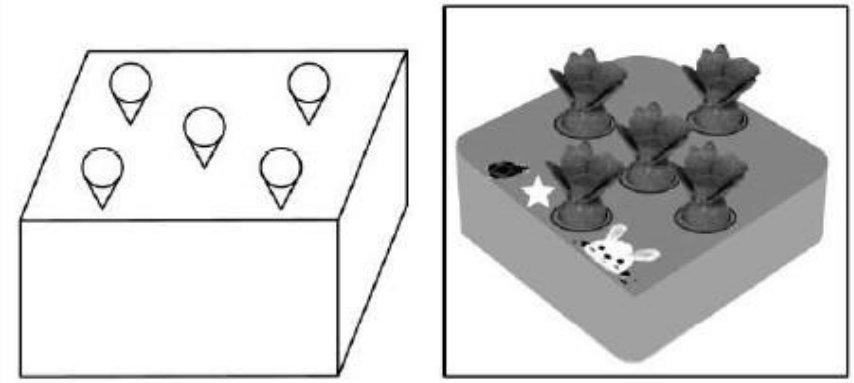
Class Frequency	Frequency
0 – 100	3
100 – 200	4
200 – 300	5
300 – 400	x
400 – 500	17
500 – 600	20
600 – 700	19
700 – 800	y
800 – 900	8
900 – 1000	3

SECTION-E

4× 3

Questions number **36** to **38** are case-study based questions of **4** marks each.

36. A solid cuboidal toy is made of wood. It has five cone-shaped cavities to hold toy carrots. The dimensions of the cuboid are: $10\ cm \times 10\ cm \times 8\ cm$
Each cone carved out – Radius = 2.1 cm and Height = 6 cm.



(i) Find the volume of wood carved out to make five conical cavities. [2]

(ii) **(A)** Find the volume of the wood in the final product. [2]

OR

(B) Find the TSA of the wood in the final product. [2]

37. In Mathematics, relations can be expressed in various ways. The matchstick patterns are based on linear relations. Different strategies can be used to calculate the number of matchsticks used in different figures.

One such pattern is shown below. Observe the pattern and answer the following questions using Arithmetic Progression:

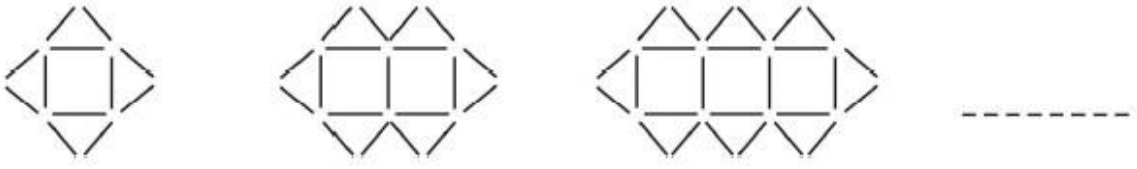


Figure 1 *Figure 2* *Figure 3*

(i) **(A)** Write the AP for the number of triangles used in the figures. Also, write the nth term of this AP. [2]

OR

(B) Write the AP for the number of matchsticks used in the figures. Also, write the sum of 1st n, terms of this AP. [2]

(ii) Which figure has 61 matchsticks? [2]

38. Gadisar Lake is located in the Jaisalmer district of Rajasthan. It was built by the King of Jaisalmer and rebuilt by Gadsi Singh in 14th century. The lake has many Chhatris. One of them is shown below:

Observe the picture. From a point A "*h*" meter above from water level, the angle of elevation of top of Chhatri (point B) is 45^0 and angle of depression of its reflection in water (point C) is 60^0. If the height of Chhatri above water level is (approximately) 10 m, then

(i) Draw a well-labelled figure based on the above information; [2]

(ii) (A) Find the height (h) of the point A above water level.
(Use $\sqrt{3} = 1{\cdot}73$) [2]

OR

(B) Find the distance between A and C. [2]