Total Commitment to Excellence

AL JANOUB INTERNATIONAL SCHOOL

مدارس الجنوب العالمية

CR.5855028501

PB No. 51029 KHAMIS MUSHAYT KINGDOM OF SAUDI ARABIA

CBSE DELHI Affln. No 5730023 SCHOOL CODE:90151

PREDICTED QUESTION PAPER – February/March 2023

CLASS: 10 SUB: MATHEMATICS(041) Marks: 80 Time: 3 hours

General Instructions:

i. This Question Paper has 5 Sections A-E.
ii. Section A has 20 MCQs carrying 1 mark each.
iii. Section B has 5 questions carrying 02 marks each.
iv. Section C has 6 questions carrying 03 marks each.
v. Section D has 4 questions carrying 05 marks each.
vi. Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.
vii. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Qs of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E
viii. Draw neat figures wherever required.

SECTION - A **20x1=20**

1. If $\Delta ABC \sim \Delta QRP$, $\frac{perimeter\ (\Delta ABC)}{perimeter\ (\Delta QRP)} = \frac{9}{4}$, and BC = 27cm, then find PR.
   a. 12cm b. 4cm c. 16cm d. 9cm

2. One equation of a pair of dependent linear equations is $-5x + 7y = 2$. The second equation can be
   a. $10x + 14y + 4 = 0$
   b. $-10x - 14y + 4 = 0$
   c. $-10x + 14y + 4 = 0$
   d. $10x - 14y = -4$

3. The distance of point A(-5, 6) from the origin is
   a. 11 b. 61 c. $\sqrt{11}$ d. $\sqrt{61}$

4. In an isosceles triangle ABC, if AC = BC and $AB^2 = 2AC^2$, then the measure of angle C will be
   a. 30° b. 45° c.90° d. 60°

5. 8 chairs and 5 tables cost Rs.10500, while 5 chairs and 3 tables cost Rs.6450. The cost of each chair will be
   a. Rs. 750 b. Rs. 600 c. Rs. 850 d. Rs. 900

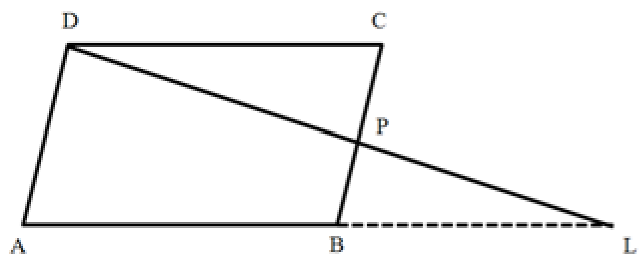
6. If the circumference of a circle increases from 2π to 4π then its area is ______ the original area
   a. Half b. Double c. Trice d. Four times

7. The co-ordinates of the point P dividing the line segment joining the points A (1,3) and B (4,6) internally in the ratio 2 : 1 are
   a. (2 , 4) b. (4 , 6) c. (4 , 2) d. (3 , 5)

8. **$2\tan 30°/(1 + \tan^2 30°)$ =**
   a. Sin 60° b. cos 60° c. tan 60° d. sin 30°

9. It is proposed to build a single circular park equal in area to the sum of areas of two circular parks of diameters 16 m and 12 m in a locality. The radius of the new park would be
   a. 10 m b. 15 m c. 20 m d. 24 m

10. If ABCD is parallelogram, P is a point on side BC and DP when produced meets AB produced at L, then select the correct option



   a. DP/BL = DC/PL
   b. DP/PL = DC/BL
   c. DP/PL = BL/DC
   d. DP/PL = AB/DC

11. If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3^n \times 5$ and LCM (a, b, c) = $2^3 \times 3^2 \times 5$, then n is equal to
   a. 1 b. 2 c. 3 d. 4

12. Graphically, the pair of equations $6x – 3y + 10 = 0$; $2x – y + 9 = 0$ represents two lines which are
   a. Intersecting at exactly one point
   b. Intersecting at exactly two points
   c. Coincident
   d. Parallel

13. If x = a, y = b is the solution of the equations x - y = 2 and x + y = 4, then a / b is :
   a. 1 b. 2 c. -2 d. 3

14. The quadratic polynomial p(x) with –24 and 4 as a product and one of the zeros respectively is
   a. $x^2 – 2x – 24$
   b. $x^2 + 2x – 24$
   c. $x^2 + 2x + 24$
   d. can't be determined

15. C is the mid-point of PQ, if P is (4, x), C is (y,- 1) and Q is (- 2, 4), then x and y respectively are
   a. (6 , 1) b. (– 6, 1) c. (6 , -1) d.(-6 , -1)

16. D and E are points on the sides AB and AC respectively of a ΔABC such that DE ∥ BC. Find the value of x when AD = 4 cm, DB = (x − 4) cm, AE = 8 cm and EC = (3x − 19) cm.
   a. 12 cm b. 13 cm c. 14 cm d. None of these

17. In any circle, if the area of its minor sector is $\frac{5}{36}$ times the area of the full circle. The angle subtended by the minor arc at the center is
   a. 50° b. 25° c. 60° d. 90°

18. From a solid right circular cylinder of height 2.4 cm and radius 0:7 cm, a right circular cone of same height and same radius is cut out. Find the total surface area of the remaining solid.
    a. $17.57cm^2$ b. $20.36\ cm^2$ c. $25.09\ cm^2$ d. $16.98\ cm^2$

DIRECTION :
In **Q19** and **Q20**, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(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 but 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 :** 12^n ends with the digit zero, where n is natural number.
    Reason : Any number ends with digit zero, if its prime factor is of the form 2m x 5n , where m, n are natural numbers.

20. **Assertion:** The roots of the quadratic equation $x^2 + 2x + 2 = 0$ are imaginary
    Reason: If discriminant $D = b^2 – 4ac < 0$ then the roots of quadratic equation $ax^2 + bx + c = 0$ are imaginary.

SECTION - B **5x2=10**

21. Find the linear relation between x and y such that P(x, y) is equidistance from the points A(1, 4) and B(-1, 2)

22. Given that $\sqrt{3}$ is an irrational number, prove that ($2 + \sqrt{3}$) is an irrational number.

23. A box contains cards numbered between 1 and 20. A card is drawn at random from the box. Find the probability that number on the drawn card is
    i. A composite number
    ii. A number divisible by 3

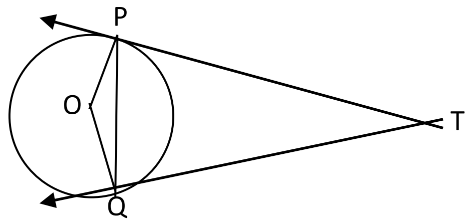
24. For what value of k, the following pair of linear equations has infinite number of solutions: $2x + 3y = 2$; $(k + 2)x + (2k + 1)y = 2(k – 1)$.
    (OR)
    If one root of $5x^2 + 13x + k = 0$ is the reciprocal of the other root, then find the value of k.

25. If sec A = $\frac{15}{7}$ and A+B=90°, find the value of cosec B
    (OR)
    If sin 3A = cos (A - 26°), where 3A is an acute angle, find the value of A

SECTION - C **6x3=18**

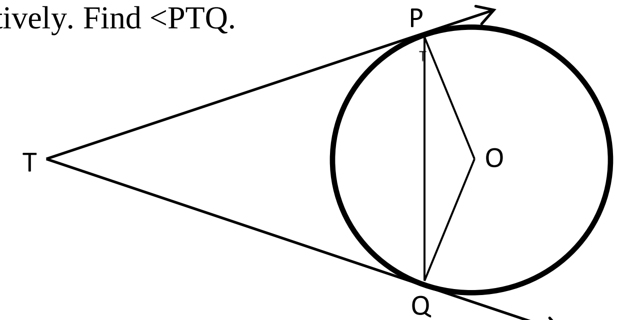
26. If coordinates of two adjacent vertices of a parallelogram are (3, 2), (1, 0) and diagonals bisect each other at (2, -5), find the coordinates of the other two vertices.

27. In the below figure, PQ is a chord of length 8 cm of a circle of radius 5 cm. the tangents at P and Q intersects at a point T. Find the lengths of TP and TQ.



OR

In the given figure PQ is the chord of length 6cm of the circle of radius 6cm.TP and TQ are tangents to the circle at points P and Q respectively. Find <PTQ.



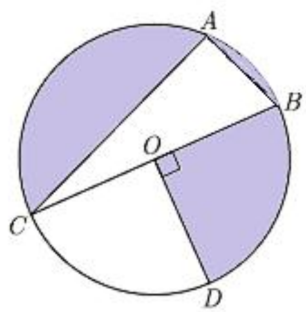
28. Find the value of x and y of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$ graphically. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

29. The side of a square is 10cm. Find the area between inscribed and circumscribed circles of the square.

30. Prove that

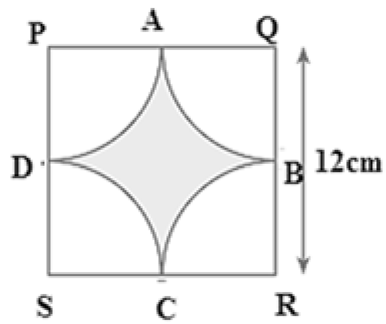
$$\left(\frac{1 + \tan^2 A}{1 + \cot^2 A}\right) = \left(\frac{1 - \tan A}{1 - \cot A}\right)^2 = \tan^2 A$$

31. In the given figure, O is the centre of the circle with $AC = 24$ cm, $AB = 7$ cm and $\angle BOD = 90°$. Find the area of the shaded region.



OR

Find the area of the shaded region in Fig., where arcs drawn with centres P, Q, Rand S intersect in pairs at mid-points A, B, C and D of the sides PQ, QR, RS and SP, respectively of a square PQRS.



SECTION - D **4x5=20**

32. In an A.P if the sum of its first n terms is $3n^2 + 5n$and its k^{th} term is 164, find the value of k.

33. The side of a square exceeds the side of another square by 4 cm and the sum of the areas of the two squares is 400 sq.cm. Find the dimensions of the squares.

OR

Solve for x

$$\frac{1}{a+b+x} = \frac{1}{a} + \frac{1}{b} + \frac{1}{x}, \ a \neq 0, b \neq 0, x \neq 0$$

34. Prove that

$$\frac{\tan^3 \alpha}{1+\tan^2 \alpha} + \frac{\cot^3 \alpha}{1+\cot^2 \alpha} = \sec \alpha \operatorname{cosec} \alpha - 2 \sin\alpha \cos\alpha$$

35. Find the mean and mode for the following data

Classes	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	4	8	10	12	10	4	2

OR

If the median of the distribution given below is 28.5, find the values of x and y.

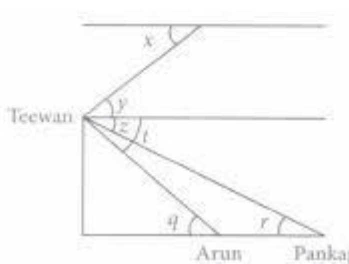
Classes	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	Total
Frequency	5	X	20	15	Y	5	100

SECTION - E **3x4=12**

Case based questions:-

36. **Case study 1:-**

Teewan, Arun and Pankaj were celebrating the festival of Diwali in open ground with firecrackers. There is a pedestal in the ground. All of sudden Teewan stands on pedestal and release sky lantern from the top of pedestal.



i. Write one pair of angle of dipression.

ii. If the position of Pankaj is 25 m away from the base of pedestal and angle r = 30°, then find the height of pedestal.

iii. If the vertical height of sky lantern from the top of pedestal is 12 m and $\angle\angle y = 30°$, then find the distance between Teewan and sky lantern.

OR

If $\angle q = 60°$ and position of Arun is 15 m away from the base of pedestal, then find the height of pedestal.

37. **Case study 2:-**

Ajay is a Class X student. His class teacher Mrs Kiran arranged a historical trip to great Stupa of Sanchi. She explained that Stupa of Sanchi is great example of architecture in India. Its base part is cylindrical in shape. The dome of this stupa is hemispherical in shape, known as Anda. It also contains a cubical shape part called Hermika at the top. Path around Anda is known as Pradakshina Path.

i. Find the lateral surface area of the Hermika, if the side of cubical part is 8 m.

ii. The diameter and height of the cylindrical base part are respectively 42 m and 12 m. If the volume of each brick used is 0.01 m^3, then find the number of bricks used to make the cylindrical base.

iii. If the diameter of the Anda is 42 m, then find the volume of the Anda.

OR

The radius of the Pradakshina path is 25 m. If Buddhist priest walks 14 rounds on this path, then find the distance covered by the priest.

38. **Case study 3:-**

Deepak bought 3 notebooks and 2 pens for Rs. 80. His friend Ram said that price of each notebook could be Rs. 25. Then three notebooks would cost Rs.75, the two pens would cost Rs.5 and each pen could be for Rs. 2.50. Another friend Ajay felt that Rs. 2.50 for one pen was too little. It should be at least Rs. 16. Then the price of each notebook would also be Rs.16.

Lohith also bought the same types of notebooks and pens as Aditya. He paid 110 for 4 notebooks and 3 pens. Later, Deepak guess the cost of one pen is Rs. 10 and Lohith guess the cost of one notebook is Rs. 30

i. Form the pair of linear equations in two variables from this situation by taking cost of one notebook as Rs. x and cost of one pen as Rs. y.

ii. Find the cost of one notebook?

iii. Find the cost of one pen?

OR

Find the total cost if they will purchase the same type of 15 notebooks and 12 pens.