KOTHARI INTERNATIONAL SCHOOL, NOIDA
TERM-END EXAMINATION, SESSION: 2023-24
GRADE: 9, SUBJECT: MATHEMATICS (041)
SET B

DATE & DAY: MONDAY- FEBRUARY 12, 2023- 24

MAXIMUM MARKS: 80 **TIME ALLOTTED: 3 HOURS**

NAME: _____ **ROLL NUMBER:_____**

GENERAL INSTRUCTIONS:

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)*
7. *All Questions are compulsory. However, internal choice has been provided in each section*
8. *Draw neat figures wherever required. Take π =22/7 wherever required if not stated.*

Q.No. **SECTION – A (20*1 = 20)** **Marks**

1. The number of line segments determined by three collinear points is: **1**
(a) 1 (b) 2 (c) 3 (d) 4

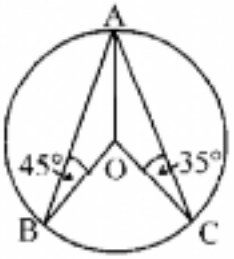
2. The graph of linear equation 6x-2y=8 cuts the y-axis at **1**
(a) (0,-2) (b) (0, 4) (c) (0, -4) (d) (0, 2)

3. The width of each of five continuous classes in a frequency distribution is 5 and the lower class limit of the lowest class is 10. The upper class limit of the highest class is **1**
(a) 15 (b) 25 (c) 35 (d) 40

4. The distance of the point *P* (4, 3) from the origin is **1**
(a) 4 (b) 3 (c) 5 (d) 7

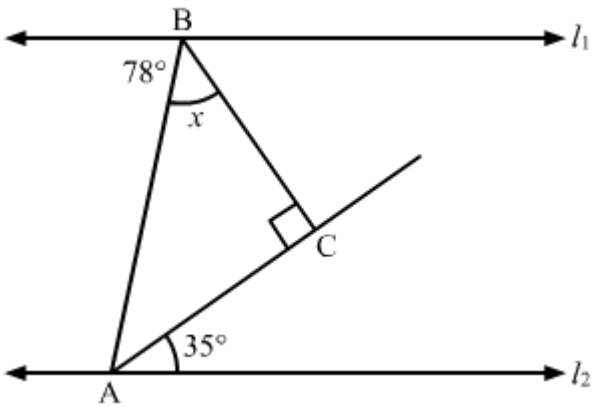
5. The product $(a + b)(a - b)(a^2 - ab + b^2)(a^2 + ab + b^2)$ is equal to **1**
(a) $a^6 + b^6$ (b) $a^6 - b^6$ (c) $a^3 - b^3$ (d) $a^3 + b^3$

6. In the figure two angles are given . Find ∟BOC , **1**



(a) 120° (b) 100° (c) 140° (d) 160°

7. In the given figure, for which value of x is $l_1 \parallel l_2$? **1**



(a) 37° (b) 43° (c) 45° (d) 47°

8. The coordinates of two points are P(4,6) and Q(-5,-7) . Find (abscissa P – abscissa Q) **1**
(a) - 1 (b) 9 (c) 13 (d) - 9

9. If the volume of a sphere is numerically equal to its surface area, then its diameteris: **1**
(a)2 units (b) 1 units (c) 3 unit (d) 6 units

10. John is of the same age as Mohan. Ram is also of the same age as Mohan. State Euclid's axiom that illustrates the relative ages of John and Ram **1**
(a) First Axiom (b) Second Axiom
(c) Third Axiom (d) Fourth Axiom

11. $(x+1)$ is a factor of $x^n + 1$ only if **1**
(a) n is an odd integer (b) n is an even integer
(c) n is a negative integer (d) n is a positive integer

12. The ratio of the side and diagonal of square is : **1**
(a) 1 : 1 (b) 1 : √2 (c) 1 : √3 (d) √3 : 1

13. Side BC of a triangle ABC has been produced to a point D such that ∠ACD = 120°. If ∠B = 1/2 ∠A then measure ∠B is equal to **1**
(a) 80° (b) 75° (c) 60° (d) 90°

14. A rabbit covers y metres distance by walking 10 metres in slow motion and the remaining by x jumps, each jump contains 2 metres. Express this information in linear equation. **1**
(a) 2x +y = 10 (b) 2y + 2x = 10 (c) y = 10 + 2x (d) y + 10 =2x

15. If a + b + c = 7 and ab + bc + ca = 20, find the value of $a^2 + b^2 + c^2$ **1**
(a) 49 (b) 40 (c) 9 (d) 90

16. The value of $3\sqrt[3]{2} \times 7\sqrt[3]{6} \times 5\sqrt[3]{18}$ is **1**
(a) 630 (b) 545 (c) 500 (d) 425

17. Which of the following statements is true? **1**

(a) π and 22/7 are both rationals
(b) π and 22/7 are both irrationals
(c) π is rational and 22/7 is irrational
(d) π is irrational and 22/7 is rational

18. Which of the following is equal to x? **1**

(a) $x^{\frac{12}{7}} - x^{\frac{5}{7}}$ (b) $\sqrt[12]{(x^4)^{\frac{1}{3}}}$

(c) $(\sqrt{x^3})^{\frac{2}{3}}$ (d) $x^{\frac{12}{7}} \times x^{\frac{7}{12}}$

Questions number 19 and 20 are Assertion and Reason based questions carrying 1 mark each. Two statements are given, one labelled as Assertion (A) and the other labelled as Reason (R). Select the correct answer to these questions from the codes (a), (b), (c), and (d) as given below.

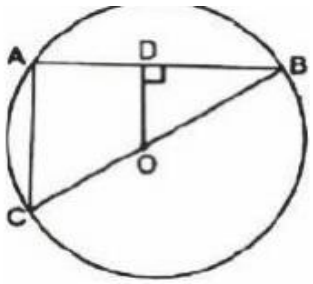
(a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of the Assertion (A).
(b) Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of Assertion (A).
(c) Assertion (A) is true, but Reason (R) is false.
(d) Assertion (A) is false, but Reason (R) is true.

19. **Assertion (A):** The rationalized form of $\frac{1}{\sqrt{7}-2}$ is √7 + 2. **1**
Reason (R): The conjugate of √7 – 2 is √7 + 2.

20. **Assertion (A):** The height of a triangle is 18 cm and its area is 72cm^2 and its base is 8 cm **1**
Reason: Area of triangle= ½ base x height

SECTION – B (5 * 2= 10)

21 In the figure, OD is perpendicular to the chord AB of a circle with centre O. If BC is a diameter, show that AC || OD and AC = 2 0D. **2**



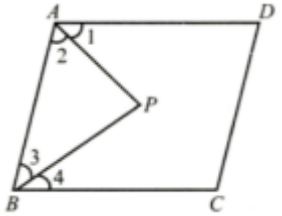
22 Divide first polynomial by second polynomial and write the answer in the form 'Dividend = Divisor × Quotient + Remainder'. **2**

$5x^5 + 4x^4 - 3x^3 + 2x^2 + 2\,;\ x^2 - x$

23 **2**

.Simplify: $\sqrt[4]{81} - 8\sqrt[3]{216} + 15\sqrt{4} + \sqrt{225}$

24 In the given figure, AP and BP are angle bisector of ∠A and ∠B which meets at P on the parallelogram ABCD. Then 2∠APB = **2**



a. ∠ C+∠ D
b. ∠ A+∠ C
c. ∠ B+∠ D
d. 2 ∠ C

25 A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 1 cm and the height of the cone is equal to its radius. Find the volume of the solid in terms of π . **2**

OR

If the volumes of two cones are in the ratio 1:4 and their diameters are in the ratio 4:5, then find the ratio of their heights.

SECTION – C (6*3 = 18)

26 If $\frac{a}{b} + \frac{b}{a} = -1$, **3**

Then find the value of a^3 - b^3

OR

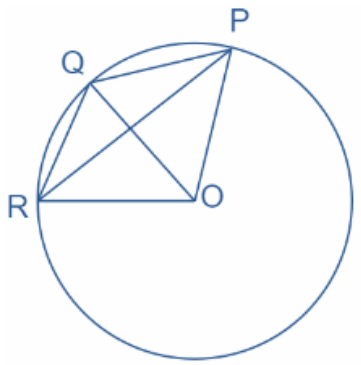
Factorize the cubic equation $x^3 + 6x^2 + 11x + 6$

27 A hemispherical bowl is made of steel 0.25 cm thick. The inside radius of the bowl is 5 cm. find the volume of steel used in making the bowl. **3**

OR

A spherical ball of lead 3 cm in diameter is melted and recast into three spherical balls. If the diameters of two balls be 3/2 cm and 2 cm, find the diameter of the third ball.

28 In the figure, OPQR is a rhombus, 3 of whose vertices lie on the circle with centre O. If the area of the rhombus is 32 √3 cm^2. Find the radius of the circle. **3**



29 The Radius of the circle is 10 cm. There are two chords of length 16 cm each. What will be **3**

the distance of these chords from the centre of the circle?

OR

Prove that the angle subtended by an arc at the centre is double the angle subtended by it at any point on the remaining part of the circle.

30 (I) Show that x = 2 and y = 1 satisfy the linear equation 2x + 3y = 7. **3**
(II) Write four solutions of 2x + 3y = 8.

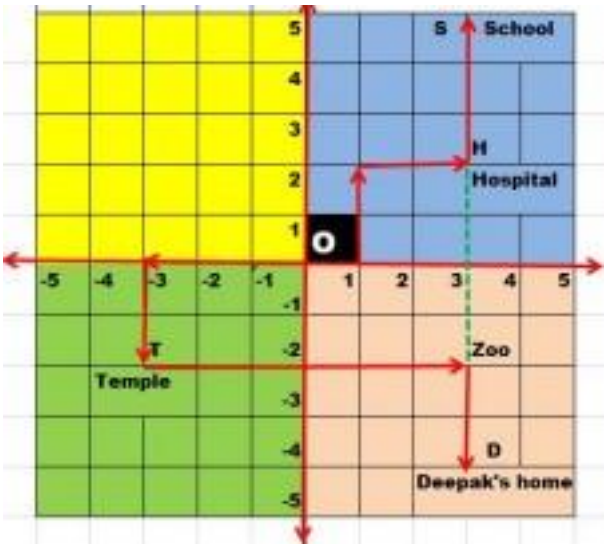
OR

Ravish tells his daughter Aarushi, "Seven years ago, I was seven times as old as you were then. Also, three years from now, I shall be three times as old as you will be". If the present ages of Aarushi and Ravish are *x* and *y* years respectively, then find their present ages.

31 Find the area of the triangle formed by the points *P* (0, 1), *Q* (0, 5) and *R* (3, 4) on the graph . **3**

OR

Read the Source/Text given below and answer the questions:



In the above picture, one small square is of size 1 km x1 km. From the starting point O(0,0) Deepak started to drive towards his home. He first drives 3km in left then he turned to his left and drove 2 km,there he found a temple. He worshipped there and drove 6km in the left direction, there is a zoo and from the zoo, he drives 2km on the right side, then he reached his home.
From O Sanjay drove for his school, he drove 1km to his right then took a left turn and drives 2km then again took a right turn and drives 2 km. He found a hospital in the way. From Hospital he drove3 km and finally reached his school.

A. What are the coordinates of the Hospital?
(a)(3,2) (b) (2,3) (c) (3,3) (d) (5,5)

B. What is common abscissa of school, Hospital, Zoo and Deepak's home?
(a)5 (b) 7 (c) 3 (d) 2

C. Deepak Drove in which quadrants?
(a) I and II (b) II and III (c) III and IV (d) IV and i

SECTION – D (4 * 5 = 20)

32 Following table shows a frequency distribution for the speed of cars passing through at a particular spot on a high way : **5**

Class interval (km/h)	**Frequency**
30-40	3
40-50	6
50-60	25
60-70	65
70-80	50
80-90	28
90-100	14

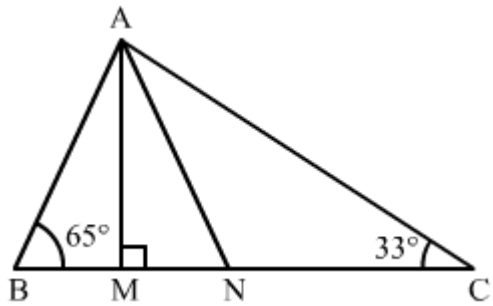
Draw a histogram and frequency polygon representing the above data .

33 A hemispherical dome of a building needs to be painted. if the circumference of the base of the dome is 17.6 m, find the cost of painting it, given the cost of painting is Rs. 5 per 100 cm^2 **5**

OR

Find the radius and the curved surface area of the cone made from a quadrant of a circle of radius 42 cm.

34 In the given figure, $AM \perp BC$ and AN is the bisector of $\angle A$. If $\angle B = 65°$ and $\angle C = 33°$, find $\angle MAN$. **5**



35 **5**

If $a = \frac{\sqrt{3}-\sqrt{2}}{\sqrt{3}+\sqrt{2}}$ and $b = \frac{\sqrt{3}+\sqrt{2}}{\sqrt{3}-\sqrt{2}}$, find the value of $a^2 + b^2 - 5ab$.

OR

The polynomials $ax^3 + 3x^2 - 3$ and $2x^3 - 5x + a$ when divided by $(x - 4)$ leave the remainders R_1 and R_2 respectively. Find the values of a in each of the following cases, if
(a) $R_1 = R_2$
(b) $R_1 + R_2 = 0$
(c) $2R_1 - R_2 = 0$

SECTION-E (3 * 4 =12)

36 UFO's are any unexplained moving object observed in the sky, especially one assumed by some observers to be of extraterrestrial (coming from a place outside the palne earth) origin.Rahul a student of class IX has an interest in a Space Science. So, he makes a model of a triangular shape of UFO which is shown in the below figure. The measurement of the sides of UFO are in the ratio 5:5:8 and its perimeter is 180 cm

A. What is the area of the UFO ? **2**
B. What is the altitude of the Triangle with respect to the longest side ? **1**
C. Find the total cost of making the UFO if the cost of the material is Rs 800 per cm^2 . **1**

37 Amit and Rahul are friends who have brilliant ideas and wish to initiate a start up . They both decide to put in a certain amount to kick the start up . The product of their investment is given by the polynomial $A(x) = 4x^2 + 9x + 5$ which is product of their individual investment.

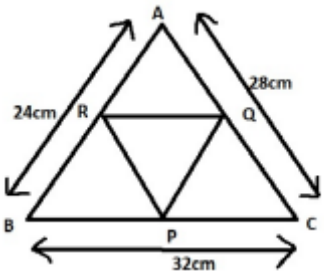
A. What is the total investment by both is x = 1000 ?
(a)4009005 (b) 4009050 (c) 4000905 (d) 4090005 **1**

B. The share of Amit and Rahul invested individually ? **1**
(a) (x + 1,4x + 5) (b) (x + 1,5x + 4) (c) (4x + 5,2x + 1) (d) None of these
1

C. What is the name given to the polynomial which represents the amount invested by each one of them ?
(a) Cubic (b) Quadratic (c) Linear (d) Zero **1**

D. What is the value of x, if the amount invested by each is equal to zero ?
(a) -1 (b) – 5/4 (c) Both (a) and (b) (d) None of These

38 Practical knowledge is very useful for student to grow in his carrier. To improve the practical knowledge and awareness about social life directorate of education announces a visit in your school . Girls are asked to prepare a rangoli in triangular shape as shown in figure.



Dimension of rangoli (ΔABC) are 24cm, 32cm and 28cm. Garland is to be placed along the side of ΔPQR, which is formed by joining the mid-points of sides of ΔABC. Some questions are arises about the above situation, answer the following questions

A. State the theorem you will use in finding the dimension PQ . **2**

B. Find the length of PQ ,RP , RQ **1**

C. Find the length of the garland. **1**

OR

What can you say about the semi perimeter of the triangular rangoli.