ROLL NUMBER					

SET	C

INDIAN SCHOOL MUSCAT
HALF YEARLY EXAMINATION 2023
MATHEMATICS - 041

CLASS : X
DATE: 17/09/2023

TIME ALLOTED : 3 HRS.
MAXIMUM MARKS: 80

GENERAL INSTRUCTIONS:

***All Questions must be attempted, however there are internal choices for 2 marks, 3 marks and 5 marks questions.**
***Section A has 20 Questions of 1 mark each.**
***Section B has 5 Questions of 2 marks each.**
***Section C has 6 Questions of 3 marks each.**
***Section D has 4 Questions of 5 marks each.**
***Section E has 3 case-based Questions of 4 marks each.**
***Use of calculator is not permitted.**
***Write your paper neatly without the use of white ink.**

SECTION - A

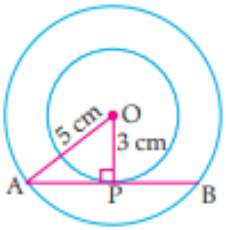
1. If angle between two radii of a circle is 120º, then the angle between the tangents at the ends of the radii is: 1
   (a) 90º (b) 50º (c) 60º (d) 40º
2. Express 98 as a product of its primes 1
   (a) $2^2 \times 7$ (b) $2^2 \times 7^2$ (c) 2×7^2 (d) $2^3 \times 7$
3. How many cubes of side 2 cm can be cut from a cuboid measuring $16cm \times 12cm \times 10cm$? 1
   (a) 240 (b) 300 (c) 200 (d) 350
4. AOBC is a rectangle whose three vertices are $A(0,6), B(8,0)\ and\ O(0,0)$. The length of its diagonal is: 1
   (a) 14 (b) 6 (c) 8 (d) 10
5. One card is drawn from a well-shuffled deck of 52 cards. The probability that the card will not be a Jack is 1
   (a) $\frac{1}{13}$ (b) $\frac{2}{13}$ (c) $\frac{12}{13}$ (d) $\frac{4}{13}$
6. If 2 angles of one triangle are equal to 2 angles of the other triangle, then the two triangles are similar by. 1
   (a) SAS similarity criterion (b) AA similarity criterion
   (c) ASA similarity criterion (d) SSS similarity criterion
7. The zeroes of the quadratic polynomial $x^2 - 12$ are 1
   (a) $+2\sqrt{3},\ -2\sqrt{3}$ (b) $+\sqrt{3},\ -\sqrt{3}$ (c) $+2,\ -2$ (d) $3,\ -3$
8. The class mark of 18−22 is 1
   (a) 18 (b) 22 (c) 20 (d) 26
9. Two cones have their heights in the ratio 1: 3 and radii in the ratio 3: 1. What is the ratio 1

of their volumes?
(a) 3: 1 (b) 2: 3 (c) 2: 1 (d) 1: 4

10. If one root of the quadratic equation $2x^2 + kx - 6 = 0$ is 2, then the value of k is 1
(a) 1 (b) -1 (c) 2 (d) -2

11. The distance of the point (5,4) from the X-axis is: 1
(a)3 units (b) 5 units (c)8 units (d)4 units

12. In the given figure, the length of 2AB is. 1



(a) 16 cm
(b) 5 cm
(c) 8 cm
(d) 4 cm

13. The product of three consecutive positive integers is divisible by 1
(a) 4 (b) 6 (c) 7 (d) only 1

14. **Assertion :** The equation $8x^2 + 3kx + 2 = 0$ has equal roots then the value of k is $\pm\frac{8}{3}$. 1
Reason : The equation $ax^2 + bx + c = 0$ has equal roots if $D = b^2 - 4ac = 0$
(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.

15. The probability of a non-leap year having 53 Saturdays is 1
(a) $\frac{2}{7}$ (b) $\frac{2}{365}$ (c) $\frac{1}{365}$ (d) $\frac{1}{7}$

16. A piece of paper is in the shape of a semicircular region of radius 10 cm. It is rolled to form a right circular cone. The slant height is 1
(a) 5 cm (b) 10 cm (c) 15 cm (d) 20 cm

17. If zeroes of $p(x) = 2x^2 - 7x + k$ are reciprocal of each other, then the value of k is 1
(a) 1 (b) 2 (c) 3 (d) -7

18. The value of mean and mode are 30 and 18 respectively, the median is 1
(a) 26 (b) 25 (c) 36 (d) 30

19. Assertion: If HCF of two numbers is 12 and LCM is 3024. Then the product of the two is 42331. 1
Reason: R: If a and b are two positive integers then $HCF \times LCM = a \times b$
(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.

20. Which of the following cannot be the probability of an event? 1
(a) 0.5 (b) 1.5 (c) 25% (d) 0.3

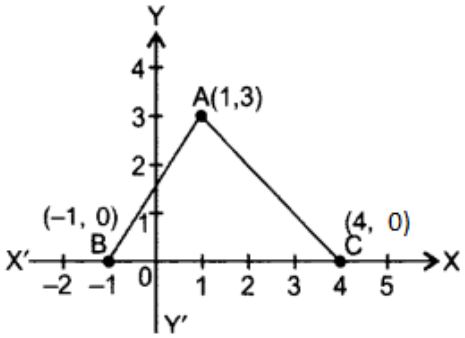
SECTION - B

21. Form a quadratic polynomial whose zeroes are $3 + \sqrt{2}$ and $3 - \sqrt{2}$. 2

22. Find the value of y for which the distance between the points $A(3, -1)$ and $B(11, y)$ is 10 units. 2

OR

In the figure, calculate the area of triangle ABC (in sq. units).



2

23. Find the median of the following data. 2

CLASS	100-200	200-300	300-400	400-500	500-600	600-700	700-800
FREQUENCY	15	17	20	12	9	5	2

24. Find the HCF and LCM of 60, 30 and 100 using Fundamental Theorem of Arithmetic. 2

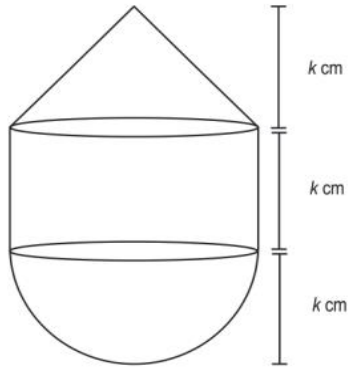
25. Find the nature of roots of the quadratic equation $2x^2 - 4x + 4 = 0$. 2

OR

Find the roots of the quadratic equation $6x^2 - x - 2 = 0$.

SECTION - C

26. The given solid is made up of a cone, a cylinder and a hemisphere (as shown in the figure). Prove that the total volume of Solid is twice the volume of Cylinder 3



(Note: The figure is not to scale.)

27. Prove that a parallelogram circumscribing a circle is a rhombus. 3

OR

A quadrilateral is drawn to circumscribe a circle. Prove that the sums of opposite sides are equal.

28. Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients of the polynomial. 3

29. A cubical block of side 10 cm is surmounted by a hemisphere. What is the largest diameter that the hemisphere can have? Find the cost of painting the total surface area of the solid so formed, at the rate of Rs.5 per 100 sq. cm. [Use $\pi = 3.14$] 3

30. A bag contains tickets, numbered 21, 22, 23, ..., 40. A ticket is taken out from the bag at random. Find the probability that the number on the drawn ticket 3

(i) is a multiple of 3
(ii) is greater than 20 and a multiple of 5.
(iii) is a perfect square number which is a multiple of 6.

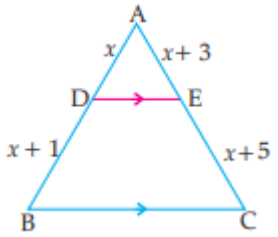
OR

In a single throw of a pair of different dice, what is the probability of getting
(i) a prime number on each dice?
(ii) a square number on each dice?
(iii) a total of 9 or 11?

31. The difference of the squares of two positive numbers is 145. The square of smaller number is 8 more than 8 times the larger number. Find the numbers. 3

SECTION - D

32. State and prove Basic Proportionality Theorem. 5
Also in $\Delta ABC, if\ DE \parallel BC$, find the value of x.



33. Prove that $\sqrt{5}$ is an irrational number. Hence prove that $4 - \sqrt{5}$ is an irrational number. 5

34. The mean of the following frequency distribution is 50. Find f_1 and f_2. 5

CLASSES	0-20	20-40	40-60	60-80	80-100	TOTAL
FREQUENCY	17	f_1	32	f_2	19	120

OR

Cost of Living Index for some period is given in the following frequency distribution.

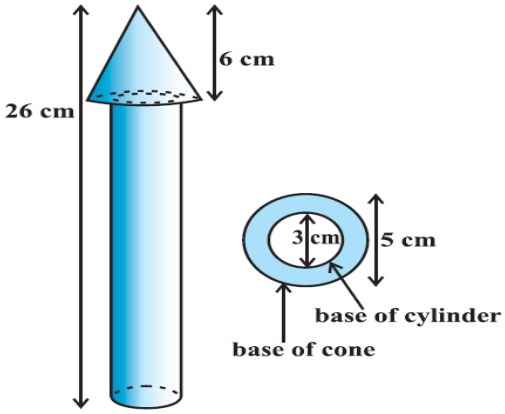
Index	1500-1600	1600-1700	1700-1800	1800-1900	1900-2000	2000-2100	2100-2200
Weeks	3	11	12	7	9	8	2

Find the mode and median for above data.

35. A solid consisting of a right circular cone of height 120 cm and radius 60 cm standing on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm. 5

OR

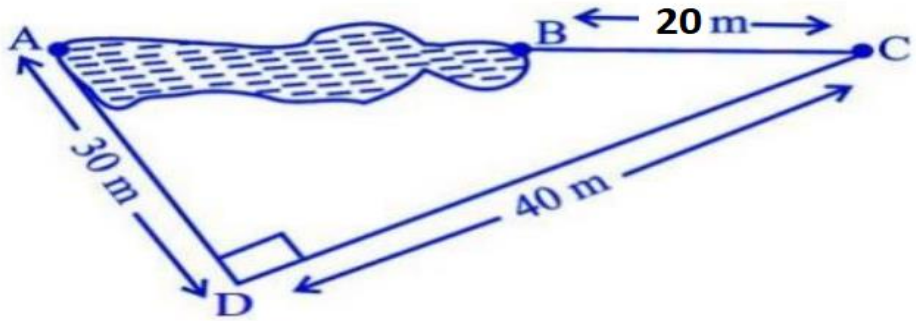
A wooden toy rocket is in the shape of a cone mounted on a cylinder, as shown in figure. The height of the entire rocket is 26 cm, while the height of the conical part is 6 cm. The base of the conical portion has a diameter of 5 cm, while the diameter of the cylindrical portion is 3 cm. If conical portion is to be painted orange and the cylindrical portion yellow, find the area of the rocket painted with each of these colours.
(Take $\pi = 3.14$)



base

SECTION - E

36. Rohan wants to measure the distance of a pond during the visit to his native. He marks points A and B on the opposite edges of a pond as shown in the figure below. To find the distance between the points, he makes a right-angled triangle using rope connecting B with another point C at a distance of 20m, connecting C to point D at a distance of 40m from point C and connecting D to the point A which is at a distance of 30m from D such that $\angle ADC = 90^0$. 4



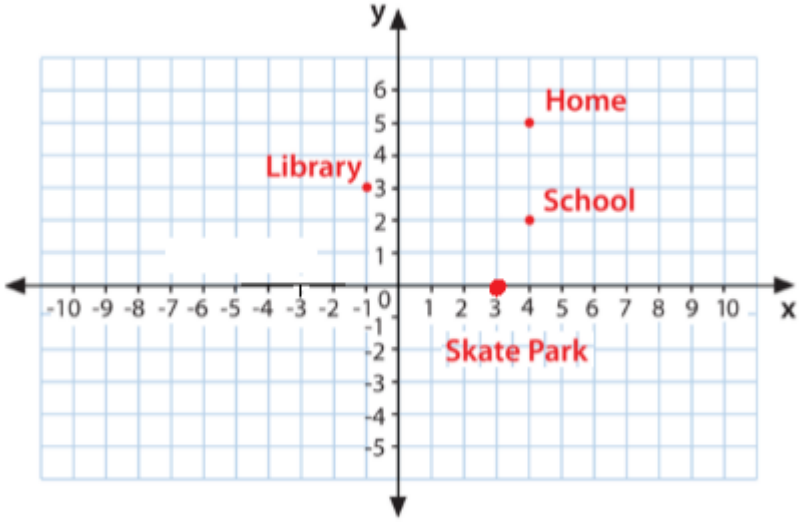
(i) What is the distance AC?
(ii) Find the length AB.

(iii) If a line is drawn through B which is parallel to AD and intersecting DC at E, find DE.

OR

(iii) If a line is drawn through B which is parallel to AD and intersecting DC at E, find BC+CE

37. Two brothers Ramesh and Pulkit were at home and have to reach School. Ramesh went to Library first to return a book and then reaches School directly whereas Pulkit went to Skate Park first to meet his friend and then reaches School. 4



(i). How far is Skate park from x axis?

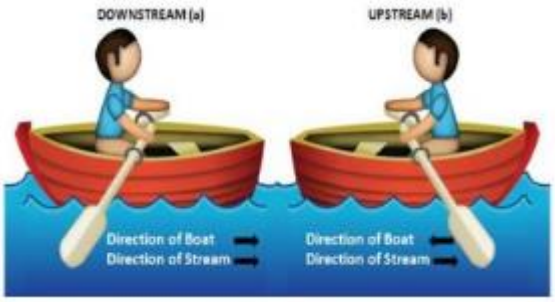
(ii). The location of the School is ----------

(iii). Who travels more to reach School? (Show working)

OR

(iii) Which is far from Home? Library or skate Park? (Show working)

38. The speed of a motor boat is 20 km/hr. For covering the distance of 15 km the boat took 1 hour more for upstream than downstream. 4



(i) What is the relation between speed, distance and time?

(ii) Which is the correct quadratic equation for the speed of the current?

(iii) What is the speed of current?

OR

(iii) What is the time taken to cover 15 km upstream?

******END OF THE QUESTION PAPER******