ABU DHABI INDIAN SCHOOL – BRANCH 1, AL WATHBA
PRE-BOARD-1 EXAMINATION (2025-2026)

GRADE: X **MAX.MARKS:80**

SUBJECT: MATHEMATICS(STANDARD) **TIME: 3 HOURS**

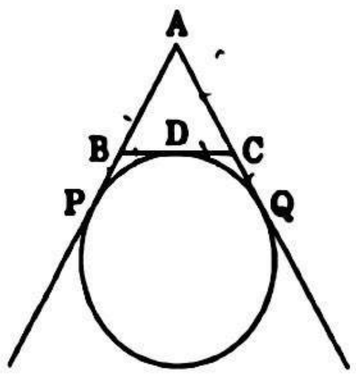
EXAM NO: /GR NO: **DATE: 17/11/2025**

General Instructions:

1.This Question Paper has 5 Sections A, B, C, D, and E.
2.Section A has 20 Multiple Choice Questions (MCQs) carrying 1 mark each.
3. Section B has 5 Short Answer-I (SA-I) type questions carrying 2 marks each.
4. Section C has 6 Short Answer-II (SA-II) type questions carrying 3 marks each.
5. Section D has 4 Long Answer (LA) type questions carrying 5 marks each.
6. Section E has 3 Case Based integrated units of assessment (4 marks each) with sub-parts.
7. All Questions are compulsory. However, an internal choice in 2 Qs of 5 marks, 2 Qs of 3 marks and 2 Questions of 2 marks have been provided. An internal choice has been provided in the 2marks questions of Section E.
8. Draw neat figures wherever required. Take $\pi=22/7$wherever required if not stated.

SECTION A **(20 X 1 = 20marks)**

1. The quadratic equations $x^2 - 4x + k = 0$ has distinct real roots if
   a) $k = 4$ b) $k > 4$ c) $k = 16$ d) $k < 4$
2. If the zero of polynomials $3x^2$-$px + 2$ and $4x^2 - qx - 10$ is 2, then value of $2p - 3q$ is given by
   a) 8 b) 7 c) 5 d) 6
3. A card is selected from a deck of 52 cards. The probability of it being a red face card will be
   a) $\frac{11}{26}$ b) $\frac{5}{26}$ c) $\frac{3}{26}$ d) $\frac{1}{26}$
4. Two poles of height 6m and 11m stand vertically upright on a plane ground. If the distance between their feet is 12m, then distance between their tops is
   a) 11m b) 12m c) 13m d) 14m
5. If $\sin A + sin^2 A = 1$, then the value of $cos^2 A + cos^4 A$
   a)2 b) 0 c) 1 d) -1
6. In the given figure, the perimeter of $\Delta ABC, if\ AP = 12cm.$



   a)24cm b)36cm c)12cm d) 48cm
7. Two concentric circles are of radii 10cm and 6cm, then the length of the chord of the larger circle which touches the smaller circle is:
   a) 16cm b) 12cm c) 18cm d) 9cm
8. A cylinder, a cone and a hemisphere are of equal base and are of the same height. What is the ratio of their volumes?
   a) 3:1:2 b) 3:2:1 c) 1:2:3 d) 1:3:2
9. D and E are respectively the midpoints on the sides AB and AC of a triangle ABC and BC= 6cm. If DEIIBC, then the length of DE is
   a) 2.5cm b) 3cm c) 5cm d) 6cm

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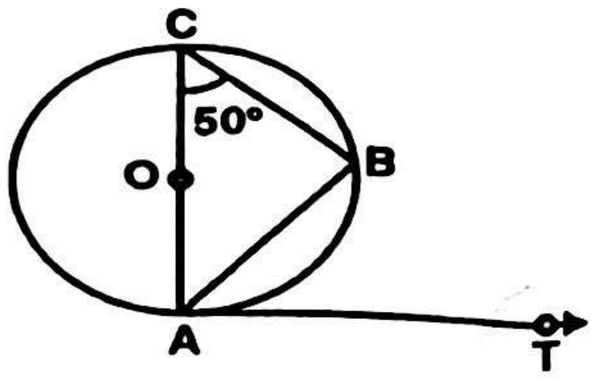
10. AB is a chord of the circle and AOC is its diameter such that <ACB = 50^0. If AT is the tangent to the circle at the point A, then <BAT is equal to



a) 65^0 b) 60^0 c) 50^0 d) 40^0

11. The midpoint of a line segment joining two points A(2,4) and B(-2,-4) is

a) (-2, 4) b) (2, -4) c) (0, 0) d) (-2, -4)

12. The value of $\frac{sin^3\theta+cos^3\theta}{sin\theta+cos\theta} + sin\theta\ cos\theta$

a)$sin\theta\ cos\theta$ b) $cos\theta$ c) $sin\theta$ d) 1

13. In a family of 3 children, the probability of having at least one boy is:

a) $\frac{7}{8}$ b) $\frac{1}{8}$ c) $\frac{3}{4}$ d) $\frac{5}{8}$

14. Consider the following frequency distribution of the heights of 60 students of a class height (in cm)

Height in CM	150-155	155-160	160-165	165-170	170-175	175-180
NO. of students	15	13	10	8	9	5

The upper limit of the median class in the given data is

a)165 b) 155 c) 160 d) 170

15. The mean and median of the data are 20 and 22 respectively. The value of the mode is:

a) 20 b) 26 c) 22 d) 21

16. If at some time, the length of the shadow of a tower is $\sqrt{3}$ times its height, then the angle of elevation of the sun, at that time is:

a)15^0 b) 30^0 c) 45^0 d) 60^0

17. A box contains cards numbered 6 to 55. A card is drawn at random from the box. The probability that the drawn card has a number which is a perfect square, is

a) $\frac{7}{50}$ b) $\frac{7}{55}$ c) $\frac{1}{10}$ d) None of these

18. The sum of the length, breadth and height of a cuboid is $6\sqrt{3}$cm and the length of its diagonal is $2\sqrt{3}$cm. The total surface area of the cuboid is

a) $48cm^2$ b) $72cm^2$ c) $96cm^2$ d)$108cm^2$

Direction for questions 19 & 20: In question numbers 19 and 20, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct option.

(a) A is true, R is true; R is a correct explanation for A

(b) A is true, R is true; R is not a correct explanation for A

(c) A is true; R is false

(d) A is false ; R is true

19. **Assertion:** The point on the X -axis which is equidistant from the points A (- 2, 3) and B (5, 4) is (2, 0).

Reason: The coordinates of point P (x, y) which divides the line segment joining the points A (x_1, y_1) and B (x_2, y_2) in the ratio m_1: m_2 is $(\frac{m_1x_2+m_2x_1}{m_1+m_2}, \frac{m_1y_2+m_2y_1}{m_1+m_2})$.

20. **Assertion:** $4x^2 - 12x + 9 = 0$ has repeated roots.

Reason: The quadratic equation $ax^2 + bx + c = 0$ have repeated roots if discriminant D > 0.

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SECTION B (5X 2= 10marks)

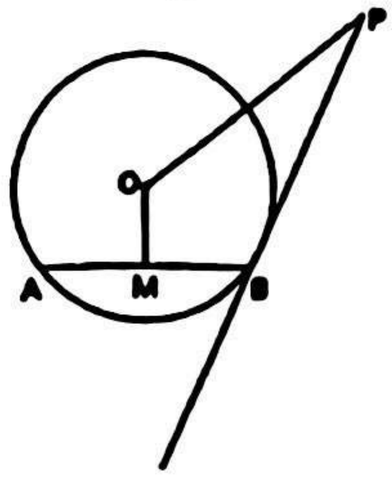
21. (A) Find the ratio in which the line segment joining A(1, –5) and B(–4, 5) is divided by the x-axis. Also find the coordinates of the point of division.

OR

(B) If the point P(x ,y) is equidistant from the points A(a + b, b – a) and B (a – b, a + b). Prove that bx = ay.

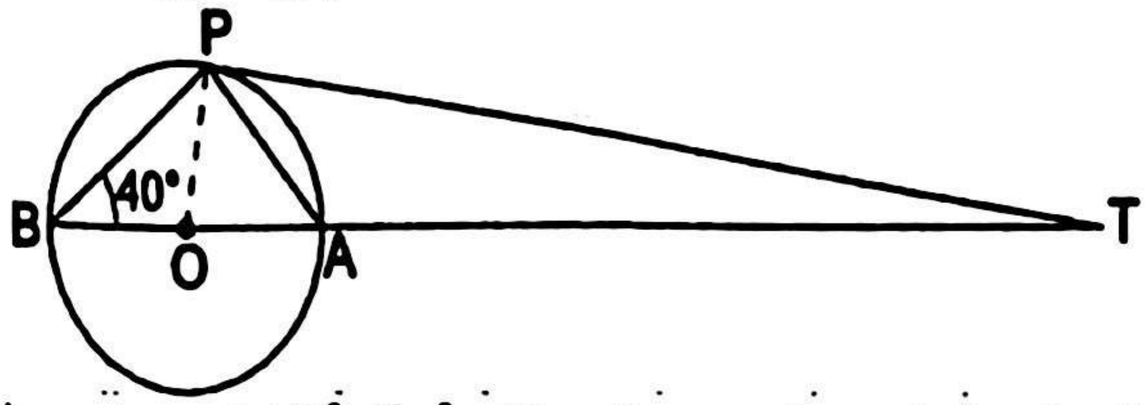
22. If $\sin\theta + \cos\theta = \sqrt{3}$, then prove that $\tan\theta + \cot\theta = 1$.

23. (A) PB is a tangent to the circle with centre O to B. AB is a chord of length 24 cm at a distance of 5cm from the Centre, if the tangent is of 20 cm length, find the length of PO.



OR

(B) In figure, BOA is a diameter of a circle with centre O and the tangent at a point P meets BA extended at T. If ∠ABP = 40°, then find the value of ∠PTA.



24. The zeroes of the polynomial $(k^2+4)\,x^2 + 13x + 4k$ are reciprocal of each other, then find the value of k.

25. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

SECTION C (6 X 3 = 18marks)

26. Two dice are thrown simultaneously at random. Find the probability of getting
    (i) Product 6
    (ii) Sum at least 10
    (iii) Sum less than or equal to 12.

27. (A) From a balloon vertically above a straight road, the angles of depression of two cars at an instant are found to be 45^0 and 60^0. If the cars are 100m apart, find the height of the balloon.

OR

(B) .An electric pole is 10 m high. A steel wire tied to top of the pole is affixed at a point on the ground to keep the pole up right. If the wire makes an angle of 45^0 with the horizontal through the foot of the pole, find the length of the wire. [Use $\sqrt{2} = 1.414$]

28. If $\sin\theta + \cos\theta = p$ and $\sec\theta + \operatorname{cosec}\theta = q$, show that $q(p^2 - 1) = 2p$

29. The data regarding marks obtained by 48 students of a class in a class test is given below. Calculate the modal marks of students.

Marks obtained	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50
Frequency	1	0	2	0	0	10	25	7	2	1

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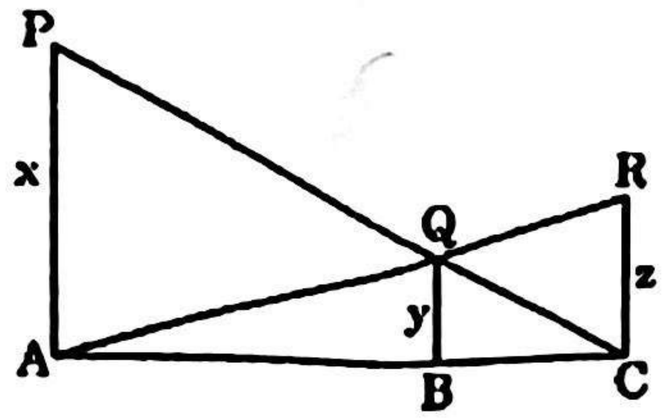
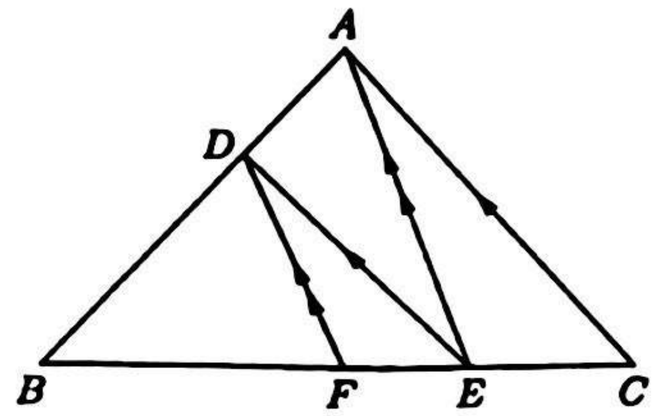
30. The difference between the outer and the inner radii of a hollow right circular cylinder of length 14 cm, is 1 cm. If the volume of metal used in making cylinder 176 cm^3, find the outer and the inner radii of the cylinder.

31. In the given figure, each one of PA, QB and RC is perpendicular to AC. If PA = x units, QB = y units, and RC = z units, show that $\frac{1}{x} + \frac{1}{z} = \frac{1}{y}$.



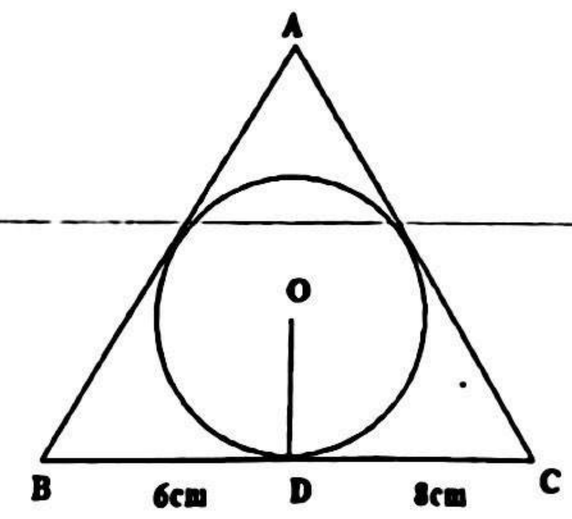
OR

In the given figure, DE || AC and DF || AE. Prove that $\frac{BF}{FE} = \frac{BE}{EC}$.



SECTION D **(4X 5= 20marks)**

32. A triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 6 cm and 8 cm respectively. Find the sides AB and AC.



33. (A) A man in a boat rowing away from a light house 100m high takes 2 minutes to change the angle of elevation of the top of the light house from 60^0 to 30^0. Find the speed of the boat in meters per minute. (Use $\sqrt{3} = 1.732$)

OR

(B) A boy observes that the angle of elevation of a bird flying at a distance of 100m is 30°. At the same distance from the boy, a girl finds the angle of elevation of the same bird from a building 20m high is 45°. Find the distance of the bird from the girl.

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34. **(A)The mean of the following frequency table is 50. But the frequencies f_1 and f_2 in class 20-40 and 60-80 respectively are missing. Find the missing frequencies.**

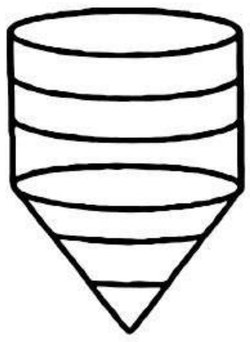
Classes	0-20	20-40	40-60	60-80	80-100	Total
Frequency	17	f_1	32	f_2	19	120

OR

(B)The median of the given data is 525. Find the values of p and q, if the total frequency is 100.

Classes	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
Frequency	2	5	p	12	17	20	q	9	7	4

35. **Fermentation tanks are designed in the form of cylinder mounted on a cone as shown below:**

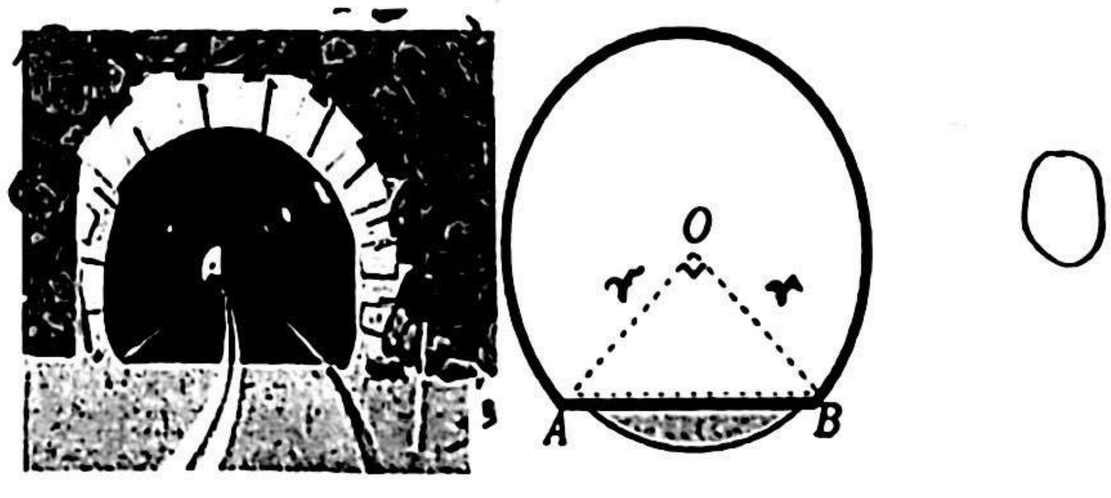


The total height of the tank is 3.3 m and height of conical part is 1.2 m. The diameter of the cylindrical as well as conical part is 1 m. Find the capacity of the tank. If the level of liquid in the tank is 0.7 m from the top, find the surface area of the tank in contact with liquid.

SECTION E **(3X 4= 12marks)**

36. **Case Study 1:**

Atal Tunnel: Atal Tunnel (also known as Rohtang Tunnel) is a highway tunnel built under the Rohtang Pass in the eastern Pir Panjal range of the Himalayas on the Leh-Manali Highway in Himachal Pradesh. At a length of 9.02 km, it is the longest tunnel above 10,000 feet (3,048 m) in the world. The tunnel reduces the travel time and overall distance between Manali and Keylon on the way to Leh. Moreover, the tunnel bypasses most of the sites that were prone to road blockades, avalanches, and traffic snarls. Earth is excavated to make a railway tunnel. The tunnel is a cylinder of radius 7 m and length 450 m. A level surface is laid inside the tunnel to carry the railway lines. Figure given below shows the circular cross - section of the tunnel. The level surface is represented by AB, the Centre of the circle is O and <AOB = 90^0. The space below AB is filled with rubble (debris from the demolition buildings).



(i) **How much volume of earth is removed to make the tunnel? (1M)**

(ii) **If the cost of excavation of 1 cubic meter is ₹ 250, what is the total cost of excavation? (1M)**

(iii) **(A)A coating is to be done on the surface of inner curved part of tunnel. What is the area of tunnel to be coated? Costing of coating is ₹ 30 per m^2. What is the total cost of coating? (2M)**

OR

(B)How much volume of debris is required to fill the ground surface of tunnel? (2M)

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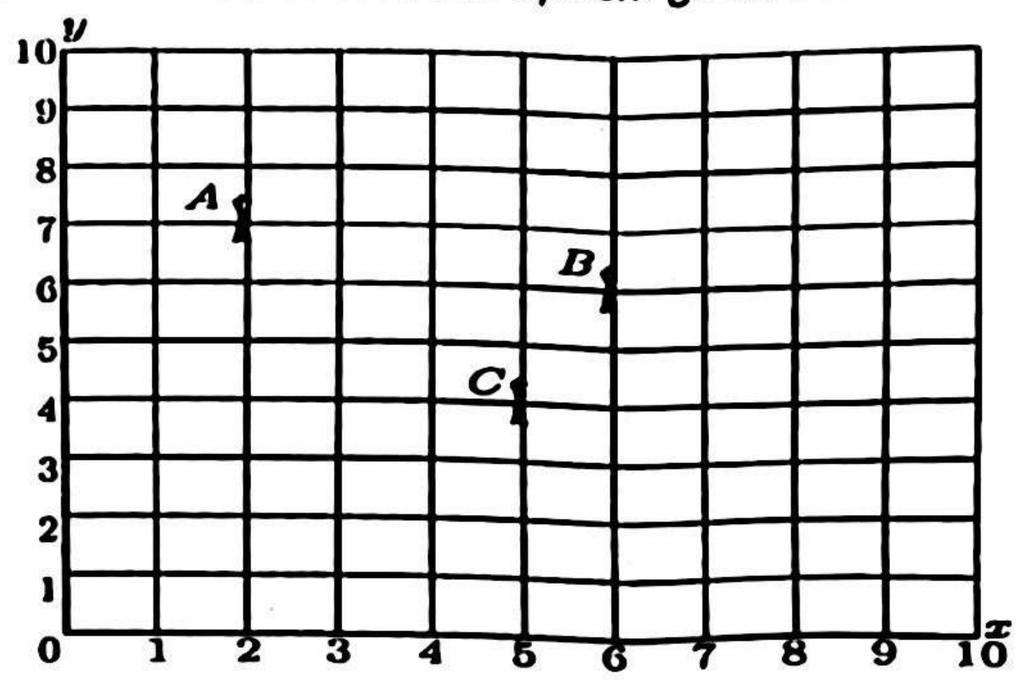
37. **Case Study 2:**

Resident Welfare Association (RWA) of a Gulmohar Society in Delhi have installed three electric poles A, B and C in a society's common park. Despite these three poles, some parts of the park are still in dark. So, RWA decided to have one more electric pole D in the park.

The park can be modelled as a coordinate system given below.



Based on the above information, answer the following questions:

(i) What is the position of pole C? (1M)

(ii) What is the distance of pole B from corner O of the park? (1M)

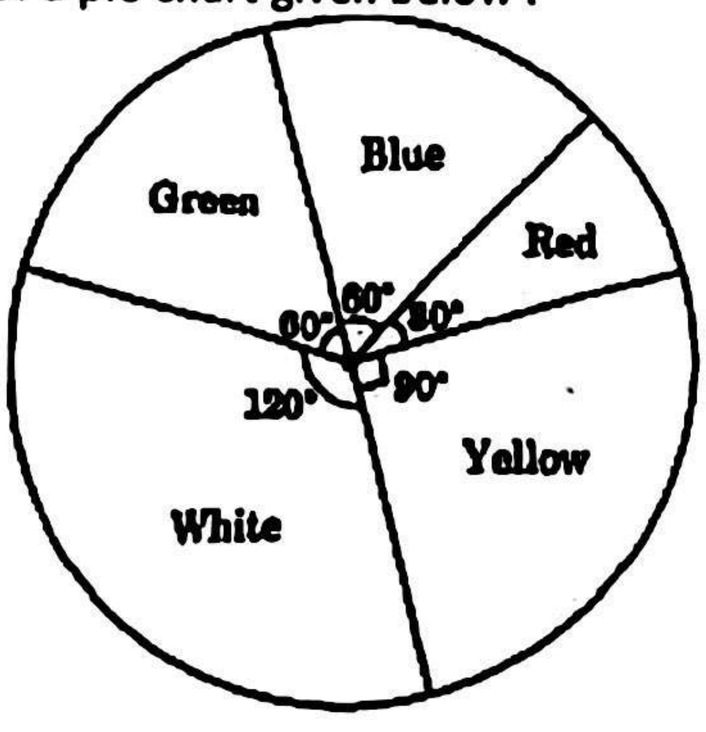
(iii) (A) Find the position of the fourth pole D so that four points A, B C and D form a parallelogram. (2M)

OR

(B) What is the distance between poles A and C? (2M)

38. **Case Study 3:**

Some students were asked to list their favourite colour. The measure of each colour is shown by the central angle of a pie chart given below :



Study the pie chart and answer the following questions:

(i) If a student is chosen at random, then find the probability of his/her favourite colour being white? (1M)

(ii) What is the probability of his/her favourite colour being blue or green? (1M)

(iii) If 15 students liked the colour yellow, how many students participated in the survey? (2M)

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