ST. JOSEPH'S COLLEGE, PRAYAGRAJ
FINAL EXAMINATION 2024
CLASS – IX
SUBJECT- MATHEMATICS

Time: 2½ Hrs **Max. Marks: 80**

General Instructions:

Answers to this paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes.
This time is to be spent in reading the question paper.
The time given at the head of this paper is the time allotted for writing the answers.

SECTION-A

Attempt all questions from this section

Q.1 Choose the correct answers to the questions from the given options. (15)

i. The mean of five numbers is 30. If one number is excluded, their mean becomes 28. The excluded number is-

(a) 28 (b) 30 (c) 35 (d) 38

ii. If one angle of a triangle is equal to sum of other two angles, then the triangle is-

(a) an obtuse angled triangle (b) a right angled triangle
(c) an isosceles triangle (d) an equilateral triangle.

iii. The point whose ordinate is 7 and which lies on y-axis is

(a) (7, 0) (b) (0, 7) (c) (2, 7) (d) (7, 3)

iv. Find the value of $(10)^{200} \div (10)^{196}$

(a) 10000 (b) 1000 (c) 100 (d) 1000000

v. If $\left(\frac{p}{q}\right)^{n-1} = \left(\frac{q}{p}\right)^{n-3}$, then the value of n is

(a) $\frac{1}{2}$ (b) $\frac{7}{2}$ (c) 1 (d) 2

vi. the value of $\sin^2 45^0 + \cos^2 45^0 - \tan^2 45^0$ is

(a) 1 (b) 0 (c) 2 (d) -1

vii. The value of $\log_2 16$ is

(a) $\frac{1}{8}$ (b) 4 (c) 8 (d) 16

viii. The diagonals of a quadrilateral are perpendicular bisectors of each other, what is the best name for this quadrilateral

(a)Square (b) rectangle (c) rhombus (d) None of these

ix. The distance between (x, y) and (0, 0) is

(a) $\sqrt{x^2 - y^2}$ (b) $\sqrt{x^2 + y^2}$ (c) $x + y$ (d) *none of these*

x. $\cos\theta.\tan\theta$=?

(a) $\cos\theta$ (b) $\sin\theta$ (c) $\operatorname{cosec}\theta$ (d) $\sec\theta$

xi. How many people can be accommodated in a dining hall of dimensions 20m×15m×4.5m, assuming each person requires $5m^3$ of air?

(a) 250 (b) 300 (c) 320 (d) 270

xii. In a data, 10 members are arranged in ascending order. If the 8th entry is increased by 6, then the median increases by-

(a) 0 (b) 2 (c) 3 (d) 6

xiii. An exterior angle of a triangle is 105^0 and its two interior opposite angles are equal. Each of these equal angle is

(a) $37\frac{1}{2}^0$ (b) $52\frac{1}{2}^0$ (c) $72\frac{1}{2}^0$ (d) 75^0

xiv. In the class intervals 10-20, 20-30, the number 20 is included in

(a) 10-20 (b) 20-30 (c) both intervals (d) none of these

xv. Assertion A: Two solid cubes have sides 6cm and 8cm respectively. The difference of lateral surface areas is 112cm.^{2}

Reason R: Lateral surface area of a cube of side a cm is 4acm^2.

(a) A is true and R is false (b) A is false and R is true

(c) Both A and R are true (d) Both A and R are false

Q.2 (i) The volume of a cuboid is 3600cm^3 and its height is 12cm. The cross section is a rectangle whose length and breadth are in the ratio 4:3, Find the perimeter of the cross section. (4)

(ii) A cubical wooden box of internal edge 1m is made of 5cm thick wood. The box is open at the top. If the wood costs Rs. 9600 per cubic metre, find the cost of the wood required to make the box. (4)

(iii) 5 years ago, the age of a man was seven times the age of his son. After five years, the age of the man will be 3 times the age of his son from now. How old are the man and his son now? (4)

Q.3 (i) Prove that the diagonals of a square are equal and bisect each other at right angles. (4)

(ii) The area of the trapezium is 105cm^2 and its height is 7cm. If one of the parallel sides is longer than the other by 6cm, find the length of the two parallel sides. (4)

(iii) Using ruler and compasses only, construct a parallelogram with diagonals 6cm and 8cm in length having given the acute angle between them is 60^0. (5)

Section-B (any four) (40 marks)

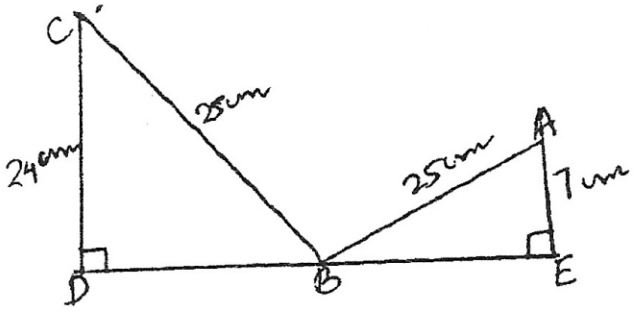
Q.4 (i) Simplify- $\dfrac{8^{\frac{1}{3}} \times 16^{\frac{1}{3}}}{(32)^{\frac{-1}{3}}}$ (3)

(ii) The population of a town in Japan increases by 20% every year. If its present population is 4,32,000 find (3)

(a) Its population after 2 years.

(b) Its population 2 years ago.

(ii) In the given figure, If AE=7cm and AB= BC=25cm and CD= 24 cm, find the length of DE and also show that ΔAEB and ΔBDC are congruent. (4)



Q.5 (i) If $a+\frac{1}{a}=4$, find the value of (3)

(*i*) $a^2+\frac{1}{a^2}$ (*ii*) $a^4+\frac{1}{a^4}$

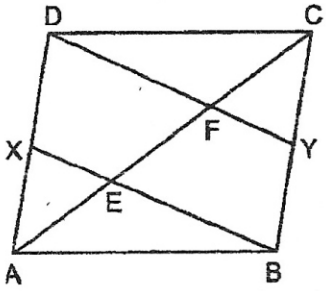
(ii) If 5 tan θ=4, find the value $\frac{(5\sin\theta-3\cos\theta)}{(5\sin\theta+3\cos\theta)}$ (3)

(iii) AB and CD are two chords of a circle, such that AB=16cm, CD=12cm and AB||CD, If the distance between them is 14cm. Find the radius of circle. (4)

Q.6 (i) The internal dimensions of a rectangular box are 12cm×xcm ×9cm. If the length of the longest rod that can be placed in this box is 17cm. Find the value of x. (3)

(ii) Construct a regular hexagon of side 2.5cm. (3)

(iii) In the given figure, ABCD is a parallelogram in which X and Y are the mid-points of AD and BC respectively. Prove that AE=EF=FC. (4)



Q.7 (i) $\frac{7+3\sqrt{5}}{7-3\sqrt{5}}=a+b\sqrt{5}$, find the value of a and b. (3)

(ii) Expand $(-2x+5y-3z)^2$ (3)

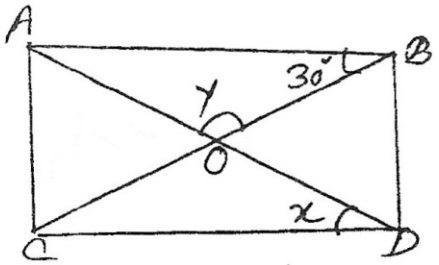
(iii) Three vertices of a square are A (2, 3), B (-3, 3) and C (-3, -2). Plot these points on a graph paper and use it to find the co-ordinates of the fourth vertex. Also find the area of the square. (4)

Q.8 (i) ΔABC, ∠B=90⁰ and D is mid point of BC. Prove that $AC^2=AD^2+3CD^2$ (4)

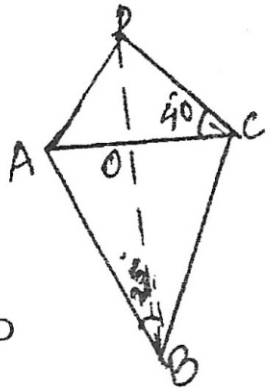
(ii) Solve the simultaneous linear equations graphically and write the co-ordinates of intersecting lines. (6)

x-2y=1, x+y=4.

Q.9 (i) In the given figure, ABCD is a rectangle. Find x and y. (3)



(ii) In the given kite, diagonals intersect at 0 if ∠ABO=25⁰, ∠OCD=40⁰, find (3)



(a) ∠ABC (iii) ∠ADC (iii) ∠BAD

(iii) In a class of 90 students, the marks obtained in a weekly test were as under- (4)

Marks	16-20	21-25	26-30	31-35	36-40	41-45	46-50
No. of students	4	12	18	26	14	10	6

Draw frequency polygon for the above data.

Q.10. (i) A group of students was given a special test. The test was completed by various students in the following time (in minutes).
18, 20, 21, 23, 25, 25, 29, 31, 31, 37 (3)

(a) Find the mean time taken by the students to complete the test.

(b) How many students took more than mean time to complete the test?

(c) If the student who took 37 minutes had taken only 23 minutes to complete the test. What would have been the mean time?

(ii) A road is to be paved with 2500 rhombus shaped bricks. The lengths of the diagonals of each brick are 12cm and 16cm. Find the cost of paving the bricks at the rate of Rs. 200 per m^2. (3)

(iii) The perimeter of a triangle is 50cm. One side of a triangle is 4 cm longer than the smaller side and the third side is 6cm less than twice the smaller side. Find the area of the triangle. (4)

**********ALL THE BEST**********