DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2024–25
FINAL EXAMINATION

CLASS: IX **FULL MARKS: 80**
SUBJECT: MATHEMATICS [SET A] **TIME: 3 HOURS**

Answers to this Paper must be written on a paper provided separately.

You will not be allowed to write during the first 15minutes.

This time is to be spent in reading the question paper.

The time given at the head of this Paper is the time allowed for writing the answers.

Attempt all questions from Section A and any four questions from Section B.

***The intended marks for questions or parts of questions are given in brackets* [ ].**

This paper consists of 6 printed pages.

SECTION A

(*Attempt **all** questions from this section)*

Question1

Choose the correct answers to the questions from the given options. (Do not copy the question, Write the correct answer only.) **[15]**

(i) If $\sqrt{2^x}$= 16 then x^2 will be:
a) 16 **b) 32** **c) 28** **d) 64**

(ii) A sum of ₹ p at compound interest at 20% per annum for 3 years becomes q, then q : p will be:
a) 3 : 1 **b) 36 : 25** **c) 216 : 125** **d) 36 : 125**

(iii) A girl walks 20 m towards east and then she walks 15 m towards north. The distance of the girl from the starting position is:
a) 35 m **b) 25 m** **c) 30 m** **d) 45 m**

(iv)Expanding the expression $(2x + 1)(5x - 1)^2$ the coefficient of the term that contains the highest power of x is:
a) 100 **b) 50** **c) 20** **d) 10**

(v) The value of $\frac{log\ 225}{\log 15}$ will be:
a) 0 **b) 1** **c) 2** **d) -1**

(vi) If the diagonal of a cube is $3\sqrt{3}$ cm, then its volume is:

a) 21 cm^3 b) 25 cm^3 c) 27 cm^3 d) 36 cm^3

(vii) If the coordinates of a point are (-3, -4), then it lies in:

a) First quadrant b) Second quadrant c) Third quadrant d) Fourth quadrant

(viii) If the diagonal of a square ABCD intersect each other at O, then the Δ AOB is:

a) An equilateral triangle b) A right-angled but not an isosceles triangle

c) An isosceles but not a right-angled triangle d) an isosceles right-angled triangle

(ix) If ∠A= 40° and ∠B = 80° then the incorrect statement is:

a) AB > BC b) AC < BC c) AB < AC d) AB ≠ BC

(x) If tan θ - cot θ = 0, then the value of sin θ + cos θ will be:

a) √2 b) 1 c) 1/√2 d) 1/√3

(xi) y = 3x + 5 has:

a) a unique solution b) only two solutions c) infinitely many solutions d) No solution

(xii) The triangle and a rectangle are on the same base and between the same parallels, the ratio of the area of the triangle to the area of the rectangle is:

a) 1 : 2 b) 1 : 3 c) 4 : 1 d) 3 : 2

(xiii) The surface area of a cube with 7 cm edge is:
a) 216 cm^2 b) 294 cm^2 c) 268 cm^2 d) 432 cm^2

(xiv) The mean of the data: 155, 160, 155, 144, 160, 144, 155, 144, 160 is:

a) 144 b) 150 c) 153 d) 155

(xv) Assertion (A): If d is the diameter of a circle, then its area is $\pi \frac{d^2}{4}$.
Reason (R): The perimeter of a semicircle with diameter d is $\pi \frac{d}{2}$ + d.

a) Both A and R are true and R is the correct reason for A.

b) Both A and R are true but R is not the correct reason for A.

c) A is false, R is true.

d) A is true, R is false.

Question 2

(i) The simple interest on a sum of money for 2 years at 12% per annum is ₹ 1380. Find:

(a) the sum of money.

(b) the compound interest on this sum for one-year compounded half-yearly at the same rate.[4]

(ii) Find the perimeter of a rhombus whose diagonals are 24 cm and 10 cm. [4]

(iii) Construct a parallelogram ABCD with diagonals AC = 9 cm and BD = 6.2 cm and one angle between the diagonals is 60°. [4]

Question 3

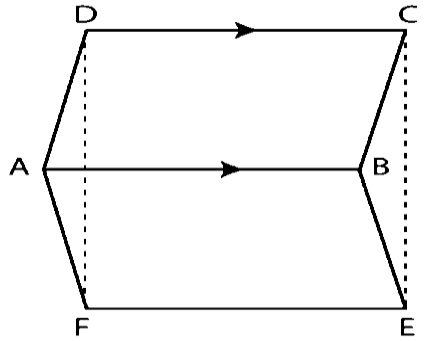
(i) Evaluate: $\frac{sin\,15^\circ\, cos\,15^\circ - cos\,75^\circ\, sin\,75^\circ + \tan 60^\circ \cot 45^\circ}{\tan 30^\circ \cos 0^\circ}$ **[4]**

(ii) In the Figure given below, ABCD and ABEF are parallelograms. Prove that

(a) CDFE is a parallelogram

(b) FD = EC

(c) Δ AFD ≅ ΔBEC. [4]



(iii) Construct a frequency polygon for the following data. [use graph paper] [5]

Age in years	20-30	30-40	40-50	50-60	60-70	70-80
No. of Persons	6	12	10	8	15	7

SECTION B

(*Attempt **any four** questions from this section)*

Question 4

(i) A two-digit number is seven times the sum of its digits. The number formed by reversing the digits is 18 less than the original number. Find the number. [3]

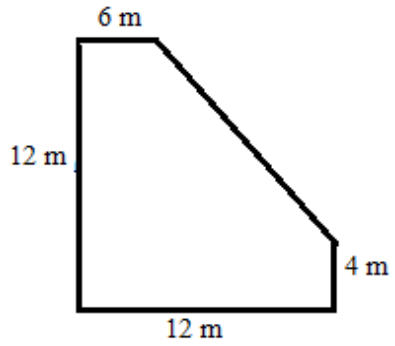
(ii) The amount of compound interest which is calculated yearly on a certain sum of money is ₹ 1250 in one year and ₹ 1375 for the 2nd year. Calculate the rate of interest. [3]

(iii) A plastic box 2.5 m long, 1.5 m wide and 65 cm deep is to be made to keep gift items. It is to be open at the top. Ignoring the thickness of the plastic sheet and assuming that the stitching margins are very small and therefore negligible, find:
(a) The area of the sheet required for making the box.
(b) The cost of sheet for it, if a sheet measuring $1m^2$ cost ₹ 20. **[4]**

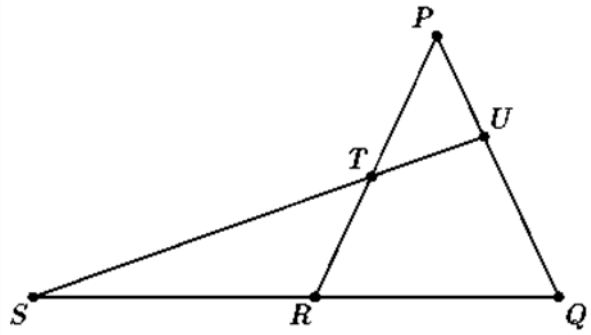
Question 5

(i) Simplify: $\frac{3^{a+2}+3^{a-1}}{4\times3^{a}-3^{a}}$ **[3]**

(ii) The figure below shows a piece of land that is to be enclosed with a fence. Fencing material is sold in metre for a price of ₹ 16 per metre. Find the total cost for fencing. **[3]**



(iii) In the given figure, ΔPQR is an isosceles triangle with PQ = PR, prove that PT > PU. **[4]**



Question 6

(i) Factorise: x (x – 2) (x – 4) + 4x - 8 **[3]**

(ii) Find the area of a circle, whose centre is at (5, -3) and which passes through the point (-7, 2). **[3]**

(iii) If x = 2 + √5, find the value of $x^2 - \frac{1}{x^2}$ **.** **[4]**

Question 7

(i) Show that: $7\log\frac{16}{15} + 5\log\frac{25}{24} + 3\log\frac{81}{80} = \log 2$ **[3]**

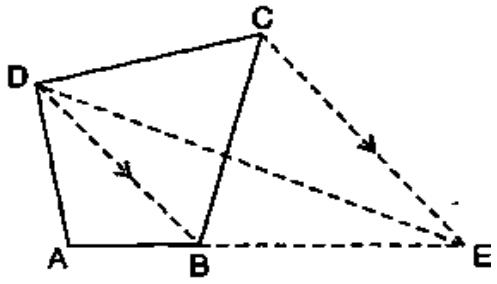
(ii) If 3 cot θ = 4, find the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 3\cos\theta}$ **.** **[3]**

(iii) Show that the quadrilateral formed by joining the mid-points of the consecutive sides of a rectangle is a rhombus. [4]

Question 8

(i) A brick measures 30 cm × 10 cm × 7.5 cm. How many bricks will be required for a wall 30 m long, 2 m high and 0.75 m thick? [3]

(ii) In the given figure, CE is drawn parallel to the diagonal BD of the quadrilateral ABCD which meets AB produced at E, show that Δ ADE and quadrilateral ABCD are equal in area. [3]



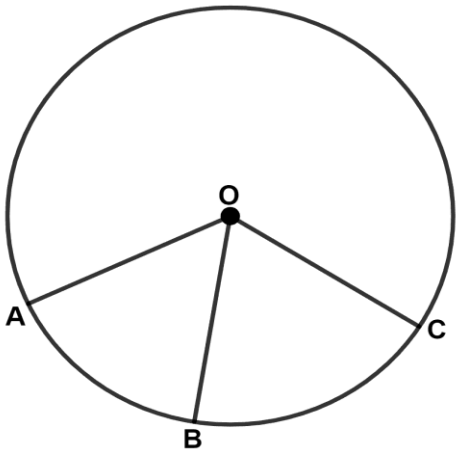
(iii) In the given figure, arc AB and arc BC are equal in length. If ∠ AOB = 48°, find: [4]

(a) ∠ BOC

(b) ∠ OBC

(c) ∠ AOC

(d) ∠ OAC



Question 9

(i) If $x \neq 0$ and $x + \frac{1}{x} = 6$; find the value of $x^4 + \frac{1}{x^4}$. [3]

(ii) Prove that in an isosceles triangle ABC, with AB = AC, the bisector of ∠B and ∠C intersect each other at O. Join A to O. Show that OB = OC and AO bisect ∠A. [3]

(iii) A field is in the form of circle. A fence is made around the boundary of the field. The cost of fencing is ₹ 2640 at the rate of ₹12 per meter. Now the field is to be thoroughly ploughed at the rate of ₹0.50 per sq. meter. Find the amount required to plough the field. [4]

Question 10

(i) The length of two adjacent sides of a parallelogram is 17cm and 12cm. One of its diagonals is 25cm long. Find the area of the parallelogram. [3]

(ii) The weight of 8 students in kgs are 54, 49, 51, 58, 61, 52, 54, 60.
(a) Find the median weight.
(b) If one of the 54 kg is replaced by 52 kg, what will be the new median? [3]

(iii) In the given figure, the angle between two altitudes DP and DQ of a parallelogram ABCD through the vertex of an obtuse angle ADC of the parallelogram is 60°.
(a) Find the angles of the parallelogram.
(b) Find ∠CDQ.
(c) Find ∠ADP . [4]