DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2022–23
FINAL EXAMINATION

CLASS: IX **FULL MARKS: 80**

SUBJECT: MATHEMATICS [Set A] **TIME: $2\frac{1}{2}$ 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 5 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 $x = 3 + \sqrt{8}$, then the value of $\frac{1}{x}$ is

(a) 3 **(b) $\sqrt{8}$** **(c) $3 - \sqrt{8}$** **(d) 11**

(ii) The compound interest on ₹ 100 for two years at the rate of 10% p.a. compounded annually is

(a) ₹ 19 **(b) ₹ 20** **(c) ₹ 21** **(d) ₹ 12**

(iii) Value of $(a - b)^2 - (a + b)^2$

(a) $2(a^2 + b^2)$ **(b) $(a^2 + b^2)$** **(c) 4ab** **(d) -4ab**

(iv) Factors of $51 - 20x + x^2$ are :

(a) (x + 3)(x – 17) **(b) (x -3)(x - 17)** **c) (x - 3)(x + 17)** **d) (x +3)(x + 17)**

(v) Evaluate : log1 + log10 + log100

a) 0 b) 1 c) 2 d) 3

(vi) In triangle PQR if ∠Q > ∠ R, then :

a) PR > PQ b) PR < PQ c) PR = PQ d) PR ≤ PQ

(vii) If a ladder 10m long reaches a window 8m above the ground, then the distance of the foot of the ladder from the base of the wall is

a) 18m b) 8m c) 6m d) 4m

(viii) The bisector of any two adjacent angles of a parallelogram intersect at ;

a) 30° b) 45° c) 60° d) 90°

(ix) The ratio of outer and inner perimeter of a circular path is 23 : 22. If the path is 5m wide , the diameter of the inner circle is

a) 55m b) 110m c) 220m d) 230m

(x) In a triangle ABC cos ($\frac{A+B}{2}$) will be

a) cos $\frac{C}{2}$ b) sin $\frac{C}{2}$ c) sin ($\frac{A+B}{2}$) d) sin (A + B)

(xi) The distance of the point (3, 4) from the x axis is,

a) 3 unit b) 4 unit c) 1 unit d) 7 unit

(xii) Find the area of a rhombus whose diagonals are 8cm and 6cm.

a)8cm^2 b) 12cm^2 c) 24cm^2 d) 96cm^2

(xiii) A cuboidal water tank is 5m long 3.5m wide and 2m deep. How many litre of water can it hold?

a) 35 b) 350 c) 3500 d) 35000

(xiv) The class mark of class interval 20 – 30 is

a) 20 b) 25 c) 30 d) 35

(xv) If a triangle and a parallelogram are on the same base and between same parallels , then the ratio of area of parallelogram to the area of a triangle is

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

Question 2

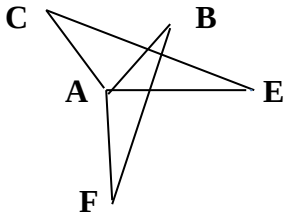
(i)The simple and the compound interest on a certain sum for 2 years at the same rate of interest are ₹1040 and ₹1081.60 respectively. Find the rate of interest and the sum. [4]

(ii) ABC is a right angled triangle such that $\angle B$ = 90°, AB = 3cm, BC = 4cm. Find the length of the perpendicular drawn from B on AC [4]

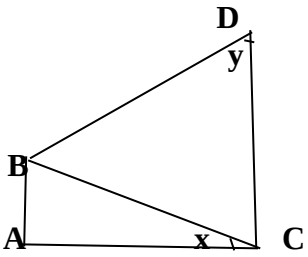
(iii) Construct a rhombus ABCD whose one side is 4.4 cm and $\angle B$ = 120° , measure the length of AC. [4]

Question 3

(i) In the adjoining figure, AB = AC, AE = AF, $\angle BAC = \angle EAF$ = 90° . Prove that CE = BF [4]



(ii) In the adjoining figure, $\angle BAC = \angle ACD = 90°$, AB = 10cm, BC = 26cm, CD = 28cm. calculate: sin x , cos x, tan y and cosec y [4]



(iii) The following table shows the height (in cm) of a group of people, construct a frequency polygon for the following data.

Height	90-94	95-99	100-104	105-109	110-114	115-119
No of people	20	46	58	26	16	30

[5]

SECTION B

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

Question 4

(i) If $2^{4n+1} + 2^9 = 2^{10}$, find the value of n. [3]

(ii) ABD is a right angled triangle , whose ∠D is a right angle. C is any point on the side BD . If AB = 8cm, BC = 6cm and AC = 3cm , then find the length of CD. [3]

(iii) The sum of the digits of a two digit number is 8. If 18 is added to this number then the digits are reversed. Find the number. [4]

Question 5

(i) If $\tan(x - 15^\circ) = 1$, find the value of cosx. [3]

(ii) A man wants to get ₹6050 from a bank after 2 years. If the bank gives 10% p.a. compound interest, find the amount of money he has to keep now in the bank. [3]

(iii) AD is a median of the triangle ABC. E is the midpoint of AD. BE produced meet AC at F. Prove that BE : EF = 3 : 1. [4]

Question 6

(i) The sum of length, breadth and height of a cuboid is 24cm, and the length of its diagonal is 15 cm. Find the area of its total surface. [3]

(ii) Factorise : $x^3 - y^3 + x^2y - xy^2$ [3]

(iii) The centre of a circle of radius 13units is the point (3, 6). P(7, 9) is a point inside the circle. APB is a chord of the circle such that AP = PB. Calculate the length of AB. [4]

Question 7

(i) Solve for x : $\log(3x + 2) - \log x = \log(x + 2)$ [3]

(ii) The diagonals of a parallelogram ABCD intersect at O. If the area of the triangle AOB is 5 square cm, find the area of triangle ABD and parallelogram ABCD. [3]

(iii) The area of cross section of a hosepipe is 3 cm^2. Water flows through it at a speed of 50 cm/sec . How many litres of water flows out of it in one minute? [4]

Question 8

(i) If $x = \sqrt{3} + \sqrt{2}$, find the value of $x^3 + \frac{1}{x^3}$ [3]

(ii) If $a - b + c = 6$ and $a^2 + b^2 + c^2 = 38$, find the value of ab + bc - ca [3]

(iii) Prove that the sum of the altitudes of a triangle is less than its perimeter. [4]

Question 9

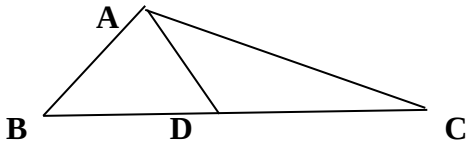
(i) Show using distance formula that the points (-2, 3), (-6, 1) and (-10, -1) are collinear. [3]

(ii) ABC is an equilateral triangle in which AD is perpendicular to BC. Prove that $AB^2 + BC^2 + CA^2 = 4\,AD^2$ [3]

(iii) The diameter of a circular park is 40m. There is a road 5m wide all around this park. Find the cost of paving this path at the rate of ₹ 7 per square meter. [4]

Question 10

(i) In the adjoining figure, AB = BD and angle B = 40° . Find the measure of ∠ADC.



[3]

(ii) If the mean of x – 3 , x – 1 , 7, x , 2x – 1 and 3x – 5 is 3.5, find the median [3]

(iii) If the diagonals of a quadrilateral bisect each other at right angles, then prove that the quadrilateral is a rhombus. [4]