DELHI PUBLIC SCHOOL NEWTOWN
SESSION 2024 –25
HALF YEARLY 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 4 printed pages.

SECTION A

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

Question 1

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

i) $\sqrt{12} \times \sqrt{15}$ is equal to:
a) $5\sqrt{6}$ **b) $6\sqrt{5}$** **c) $10\sqrt{5}$** **d) $\sqrt{25}$**

ii) The correct expression for $\sqrt{x^{-2}y^3}$ will be:
a) $\frac{y^{2/3}}{x}$ **b) $\frac{y^{3/2}}{x}$** **c) $\frac{y^{-2}}{x}$** **d) 1**

iii) The compound interest on ₹5000 at 20% per annum for 1 year compounded half-yearly is:
a) ₹ 1050 **b) ₹ 1005** **c) ₹ 6000.50** **d) ₹ 6050**

iv) The logarithm of unity to any base is:
a) 10 **b) 1** **c) 0** **d) -1**

v) If $x^2 + kx + 6 = (x+2)(x+3)$ for all k, then the value of k is:
a) -1 **b) 1** **c) 3** **d) 5**

vi) The point satisfies the equation x - 2y = 4 is:
a) (0,2) **b) (2,0)** **c) (4,0)** **d) (1,1)**

vii) The point (0, -4) lies:
a) on x-axis **b) on y-axis**
c) at origin **d) between x-axis and y-axis**

viii) Factorisation of y(y -z) + 9(z -y) is:

a) (y - z) (y + 9) **b) (y - z) (y - 9)**

c) (z - y) (y + 9) **d) (z + y) (y + z)**

ix) For the equation 4x + 5y = 19, if x = 1 is taken then the value of y will be:

a) 3 **b) -3** **c) 2** **d) -2**

x) The distance of the point (3, 5) from y axis is:

a) 4 units **b) 3 units** **c) $\sqrt{34}$ units** **d) 5 units**

xi) If $\log(x - 3) = 1$, then the value of x is:

a)10 **b) 15** **c) 12** **d) 13**

xii) If cos A = 12/13, then the value of sin A is:

a)13/5 **b) 12/5** **c)5/12** **d)5/13**

xiii) If a = 15°, then the value of 4 Sin 2a × Cot 6a will be:

a) ½ **b) 1** **c) 0** **d) 2**

xiv) For two triangles, if two angles and the included side of one triangle are equal to two angles and the included side of another triangle. Then the congruency rule is:

a) SSS **b) ASA** **c) SAS** **d) RHS**

xv) Assertion (A): The sum of two rational numbers is also rational.
Reason (R): 0.12112111211112…….. is a rational number.

a) A is true, R is false
b) A is false, R is true
c) both A and R are true
d) both A and R are false

Question 2

i) Prakash invests ₹ 28000 at the rate of 10% p.a, interest compounded yearly. Find

a) the amount received by him after 1 year.

b) the interest for the 2nd year.

c) the total Amount received at the end of three years. **[4]**

ii) In a right-angled triangle ABC right angled at B, if tan A = 4/3 then find the values of Sin A, Cos A and Cosec A. **[4]**

iii) Show that the Triangle made by the points A (1, 2), B (-2, -3), C (2, -3) is a scalene triangle. (use distance formula) **[4]**

Question 3

i)Factorize: **[2+2]**

a) $9 + 3xy + x^2y + 3x$

b) $9x^2 + 22xy + 8y^2$

ii) If $2^x \times 3^y \times 5^z = 2160$, find the value of x, y, z and compute the value of $2^x \times 3^{-y} \times 5^{-z}$. **[4]**

iii) Solve Graphically the equations: x - 2y - 4 = 0 and 2x + y - 3= 0. Also, find the area of triangle formed by the two lines and y axis. **[5]**

SECTION B

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

Question 4

i) ABC is a triangle with ∠B = 2∠C, D is point on BC such that AD bisect ∠BAC and AD = CD, prove that ∠BAC = 72°. [3]

ii) Expand: (3x + 5y +2z) (3x – 5y + 2z) [3]

iii) Find the value of x, if log (x + 5) + log (x - 5) = 4log2 + 2log3 [4]

Question 5

i) Solve for x; when $2^{x+3} + 2^{x+1} = 320$ [3]

ii) If x = $\frac{1}{x-5}$; x ≠ 5, find the value of $x^2 + \frac{1}{x^2}$ [3]

iii) Solve the following equations: 2a – $\frac{3}{b}$ = 12 and 5a + $\frac{7}{b}$ = 1 by any algebraical method. [4]

Question 6

i) Factorize: $x^9 - 512$ [3]

ii) Put $\frac{5+3\sqrt{3}}{7+4\sqrt{3}}$ in the form a + b$\sqrt{3}$. [3]

iii) Given that the distance between the points A (x + 2, -2) and B (11, 6) is 17 units. Find the values of x. [4]

Question 7

i) Factorize: $a^2 + \frac{1}{a^2}$ - 2 - 3$a + \frac{3}{a}$ [3]

ii) If log 8 = 0.9030; find the value of log $\sqrt{32}$. [3]

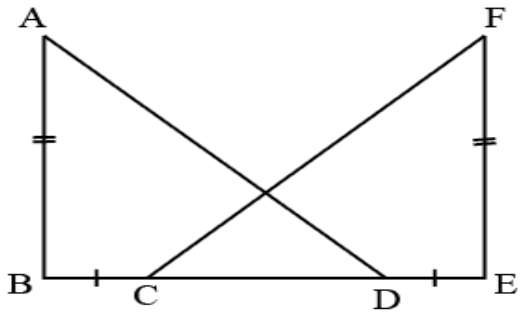
iii) If a = $2^{\frac{1}{3}} - 2^{\frac{-1}{3}}$, then show that 2a^3 + 6a = 3 [4]

Question 8

i) If 13 sin θ = 5; find the value of $\frac{5\sin\theta - 2\cos\theta}{3\tan\theta}$. [3]

ii) In a factory, the production of motorbikes rose to 23328 from 20000 in 2years. Find the rate of growth of the production of motorbikes per year. [3]

iii) In the given figure AB and FE are perpendicular to BE and AB = FE, BC = DE, prove that AD = FC. [4]



Question 9

i) Calculate the compound interest on ₹8000 in $1\frac{1}{2}$ years with 15% rate of interest per year. [3]

ii) Find the value of ($\cos 0^0 + \sin 45^0 + \sin 30^0$) ($\sin 90^0 - \cos 45^0 + \cos 60^0$) [3]

iii) If $x = 3 + 2\sqrt{2}$, find the value of $x^3 + \frac{1}{x^3}$ [4]

Question 10

i) Show $\sqrt{13}$ is an irrational number by the method of contradiction. [3]

ii) Calculate the difference between the compound interest and simple interest on ₹12000 at 9% per annum in 2 years. [3]

iii) 3 tables and 2 chairs cost ₹ 1900 and 2 tables and 4 chairs cost ₹ 1800. Find the cost of 2 tables and a chair. [4]