Saksham Goyal
X - B
Roll NO - 30.

DELHI INTERNATIONAL SCHOOL

HALF YEARLY EXAMINATION (2024-25)

SUBJECT – MATHEMATICS (041)

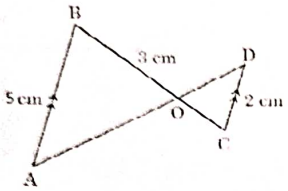
CLASS – X

GENERAL INSTRUCTIONS

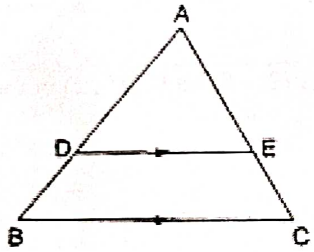
I. Read the question carefully before answering.
II. The question paper consists of 38 questions divided into five sections A, B, C, D and E
III. Section-A comprises of 20 questions of 1 mark each.
IV. Section-B comprises of 5 questions of 2 marks each
V. Section-C comprises of 6 questions of 3 marks each
VI. Section-D comprises of 4 questions of 5 marks each
VII. Section-E comprises of 3 questions of 4 marks each (case based study)

TIME: 3 HOURS **MM - 80**

S.NO	SECTION – A	MARKS
1.	The HCF of 135 and 225 is:	1
a)	5	
b)	15	
c)	45	
d)	75	
2.	The product of a rational number and an irrational number is	1
a)	both rational and irrational number	
b)	an integer	
c)	an irrational number only	
d)	a rational number only	
3.	If α, β are the zeros of the polynomial $x^2 + 6x + 2$ then $(1/\alpha+1/\beta) = ?$	1
a)	- 3	
b)	- 12	
c)	3	
d)	12	
4.	If the pair of equations $3x - y + 8 = 0$ and $6x - ry + 16 = 0$ represent coincident lines, then the value of r is:	1
a)	1/2	
b)	-1/2	
c)	2	
d)	-2	
5.	If $\Delta ABC \sim \Delta PQR$ such that AB = 9.1 cm and PQ = 6.5 cm. If the perimeter of ΔPQR is 25 cm, then the perimeter of ΔABC is	1
a)	36 cm	
b)	30 cm	
c)	35 cm	
d)	34 cm	

6.	If a pair of linear equation is consistent, then the lines will be	
a)	always intersecting	
b)	intersecting or coincident	
c)	always coincident	
d)	parallel	
7.	The polynomial $9x^2 + 6x + 4$ has	1
a)	two real zeroes	
b)	one real zero	
c)	no real zeroes	
d)	many real zeroes	
8.	In the given figure, AB ‖ CD. If AB = 5 cm, CD = 2 cm and OB = 3 cm, then the length of OC is 	1
a)	3/5 cm	
b)	6/5 cm	
c)	10/3 cm	
d)	15/2 cm	
9.	In an A.P.. if d = – 4, n = 7 and $a_n = 4$, then 'a' is	1
a)	7	
b)	6	
c)	28	
d)	20	
10.	The value(s) of k for which the quadratic equation $2x^2 + kx + 2 = 0$ has equal roots, is:	1
a)	0	
b)	4	
c)	- 4	
d)	± 4	
11.	If x = 3 is a solution of the equation $3x^2 + (k - 1)x + 9 = 0$ then k = ?	1
a)	13	
b)	- 11	
c)	11	
d)	- 13	
12.	A line segment is of length 10 units. If the coordinates of its one end are (2, - 3) and the abscissa of the other end is 10, then its ordinate is	1
a)	- 3, 9	
b)	9, - 6	
c)	9, 6	
d)	3, - 9	

	If $\sin\alpha = 1/\sqrt{2}$ and $\tan\beta = 1$, then the value of $\cos(\alpha+\beta)$ is	1
a)	3	
b)	1	
c)	2	
d)	0	
14.	If in two triangles ABC and DEF, $\frac{AB}{DE} = \frac{BC}{FE} = \frac{CA}{FD}$, *then*	1
a)	$\Delta FDE \sim \Delta ABC$.	
b)	$\Delta BCA \sim \Delta FDE$.	
c)	$\Delta FDE \sim \Delta CAB$	
d)	$\Delta CBA \sim \Delta FDE$.	
15.	If x + 1, 3x and 4x + 2 are three consecutive terms of an A.P., then the value of x is:	1
a)	5	
b)	2	
c)	4	
d)	3	
16.	$(\sec^2\theta - 1)(\text{cosec}^2\theta - 1)$ is equal to:	1
a)	1	
b)	0	
c)	- 1	
d)	2	
17.	The point P which divides the line segment joining the points A (2, - 5) and B (5, 2) in the ratio 2 : 3 lies in the quadrant.	1
a)	III	
b)	I	
c)	II	
d)	IV	
18.	If the distance between the points A(4, p) and B(1, 0) is 5 units, then the value(s) of p is (are)	1
a)	0	
b)	4 only	
c)	- 4 only	
d)	±4	
19.	Assertion: $(\cos^4 A - \sin^4 A)$ is equal to $2\cos^2 A - 1$. Reason: The value of $\cos\theta$ decreases as θ increases.	1
a)	Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	
b)	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).	
c)	Assertion (A) is true, but Reason (R) is false.	
d)	Assertion (A) is false but Reason (R) is true	
20.	Assertion (A): Point P (0, 2) is to be point of intersection of y-axis with the line 3x + 2y = 4. Reason (R): The distance of paint P (0, 2) from x-axis is 2 units.	1
a)	Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).	
b)	Both Assertion (A) and Reason (R) are true, but Reason (R) is not the correct explanation of the Assertion (A).	
c)	Assertion (A) is true, but Reason (R) is false.	
d)	Assertion (A) is false but Reason (R) is true.	

	SECTION - B	
21.	Prove that $\sqrt{5}$ is an irrational number.	2
22.	Find the zeros of the polynomial $2x^2 + 5x - 12$ and verify the relationship between its zeros and coefficients.	2
23. a) b)	Solve the pair of equations: $43x + 67y = -24$, $67x + 43y = 24$	2
24.	Find whether 55 is a term of the AP: 7, 10, 13,...or not. If yes, find which term it is.	2
25.	Find a point on the y - axis which is equidistant from the points A (6,5) and B (- 4, 3).	2
	SECTION – C	
26.	A shopkeeper has 120 litres of petrol, 180 litres of diesel and 240 litres of kerosene. He wants to sell oil by filling the three kinds of oils in tins of equal capacity. What should be the greatest capacity of such a tin?	3
27.	D and E are points on the sides AB and AC respectively of a $\triangle ABC$ such that DE$\parallel$ BC. AD = (7 x - 4) cm, AE = (5 x - 2) cm, DB = (3 x + 4) cm and EC = 3 x cm.  Find the value of x.	3
28.	Find the zeros of $p(x) = x^2 + 2\sqrt{2}x - 6$ and verify the relationship between the zeros and its coefficients.	3
29.	Father's age is three times the sum of the ages of his two children. After 5 years, his age will be twice the sum of the ages of two children. Find the age of father. OR The larger of two supplementary angles exceeds the smaller by 18 degrees. Find the angles.	3
30.	If the points A (6, 1), B (8, 2), C (9, 4) and D (k, p) are the vertices of a parallelogram taken in order, then find the values of k and p.	3
31.	If $\tan(A + B) = 1$ and $\tan(A - B) = 1/\sqrt{3}$, A > B, then find the values of A and B.	3
	SECTION – D	
32.	The hypotenuse of a right angled triangle is 6 cm more than twice the length of the shortest side. If the length of third side is 6 cm less than thrice the length of shortest side, then find the dimensions of the triangle.	5

PA = PB

$\sqrt{36+y^2+25-10y} = \sqrt{16+y^2+49-8y}$

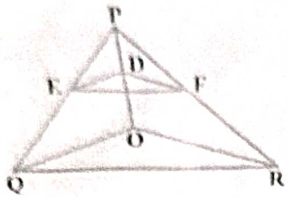
$61+10y = 25-6y$

$36 = 4y$

$y = 9$

State and prove BPT Theorem. 5

OR



In figure, DE || OQ and DF || OR. Show that EF || QR.

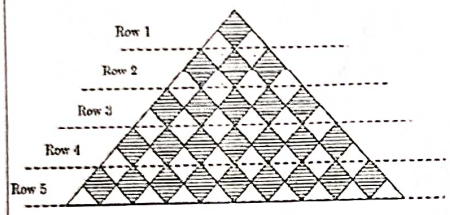
34. If (1, 2), (4, y), (x, 6) and (3, 5) are the vertices of a parallelogram taken in order, find x and y. 5

35. Find three numbers in A.P. whose sum is 21 and their product is 231. 5

SECTION – E

36. Case study I

A fashion designer is designing a fabric pattern. In each row, there are some shaded squares and unshaded triangles. 1



a) Identify A.P. for the number of squares in each row. 2

b) If each shaded square is of side 2 cm, then find the shaded area when 15 rows have been designed. 1

c) Identify A.P. for the number of triangles in each row.

37. Case study II

While designing the school year book, a teacher asked the student that the length and width of a particular rectangular photo is increased by n units each to double the area of the photo. The original photo is 18 cm long and 12 cm wide.

Based on the above information. answer the following Questions:

a) Write an algebraic equation depicting the above information. 1

b) What should be the new dimensions of the enlarged photo? 2

OR

Can any rational value of x make the new area equal to 220 cm^2 ?

c) Write the corresponding quadratic equation in standard form. 1

38. Case study III

A school has a book bank for the help of students from the economically weaker section. Students of class X donated the following number of books to the book bank.

English : 96

Hindi : 240

Mathematics : 336

These books have to be stacked in such a way that all the books are stored topic-wise and number of copies in each stack is the same.

a) Which mathematical concept is used in the above problem? 1

b) What is the maximum number of books in each stack? 2

c) By donating books through the school book bank which value is depicted by the students of class X? 1