SUBJECT : MATHEMATICS
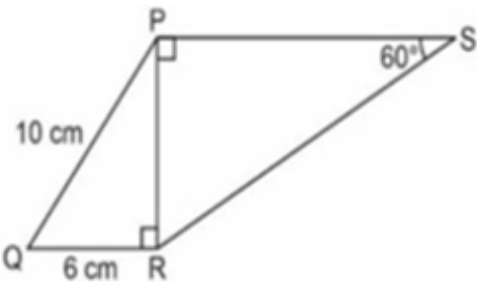## Class : X

M.M – 40   **TIME : 1.30** Hrs

General   Instructions

1. All the questions are compulsory

2. This question paper is divided into 5 sections A ,B ,C ,D and E containing 20 questions.

3. Section A (Q.1 - 10) comprising 10 questions, I mark each

  Section B (Q .11 - 14) comprising 4 questions, 2 marks each.

  Section C (Q.15-17)) comprising 3 questions, 3 marks each

  Section D (Q.18) comprising 1 question of 5 marks

  Section (Q.19-20) comprising 2 Case study based questions of 4 marks each

Q.no.	SECTION A	marks
1	The largest number which divides 70 and 125 leaving remainders 5 and 8 respectively , is (a)13 (b) 65 (c)875 (d)1750	1
2	If one of the zeroes of the quadratic polynomial $(k-1)x^2 + kx + 1$ is -3, then the value of k is (a)$\frac{4}{3}$ b) $-\frac{4}{3}$ (c) $\frac{2}{3}$ (d) $-\frac{2}{3}$	1
3	If the zeroes of the quadratic polynomial $x^2 + (a+1)x + b$ are 2 and -3, then (a)a = -7, b = -1 (b)a=5 , b = -1 (c)a = 2 , b = -6 (d)a =0,b = -6	1
4	The quadratic equation $2x^2 - 25 x + 1 = 0$ has (a)two distinct real roots (b)two equal roots (c) no real roots (d) more than 2 real roots	1
5	A line intersects the y-axis and x - axis at the points P and Q, respectively. If (2,-5) is the mid- point of PQ , then the coordinates of P and Q are respectively. (a)(0,-5) and (2,0) (b)(0,10) and (-4,0) (c)(0,4) and (-10,0) (d)(0,-10) and (4,0)	1
6	Two alarm clocks ring their alarms at regular intervals of 50 seconds and 48 seconds. If they first beep together at 12 noon, at what time will they beep again for the first time ? (a) 12.20pm (b)12.12 pm (c)12.11pm (d)12.18pm	1
7	In the quadrilateral PQRS, PR is perpendicular to QR and PS What is the value of tan Q?	1

	(a)$\frac{3}{5}$ b) 1 (c) $\frac{1}{2}$ (d) $\frac{4}{3}$	
8	If $\sin \alpha = \frac{1}{2}$ and $\cos \beta = \frac{1}{2}$, then the value of $(\alpha + \beta)$ is

(a)0° (b)30° (c)60° (d)90° | 1 |
| | (Assertion Reason based question)

Directions: In the question numbers 9 and 10 , a statement of assertion (A) is followed by a statement of reason(R).Choose the correct option from the following :

a) Both (A) and (R) are true.(R) is the correct explanation of (A).

(b) Both (A) and (R) are true but (R) is not the correct explanation of (A)

(c) (A) is true but (R) is false.

(d) (A) is false but (R) is true. | |
| 9 | Assertion (A): The value of y is 6, for which the distance between the points P(2, -3) and Q(10, y) is 10.

Reason (R): Distance between two given points $A(x_1 , y_1)$ and $B(x_2 , y_2)$ is given by

$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$ | 1 |
| 10 | Assertion (A): The H.C.F of two numbers is 16 and their product is 3072. Then their L.C.M is 192.

Reason (R): If a and b are 2 positive integers then HCF $\times$ LCM = a $\times$ b | 1 |
| | **SECTION B** | |
| 11 | If (a ,b) are the mid-point of the line segment joining the point A(10,-6) and B(k,4) and

a $-2b = 18$. Find the value k and the distance AB. | 2 |
| 12 | If $\cot^2 45^\circ - \sec^2 60^\circ + \sin^2 60^\circ + p = \frac{3}{4}$,then find the value of p. | 2 |
| 13 | Rahul solves an Quadratic equation $3x^2 - 11x - 20 = 0$ and finds the roots as 5 and $\frac{4}{3}$. Is the roots correct? Justify your answer. | 2 |
| 14 | If $\sin A + \cos A = \sqrt{3}$, then find the value of $\sin A.\cos A$

OR

Show that $\tan^4 A + \tan^2 A = \sec^4 A - \sec^2 A$ | 2 |
	SECTION - C	
15	Prove that $\sqrt{3}$ is an irrational number.	3
16	Find the zeroes of the polynomial $3x^2 + 11x - 4$ and verify the relationship between the zeroes and the coefficient of the polynomials.	3
17	Prove that : $\frac{\tan \theta + \sec \theta - 1}{\tan \theta - \sec \theta + 1} = \frac{1 + \sin \theta}{\cos \theta}$	3
	SECTION - D	
18	A train , travelling at a uniform speed for 360 km , would have taken 48 minutes less to travel the same distance of its speed were 5km/h more . Find the original speed of the train.

OR

The denominator of a fraction is one more than twice the numerator. If the sum of the fraction and its reciprocal is $\frac{216}{21}$, find the fraction | 5 |
| | **SECTION - E** | |

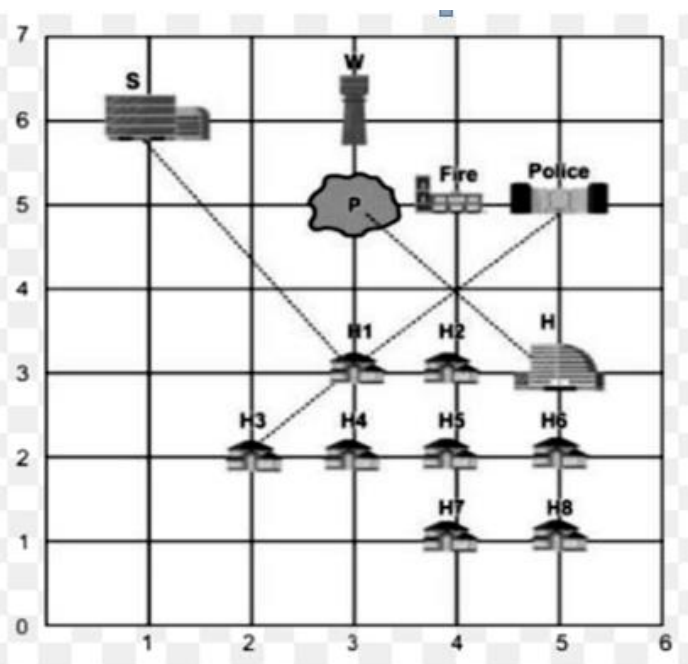| 19	**Case study 1**	
	A seminar is being conducted by an Educational Organization, where the participants will be educators of different subjects. The number of participants in Hindi, English and Mathematics are 60, 84, and 108 respectively. Based on the above information answer the following question: (i)In each room the same number of participants are to be seated and all of them being in the same subject. How many maximum number of participants can accommodated in each room? (ii) What is the minimum number of rooms required during the event? (iii)What is the LCM of 60, 84 and 108 ?	1 1 2
	OR	
	(iii) Express 510 as product prime factors and write the sum of exponents of all prime factors.	1
20	Shown below is a town plan on a coordinate grid , where 1 unit = 1km . Consider the coordinates of each building to be the point of intersection of the respective grid lines	
		1 2 2 1
	Based on the above information answer the following question: (i)Write the coordinates of hospital. (ii)What is the distance between the School and House1 along the path shown?	
	OR	
	(ii) What is the ratio in which House H1 divides the path joining House H3 and the police station?	
	(iii)Write the ordinate of House H2.	