SHIKSHA CLASSES

Pre. Question Paper - 01

Sub. : Maths **Total Marks : 80**
Std. X (CBSE) **Time : 3 hours**

	SECTION A **Section A consists of 20 questions of 1 mark each**	
1.	If $6370 = 2^m.5^n.7^k.13^p$, then the value of $m + n + k + p$ is a) 2 b) 3 c) 4 d) 5	1
2.	Which one of the following is not a quadratic equation? a) $(x + 2)^2 = 2(x + 3)$ b) $x^2 + 3x = (–1)(1 – 3x)^2$ c) $(x + 2)(x – 1) = x^2 – 2x – 3$ d) $x^3 – x^2 + 2x + 1 = (x + 1)^3$	1
3.	If the zeroes of the quadratic polynomial $ax^2 + bx + c$, are equal, then a) c and a have opposite signs b) c and b have opposite signs c) c and a have the same signs d) c and b have same sign	1
4.	The pairs of equations $x + 2y – 5 = 0$ and $– 4x – 8y + 20 = 0$ have: a) Unique solution b) Exactly two solutions c) Infinitely many solutions d) No solution	1
5.	A point G divides a line segment in the ratio 3 : 7. The segment starts at the origin and ends at a point K having 20 as its abscissa and 40 as its ordinate. Given that G is closer to the origin than to point K, which of the following are the co-ordinates of point G? a) (6, 12) b) (12, 6) c) (14, 28) d) (28, 14)	1

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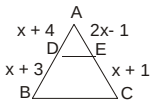
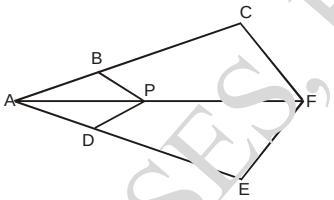
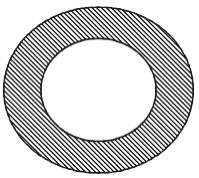
6.	In fig, DE || BC find the value of x.  a) $\sqrt{5}$ b) $\sqrt{6}$ c) $\sqrt{3}$ d) $\sqrt{7}$	1
7.	If $\tan\alpha = \sqrt{3}$ and $\tan\beta = \frac{1}{\sqrt{3}}, 0 < \alpha,\beta < 90^0$ then the value of $\cot(\alpha+\beta)$ is a) $\sqrt{3}$ b) 0 c) $\frac{1}{\sqrt{3}}$ d) 1	1
8.	The value of $\frac{4 - \sin^2 45^0}{\cot k.\tan 60^0}$ is 3.5 What is the value of k ? a) 30^0 b) 45^0 c) 60^0 d) 90^0	1
9.	In fig, if PB || FC and DP || EF, AB = 2 cm, AC = 8 cm, then find $\frac{AD}{DE}$.  a) $\frac{3}{4}$ b) $\frac{1}{3}$ c) $\frac{1}{4}$ d) $\frac{2}{3}$	1
10.	The diameter of a wheel is 1m. The number of revolutions it will make to travel a distance of 22km will be a) 2800 b) 4000 c) 5500 d) 7000	1
11.	If the sum of the areas of two circles with radii R_1 and R_2 is equal to the area of a circle of radius R, then a) $R_1 + R_2 = R$ b) $R_{12} + R_{22} = R_2$ c) $R_1 + R_2 < R$ d) $R_{12} + R_{2\,2} < R_{\,2}$	1
12.	Two coins of diameter 2 cm and 4 cm respectively are kept one over the other as shown in the figure. The area of the shaded ring shaped region in square cm is  a) π b) 2π c) 3π d) 4π	1

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13.	The probability of event equal to zero is called; a) Unsure event b) Sure Event c) Impossible event d) Independent event	1
14.	The mode and mean is given by 7 and 8, respectively. Then the median is: a) $\frac{1}{13}$ b) $\frac{13}{3}$ c) $\frac{23}{3}$ d) 33	1
15.	The missing terms in AP:___, 13,___, 3 are: a) 11 and 9 b) 17 and 9 c) 18 and 8 d) 18 and 9	1
16.	For the following distribution **Class** | 0 – 10 | 10 – 20 | 20 – 30 | 30 – 40 | 40 – 50 **Frequency** | 20 | 30 | 24 | 40 | 18 the sum of lower limits of the modal class and the median class is a) 20 b) 30 c) 40 d) 50	1
17.	The roots of the equation $7x^2 + x - 1 = 0$ are a) real and distinct b) real and equal c) not real d) none of these	1
18.	$\sqrt{\frac{1+\cos\theta}{1-\cos\theta}}$ is equal to a) $\operatorname{cosec}\theta + \cot\theta$ b) $\operatorname{cosec}\theta - \cot\theta$ c) $\cot\theta - \operatorname{cosec}\theta$ d) $\operatorname{cosec}^2\theta + \cot^2\theta$	1
19.	**Assertion (A) :** 2 is an example of a rational number. **Reason (R) :** The square roots of all positive integers are irrational numbers. 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 assertion (A). c) Assertion (A) is true but reason (R) is false. d) Assertion (A) is false but reason (R) is true.	1

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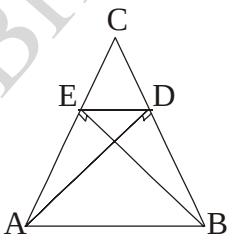
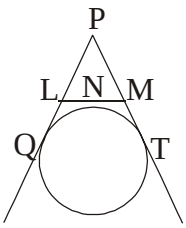
20.	**Assertion (A) :** If the pair of lines are coincident, then we say that pair of lines is consistent and it has a unique solution. **Reason (R) :** If the pair of lines are parallel, then the pairs has no solution and is called inconsistent pair of equations. a) Both assertion (A) and reason (R) 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 assertion (A). c) Assertion (A) is true but reason (R) is false. d) Assertion (A) is false but reason (R) is true.	1
	SECTION B **Section B consists of 5 questions of 2 marks each.**	
21.	If $3x + 2y = 10$ and $7x - 3y = 8$ then find value of xy.	2
22.	In the given figure, AD & BE are perpendiculars to BC and AC respectively. Show that $\triangle ADC \sim \triangle BEC$.  	2
23.	If PQ = 28 cm, then find the perimeter of $\triangle PLM$  	2
24.	Find the ratio of volume of a cone, a cylinder and a hemisphere of same base radius and equal heights. **OR** 12 solid spheres of the same radii are made by melting solid metalic cylinder of base diameter 2 cm and height 16cm. Find the diameter of the each sphere.	2
25.	If $\tan A = \frac{3}{4}$, find the value of $\frac{1}{\sin A} + \frac{1}{\cos A}$. **OR** Prove that $(1 + \cot A - \operatorname{cosec} A)(1 + \tan A + \sec A) = 2$.	2

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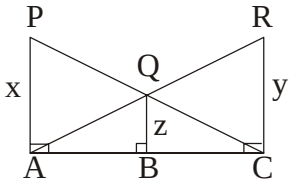
	SECTION C **Section C consists of 6 questions of 3 marks each.**	
26.	Prove that $3-\sqrt{5}$ is irrational, given that $\sqrt{5}$ is irrational.	3
27.	If zeroes of the polynomial $x^2 + (p + 1)x + q$ are 2 and – 3, then find value of p and q.	3
28.	The age of the father is twice the sum of the ages of his 2 children. After 20 years, his age will be equal to the sum of the ages of his children. Find the age of the father. **OR** Speed of a boat in still water is 15 km/h. It goes 30 km upstream and returns back at the same point in 4 hours 30 minutes. Find the speed of the stream.	3
29.	If $\tan\theta = \frac{8}{15}$, then evaluate $\frac{(2+2\sin\theta)(1-\sin\theta)}{(1+\cos\theta)(2-2\cos\theta)}$.	3
30.	$\Delta ABC \sim \Delta PQR$. AD is the median to BC and PM is the median to QR. Prove that $\frac{AB}{PQ} = \frac{AD}{PM}$. **OR** In the given fig. PA, QB and RC are each perpendicular to AC.  Prove that $\frac{1}{x} + \frac{1}{y} = \frac{1}{z}$.	3
31.	Two dice are thrown. Find the probability of getting an odd number on one die and a multiple of 3 on the other.	3

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	SECTION D **Section D consists of 4 questions of 5 marks each.**	
32.	At a point on level ground, the angle of elevation of a vertical tower is found to be such that its tangent is $\frac{5}{12}$. On walking 192m towards the tower, the tangent of the angle of elevation is $\frac{3}{4}$. Find the height of the tower. **OR** The angles of depression of the top and bottom of a 8m tall building from the top of a multi storied building are 30^0 and 45^0, respectively. Find the height of the multi storied building and the distance between the two buildings.	5
33.	a) Prove that the parallelogram circumscribing a circle is a rhombus. b) In figure, a quadrilateral ABCD is drawn to circumscribe a circle, with centre O, in such a way that the sides AB, BC, CD and DA touch the circle at the points P, Q, R and S respectively. Prove that: AB + CD = BC + DA.	5
34.	A pen stand made of wood is in the shape of a cuboid with four conical depressions and a cubical depression to hold the pens and pins respectively. The dimensions of the cuboid are 10cm, 5cm and 4cm. The radius of each of the conical depression is 0.5cm and the depth is 2.1 cm. The edge of the cubical depressions is 3 cm. Find the volume of the wood in the entire stand. **OR** A military tent of height 8.25 m is in the form of a right circular cylinder of base diameter 30 m and height 5.5 m surmounted by a right circular cone of same base radius. Find the length of the canvas used in making the tent, if the breadth of the canvas is 1.5 m.	5

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35. The mean of the frequency distribution given below is 57.6 and the sum of the observatons is 50. Find the missing frequencies. 5

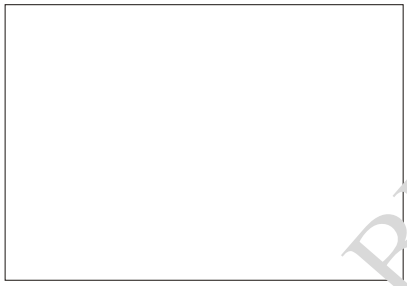
Class	0 – 20	20 – 40	40 – 60	60 – 80	80 – 100	100 – 120
Frequency	7	f_1	12	f_2	8	5

SECTION E

Case study based questions are compulsory.

36. **Case study Based - 1**

Relationship between zero and coefficient of polynomial



Suresh and Ravi are in class 10. They have their maths test within few days. They both are studying together and are discussing polynomials. Suresh told the following facts to Ravi.

- In general, if α and β are the zeroes of the quadratic polynomial $p(x) = ax^2 + bx + c$, $a \neq 0$ then $x - \alpha$ and $x - \beta$ are the factors of $p(x)$.
- Sum of zeroes of $p(x) = -\frac{(\text{coefficient of } x)}{\text{coefficient of } x^2}$
- Product of the polynomial $p(x) = \frac{(\text{constant term})}{\text{coefficient of } x^2}$

a) Find zeroes of the polynomial $\sqrt{3}x^2 + 10x + 7\sqrt{3}$. 1

b) Find sum of zeroes of polynomial $2x^2 - x - 3$. 1

c) If one of the zeroes of the quadratic polynomial $(K - 1)x^2 + Kx + 1$ is -3, then find the value of K. 2

OR

Find the zeroes of the polynomial $3x^2 - 4x - 4$ and verify it.

37. **Case Study :** Making a Model

Pawan, a student of class X, was asked to make a science model shaped like a cylinder with open base and conical above it by using a cardboard sheet.

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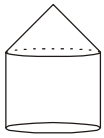
The diameter of the model is 21 cm and its length is 28 cm. The height of cylinder is 20 cm.



a) Find the curved surface area of the cylindrical portion. $\left(\text{Use } \pi = \frac{22}{7}\right)$ 1

b) Find the slant height of the conical portion 1

c) How much is the volume of a cylinder if the radius and height of the base is 7 cm and 14 cm? 2

OR

The material of a cone is converted into the shape of a cylinder of equal radius. If height of the cylinder is 5 cm. then find the height of the cone.

38. **Consumption of Electricity**

The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality :

Monthly consumption	65 – 85	85 – 105	105 – 125	125 – 145	145 – 165	165 – 185	185 – 205
No. of consumers	4	5	13	20	14	8	4

a) Write the modal class of the given distribution. 1

b) What is the class size of the modal class? 1

c) Find the sum of upper limit of modal class and lower limit of median class. 2

OR

Find the mode of the above given data.

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