CLASS X

- **Please check that this question paper contains 4 printed pages.**
- **Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.**
- **Please check that this question paper contains 30 questions.**

General Instructions: -

1. **All questions are compulsory.**
2. **The question paper consists of 30 questions divided into three sections A, B ,C and D . Section A contains 10 questions of 1 marks each, Section B is of 5 questions of 2 marks each, Section C is of 10 questions of 3 marks each and Section D is of 5questions of 6 marks each.**
3. **Write the serial number of the question before attempting it.**
4. **If you wish to answer any question already answered, cancel the previous answer.**
5. **In questions where internal choices is provided. You must attempt only one choice.**

MATHEMATICS

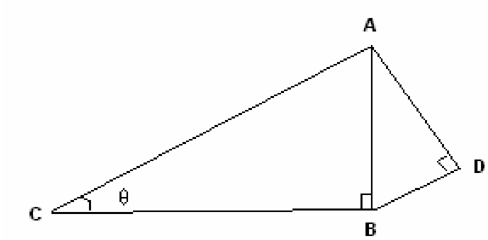
Time Allowed : 3 hours **Maximum Marks : 80**

PART – A

(1) What is the perimeter of a sector of angles 45^0 of a circle with radius 7 cm? (Use $\pi = \frac{22}{7}$)

(2) For what value of k, are the roots of the quadratic equation $kx^2 + 4x + 1 = 0$ equal and real?

(3) In fig, AD=4 cm, BD=3 cm and CB=12 cm, find $\cot\theta$.



(4) Write the next term of the A.P. $\sqrt{2}, \sqrt{8}, \sqrt{18}$..........

(5) Evaluate: $\cos^2 20^0 + \cos^2 70^0 + \sin 48^0 \sec 42^0 + \cos 40^0 \cos ec 50^0$.

(6) If the probability of winning a game is $\frac{5}{11}$, what is the probability of losing it?

(7) In figure $\angle$ABC=90^0 and P is the mid-point of AC. Find the length of BP.

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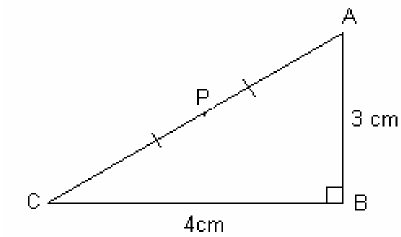
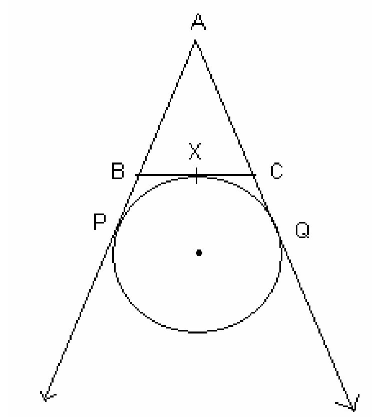


(8) In figure, find in figure, find the perimeter of ΔABC if AP=10 cm.



(9) What is the perimeter of a sector of angles 45^0 of a circle with radius 7 cm? (Use $\pi = \frac{22}{7}$) .

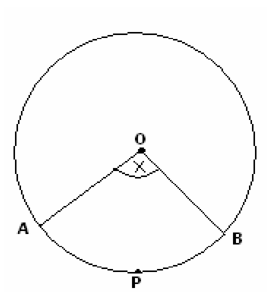
(10) The diameter of a circle is 84 cm. find the number of revolutions it will make in moving 792 meters.

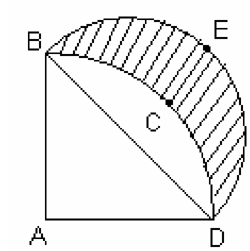
(11) The point of intersection of the ogives (more than and less than type) is given by (20.5, 30.4). What is the median?

PART – B

(12) Find the zeroes of the quadratic polynomial $2x^2 - 9 - 3x$ and verify the relationship between the zeroes and the coefficients.

(13) In fig, O is the centre of a circle. The area of sector OAPB is $\frac{5}{18}$ of the area of the circle. Find x.





OR

In figure, ABCD is a quadrant of a circle of radius 14 cm and a semi-circle BED is drawn with BD as diameter. Find the area of the shaded region.

(14) If the vertices of a triangle are (1, k), (4, -3), (-9, 7) and its area 15 square units, find the value of k.

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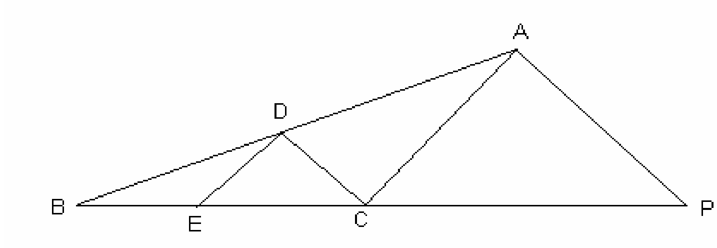
(15) A box contains cards bearing numbers from 6 to 70. If one card is drawn at random from the box, find the probability that it bears (i) a one digit number, (ii) a number divisible by 5.

(16) In figure, DE | | AC and $\frac{BE}{EC} = \frac{BC}{CP}$. Prove that DC | | AP.



PART – C

(17) Using prime factorization method, find the HCF and LCM of 72, 126 and 168. Also show that HCF$\times$LCM$\neq$product of the three numbers.

(18) Represent the following system of linear equations graphically. From the graph, find the points where the lines intersect x-axis: 2x-y = 2 ; 4 x – y = 8 .

(19) Solve the following system of equations for x and y:

$$(a-b)x+(a+b)y = a^2-2ab-b^2; (a+b)(x+y) = a^2+b^2 .$$

OR

For what value of 'm' will the equation $2mx^2 - 2(1+2m)x + (3+2m) = 0$ have real and equal roots?

(20) Prove that: $\dfrac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = \cos ec\theta + \cot\theta$.

OR

Prove that: $(\cos ec\theta - \sin\theta)(\sec\theta - \cos\theta) = \dfrac{1}{\tan\theta + \cot\theta}$.

(21) Find the sum of all two digit natural numbers which when divided by 7 yield 1 as remainder.

(22) The line joining the points (2, -1) and (5, -6) is bisected at P. if P lies on the line 2x+4y+k=0, find the value of k.

(23) In ΔABC, if AD is the median, show that $AB^2 + AC^2 = 2\left(AD^2 + BD^2\right)$.

(24) Determine the ratio in which the line 3x+4y-9=0 divides the line-segment joining the points (1, 3) and (2, 7).

(25) Construct a triangle with sides 4 cm, 5 cm, 7 cm. Then, construct a triangle to it whose sides are $\frac{2}{3}$ of the corresponding sides of the given triangle.

(26) A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 6km/h, in how much time will the tank be filled?

OR

In figure, AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OD is the diameter of the smaller circle. If OA=14 cm, Find the area of the shaded region .

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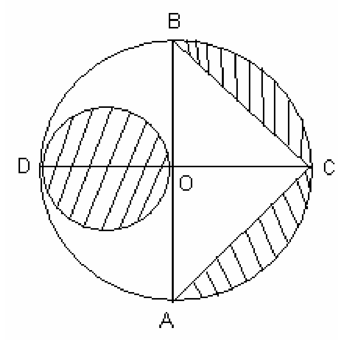


PART – D

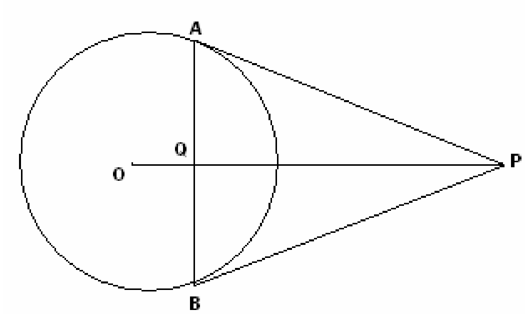
(27) Rs 6500 is divided equally among a certain number of persons. Had there been 15 more persons, each would have got Rs 30 less. Find the original number of persons.

OR

In a class test, the sum of Gagan's marks in Mathematics and English is 45. If he had 1 more mark in Mathematics and 1 less in English, the product of marks would have been 500. Find the original marks obtained by Gagan in Mathematics and English separately.

(28) The angle of elevation of a jet-plane from a point P on the ground is 60^0. After a flight of 15seconds, the angle of elevation changes to 30^0. If the jet-plane is flying at a constant height of $1500\sqrt{3}$ m, find the speed of the jet-plane is km/hour.

(29) Prove that the lengths of tangents drawn from an external point to a circle are equal. Making use of the above, prove the following:
From an external point P, two tangents PA and PB are drawn to a circle with centre O as shown in figure. Show that OP is the perpendicular bisector of AB.



OR

Prove that the ratio of the areas of two similar triangles is equal to the ratio of the squares on their corresponding sides.
Using the above, prove the following:
If the areas of two similar triangles are equal, prove that they are congruent.

(30) A bucket is in the form of a frustum of a cone whose radii of bottom and top are 7 cm and 28 cm respectively. If the capacity of the bucket is 21560 cube cm, find the whole surface area of the bucket.

(31) Find the mean, mode and median for the following data :

Classes	5-15	15-25	25-35	35-45	45-55	55-65	65-75
Frequency	2	3	5	7	4	2	2

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