



KULAPATI MUNSHI BHAVAN'S VIDYA MANDIR, POTTORE THRISSUR
MODEL EXAM - 2017

Grade: X

MATHEMATICS

Time: 3 Hrs

Date: 30.01.2017

Max. Marks: 90

GENERAL INSTRUCTIONS

There is no overall choice in this question paper.

Use of calculator is not permitted.

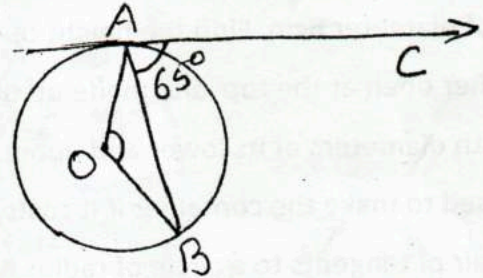
The question paper consists of 31 questions divided into four sections A, B, C and D. Section-A comprises of 4 questions of 1 mark each; Section B comprises of 6 questions of 2 marks each; Section C comprises of 10 questions of 3 marks each and Section D comprises of 11 questions of 4 marks each.

SECTION - A

1. The first and last terms of an AP are 1 and 11 respectively. If the sum of its terms is 36, find the number of terms.

2. Find the ratio in which the line joining (3,4) and (-2, 1) is divided by Y-axis.

3. In the given fig: If O is the centre of the circle, AB is a chord and the tangent AC at A makes an angle of 65° with AB, then find $\angle AOB$.



4. A pair of die is thrown. Find the probability of getting sum of numbers which is perfect square and is divisible by 5.

SECTION - B

5. Find the roots of the following quadratic equation : $4x^2 - 4px + (p^2 - q^2) = 0$.

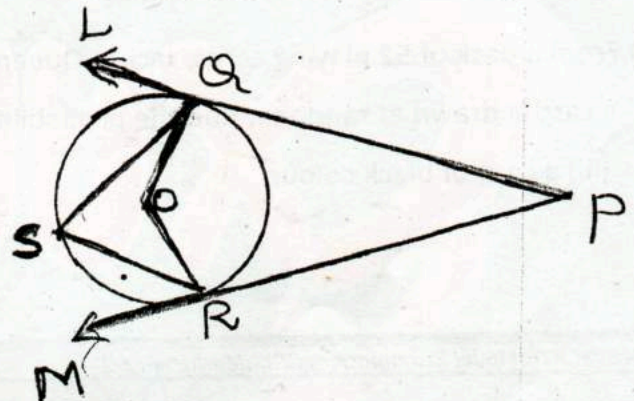
6. Find the number of natural numbers between 101 and 999 which are divisible by both 2 and 5.

7. A bicycle wheel makes 5000 revolutions in moving 11 km. Find the diameter of the wheel. (use $\pi = \frac{22}{7}$)

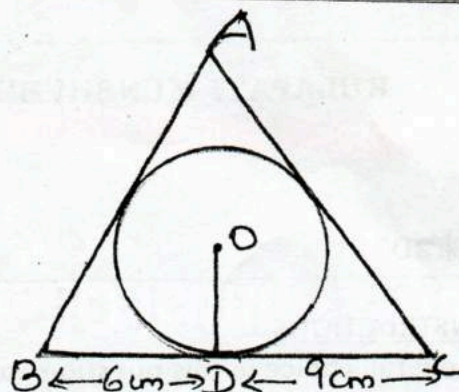
8. In a wooden cube, a conical depression is made and wood is taken out. If the diameter of this conical depression is 1 cm and depth 1.4 cm, find the volume of wood of the cone.

9. PQL and PRM are tangents to a circle with centre O at points Q and R respectively, S is a point on the circle such that $\angle SQL = 50^\circ$ and $\angle SRM = 60^\circ$.

Find the value of $\angle QSR$.



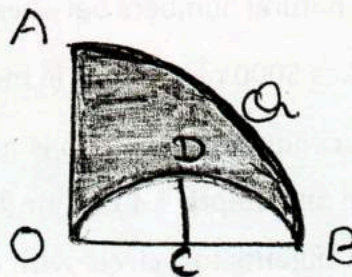
10. In the given fig: a ΔABC is drawn to circumscribe a circle of radius 3cm, such that the segments BD and DC are respectively of lengths 6cm and 9cm. If the area of ΔABC is 54cm^2 , then find the length of sides AB and AC.



SECTION - C

11. If the roots of the quadratic equation $(a-b)x^2 + (b-c)x + (c-a) = 0$, $a \neq b$ are equal, then prove that $b+c = 2a$.
12. The sum of the 2nd and the 7th terms of an AP is 30. If its 15th term is one less than twice its 8th term, find the AP.
13. If $A(x, y)$ is the midpoint of the line segment joining the points $P(5, 3)$ and $Q(k, 7)$ and lies on the line $x + y = 10$, then find the value of k .
14. A hemispherical bowl of internal diameter 36cm contains liquid. This liquid is filled into 72 cylindrical bottles of diameter 6cm. Find the height of each bottle if 10% of liquid is wasted in this transfer.
15. A container open at the top and made up of metal sheet is in the form of a frustum of a cone of height 16cm with diameters of its lower and upper ends as 16cm and 40cm respectively. Find the cost of metal sheet used to make the container if it costs ₹10 per 100cm^2 . (use $\pi = 3.14$)
16. Draw a pair of tangents to a circle of radius 4.5 cm which are inclined to each other at an angle of 45° .
17. A motor boat whose speed in still water is 18 km / hr takes 1 hour more to go 24km upstream than to return downstream to the same spot. Find the speed of the stream.
18. The angle of elevation of an aeroplane from a point A on the ground is 60° . After a flight of 15 seconds, the angle of elevation changes to 30° . If the aeroplane is flying at a constant height of $1500\sqrt{3}\text{m}$ find the speed of the plane in km / hr.

19. OAQB is a quadrant of a circle with centre O. C is the midpoint of OB. $CD = CO = 7\text{cm}$. Find the area of the shaded region.



20. From a pack of 52 playing cards, Jacks, Queens and Kings of red colour are removed. From the remaining, a card is drawn at random, find the probability that drawn card is (i) a black king (ii) a card of red colour, (iii) a card of black colour.



SECTION- D

21. Solve for x : $(\frac{2x}{x-5})^2 + \frac{10x}{x-5} - 24 = 0, x \neq 5$.

22. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

23. The vertices of parallelogram ABCD are A(3, -4), B(-1, -3) and C(-6, 2). Find the co-ordinates of vertex D. and also find the area of parallelogram ABCD.

24. From a point on the ground, the angle of elevation of the top of a tower is observed to be 60°. From a point 40m vertically above the first point of observation, the angle of elevation of the top of the tower is 30°. Find the height of the tower and its horizontal distance from the point of observation.

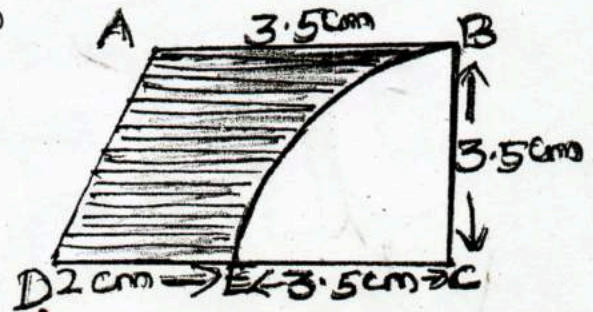
25. Draw a ΔPQR in which PQ = 4cm, QR = 6cm, PR = 9cm. Construct a triangle similar to the given triangle with scale factor $\frac{1}{2}$.

26. The age in years of a mother is twice the square of the age of her daughter. Eight years from now, the age of mother will be 4 years more than three times the age of the daughter. Find their present ages.

27. A heap of rice is in the form of a cone of diameter 9m and height 3.5m, find the volume of the rice. How much canvas cloth is required to just cover the heap. (Take $\pi = \frac{22}{7}$).

28. A sum of ₹2750 is to be used to give ten cash prizes to the students of a school for their overall academic performance. If each prize is ₹50 less than the preceding prize. find the value of each prize.

29. From a thin metallic piece, in the shape of a trapezium ABCD in which AB || CD and $\angle BCD = 90^\circ$, a quarter circle BEFC is removed. Given AB = BC = 3.5 cm and DE = 2 cm Calculate the area of the remaining (shaded) part of the metal sheet. (use $\pi = \frac{22}{7}$)



30. Due to heavy floods in a state, thousands were rendered homeless. 50 schools collectively offered to the state government to provide place and the canvas for 1500 tents to be fixed by the government and decided to share their whole expenditure equally. The lower part of each tent is cylindrical of base radius 2.8m and height 3.5m, with conical upper part of same base radius but of height 2.1m. If the canvas used to make the tents costs ₹120 per m², then find the amount shared by each school to set up the tents. What value is generated by the above problem? (Take $\pi = \frac{22}{7}$).

31. A card is drawn at random from well shuffled deck of playing cards. Find the probability that the card drawn is (i) a card of spade or an ace. (ii) a black king. (iii) neither a jack nor a king. (iv) either a king or a queen.

