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Class - X

Mathematics

GENERAL INSTRUCTIONS:

1. All questions are compulsory.
2. The question paper consists of thirty four questions divided into four sections A, B, C & D. Section A comprises of ten questions of 01 marks each, Section B comprises of eight questions of 02 marks each, Section C comprises of ten questions of 03 marks each and section D comprises of six questions of 04 marks each.
3. All questions in section A are multiple choice questions where you are to select one correct option out of given four.
4. There is no overall choice. However internal choice has been provided in one question of 02 marks each, three questions of 03 marks each and two questions of 04 mark each. You have to attempt only one of the alternatives in all such questions.
5. Use of calculators is not permitted.

Section - 'A'

1. If $x = \frac{2}{3}$ is a solution of the equation $kx^2 - x - 2 = 0$, then the value of k is:
(a) $k = -6$ (b) $k = 6$
(c) $k = 3$ (d) $k = 2$
2. If $4k + 8$, $2x^2 + 3k + 6$, $3k^2 + 4k + 4$ are the three successive terms of an A.P., then the value of k is:
(a) 0 or 1 (b) 0 or 2
(c) 1 or 2 (d) 0 or - 2
3. Two consecutive circles are of radii 5cm and 3cm. The length of the chord of the larger circle touches the smaller circle is:
(a) 4cm (b) 8cm
(c) 7cm (d) 9cm
4. A point 'A' is 13cm from the centre of the circle. The length of the tangent drawn from 'A' to the circle is 12cm. The radius of the circle is:
(a) $\sqrt{313}$ cm (b) 5cm
(c) 8cm (d) 10cm
5. If all the sides of a parallelogram touches the circle, then the parallelogram is:
(a) square (b) rhombus
(c) rectangle (d) kite
6. If TP & TQ are two tangents to a circle with centre O so that $\angle POQ = 80^\circ$, then $\angle PTQ$ is equal to:
(a) 60° (b) 100°
(c) 70° (d) 120°
7. Three solid spheres of radii 3cm, 4cm and 5cm respectively are melted & converted into a single solid sphere. The radii of the sphere is:
(a) 12cm (b) 6cm
(c) 8cm (d) 10cm

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8. The area of sector of a circle whose radius is 14cm & the angle of sector is 45° , is:
- (a) 66cm^2 (b) 77.5cm^2
(c) 77cm^2 (d) 88cm^2
9. If the altitude of the sun is 60° , then the height of the vertical tower that will cast a shadow of length 30m is:
- (a) $30\sqrt{3}\text{m}$ (b) 15m
(c) $\frac{30}{\sqrt{3}}\text{cm}$ (d) $15\sqrt{2}\text{m}$
10. Out of 15 boys and 10 girls of a class, one student is to be selected as monitor of the class. The probability of selecting a girl is:
- (a) $\frac{2}{3}$ (b) $\frac{3}{2}$
(c) $\frac{2}{5}$ (d) $-\frac{2}{5}$

Section - 'B'

11. Solve for x : $36x^2 - 12ax + a^2 - b^2 = 0$
12. Find the sum of all three digit numbers which are multiple of
13. The length of a tangent drawn from a point Q outside the circle is 16cm . The radius of the circle is 12cm . Find the distance between Q & the centre of the circle.
14. Find the area of a ring shaped region enclosed between two concentric circles of radii 20cm & 15cm .
15. A cubical block of side 7cm is surmounted by a hemisphere. What is the greatest diameter the sphere can have? Find the surface area of the solid.
16. Find the co-ordinates of a point which divides the join of $(-1, 7)$ & $(4, -3)$ in the ratio 2:3.
17. Find the value of ' k ' for which the following points are collinear: $(7, -2)$, $(5, 1)$, $(3, k)$.
18. A pair of dice is thrown once, find the probability of getting a total of 11.

OR

Find the probability of two friends having (i) different birthdays (ii) the same birthdays (assuming that none of them is born in a leap year).

Section - 'C'

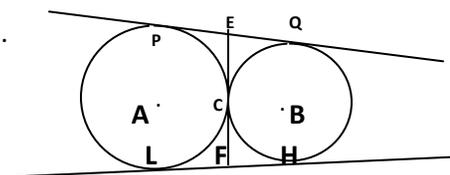
19. Find the roots of the following equation, if they exist:

$$\frac{x+2}{x+1} + \frac{x+4}{x+3} = \frac{x+3}{x+2} + \frac{x+5}{x+4}, \quad x \neq -1, 3, -2, -4$$

OR

The difference of squares of two natural numbers is 45. The square of the smaller number is four times the larger number. Find the numbers.

20. In an A.P. the sum of its first n terms is $n^2 + 2n$. Find the 16^{th} term.
21. In the given figure, two circles touch each other externally at C. Prove that the common tangent at C bisects the other two common tangents.



OR

PQ & PR are the tangents of the circle with centre O. PS passes through O. If $PQ=12\text{cm}$, $OQ=5\text{cm}$. Find PS.

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22. Construct a ΔABC in which $AB=4.5\text{cm}$, $BC=5\text{cm}$ & angle $B=60^\circ$. Draw a triangle similar to ΔABC whose sides are $\frac{3}{2}$ of the corresponding sides of ΔABC .
23. Three horses are tethered with a 7m long rope at the three corners of a triangular field having sides 20m , 34m & 42m . Find the area
24. A container made up of a metal sheet is in the form of a frustum of a cone of height 16cm with radii of its lower & upper end as 8cm and 20cm respectively. Find the cost of the milk which can completely fill the container at the rate of Rs20 per litre.

OR

A toy is in the form of a cone mounted on a hemisphere of radius 3.5cm . If the total height of the toy is 15.5cm , find its total surface area of the toy.

25. A statue 1.46cm tall, stands on the top of a pedestal from a point on the ground, the angle of elevation of the top of the statue is 60° & from the same point, the angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal. $\sqrt{3} = 1.73$
26. If the distances of P x, y from the points A $3, 6$ & B $-3, 4$ are equal, prove that $3x + y = 5$.
27. For what value of ' p ', are the points $2, 1$, $p, -1$ & $-1, 3$ are collinear?
28. From a well-shuffled pack of 52cards black aces & black queen are removed. From the remaining cards, a card is drawn at random. Find the probability of drawing a king or a queen.

Section – 'D'

29. A peacock is sitting on the top of a pillar, which is 9m high. From a point 27m away from the bottom of a pillar a snake is coming to its hole at the base of the pillar. Seeing the snake the peacock pounces on it. If their speeds are equal, at what distance from the hole is the snake caught?

OR

Two pipes running together can fill a cistern in $2\frac{8}{11}$ minutes. If one pipe takes one minute more than the other to fill the cistern, find the time in which each pipe would fill the cistern.

30. The sum of the first 20 terms of an A.P. is equal to the sum of first 30 terms. Show that the sum of its first 50 terms is zero.
31. Prove that the intercept of the tangents between two parallel tangents to a circle subtends a right angle at centre.
32. A cylindrical container filled with ice-cream whose diameter is 12cm & height is 15cm . The whole ice-cream is distributed to 10 children in equal cones having hemispherical tops. If the height of the conical portion is twice the diameter of its base, find the diameter of the ice-cream cone.

OR

A cylindrical measuring jar of internal diameter 8cm is partially filled with water. One ball of diameter 2cm & one cone of radius 2cm & height 3cm are dropped in it. Both are submerged in water completely. What will be the change in level of water in jar?

33. A car is travelling on a straight road leading to a tower. From a point at a distance of 500m from the tower, the angle of elevation of the top of the tower as seen by the driver is 30° . After driving towards the tower for 10seconds , the angle of elevation of the top of the tower as seen by the driver is found to be 60° . Find the speed of the car.

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34. If the radii of the circular ends of conical buckets which is 45cm high are 28cm & 7cm, find the capacity of the bucket. use $\pi = \frac{22}{7}$

M. C.Q. Answers:

1. b
2. b
3. b
4. b
5. b
6. b
7. b
8. c
9. a
10. c

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