ॐ ॐ UNIVERSAL EDUCATION CENTRE

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Time – 3 Hrs   MATHS 10TH M.M. 90

SECTION – A

Question numbers 1 to 8 carry one mark each. For each questions, four alternative choices have been provided of which only one is correct. You have to select the correct choice.

Q.1 Which constant should be added and subtracted to solve the quadratic equation $4x^2 - \sqrt{3}x - 5 = 0$ by the method of completing the squares ?

(A) $\frac{9}{16}$ (B) $\frac{3}{16}$ (C) $\frac{3}{4}$ (D) $\frac{\sqrt{3}}{4}$

Q.2 The 2lst term of the AP whose first two terms are -3 and 4 respectively, is

(A) 77   (B) 137   (C) 143   (D) -143

Q.3 A tangents PT at a point T of a circle of a radius 8cm meets a line through the centre O at a point P, so that OP=17cm. The length of PT is :-

(A) 12 cm   (B) 8.5 cm   (C) 7.5 cm   (D) 15 cm

Q.4 In the given figure, O is the centre of a circle, PQ is a chord and the tangent PR at P makes an angle of 50 with PQ. The ∠POQ. is equal to :
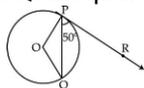
(A) 100˚   (B) 80˚   (C) 90˚   (D) 75˚

Q.5 Two parallel lines touch the circle at points A and B. If area of the circle is 25 π cm^2, then AB is equal to :

(A) 5 cm   (B) 8 cm   (C) 10 cm   (D) 25 cm

Q.6 To draw two tangents to a circle from an external point inclined to each other at an angle of 100˚ , it is required to draw tangents at the ends of two radii , the angles between which is

(A) 80˚   (B) 100˚   (C) 90˚   (D) 50˚

Q.7 A cylindrical pencil sharpened at one edge is the combination of :

(A) a cone and a cylinder   (B) frustum of   a cone and cylinder

(C) a hemisphere and a cylinder   (D) two cylinders

Q.8 Area of the largest triangle that can be inscribed in a semi – circle of radius r units is

(A) r^2 sq. units   (B) $\frac{1}{2}$ r^2 sq. units.   (C) 2 r^2 sq. units   (D) $\sqrt{2}$ r^2 sq. units

SECTION – B   Question number 09 to 14 carry 2 marks each.

Q.9 Find The angle of elevation of the top of a 15m high tower at a point 15m away from the base af the tower.

Q.10 A single letter is selected at random from the word 'PROBABILITY'. Find The probability that it is a   vowel.

Q.11 The product of two consecutive positive integers is 306. Find the integers.

Q.12 Which term of the A.P. 8, 14, 20, 26……. will be 72 more than its 41$_{st}$ term ?

Q.13 If all the sides of a parallelogram touch a circle, show that the parallelogram is a rhombus

Q.14 A road which is 7m wide surrounds a circular park whose circumference is 352m. Find the area of the road.

SECTION – C   Question numbers 15 to 24 carry 3 marks each.

Q.15 How many spherical bullets can be made out of a solid cube of lead whose edge measures 44 cm, each bullet being 4cm in diameter ?

Q.16 In what ratio the line segment joining the points (-2,-3) and (3,7) is divided by the y – axis ? Also, find the co – ordinates of the point of division.

Q.17 Find a relation between *x* and y such that P (*x*, y) is equidistant from the points A (7, 1) and B (3, 5)

Q.18 In a single throw of two dice, Find the probability of getting a total of 8 ?   **OR**

A card is drawn from a well shuffled pack of 52 cards. Find the probability of getting. (i) a face card (ii) a red ace.

Q.19 Solve for x : $2\left(\frac{x-1}{x+3}\right) - 7\left(\frac{x+3}{x-1}\right) = 5, \ x \neq -3,1$ **OR**

Solve for $x : \ 36x^2 - 12ax + a^2 - b^2 = 0$

Q.20 A man starts repaying a loan with first monthly installment of Rs 1000. If he increases the installment by Rs 50 every month, what amount he will pay in the 30th installment ?

Q.21 In the given figure, the two circles touch each other externally at C. Prove that the common tangent at C bisects the other two tangents.
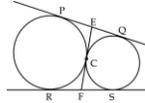
OR

In figure the incircle of ΔABC touches the sides BC, CA and AB at D, E and F respectively. Show that

AF+BD+CE=AE+BF+CD = $\frac{1}{2}$ (Perimeter of ΔABC)
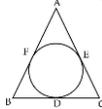
Q.22 Draw a line segment AB of length 7cm. Taking A as centre, draw a circle af radius 3cm and taking B as centre, draw another circle af radius 2.5cm. Construct tangents to each circle from the centre of the other circle.

Q.23 In the given figure, ABC is a right angled triangle right angled at A. Semi – circles are drawn on AB, AC and BC as diameters. Find the area of the shaded region.
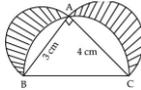
Q.24 A vessel is in the form of a hemispherical bowl surmounted by a hollow cylinder. The diameter of the hemisphere is 14cm and the total height of the vessel is 13cm. Find the capacity of the vessel.   **OR**

A toy is in the form of a cone of radius 3.5cm mounted on a hemisphere of same radius. The total height of the toy is 15.5cm. Find the volume of the toy.

SECTION – D   **Question numbers 25 to 34 carry 4 marks each.**

Q.25 A tree 12m high is broken by the wind in such a way that its top touch the ground and makes an angle of 60° with the ground. At what height from the bottom the tree is broken by the wind ?

Q.26 Show that the points A (5, 6), B (1, 5), C (2, 1) and D (6, 2) are the vertices of a square ABCD.

Q.27 The point R divides the line segment AB, where A(- 4, 0) and B (0, 6) are such that AR = $\frac{3}{4}$ AB. Find the co – ordinates of R.

Q.28 A number is selected from the numbers 1, 2, 3, 4 and a second number is selected from the numbers 1, 5, 6, 12. Find the probability that the product of two numbers selected is less than 12 ?

Q.29 A two digit number is such that the product of the digits is 20. If 9 is subtracted from the number, the digits inter change their places. Find the number.   **OR**

300 apples are distributed equally among a certain number of students. Had there been 10 more students, each would have received one apple less. Find the number of students.

Q.30 The sum of first six terms af an A.P is 42. The ratio of its 10th term to its 30th term is 1:3. Calculate the first term and the thirteenth term of an. A.P

Q.31 Prove that the tangent at any point af a circle is perpendicular to the radius through the point of contact.

Q.32 A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 100cm and the diameter of the hemispherical ends is 42cm; find the cost of polishing the surface of the solid at the rate of 5 paise per sq. cm.   **OR**

A Solid metal cylinder of radius 14cm and height 21cm is melted and recast into spheres of radius 3.5cm. Calculate the number of spheres that can be made.

Q.33 A bucket is in the form of a frustum of a cone whose radii of bottom and top are 7cm and 28cm respectively. If the capacity of the bucket is 21560cm³, find the whole surface area of the bucket.

Q.34 The angle of elevation of the top af a vertical tower from a point on the ground is 60°. At a point 40m vertically above the first point of observation, the angle of elevation is 30°. Find the height of the tower.

ALL THE BEST