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# UNIVERSAL EDUCATION CENTRE

JAYANT SHARMA ( 94145-37474 )

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.**

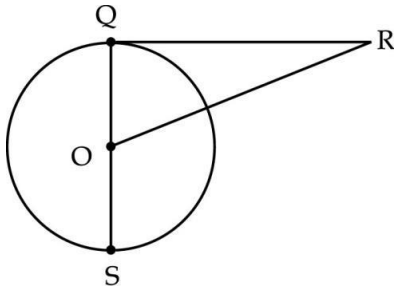
Q.1 For what value of k, x=$\sqrt{2}$ is a solution of the equation $kx^2 + \sqrt{2}x - 4 = 0$

(A) k=1 (B) k=0 (C) k=$2\sqrt{2}$ (D)k=0

Q.2 37th term of the A.P. : $\sqrt{x}$ , $3\sqrt{x}$ , $5\sqrt{x}$ , ..... is

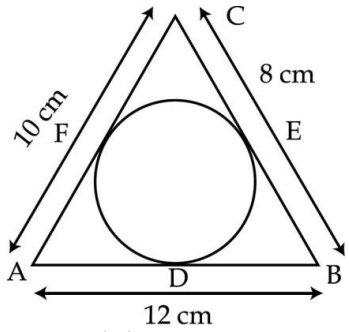
(A) $37\sqrt{x}$ (B) $39\sqrt{x}$ (C) $73\sqrt{x}$ (D) $75\sqrt{x}$

Q.3 In figure RQ is a tangent to the circle with centre O. If SQ=6 cm, QR=4 cm, find OR.




(A) 4 cm (B) 5 cm (C) 6 cm (D) 3 cm

Q.4 A circle is inscribed in a ΔABC having sides 8 cm, 10 cm and 12 cm as in figure. The length of AD, BE and CF (in cm) are :

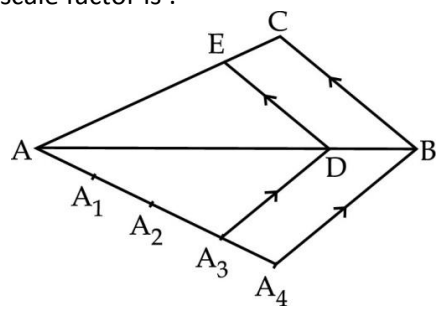



(A) 7, 5, 3 (B) 8, 4, 2 (C) 6, 6, 4 (D) 2, 8, 4

Q.5 To draw a pair of tangents to a circle which are inclined to each other at an angle of 70˚, it is required to draw tangents at end points of those two radii of the circle, the angle between which should be :

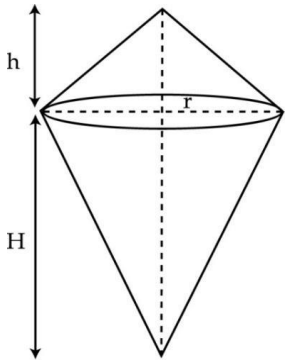
(A) 100˚ (B) 80˚ (C) 200˚ (D) 110˚

Q.6 In figure, ΔADE is constructed similar to ΔABC. The scale factor is :




(A) $\frac{7}{3}$ (B) $\frac{3}{4}$ (C) $\frac{4}{3}$ (D) $\frac{3}{7}$

Q.7 A solid metallic object is shaped like a double cone as shown in Figure. Radius of base of both cones is same but their heights are different. If this cone is immersed in water, the quantity of water it will displace is equal to :




(A) $\frac{1}{3}\ \pi r^2 H\ \ units^3$ (B) $\frac{1}{3}\ \pi r^2(h+H)\ \ units^3$ (C) $\frac{1}{3}\ \pi r^2(H-h)\ \ units^3$ (D) $\frac{1}{3}\ \pi r^2(H+\frac{h}{3})\ \ units^3$

Q.8 The diameter of a wheel is 1.26 m. The distance covered in 500 revolutions is :

(A) 2670 m (B) 2880 m (C) 1980 m (D) 1596 m

SECTION B 2 MARKS EACH

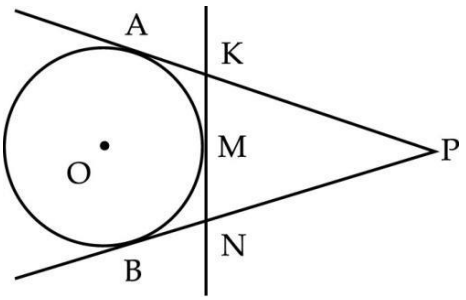
Q.9 An observer 1.5 m tall is 28.5 m away from a tower 30 m high. Find The angle of elevation of the top of the tower from his eye .

Q.10 From numbers 3, 5, 5, 7, 7, 7, 9, 9, 9, 9 one number is selected at random. Find The probability that the selected number is mean.

Q.11 Determine the roots of the following quadratic equation : $4\sqrt{5}x^2 - 17x + 3\sqrt{5} = 0$

Q.12 If for a given A.P : a=7, $a_{13}$=35, find $S_{13}$ .

Q.13 PA and PB are tangents from point P to the circle with centre O as shown in figure. At point M, a tangent is drawn cutting PA at K and PB at N. Prove that KN=AK+BN.




Q.14 A bicycle wheel of radius 35 cm is making 25 revolutions in10 seconds. At what speed in km/hr is the cycle moving?

SECTION C 3 MARKS EACH

Q.15 A glass cylinder with diameter 20 cm has water to a height of 9 cm. A metal cube of 8 cm edge is immersed in it completely. Calculate the height by which water will rise in the cylinder ( use $\pi = \frac{22}{7}$ )

Q.16 A point P on *x*–axis is equidistant from A(-6, 4) and B(2, -8). Find the coordinates of P.

Q.17 Find the coordinates of a point dividing the line segment joining the points P(-3, 4) and Q(1, 2) in ratio 2 : 1.

Q.18 A bag has 7 red and 13 black balls. Another bag has 3 red and 17 white balls. The balls in the two bags are put in a basket and mixed thoroughly. A ball is picked at random from the basket. What is the chance that it is
(i) white ball (ii) not a red ball. **OR**
A card is drawn from a well shuffled pack of 52 cards. Find the probability that it is : (i) an ace (ii) a king of spades

Q.19 Solve for x : $\frac{x+1}{x-1} + \frac{x-2}{x+2} = 3,\ x \neq 1, -2$ **OR**

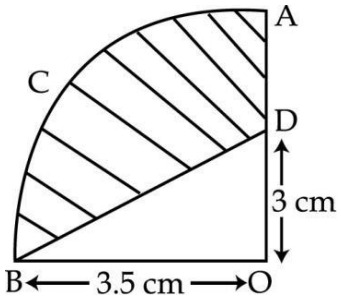
If roots of a quadratic equation (b - c) $x^2$+(c - a) *x*+(a - b)=0 are real and equal, then prove that 2b=a+c

Q.20 The sum of first 8 terms of an A.P. is 140 and sum of first 24 terms is 996. Find the A.P.

Q.21 Two concentric circles are of radii 6.5 cm and 2.5 cm. Find the length of chord of the larger circle which is tangent to the smaller circle. **OR**
Prove that the parallelogram circumscribing a circle is a rhombus.

Q.22 Draw a triangle PQR with sides PQ=6 cm, QR=5 cm and ∠PQR=60˚. Construct another triangle such that its sides are $\frac{5}{6}$ of the corresponding sides of ΔPQR.

Q.23 In figure, OACB is a quadrant of a circle with centre O and radius 3.5 cm. If OD=2 cm, find the area of shaded region.




Q.24 From a solid cylinder whose height is 7 cm and radius 6 cm, a conical cavity of height 7 cm and base radius 6 cm is taken out. Find the volume of the remaining solid. **OR**

A solid is composed of a cylinder with hemispherical ends. If the whole length of the solid is 108 cm and the diameterof the hemispherical ends is 36 cm, find the cost of polishing its surface at the rate of 70 paise per square cm.

SECTION D 4 MARKS EACH

Q.25 A statue 1.6 m 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˚ and from the same point the angle of elevation of the top of the pedestal is 45˚. Find the height of the pedestal.

Q.26 The vertices of a quadrilateral ABCD are A(-8,7), B(-4,-5), C(-1, - 6), D(4, 5). Find the area of the quadrilateral ABCD.

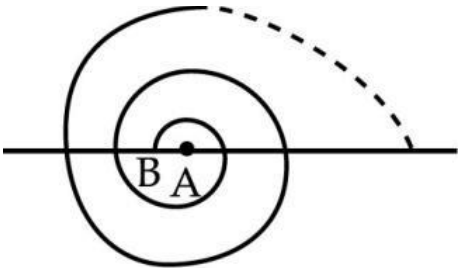
Q.27 ΔABC is an isosceles triangle with AB=AC and vertex A is on y-axis. If the coordinates of vertex B and C are (-5, -2) and (3, 2) respectively, then find the coordinates of vertex A. Also find the length of median AD.

Q.28 Three coins are tossed simultaneously once. Find the probability of getting (i) at least one tail (ii) no tail.

Q.29 Two water taps together can fill a tank in $2\frac{11}{12}$ hrs. The tap of smaller diameter takes 2 hours more than the larger one to fill the tank separately. Find the time in which each tap can separately fill the tank. **OR**

A student scored a total of 32 marks in class tests in mathematics and science. Had he scored 2 marks less in Science and 4 more in Mathematics, the product of his marks would have been 253. Find his marks in two subjects.

Q.30 A spiral is made up of successive semi–circles with centres alternately at A and B starting with A, of radii 1 cm, 2 cm, 3 cm, ..... as shown in the figure. What is the total length of spiral made up of eleven consecutive semicircles ? (Use $\pi$ =3.14)




Q.31 If *l* and m are two parallel tangents at A and B. The tangent at C makes an intercept DE between *l* and m. Prove that ∠DFE=90˚.

Q.32 A cylindrical bucket, 32 cm high and with radius of base 18 cm, is filled with sand. This bucket is emptied on the ground and a conical heap of sand is formed. If the height of the conical heap is 24 cm, find the radius and slant height of the heap.

**OR**

A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy. If a right circular cylinder circumscribes the toy, find the difference of the volume of the cylinder and toy. (Take $\pi = 3.14$)

Q.33 A fez, the cap used by the Turks, is shaped like the frustum of a cone. If its radius of the open side is 10 cm, radius at the upper base is 4 cm and its slant height is 15 cm. Find the area of material used for making it.

Q.34 From the top of a light house, angles of depression of two ships are 45˚ and 60˚ . The ships are on opposite side of the light house and in line with its foot. If the distance between the ships is 400 m, find the height of the light house. (Use $\sqrt{3}$ = 1.732)

*ALL THE BEST*

*SOLUTIONS*

1. (A) k = 1
2. (C) $73\sqrt{x}$
3. (B) 5 cm
4. (A) 7, 5, 3
5. (D) 110°
6. (B) $\frac{3}{4}$
7. (B) $\frac{1}{3}\pi r^2\ h$ +H unit$^3$
8. (C) 1980 m
9. 45°
10. $\frac{3}{10}$
11. $\frac{3}{5}\sqrt{5}$ *or* $\frac{\sqrt{5}}{4}$
12. 273
13. PA = PB, KA = KM, NB = NM (Length of tangents from external points are equal)

    KA + NB = KM + NM or AK + BN = KM + MN = KN

    Hence proved
14. Speed = 19.8 km/hr
15. 1.62 cm
16. P(1, 0)
17. point R $\left(-\frac{1}{3}, \frac{8}{3}\right)$
18. p(Red or white) = $\frac{17}{40}$

    p(not red) = $\frac{3}{4}$

    **OR**

    (i) P (ace) = $\frac{1}{13}$

    (ii) P (King of spade) = $\frac{1}{52}$
19. $x$ = 2, or - 5

    **OR**

    a+c=2b
20. A.P. is 7, 10, 13, .....
21. AB = 12 cm

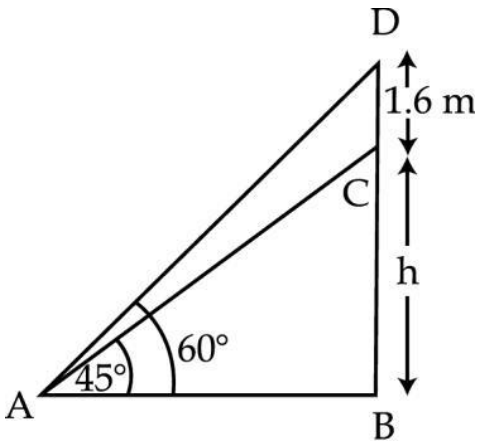
    **OR**

    AB=BC=CD=DA . therefore ABCD is a rhombus
22. Correct Construction
23. $6\frac{1}{8}\ cm^2$
24. 528 cm3

    **OR**

    Rs. 8553.60

25.




Height of pedestal = h= 2.2 m app.

26. = 87 sq. units

27. $\sqrt{5}$

28. Sample space = { HHH, HTH, HHT, THH, TTH, THT, HTT, TTT }

P(at least one tail) = $\frac{7}{8}$

P(no tail) = $\frac{1}{8}$

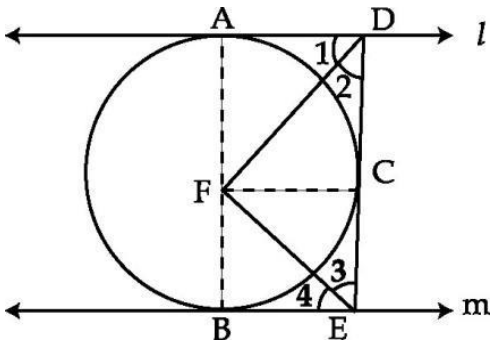
29. smaller tap can fill the tank in 5+2=7 hrs and larger tank in 5 hrs

**OR**

Marks in Mathematics = 7
Marks in Science = 25
Marks in Mathematics =19
Marks in Science =13

30. 207.24 cm

31. correct prove



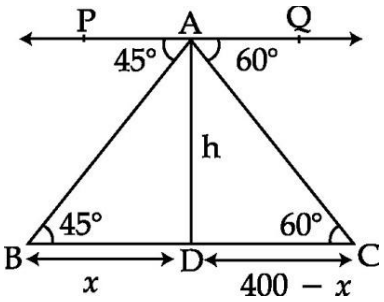

32. $12\sqrt{13}\ cm$

**OR**

25.12 cm3.

33. 710.28 cm2

34.




253.6 m