

## UNIQUE EDUCATION ACADEMY, BHILWARA

### Guess Paper 2019-2020(Part-1st)

#### Subject-Mathematics

#### Class-10<sup>th</sup>

**Q.1** (a) If  $x = 3$  is one root of the quadratic equation  $x^2 - 2kx - 6 = 0$ , then find the value of  $k$ .

(b) If the quadratic equation  $kx(x-2)+6=0$  have two equal roots then find the value of  $k$ ?

(c) Find the nature of the root of the quadratic equation  $3x^2-4\sqrt{3}x+4=0$ .

**Q.2** (a) A tangent PQ at a point P of a circle of radius 5 cm meets a line through the centre O at a point Q so that  $OQ=12$  cm. Length of PQ will be \_\_\_\_\_

(b) If the angle between two tangents drawn from an external point P to a circle at points T and M of having radius "R" and centre O, is  $45^\circ$ , then find the length of OP, OM and OT.

(c) Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that  $\angle PTQ = 2\angle OPQ$ .

**Q.3** (a) Find the value of "k" for which the points A(2,3), B(4,k) and C(6,-3) are collinear.

(b) Find the area of the triangle formed by the points  $P(a_1, b_1)$ ,  $Q(a_2, b_2)$  and  $R(a_3, b_3)$ .

(c) Find the relation between  $x$  and  $y$  such that the point  $(x, y)$  is equidistant from the points (7,1) and (3,5).

**Q.4** (a) Determine the AP whose 3<sup>rd</sup> term is 5 and the 7<sup>th</sup> term is 9.

(b) Which term of the AP : 21, 18, 15, ... is -81? Also, is any term 0? Give reason for your answer.

(c) Find the sum of first n terms of an AP having first term A and common difference D.

**Q.5** (a) What is the value of :  $\tan 48^\circ \tan 23^\circ \tan 60^\circ \tan 42^\circ \tan 67^\circ$  ?

(b) If  $4A$  is an acute angle, then find the value of  $A$  for the given equation:  $\sec 4A = \operatorname{cosec} (A - 20^\circ)$ ?

(c) What is the value of  $(\cos^2 44^\circ - \sin^2 46^\circ)$  ?

**Q.6** (a) Given  $\Delta ABC \sim \Delta PQR$ , if  $\frac{AB}{PQ} = \frac{2}{3}$ , then find  $\frac{\operatorname{ar}(ABC)}{\operatorname{ar}(PQR)} = ?$

(b) Given  $\Delta ABC \sim \Delta PQR$ , if  $\frac{\operatorname{ar}(ABC)}{\operatorname{ar}(PQR)} = \frac{9}{64}$  then find  $\frac{PQ^2}{AB^2} = ?$

(c) Let  $\Delta ABC \sim \Delta DEF$  and their areas be, respectively,  $64 \text{ cm}^2$  and  $121 \text{ cm}^2$ . If  $EF = 15.4 \text{ cm}$ , find  $BC$ .

(d) A girl of height 90 cm is walking away from the base of a lamp-post at a speed of 1.2 m/s. If the lamp is 3.6 m above the ground. Find the length of her shadow after 4 seconds.

**Q.7** (a) What is the HCF of a prime number and the composite number?

(b) What is the HCF of highest two prime number of 2 digits?

(c) Given that  $\operatorname{HCF}(306, 657) = 9$ , find the  $\operatorname{LCM}(306, 657)$ .

(d) Which of the following rational numbers have terminating expansion?

$$\frac{13}{3125} \quad \frac{29}{343}$$

(e) Which of the following is a rational number? Give reason please.

(i) 0.120120012000120000... (ii) 43.123456789

(f) Prove that  $3 + 2\sqrt{5}$  is irrational.

**Q.8** (a) The probability of a team getting success in a cricket match is 0.25, if the team has won 35 matches then find the total number of matches the team has played.

(b) bag contains 36 white and some black balls. If the probability of drawing a black ball from the bag is 5 times that of drawing a white ball, find the number of total balls in the bag.

**Q.9** (a) A motor boat whose speed is 12 km/h in still water takes 6 hour more to go 54 km upstream than to return downstream to the same spot. Find the speed of the stream.

(b) Solve for x:

$$\frac{x^{2002} + 4x^{2001}}{4x^{2000}} = 2449.25$$

(c) Solve for x:

$$\frac{1}{x} + \frac{1}{2a} + \frac{1}{b} = \frac{1}{2a+b+x}$$

(d) For which values of p does the pair of equations given below has unique solution?

$$-4x + py + 8 = 0 \quad ; \quad 2x - 2y - 5 = 0$$

(e) For which values of a and b does the following pair of equations have infinite number of solution?

$$2x + 3y = 7 \quad ; \quad (a-b)x + (a+b)y = 3a + b - 2$$

(f) A boat goes 20 km upstream and 30 km downstream in 6 hours. In 11 hours, it can go 25 km upstream and 90 km downstream. Determine the speed of stream and that of the boat in still water.

(g) If  $ad \neq bc$ , then prove that the equation

$(a^2 + b^2)x^2 + 2(ac + bd)x + (c^2 + d^2) = 0$  has no real roots.

**Q.10** (a) An observer 1.5 m tall is 28.5 m away from a chimney. The angle of elevation of the top of the chimney from her eyes is  $45^\circ$ . What is the height of the chimney?

(b) The angles of depression of the top and bottom of an 8 m tall building from the top of a multi-stored building are  $30^\circ$  and  $45^\circ$  respectively. Find the height of the multi-stored building and the distance between the two buildings.

**Q.11** (a) Which term of the A.P. :  $84, 81\frac{1}{2}, 79, \dots$  is its first negative term?

(b) An A.P. has 9 total terms, the last term is 28 and the sum of all its terms is 144. Find the first term and the common difference of the A.P.

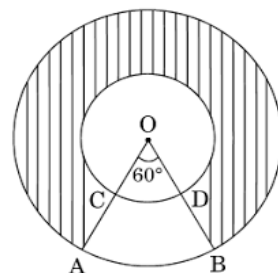
(c) There is a frog in a well of depth 305 m. If the frog starts jumping up 5 m in day and 2.5 m down in night. Find total distance covered by frog to come out-side the well. Consider that the frog goes down due to napping in night only.

**Q.12** (a) Determine the ratio in which the line  $2x + y - 4 = 0$  divides the line segment joining the points  $P(-\frac{21}{4}, 3)$  and  $Q(-\frac{1}{4}, -\frac{2}{5})$ .

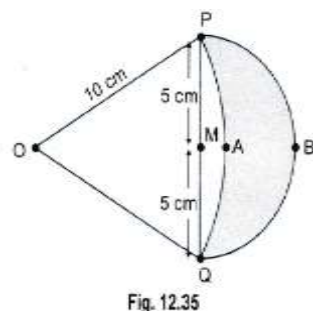
(b) Find the value of  $k$  for which the line  $3x - ky - 5 = 0$  passing through the point  $A(-2, -4)$ .

**Q.13**

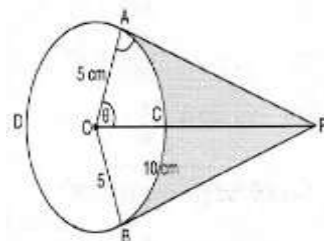
(a) In the given figure, two concentric circles with centre O have radii 21 cm and 42 cm. If  $\angle AOB = 60^\circ$ , find the area of the shaded region. [ Use  $\pi = \frac{22}{7}$  ]



(b) In figure, are shown two arcs PAQ and PBQ. Arc PAQ is a part of circle with centre O and radius OP while arc PBQ is a semicircle drawn on PQ as diameter with centre M. If  $OP = PQ = 10$  cm, show that area of shaded region is  $25(\sqrt{3} - \frac{\pi}{6})$  cm<sup>2</sup>.



(c) An elastic belt is placed around the rim of a pulley of radius 5 cm. From one point C on the belt, the elastic belt is pulled directly away from the centre O of the pulley until it is at P, 10 cm from the point O. Find the length of the belt that is still in contact with the pulley. Also find the shaded area, (use  $\pi = 3.14$  and  $\sqrt{3} = 1.73$ )



**Q.14** (a) If the polynomial  $x^4 - 6x^3 + 16x^2 - 25x + 10$  is divided by  $x^2 - 2x + k$  the remainder comes out to be  $x + a$ , find  $k$  and  $a$ .

(b) If two zeroes of the polynomial  $x^4 - 6x^3 - 26x^2 + 138x - 35$  are  $2 \mp \sqrt{3}$ , find the other roots.

**Q.15** (a)  $\frac{\cos A - \sin A + 1}{\cos A + \sin A - 1} = \operatorname{cosec} A + \cot A$

(b)  $\tan A + \sin A = m$  and  $\tan A - \sin A = n$  then show that  $m^2 - n^2 = 4\sqrt{mn}$

(c)  $\operatorname{cosec} A + \cot A = p$  then prove that  $\cos A = \frac{p^2 - 1}{p^2 + 1}$

**Q.16** (a) Construct a triangle with sides 5cm,6cm and 7 cm and then another triangle whose sides are  $\frac{7}{5}$  of the corresponding sides of the first triangle.

(b) Draw a triangle ABC with side  $BC = 6.5$  cm,  $\angle B = 30^\circ$ ,  $\angle A = 105^\circ$ . Then construct another triangle whose sides are  $\frac{3}{4}$  times the corresponding sides of the triangle ABC.

(c) Draw a circle of radius 3 cm. Take two points P and Q on one of its extended diameter each at a distance of 7 cm from its centre. Draw tangents to the circle from these two points P and Q.

(d) Draw a pair of tangents to a circle of radius 5 cm which are inclined to each other at an angle of  $60^\circ$ .

**Q.17** (a) The median of the following data is 525. Find the value of x and y, if the sum of frequency is 100:

C.I	0-100	100-200	200-300	300-400	400-500	500-600	600-700	700-800	800-900	900-1000
F	2	5	x	12	17	20	y	9	7	4

(b) During the medical check-up of 35 students of a class, their weights were recorded as follows:

**Weight (in kg)**

**Number of students**

Less than 38	0
Less than 40	3
Less than 42	5
Less than 44	9
Less than 46	14
Less than 48	28
Less than 50	32
Less than 52	35

Draw a less than and more than type ogives for the given data. Hence obtain the median weight from the graph and verify the result by using the formula.

(c) The following frequency distribution gives the monthly consumption of electricity of 68 consumers of a locality. Find the median, mean and mode of the data and compare them.

Monthly consum.	65-85	85-105	105-125	125-145	145-165	165-185	185-205
Num of consumer	4	5	13	20	14	8	4

**Q.18** (a) Metallic spheres of radii 6 cm, 8 cm and 10 cm, respectively, are melted to form a single solid sphere. Find the surface area of the resulting sphere.

(b) An open metallic bucket is in the shape of a frustum of a cone if the diameter of the two circular ends of the bucket are 45 cm and 25 cm and the vertical height of the bucket is 24 cm find the area of the metallic sheet used to make the bucket also find the volume of water it can hold. (Take  $\pi = \frac{22}{7}$ )

(c) A gulab jamun, contains sugar syrup up to about 30% of its volume. Find approximately how much syrup would be found in 45 such gulab jamuns, each shaped like a cylinder with two hemispherical ends with total length 5 cm and diameter 2.8 cm.



(d) A wooden article was made by scooping out a hemisphere of radius 3 cm, from each end of a solid cylinder of height 10 cm and diameter 14 cm, then find the total surface area of the article.

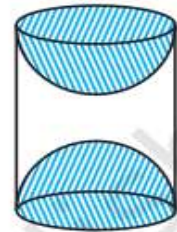


Fig. 13.11