

**DEPUTY DIRECTOR OF PUBLIC INSTRUCTION, KOLAR DISTRICT,
KOLAR.-19-20**

**MATHS
MODEL PAPER -1**

I. For each of the following questions four alternatives are given. Choose the correct alternative and write along with its serial number : 1x8=8

- 1) The 21st term of the Arithmetic Progression 5, 7, 9, 11, is
 - A) 40
 - B) 45
 - C) 50
 - D) 60
- 2) The quadratic polynomial with sum of zeroes -3 and product of zeroes 2 is
 - A) $x^2 - 3x + 2$
 - B) $x^2 + 2x - 3$
 - C) $x^2 - 2x + 3$
 - D) $x^2 + 3x + 2$
- 3) The two roots of the quadratic equation $m^2 - 4m - 12 = 0$ are
 - A) 6 and -2
 - B) 6 and 2
 - C) -6 and -2
 - D) 2 and -6
- 4) If the pair of Linear equations $Kx - 5y = 2$ and $6x + 2y = 7$ have no solution, then the value of ' K ' is
 - A) -10
 - B) -6
 - C) -5
 - D) -15
- 5) The value of $(\sin 45^\circ \times \cos 45^\circ) - \sin 30^\circ$ is
 - A) -1
 - B) $\frac{1}{2}$
 - C) 0
 - D) 1

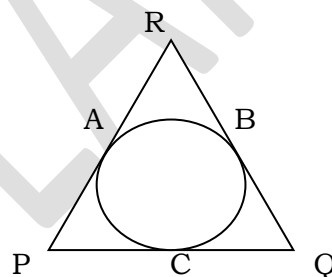
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- 6) A cubical die whose faces are numbered from 1 to 6 is rolled once. The probability of getting a number on the top face which is a multiple of 3 is

- A) $\frac{1}{6}$
 B) $\frac{3}{6}$
 C) $\frac{2}{6}$
 D) 1

- 7) In the figure if $PQ = 12$ cm, $QR = 8$ cm and $PR = 10$ cm then PC measures

- A) 4 cm
 B) 5 cm
 C) 6 cm
 D) 7 cm



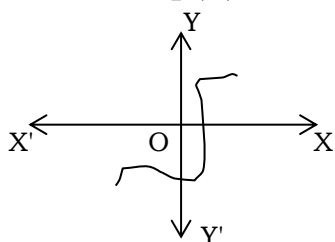
- 8) The volumes of two spheres are in the ratio $64 : 27$. The ratio of their surface areas is

- A) $16 : 9$
 B) $1 : 2$
 C) $2 : 3$
 D) $3 : 4$

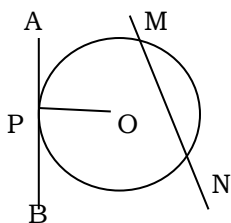
II. Answer the following questions :

1x8=8

- 9) Write the H.C.F. of any two Prime numbers.
 10) Write the first three terms of an Arithmetic Progression with first term -4 and common difference +4
 11) The graph of $Y = p(x)$ for some polynomial $p(x)$ is given. Write the number of zeroes of $p(x)$



- 12) If a, b, c are real numbers, $a \neq 0$ and ' x ' is the variable, then write the standard form of Quadratic equation.
- 13) If $\sec\theta = \frac{5}{4}$ then write the value of $\cos\theta$.
- 14) State basic proportionality theorem.
- 15) Name the secant in the given figure.



- 16) If r_1 and r_2 ($r_1 > r_2$) are the radii of two circular ends and ' h ' is the height of the frustum of a cone, then write the formula used to calculate its volume.

III. Answer the following :

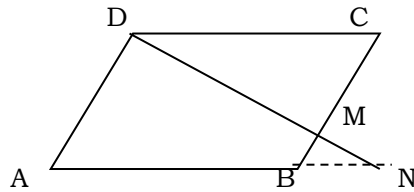
2x8=16

- 17) A man starts repaying a loan as first instalment of 300. If he increases the instalment by 20 every month, then calculate the amount he pays in 20th instalment by using suitable formula.
- 18) Solve the given pair of linear equations :

$$x + 3y = 6$$

$$2x - 3y = 12$$
- 19) Find the quotient obtained when the polynomial $p(x) = 3x^3 + x^2 + 2x + 5$ is divided by the polynomial $q(x) = x^2 + 2x + 1$
 OR
 Find the zeroes of the polynomial $p(x) = 6x^2 - 3 - 7x$
- 20) Find the roots of the quadratic equation $x^2 + 5x + 3 = 0$ using Quadratic formula.

- 21) 'M' is a point on the side BC of a parallelogram ABCD. DM when produced meets AB produced at N. Prove that $\frac{DM}{MN} = \frac{DC}{BN}$



ΔABC is an Isosceles triangle with $AB=AC=13\text{cm}$. The length of the altitude from A on BC is 5 cm. Find BC.

- 22) Two identical fair coins are tossed simultaneously. Find the probability of getting atleast one head.
- 23) Construct a pair of tangents to a circle of radius 4 cm from a point which is 9 cm away from its centre.
- 24) In a circle of radius 21 cm, an arc subtends an angle of 120° at the centre. Calculate the length of the arc.

IV. Answer the following :

3x9=27

- 25) Use Euclid's Division lemma to show that the cube of any positive integer is of the form $9m$ or $9m+1$ or $9m+8$

OR

Prove that $\sqrt{2}$ is an irrational number.

- 26) The age of a father is twice the square of the age of his son. Eight years hence, the age of the father will be 4 years more than three times the age of the son. Find their present ages.

OR

Find the value of 'P' for which the quadratic equation $4x^2 - (p - 2)x + 1 = 0$ has equal roots.

- 27) Prove that $\frac{\tan\theta}{\sec\theta-1} - \frac{\sin\theta}{1+\cos\theta} = 2 \cot\theta$

OR

Prove that

$$(1 + \cot A - \operatorname{Cosec} A)(1 + \tan A + \sec A) = 2$$

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- 28) Find the mean of the following frequency distribution table

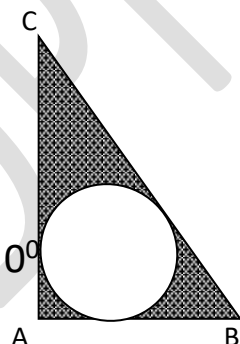
C – I	0 - 10	10 - 20	20 - 30	30 - 40	40 - 50
f	6	5	3	4	2

- 29) Draw a triangle ABC with side BC = 6 cm, AB = 5 cm and $\angle ABC = 60^\circ$. Then construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of triangle ABC.
- 30) The following distribution gives the ages of persons who visits a grocery shop on a particular day.

Age in Years	5-15	15-25	25-35	35-45	45-55	55-65	65-75
No. of Persons	6	10	15	13	24	8	7

Convert the above distribution to a "less than type" cumulative frequency distribution and draw its O give.

- 31) Prove that the lengths of tangents drawn from an external point to a circle are equal.
- 32) In the figure ABC is a right angled triangle right angled at A. Find the area of the shaded region if AB = 6 cm, BC = 10 cm, AC = 8 cm. 'O' is the centre of incircle of ΔABC . [use $\pi = \frac{22}{7}$]



OR

A circular pond is of diameter 17.5 m. It is surrounded by a 2m wide path. Find the cost of constructing a road in this path at the rate of 25 per square metre. [use $\pi = 3.14$]

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- 33) An exhibition tent is in the form of a cylinder surmounted by a cone. The height of the tent above the ground is 85 m and

height of the cylindrical part is 50m. If the diameter of the base is 168 m, find the quantity of canvas required to make the tent.
[use $\pi = \frac{22}{7}$]

V. Answer the following :

4x4=16

- 34) Find the Arithmetic Progression whose first term is 5 and the sum of its first four terms is half the sum of the next four terms.

OR

The sum of 2nd and 7th terms of an Arithmetic Progression is 30. If its 15th term is 1 less than twice its 8th term, find the Arithmetic Progression.

- 35) A man in a boat rowing away from a light house 150 m high takes 2 minutes to change the angle of elevation of the top of the light house from 60° to 45°. Find the speed of the boat.
- 36) Prove that " the ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides ".
- 37) Solve the given pair of Linear equations by graphical method.
- $$\begin{aligned}x - y &= 2 \\ 2x + y &= 10\end{aligned}$$

VI. Answer the following :

5x1=5

- 38) Show that the points O (0,0), A (3, $\sqrt{3}$) and B (3, $-\sqrt{3}$) are the vertices of an equilateral triangle. Find the area of this triangle.

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**MATHEMATICS - 2019-20
MODEL PAPER-2**

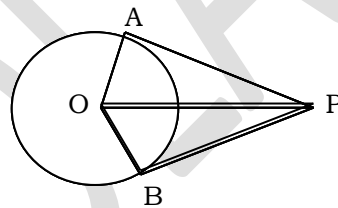
I. Four alternates are given for each of the following incomplete statements / questions . Choose the most appropriate alternate and write its along with its alphabet : 8x1=8

- 1) The n^{th} term of an arithmetic progression with first term 'a' and common difference 'd' is

A) $a - (n+1)d$ B) $a+(n+a)d$ C) $a+(n-1)d$ D) $a+nd$

- 2) In the given figure $\angle APO = 30^\circ$ the measure of $\angle AOB$ is

A) 30° B) 60°
C) 130° D) 120°



- 3) The largest number that divides 32 and 80 is

A) 9 B) 32 C) 16 D) 20

- 4) The discriminant of the quadratic equation $ax^2 + bx + c = 0$ is

A) $2b^2 = 4ac$ B) $b^2 + 4ac$ C) $b^2 - 4ac$ D) $b^2 - 2ac$

- 5) If $\tan\theta = \frac{7}{24}$ then the value of $\cot\theta$ is

A) $\frac{7}{24}$ B) $\frac{24}{25}$ C) $\frac{24}{7}$ D) $\frac{7}{27}$

- 6) The value of $P(E)$ when $P(\bar{E}) = 0.05$ is

A) 0.95 B) 0.85 C) 0.05 D) 1.95

- 7) A metallic cone of volume $\frac{2156}{3} \text{ cm}^3$ is recast into a hemisphere.

The radius of the hemisphere is

A) 14 cm B) 7 cm C) 21 cm D) 3.5 cm

- 8) In the given figure $BC = 2DE$, the value of $AB : AD$ is



A) 1 : 2

B) 1 : 4

D — E

C) 2 : 1

D) 1 : 1

B

C

.. 2 ..

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II. Answer the following questions :

1x8=8

- 9) Write the Prime factors of 140.
- 10) Find the value of x when the lines $2x + 3y = 4$ and $4x + (x+1)Y+6=0$ are parallel.
- 11) Write the degree of the polynomial $8x^3 + 3x^4 - 5$
- 12) Determine the nature of roots of $x^2 - 4x + 4 = 0$
- 13) Evaluate : $\text{Cosec } 52^\circ - \text{Sec } 38^\circ$
- 14) Write the formula to find mode of an grouped data.
- 15) Two fair dice is thrown. Write the sample space.
- 16) State basic proportionality theorem.

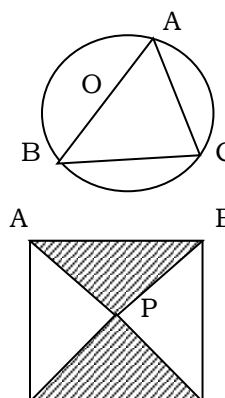
III. Answer the following questions :

2x8=16

- 17) Prove that $3 + \sqrt{5}$ is an irrational number.
- 18) Form a quadratic polynomial whose zeroes are $2 + \sqrt{3}$ and $2 - \sqrt{3}$
- 19) Solve using quadratic formula : $3x^2 - 5x + 2 = 0$
- 20) In what ratio does the point $(-4, 6)$ divide the line segment joining the points $A(-6, 10)$ & $B(3, -8)$.
- 21) A solid rectangular block of metal 49 cm , 44 cm , 18 cm in melted and formed into a solid sphere. Calculate the radius of the sphere.
- 22) Find the area of the shaded region in figure.
 $AC = 24$ cm, $BC = 10$ cm, & 'O' is the centre of the Circle. (use $\pi = 3.14$)

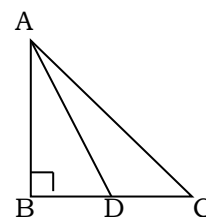
OR

- 23) Find the area of a shaded region if ABCD is a square of side 14 cm. APD, BPC are semi circle.



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- 24) In a right angled triangle ABC $\angle C = 90^\circ$
if D is the mid point of BC. Prove that
 $AB^2 = 4 AD^2 - 3 AC^2$



OR

ABC and PQR are similar triangles BC is twice the side QR and area of triangle ABC 16 cm^2 . Find the area of triangle PQR.

- 25) Draw a pair of tangents to circle of radius 5 cm from a point 9 cm away from its centre.

IV. Answer the following questions :

3x9=27

- 26) The sum of numerator and denominator of a fraction is 14. If 2 is added to numerator and 2 is subtracted from denominator it becomes $\frac{5}{3}$. Find the fraction.

- 27) Find all other zeroes of $2x^4 - 3x^3 - 3x^2 + 6x - 2$ if you know that two of its zeroes are $\sqrt{2}$ & $-\sqrt{2}$

OR

On dividing $x^3 - 3x^2 + x + 2$ by a polynomial $g(x)$ the quotient and remainder obtained are $x-2$ and $-2x + 4$ respectively. Find $g(x)$.

- 28) The sum of two numbers 'a' and 'b' is 15 and sum of their reciprocals. $\frac{1}{a}$ and $\frac{1}{b}$ is $\frac{3}{10}$. Find the numbers 'a' and 'b'

- 29) Find the value of $\frac{\sin 30^\circ - \tan 45^\circ - \operatorname{cosec} 45^\circ}{\sec 30^\circ + \cos 60^\circ + \cos 45^\circ}$

- 30) The 3 vertices of parallelogram are (1, -2), (3, 6) and (5,10) Find its fourth vertex.

OR

Find the area of the triangle formed by joining the mid points of the sides of the triangle whose vertices are (0,1) (2,1) and (0,3). Find the ratio of area of the given triangle.

- 31) Find the mean value of the following data.

Class interval	5-15	15-25	25-35	35-45	45-55
Frequency	4	3	7	2	4

OR

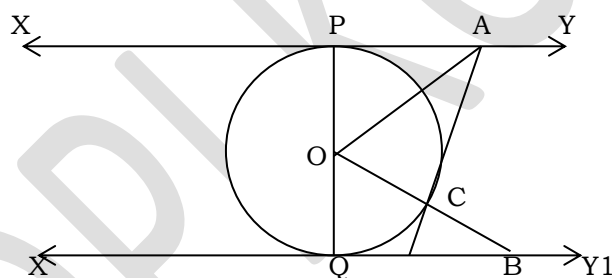
Find the median value of the following data.

Class interval	0-10	10-20	20-30	30-40	40-50
Frequency	4	5	8	2	1

- 32) Prove that " the lengths of tangents drawn from an external point to a circle are equal "

OR

In figure XY and X, Y are two parallel tangents to circle with centre 'O' and tangents AB with point of contact C intersecting at A and X, Y at B. Prove that $\angle AOB = 90^\circ$



- 33) Draw a triangle ABC with sides $BC = 6$ cm, $AB = 5$ cm and $\angle ABC = 60^\circ$ then construct a triangle whose sides are $\frac{4}{3}$ times the corresponding sides of triangle ABC.
- 34) Draw a less than type give curve for the following data.

Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	8	7	5	3	4	2	1

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V. Answer the following questions :

4x4=16

- 35) The sum of the first 7 terms of an A.P. is 182. If its 4th and 17th terms are in the ratio 1:5. Find the terms of arithmetic progression.
- 36) Prove that "if in two triangles corresponding angles are equal then their corresponding sides are in the same ratio".

OR

Divide 32 in the four parts which are the four terms of an AP such that the ratio of the product of the first and fourth terms is to the product of the second and third terms as 7 : 32.

- 37) Solve $x + y = 5$ and $2x + y = 7$ graphically.
- 38) The angle of elevation of the top of a tower from a point A on the ground is 30° moving a distance of 20 m towards foot of the tower to a point B, the angle of elevation increases to 60°. Find the height of the tower and the distance of tower from the point A.

VI. Answer the following question :

5x1=5

- 39) A container open from the top made up of a metal sheet is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively. Find the cost of milk which can completely fill the container at the rate of 35 per litre. Find the cost of metal sheet used if the cost is 50 per 100 cm² (use $\pi = 3.14$)

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MATHEMATICS - 2019-20
MODEL PAPER-3

Time : 3 hours

Marks : 80

I. In the following questions four choices are given for the each question. Choose and write the correct answer along with its alphabet : 1x8=8

- 1) In an AP $S_7 = 44$ and $S_6 = 39$ then 7th term of AP is
a) 5 b) 12 c) 15 d) 8
- 2) The triangle with measurement of sides 3cm, 4cm, 5cm is
a) Acute angled triangle b) Obtuse angled triangle
c) Right angled triangle d) Not possible to construct a triangle
- 3) The measure of one tangent from an external point to a circle is 14 cm then the measure of another tangent is
a) 7 cm b) 14 cm c) 10 cm d) 16 cm
- 4) The distance between origin and point P (m, n) is
a) $m^2 - n^2$ b) $\sqrt{m^2 + n^2}$ c) $m \cdot n$ d) $m^2 + n^2$
- 5) In the following irrational number is
a) 7.36533 b) $7/11$ c) $\sqrt{25} + \sqrt{144}$ d) $3 + \sqrt{5}$
- 6) The polynomial whose zeroes are 2 and 5 is
a) $x^2 - 7x - 10$ b) $x^2 + 7x + 10$ c) $x^2 + 7x - 10$ d) $x^2 - 7x + 10$
- 7) If $b^2 - 4ac < 0$ then roots of quadratic equation is
a) Equal and Real b) Real and Distinct
c) No Real Roots d) All the above
- 8) The value of $\frac{\sin 55^\circ}{\cos 35^\circ}$ is
a) 1 b) 2 c) 0 d) 1

II. Answer the following : 1x8=8

- 9) If $\sum f_i x_i = 300$ $\sum f_i = 10$ then find the mean.
- 10) The probability of loosing a game is $2/5$ then find the probability of winning the game.
- 11) Find the slant height of cone whose radius 5cm and height is 12cm
- 12) Find the common difference of the AP 12, 7, 2,

..2..

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- 13) Write the coordinates of the midpoint of the line joining the points (5, 6) and (1, 2)
- 14) If the HCF of 28 and 32 is 4 then find LCM.
- 15) If $\sin\theta = \frac{2}{\sqrt{3}}$ and $\cos\theta = \frac{3}{\sqrt{3}}$ then find $\tan\theta$
- 16) Write the formula to find the sum of first n terms of AP.

III. Answer the following :

2x8=16

- 17) Construct two tangents to a circle of radius 4.5 cm such that angle between them is 60.
- 18) Show that $3 + \sqrt{5}$ is an irrational number ?

OR

Without actually performing the long division state whether $\frac{7}{30}$ will have terminating decimal expansion or non terminating repeating decimal.

- 19) Write a quadratic polynomial whose sum of the zeroes is $\frac{1}{3}$ and product of zeroes is -2.
- 20) Find the zeroes of quadratic polynomial $x^2 - 2x - 8$.
- 21) Solve the equation $x^2 - 3x - 10 = 0$ by using formula.
- 22) The following distribution gives the daily income of 50 workers of a factory.

Daily income in	100-120	120-140	140-160	160-180	180-200
No. of Workers	12	14	8	6	10

OR

Convert the distribution above to a less than type cumulative frequency distribution and draw its O give.

- 23) 2 cubes each of volume 64 cm³ are joined end to end. Find the surface area of the resulting cuboid.

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- 24) A box contains 125 discs which are numbered from 1 to 125. If one disc is drawn at random from the box. Find the probability it bears. A number divisible by 4.

IV. Answer the following :

3x9=27

- 25) If three times the larger of the two numbers is divided by the smaller one we get 4 as quotient and 3 as the remainder. Also if seven times the smaller number is divided by the larger one. We get 5 as quotient and 1 as remainder find the numbers.
- 26) Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact .

OR

Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle is bisected at the point of contact.

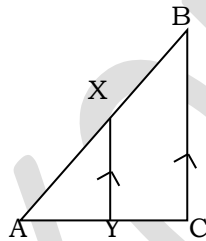
- 27) Draw a triangle ABC with side $BC = 6\text{cm}$, $AB = 5\text{cm}$ and $\angle ABC = 60^\circ$. Construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.
- 28) If A (-5, 7), B (-4, -5), C (-1, -6) and D (4,5) are the vertices of a quadrilateral then find the area of the quadrilateral ABCD.
- 29) A cottage industry produces a certain number of pottery articles in a day. It was observed on a particular day that the cost of production of each article (in rupees) was 3 more than twice the number of articles produced on that day. If the total cost of production on that day was 90. Find the number of articles produced and the cost of each article.

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- 30) The median of the following data is 525. Find the values of x and y if the total frequency is 100.

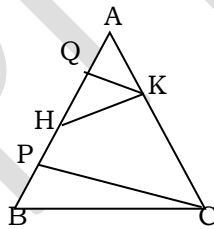
Class Interval	Frequency
0 - 100	2
100 - 200	5
200 - 300	x
300 - 400	12
400 - 500	17
500 - 600	20
600 - 700	y
700 - 800	9
800 - 900	7
900 - 1000	4

- 31) In the adjoining figure $xy \parallel bc$, $AX = p-3$, $BX=2P-2$ and $\frac{AY}{CY} = \frac{1}{4}$. Find the value of P.

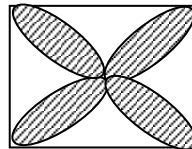


OR

In the figure $PC \parallel QK$ and $BC \parallel HK$ if $AQ = 6\text{cm}$, $QH = 4\text{cm}$, $HP = 5\text{cm}$ and $KC = 18\text{ cm}$ then find the length of AK and AB.



- 32) Find the area of the shaded design in Fig. where ABCD is a square of side 10 cm and semicircles are drawn with each side of a square as diameter (use $\pi = 3.14$)



- 33) Prove that

$$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta \cdot \operatorname{cosec}\theta$$

or

.. 5 ..

If $\sin (A-B) = \frac{1}{2}$, $\cos (A+B) = \frac{1}{2}$, $0 < A+B \leq 90^\circ$ $A > B$ find A and B

V. Answer the following questions :

4x4=16

- 34) Prove that areas of similar triangle are proportional to square on the corresponding sides.
- 35) Sum of 6 terms of AP is 90. Sum of first two terms is diminished by 32 with the sum of last two terms find the terms of AP.

OR

A manufacturer of TV sets produced 600 sets in the third year and 700 sets in the seventh year assuming that the production increases uniformly by a fixed number every year find

- i) The production in the 1st year
 - ii) The production in the 10th year
 - iii) The total production in first 7 years
- 36) A person standing on the bank of a river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60° . When he moves 40 m away from the bank, he finds the angle of elevation to be 30° . Find the height of the tree and the width of the river. ($\sqrt{3} = 1.73$)
- 37) A solid is in the form of a right circular cone mounted on a hemisphere. The radius of the hemisphere is 3.5 cm and the height of the cone is 4 cm the solid is placed in a cylindrical tub full of water in such away that the whole solid is submerged in water. If the radius of the cylinder is 5 cm and its height is 10.5cm Find the volume of water left in the cylindrical tub. (use $\pi = \frac{22}{7}$)

V.

5x1=5

- 38) The taxi charges in a city consists of a fixed charge together with the charge for the distance covered. For a distance of 10 km the charge paid is 105 and for a journey of 15 km, the charge paid is 155. What are the fixed charged and the charge per km? How much does a person have to pay for travelling a distance of 25km? Form a pair of linear equation and obtain the solution graphically?

**DEPUTY DIRECTOR OF PUBLIC INSTRUCTION, KOLAR DISTRICT,
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SSLC Mathematics Model Paper-4

Max Marks : 80

I. In the following questions, four choices are given for each question. Choose and write the correct answer along with its alphabet : 1x8=8

1. In the A.P. if the first term is 4 and the common difference is -3 then the 12th term is
a) 29 b) 28 c) -29 d) -28
2. In the pair of linear equations $x + y = 14$ and $x - y = 4$ the value of x and y are
a) 5 and 9 b) 9 and 5 c) 8 and 5 d) 10 and 5
3. If tangent PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80° .
a) 50° b) 60° c) 80° d) 70°
4. H.C.F. of 135 and 225 is
a) 45° b) 90° c) 1 d) 135
5. If the sum of the two number is 27 and product is 182 then the numbers are
a) -14 and -13 b) 14 and 13
c) -14 and 13 d) 14 and -13
6. If $\tan 2A = \cot (A-18^\circ)$ where $2A$ is an acute angle then the value of A is
a) 28° b) 46° c) 36° d) 18°
7. A die is thrown once, the probability of getting a prime number is
a) $3/6$ b) $6/6$ c) $4/6$ d) $5/6$
8. The formula to calculate the volume of the Frustrum is
a) $\frac{1}{3} \pi h (r_1 + r_2 + r_1^2 r_2^2)$ b) $\frac{1}{3} \pi h (r_1 + r_2^2 + r_1 r_2)$
c) $\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$ d) $\frac{1}{3} \pi h (r_1^2 + r_2^2 + r_1 r_2)$

II. Answer the following questions : 1x8=8

9. Write the zeroes of the polynomials $p(x) = x^2 - 15$

10. Find the roots of the quadratic equation $x^2 + x - 6 = 0$

11. In an AP, $a_{12} = 37$, $d = 3$ then find 'a'

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12. State pythagorus theorem.

13. Express 3825 as a product of its prime factors.

14. Find the value of $\frac{1 - \tan^2 45^\circ}{1 + \tan^2 45^\circ}$

15. Find the distance between the points : $(a + b)$ $(-a, -b)$

16. If the perimeter and area of a circle are numerically equal, then find the radius of the circle.

III. Answer the following :

2x8=16

17. Solve $2x + 3y = 11$ and $2x - 4y = -24$

18. Prove that $6 + \sqrt{2}$ is irrational.

19. Find the roots of the equation $100x^2 - 20x + 1 = 0$

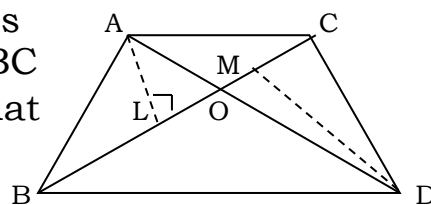
20. Find the co-ordinates of the points which divides the join of $(-1, 7)$ and $(4, -3)$ in the ratio $2 : 3$.

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

OR

In figure ABC and DBC are two triangles on the same base BC. If AD intersects BC at 'O'. If $AL \perp BC$ and $DM \perp BC$ show that

$$\frac{\text{ar (AB)}}{\text{ar (DBC)}} = \frac{AO}{DO}$$



22. In bag contains 3 red balls and 5 black ball. A ball is dran at random from the bag. What is the probability that the ball drawn is (i) red (ii) not red.

23. The length of a tangent from a point A at distance 5 cm from the centre of the circle is 4 cm. Find the radius of the circle.

24. If A, B and C are interior angles of a triangles ABC, then show that $\sin\left(\frac{B + C}{2}\right) = \cos (A/2)$

OR

If $\cos\theta = 0.6$ show that $5 \sin\theta - 3 \tan\theta = 0$

.. 3 ..

// 3 //

IV. Answer the following :

3x9=27

25. Five years ago, Nuri was thrice as old as Sonu. Ten years later, Nuri will be twice as old as Sonu. How old are Nuri and Sonu ?

OR

The sum of the digits of two digit number is 9 also nine times this number is twice the number obtained by reversing the order of the digits. Find the number.

26. Obtain all other zeroes of $3x^4 + 6x^3 - 2x^2 - 10x - 5$ if two of its zeroes are $\frac{\sqrt{5}}{3}$ and $\frac{\sqrt{-5}}{3}$
27. A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

OR

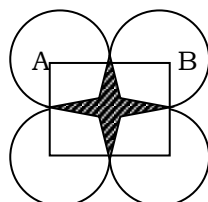
If the roots of the equation $(a^2 + b^2)x^2 + 2(bc - ad)x + c^2 + d^2 = 0$ are equal show that $ac + bd = 0$.

28. If $(1,2)$, $(4,y)$, $(x,6)$ and $(3,5)$ are the vertices of a parallelogram taken in order, find x and y .

OR

Find the area of triangle formed by joining the midpoints of the sides of the triangle whose vertices are $(0, -1)$, $(2,1)$ and $(0,3)$

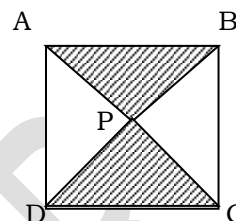
29. Two tangents TP and TQ are drawn to a circle with centre O from an external point T. Prove that $\angle PTQ = 2 \angle OPQ$.
30. In figure ABCD is a square of side 14 cm with centres A, B, C and D. Four circles are drawn such that each circle touches externally two of the remaining three circles. Find the area of shaded region.



// 4 //

OR

Find the area of the shaded region in figure , if ABCD is a square of side 14 cm and APD and BPC are semicircle.



31. The following table gives the literacy rate in percentage of 35 cities. Find the mean literacy rate.

Literacy rate in %	45-55	55-65	65-75	75-85	85-95
Number of cities	3	10	11	8	3

32. The following table gives production yield per hectare of wheat of 100 farms of a village

Product yield in kg/hector	50-55	55-60	60-65	65-70	70-75	75-80
Number of farms	3	2	8	24	38	16

Change the distribution to a more than type distribution and draw its give.

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

V. Answer the following :

4x4=16

34. Draw the graph of the equation $x-y+1=0$ and $3x+2y-12=0$.
35. The sum of first 8 terms of a Arithmetic progression is 136 and the sum of first 15 terms is 465. Find the sum of first 25 terms.

OR

The sum of the first three terms of an A.P. is 33. If the product of the first term and third term exceeds the 2nd term by 29, then find the A.P.

36. The angles of elevation of the top of a building from the foot of the tower is 30° and the angle of elevation of the top of the tower from the foot of the building is 60° . If the tower is 50 m high. Find the height of the building.
37. Prove that " the ratio of areas of two similar triangles is equal to the square of the ratio of their corresponding sides ".
38. A solid iron pole consists of a cylinder of height 220 cm and base diameter 24 cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1cm³ of iron has approximately 8g mass (use $\pi = 3.14$)

** ** *

I. Each of the following incomplete statement is provided with four alternatives. Choose the most appropriate among them and write with its alphabet : 1x8=8

- 1) Degree of the polynomial $m^2 - 2m + m^4 + 5$ is
 a) 2 b) 1 c) 4 d) 0
- 2) If n^{th} term of an Arithmetic Progression is $2n + 3$ then its 5^{th} term is
 a) 13 b) 8 c) $5n + 3$ d) $3n + 5$
- 3) The rational number that has the terminating decimal expansion among the following is
 a) $\frac{23}{2^2 \times 7^2}$ b) $\frac{37}{2^2 \times 5}$ c) $\frac{21}{5^3 \times 3^2}$ d) $\frac{18}{2 \times 5^2 \times 3^3}$
- 4) Value of $\tan 1 : \tan 2 : \tan 3 : \dots \dots \dots \tan 89^\circ$ is
 a) 0 b) Cannot be determined c) -1 d) 1
- 5) Formula used to find the area of a quadrant of a circle of radius 'a' is
 a) $\frac{1}{4} \pi a^2$ b) $\frac{\theta}{90^\circ} \pi a^2$ c) $\frac{1}{2} \pi a^2$ d) $4\pi a^2$
- 6) In the pair of linear equations $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$ if $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$ then the lines representing the equations are
 a) Consistant b) Coincide c) Interest d) Parallel
- 7) In ΔABC , if $\angle A = 40^\circ$ and $\angle B = 60^\circ$ and in ΔPQR , $\angle P = 40^\circ$ and $\angle R = 60^\circ$, then the correct relationship is
 a) $\frac{AB}{PQ} = \frac{BC}{QR}$ b) $\frac{BC}{QR} = \frac{PR}{AB}$
 c) $\frac{AC}{PR} = \frac{AB}{PQ}$ d) $\frac{AB}{PR} = \frac{BC}{QR}$
- 8) The distance of the point A (4, -3) from the origin is
 a) 25 unit b) 4 unit c) 5 unit d) 9 unit

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II. Answer the following questions : 1x8=8

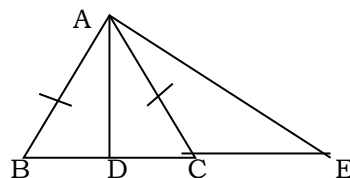
- 9) Find the H.C.F. of 45 and 120.

- 10) Frame a quadratic polynomial whose sum of zeros is 1 and product of zeros is -2
- 11) If $\tan A = \frac{4}{3}$ then find the value of $\cot A$
- 12) Write the fifth term of an A.P. whose first term is 'b' and common difference is 'c'
- 13) $\triangle ABC \cong \triangle DEF$ ratio of their areas is 1:4 and if $BC = 8$ cm, find the length of EF .
- 14) Find the value of the discriminant of the quadratic equation :
 $2x^2 + 3 + x = 0$
- 15) A box contains 2 white and 4 orange balls. If a ball is taken out randomly the probability of getting 'not an orange' ball is 0.33, then find the probability of getting in orange ball.
- 16) Write the co-ordinates of the mid point M of a line joining points A (x, y) and B (x_2 , y_2)

III. Answer the following questions :

2x8=16

- 17) Prove that $3 + \sqrt{7}$ is an irrational number.
- 18) Two identical coins are tossed once. Find the probability of getting atmost one head.
- 19) In the figure AD is the altitude of $\triangle ABC$ and $AB = AC$. If $3BD = 3AD$ and $3DE = 4AD$. Prove that $BE^2 = AB^2 + AR^2$

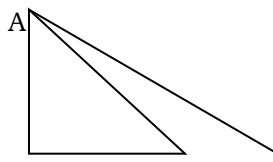


OR

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In the figure $AD \perp BD$ and if
 $AB^2 = AC^2 + 3BC^2$
 Prove that $BC = CD$



- 20) Solve the quadratic equation $2x^2 - x - 6 = 0$ using the formula.
- 21) Draw a circle of radius 4 cm and construct the tangents at the end points of its diameter.
- 22) Find how many three digit numbers are divisible by 6 ?
- 23) A cylindrical rod of radius 5 mm is made by melting a solid right circular cone with radius of its base 6 cm and height 14 cm. Find the length of the rod.

OR

A rectangular tank is 15 m long and 11 m broad, is to receive the entire amount of water from a fully filled cylindrical tank of internal diameter 21m and height 5m. Find the least height of the tank to hold the entire water from the cylinder. (use $\pi = \frac{22}{7}$)

- 24) Solve the pair of linear equations $x + 3y = 1$ and $2x - y = 9$

IV. Answer the following questions :

3x9=27

- 25) Construct ΔABC with sides $AB = 5\text{cm}$, $BC = 6\text{cm}$ and $\angle ABC = 50^\circ$ and construct another triangle similar to it with the ratio of corresponding sides $\frac{4}{5}$.
- 26) Find the quotient when the polynomial $p(x) = x^5 - 9x^3 - 8x^2 + 72$ is divided by $g(x) = x - 2$ and state whether $g(x)$ is a factor of $p(x)$
- 27) Find the Median of the following frequency distribution.

Class Interval	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100
Frequency	4	12	14	16	20	16	10	8

OR

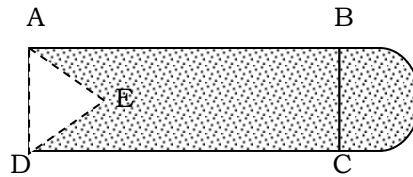
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If the mean of the following distribution is 54, find ' P '

Class Interval	0-20	20-40	40-60	60-80	80-100
Frequency	7	P	10	9	13

- 28) From the rectangle ABCD with AB = 20 cm, a right angled triangle with $\angle AED = 90^\circ$, AE = 9cm and DE = 12cm is cutoff and on the other end a semicircle with diameter equal to BC is attached as shown in the figure. Find the area and perimeter of the shaded region. (use $\pi = 3.14$)



- 29) Show that $\frac{\tan^3\theta}{1+\tan^2\theta} + \frac{\cot^3\theta}{1+\cot^2\theta} = \sec\theta\operatorname{cosec}\theta - 2\sin\theta\cos\theta$

OR

Show that $\left(\frac{1 + \sin\theta - \cos\theta}{1 + \sin\theta + \cos\theta} \right)^2 = \frac{1 - \cos\theta}{1 + \cos\theta}$

- 30) Prove that " the tangents drawn from an external point to a circle are equal in length "
- 31) If $(-1, -2)$, $(4, -3)$, $(2, 3)$ and $(-3, 4)$ are the consecutive vertices of a parallelogram, then find its area.

OR

Find the co-ordinates of points which trisect the line segment joining the points A $(-3, 2)$ and B $(3, 8)$

- 32) Following frequency distribution gives the marks scored by the students in a degree examination. Represent this by a ' less than ' ogive curve.

Marks Scored	400-450	450-500	500-550	550-600	600-650	650-700
No. of Students	12	18	25	20	17	8

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- 33) If the sum of the squares of two consecutive even positive integers is increased by 100, then it will be 10 times the difference of their squares, find the integers.

OR

Somu's mother is elder to him by 20 years. After three years square of the age of Somu is 8 more than twice the age of his mother. Find their present ages.

V. Answer the following questions :

4x4=16

- 34) Solve the pair of linear equations $2x+y=2$ and $3x+y=5$ by graphical method.
- 35) A boy observes the tip of a tower fixed on the top of a building of height 14m from a point on the ground, then the angle of elevation is 45° . While walking towards the building again he observes the tip and base of the tower from another point, now if angles of elevation are 60° and 30° respectively. Find the height of the tower and the distance he walked.
- 36) First terms of two A.P.s are 2 and 5 and their common differences are 3 and -2 respectively. If the difference of the sums of first 'n' terms of these two A.P.s is 195. Find the number of terms.

OR

If square of the second term of an A.P. is equal to its 12th term and 10th term is thrice the third term. Find the sum of first 25 terms of that A.P.

- 37) A tent is cylindrical upto a height of 4m and conical above it. The diameter of their bases is 32m and the maximum height of the tent is 16m. If the width of the canvas available is 8m. Find the minimum length of the canvas used to make the tent.
(use $\pi = \frac{22}{7}$)

VI.

5x1=5

- 38) State and prove Thale Theorem.

** ** *

**DEPUTY DIRECTOR OF PUBLIC INSTRUCTION, KOLAR DISTRICT,
KOLAR.**

MODEL PAPER-6

Subject :- Mathematics

Maximum marks :-80

Time :- 3 Hours

I. In the following questions four choice are given for each question, choose and write the correct answer along with its alphabet :-

1X8=8

1. In an AP $S_7 = 44$ and $S_6 = 39$ then 7th term of AP is
A) 5 B) 12 C) 15 D) 8
2. The triangle with measure of sides are 3cm, 4cm, 5cm is
A) Acute angle triangle
B) Obtuse angle triangle
C) Right angle triangle
D) Not possible to construct a triangle
3. The measure of one tangent from a external point to a circle is 14 cm then the measure of another tangent is
A) 7cm B) 14cm C) 10cm D) 16cm
4. The distance between origin and point $[m,n]$ is
A) $m^2 - n^2$ B) $\sqrt{m^2 + n^2}$ C) mn D) $m^2 + n^2$
5. In the following irrational number is

- A) $7.36533.....$ B) $7/11$ C) $\sqrt{25} + \sqrt{144}$ D) $3 + \sqrt{5}$
6. The polynomial whose zeroes are 2 and 5 is
- A) $x^2 - 7x - 10$ B) $x^2 + 7x + 10$
- C) $x^2 + 7x - 10$ D) $x^2 - 7x + 10$
7. If $b^2 - 4ac < 0$ then roots of quadratic equation is
- A) Equal and Real B) Real and distinct
- C) No real roots D) All the above
8. The value of $\sin 55^\circ$ is
- $\cos 35^\circ$
- A) 1 B) 2 C) D D) -1

II. Solve :

1X8=8

9. If $\sum fixi = 300$, $\sum fi = 10$ then find the mean.
10. The probability of losing a game is $2/5$ then find the probability of winning game ?

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11. Find the slant height of cone whose radius is 5cm and height is 12cm
12. Find the difference in AP 12, 7, 2
13. What is the Coordinate of midpoint which join point (5, 6) and (1, 2)
14. If HCF of 28 and 32 is 4 find LCM

15. If $\sin \theta = \frac{2}{\sqrt{3}}$ $\cos \theta = \frac{3}{\sqrt{3}}$ find $\tan \theta$

16. What is the formula to find the sum of in terms of A.P. ?

III. Simplify :

2X8=16

17. Construct two tangent to a Circle of radius 4.5cm such that angle between them is 60

18. show that $3 + \sqrt{5}$ is an irrational number.

[or]

Without actually performing the long division show whether $\frac{7}{80}$ will have terminating decimal expansion or a non-terminating repeating decimal.

19. Write a quadratic polynomial whose sum of zeroes is $\frac{1}{3}$ and product of zeroes is -2,

20. Find the zeroes of quadratic polynomial $x^2 - 2x - 8$

21. Solve the equation $x^2 - 3x - 10$ by using formula.

22. The following distribution gives the daily income of 50 workers of a factory.

23. 2 cubes each of volume 64 cm^3 are joined end to end find the surface area of the resulting solid.

24. A box contains 125 discs which are numbered from 1 to 125. If one disc is drawn at random from the box find the probability it bears a number divisible by 5.

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IV. Solve the problems :-

25. If three times the larger of the two numbers is divided by the smaller and we get 4 as quotient and 3 as the remainder. Also if seven times the smaller number is divided by the larger one we get 5 as quotient and 1 as remainder find the numbers.

26. Theorem 4.1 :- The tangent at any point of a circle with centre O and a tangent line XY to the circle at a point P. we need to prove that OP is perpendicular to XY.

[or]

Example :- Prove that in two concentric circles the chord of the larger circle which touches the smaller circle is bisected at the point of contact.

27. Draw a triangle ABC with side BC = 6cm AB = 5cm and $\angle ABC = 60^\circ$. The construct a triangle whose sides are $\frac{3}{4}$ of the corresponding sides of the triangle ABC.

28. If A (-5,7) B (+4,-5) C (-1,-6) and D (4,5) are the vertices of a quadrilateral find the area of the quadrilateral ABCD.

29. A cottage industry produces a certain number of pottery articles in a day it was observed on a particular day that the cost of production of each article was 3 more than twice the number of article was 3 more than twice the number of articles produced on that day if that day. The total cost of production on that day was Rs. 90, find the number of articles produced and the cost of each article.

30. The median of the following data is 525, find the values of x and y if the total frequency is 100.

Class interval	Frequency
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	y
700-800	9
800-900	7
900-1000	4

// 4 //

[or]

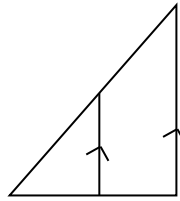
The following data gives the information on the observed lifetimes of 225 electrical components :-

Life times [in hours]	0-20	20-40	40-60	60-80	80-100	100-120
Frequency	10	35	52	61	38	29

31. In the adjoining figure $xy \parallel BC$ $AX = P-3$ $BX = 2p-2$
and $\frac{AY}{CY} = \frac{1}{4}$ find the value of P

CY 4

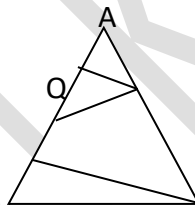
B



A Y C

[OR]

In the figure $pc \parallel QK$ and $BC \parallel HK$ If $AQ = 6\text{cm}$ $QK = 4\text{cm}$
 $HP = 5\text{cm}$ and $KC = 18\text{cm}$ then find the length of AK and AB.



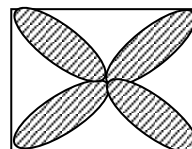
H

P

B

C

32. Find the area of the shaded design, where ABCD is a square of side 10cm and semicircle are drawn with each side of the square as diameter [use $\pi = 3.14$]



33. Prove that

$$\frac{\tan\theta}{1-\cot\theta} + \frac{\cot\theta}{1-\tan\theta} = 1 + \sec\theta \cdot \operatorname{cosec}\theta$$

$$\frac{1-\cot\theta}{1-\tan\theta}$$

OR

If $\sin(A-B) = \frac{1}{2}$, $\cos(A+B) = \frac{1}{2}$, $0 < A+B \leq 90^\circ$, $A > B$ find A and B

.. 5 ..

V. Answer these questions :-

34. Prove the ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides.

35. Sum of 6 terms of AP is 20 sum of first two terms is diminished by 32 with the sum of last two terms. Find the terms of AP.

36. A Person standing on the bank of river observes that the angle of elevation of the top of a tree standing on the opposite bank is 60° when he moves 40° metres away from the bank, he finds the angle of elevation to be 30° find the height of the tree and the width of the river [use $\sqrt{3} = 1 + 3$]

37. A Solid is in the form of a right circular cone mounted on a hemisphere the radius of the hemisphere is 3.5cm and the height of the cone is 4cm.

[OR]

The solid is placed on a cylinder tub full of water on such a way that the whole solid is submerged on water. If the radius of the cylinder is 5cm and its height of 10.5cm find the volume of water left in the cylindrical. [use $\pi = \frac{22}{7}$]

VI.

38. Form the pair of linear equations for the following problems and find their solutions by graphical method

(i) The taxi charges in a city consists of a fixed charge together with the charge for the distance covered for a distance of 10 km. the charges paid is Rs. 105 and for a Journey of 15 km the charges

paid is Rs.155. What are the fixed charges and the charges per km ? How much does a person have to pay for travelling a distance of 25 km ?

** ** *

DPIKOLAR