## KOMARASAMY GOUNDER MAT.HR.SEC.SCHOOL - KURUMANDUR

PRE - QUARTERLY EXAMINATION-SEP - 2023

TIME: 3.00
$\underline{\underline{X} \text {-STANDARD }}$
$\underline{\text { MATHEMATICS }}$
$\underline{\text { PART-I }}$$\quad$ MA
$14 \times 1=14$
Note: 1.Answer all the questions.
2. Choose the best answer .

1. $7^{4 k} \equiv$ $\qquad$ $(\bmod 100)$
a) 1
b) 2
c) 3
d) 4
2. Basic proportionality theorem is also known as
a) Thales theorem
b) Angle bisector Theorem
c) Pythagoras theorem
d) Alternate segment theorem
3. $(2,1)$ is the point of intersection of two lines.
a) $x-y-3=0 ; 3 x-y-7=0$
b) $x+y=3 ; 3 x+y=7$
c) $3 x+y=3 ; x+y=7$
d) $x+3 y=3 ; x-y-7=0$
4. If $f(x)=x^{2}-x$ then $f(x-1)-f(x+1)=$ $\qquad$
a) $4 x$
b) $2-2 x$
c) $2-4 x$
d) $4 x-2$
5. $\frac{a^{2}}{a^{2}-b^{2}}+\frac{b^{2}}{b^{2}-a^{2}}=$
a) $\mathbf{a}-\mathrm{b}$
b) $\mathbf{a}+\mathbf{b}$
c) $a^{2}-b^{2}$
d) 1
6. In $\triangle L M N, \angle \mathrm{~L}=60^{\circ}, \angle \mathrm{M}=50^{\circ}$ : If $\triangle L M N \sim \triangle P Q R$ then the value of $\angle \mathrm{R}$ is
a) $40^{\circ}$
b) $\mathbf{7 0}{ }^{\circ}$
c) $30^{\circ}$
d) $\mathbf{1 1 0}^{\circ}$
7. The solution of the system $x+y-3 z=-6 ;-7 y+7 z=7 ; 3 z=9$ is
a) $x=-1, y=-2, z=-3$
b) $x=-1, y=-2, z=3$
c) $x=-1, y=2, z=3$
d) $x=1, y=2, z=3$
8. If $A$ and $B$ are any two non - empty sets and $R$ is a relation from $A$ to $B$, then the domain of $R$ is
a) A
b) B
c) a subset of $A$
d) a subset of B
9. Let $A=\{1,2,3,4\}$ and $B=\{4,8,9,10\}$. A function $f: A \rightarrow B$ given by $\mathrm{f}=\{(1,4),(2,8),(3,9)(4,10)\}$ is a
a) Many - one function
b) Identify function
c) One - to - one function
d) Into function
10. In how many ways 64 can be written as the product of three numbers such as that the Numbers are in G.P ?
a) 0
b) 1
c) 3
d) infinite
11. The value of $\left(1^{3}+2^{3}+3^{2}+\cdots\right.$ $\left.15^{2}.\right)-(1+2+3+$ $\qquad$ $+15)$ is
a) 14400
b) 14200
c) 14280
d) 14520
12. $\frac{3 y-3}{y}+\frac{7 y-7}{3 y^{2}}$ is
a) $\frac{9 y}{7}$
b) $\frac{9 y^{3}}{21 y-21}$
c) $\frac{21 y^{2}-42 y+21}{3 y^{3}}$
d) $\frac{7\left(y^{2}-2 y+1\right)}{y^{2}}$
13. If $\sin \theta=\cos \theta$, then $2 \tan ^{2} \theta+2 \sin ^{2} \theta-1$ is equal to
a) $\frac{-3}{2}$
b) $\frac{3}{2}$
c) $\frac{2}{3}$
d) $\frac{-2}{3}$
14. Two straight lines $a_{1} x+b_{1} y+c_{1}=0$ and $a_{2} x+b_{2} y+c_{2}=0$, where the coefficients are non - zero are perpendicular if
a) $a_{1} b_{2}-a_{2} b_{1}=0$
b) $a_{1} b_{2}+a_{2} b_{1}=0$
c) $a_{1} a_{2}+b_{1} b_{2}=0$
d) $a_{1} a_{2}-b_{1} b_{2}=0$

PART-B (MARKS 20)
II. Answer any ten questions. Question No. 28 is compulsory .
15. Compute x , such that $10^{4} \equiv x(\bmod 19)$
16. Find the first term and common ratio of the G.P , whose $2^{\text {nd }}$ term is $\sqrt{6}$ and $6^{\text {th }}$ term is $9 \sqrt{6}$.
17. The vertical stick of length 6 m casts a shadow 400 cm long on the ground and at the same time
a lower casts a shadow 28 m long. Using similarity, find the height of the tower.
18. prove the identity $\frac{\cos \theta}{1+\sin \theta}-\boldsymbol{\operatorname { s e c } \theta}-\tan \theta$
19. In $\triangle A B C, D$ and $E$ are points on the sides $A B$ and $A C$ respectively such that $D E \| B C$ if $\frac{A D}{D B}=\frac{3}{4}$ and $A C=15 \mathrm{~cm}$ Find $A E$.
20. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
21. Which term of an A.P $111,108,105,102$, is 3 ?
22. If $\mathrm{P}=\frac{a}{a+b}, \mathrm{Q}=\frac{b}{a+b}$ then find $\frac{1}{P^{2}-Q^{2}}$.
23. Show that the points $(-3,-4),(7,2)$ and $(12,5)$ are collinear.
24. Find the square root of $\frac{400 x^{4} y^{12} z^{16}}{100 x^{8} y^{4} z^{4}}$
25. If $f(x)=3 x+2, g(x)=6 x-k$ and if $f o g=g$ of, then find the value of $k$.
26. Subtract $\frac{1}{x^{2}+2}$ from $\frac{2 x^{3}+x^{2}+3}{\left(x^{2}+2\right)^{2}}$.
27. Let $\mathrm{x}=\{3,4,6,8\}$. Determine whether the relation $\mathrm{R}=\{(x, f(x) / x \in x$,$\} .$
28. Can you find the 4 digit pin number 'pqrs' of an ATM card such that $p^{2} \times q^{1} \times r^{4} \times s^{3}=$ 3,15,000?

## PART-III (MARKS 50)

Note : Answer any ten question of the following :
50
Question Number ' 42 ' is compulsory.
29. A person saved money every year, half as much as he could on the previous year. If he had totally saved $₹ 7875$ in 6 years. Then how much did he save in the just year?
30. Solve : $\frac{1}{2 x}+\frac{1}{4 y}-\frac{1}{3 z}=\frac{1}{4} ; \frac{1}{x}=\frac{1}{3 y} ; \frac{1}{x}-\frac{1}{5 y}+\frac{4}{z}=2 \frac{2}{15}$
31. Find the sum of the all natural number between 100 and 1000 which are divisible by 11 .
32. Solve : $p q x^{2}-(p+q)^{2} x+(p+q)^{2}=0$ by formula method.
33. Let $\mathrm{A}=\{x \in N / 1<x<4\} \mathrm{B}=\{x \in W / 0 \leq x \leq 3\}$ and $\mathrm{C}=\{X \in N / X<2\}$ then verify $\mathrm{AX}(B \cap C)=(\mathrm{AXB}) \cap(\mathrm{AXC})$.
34. Using slope concept , show that the point $(1,-4),(2,-3)$ and $(4,-7)$ form a right angled triangle.
35. Find the sum to $n$ terms of the series $0.4+0.44+0.444+$. $\qquad$ to n terms.
36. If the function $\mathrm{f}: \mathrm{R} \rightarrow \mathrm{R}$ is defined by $\mathrm{f}(\mathrm{x})\left\{\begin{array}{c}2 x+7 ; x<-2 \\ x^{2}-2 ;-2 \leq x<3 \\ 3 x-2 ; x \geq 3\end{array}\right\}$ Then find the value of
i) $f(4)$
ii) $f(-2)$
iii) $f(4)+2 f(1)$
iv) $\frac{f(1)-3 f(4)}{f(-3)}$
37. If $\mathrm{f}(\mathrm{x})=x^{2}, g(x)=3 x$ and $h(x)=x-2$, Prove that ( fog ) oh $=\mathrm{fo}(\mathrm{goh})$
38. If $\mathrm{A}=\frac{2 x+1}{2 x-1} \cdot \mathrm{~B}=\frac{2 x-1}{2 x+1}$ Find $\frac{1}{A-B}-\frac{2 B}{A^{2}-B^{2}}$
39. State and prove Angle Bisector theorem.
40. Find line joining the points $A(0,5)$ and $B(4,1)$ is a tangent to a circle whose centre $C$ is at the point $(4,4)$. Find.
i) the equation of the line $A B$
ii) The equation of the line through $C$ which is perpendicular to the line $A B$.
iii) The coordinates of the point of contrast of tangent line $A B$ with the circle.
41. One hundred and fifty students are admitted to a school. They are distributed over three sections A , B, and C. If 6 students are shifted from section A to section C, the sections will have equal number of students. If 4 times of students of sections $C$ exceeds the number of students of section A by the number of students in sections B , find the number of students in
the three sections.
42. If $x=1+p+p^{2}+$ $\qquad$ $\propto, y=1+q+q^{2}+$ $\qquad$ $\propto$, and $|\mathrm{p}|<1,|\mathrm{q}|<1$ then show
that $1+p q+p^{2} q^{2}+\ldots \ldots \ldots \ldots \ldots \ldots,=\frac{x y}{x+y-1}$
PART - IV (MARKS 16)
IV. Answer the following :

16
43. Draw $\triangle P Q R$ such that $P Q=6.8 \mathrm{~cm}$. Vertical angle is $50^{\circ}$ and the bisector of the vertical angle
meets the base at D where $\mathrm{PD}=5.2 \mathrm{~cm}$.
Or
Draw a triangle $A B C$ of base $B C=8 \mathrm{~cm}, \angle A=60^{\circ}$ and the bisector of $\angle A$ meets $B C$ at $D$ such that $\mathrm{BD}=6 \mathrm{~cm}$.
44. Nishanth is the winner in a Marathon race of 12 km distance. He ran at the uniform speed of $12 \mathrm{~km} / \mathrm{hr}$ and reached the destination in 1 hour. He was followed by Aradhana Jeyanth ,Sathya and swetha with their respective speed of $6 \mathrm{~km} / \mathrm{hr}, 4 \mathrm{~km} / \mathrm{hr}, 3 \mathrm{~km} / \mathrm{r}$ and $2 \mathrm{~km} / \mathrm{hr}$, and they covered the distance in $2 \mathrm{hrs}, 3 \mathrm{hrs}, 4 \mathrm{hrs}$ and 6 hrs respectively

Draw the speed -time graph and use it to find the time taken to Kaushik with his speed of 2.4 km.hr.

Or
Draw the graph of $y=x^{2}-5 x-6$ and hence solve $x^{2}-5 x-14=0$

