QUARTERLY EXAMINATION : 2021-22

Class - IX (ICSE)

Time : 2½ hrs. **MATHEMATICS** M.M.: 80

Answer to this paper must be written on the paper provided separately.
You will not be allowed to write during the first 15 minutes. This time is to be spent in reading the question paper. The time given at the head of this paper is the time allowed for writing the answer.
Attempt all questions from Section - I and any four questions from Section - II.
All working, including rough work must be clearly shown and must be done on the same sheet as the rest of the answer.
Omission of essential working will result in loss of marks.
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION - I [40 Marks]
(All questions are compulsory)

Q.1. (a) If $a+b+c=12$ and $ab+bc+ca=22$ find $a^2+b^2+c^2$ [3]

(b) What sum of money will amount to ₹ 9261 in 3 years at 5% p.a. compound interest ? [3]

(c) Evaluate $x^{1/2}.y^{-1}.z^{2/3}$ where x=9, y= 2 and z= 8 [4]

Q.2. (a) Solve for x : $\log(5x - 4) - \log(x+1)=\log 4$ [3]

(b) Solve for x and y : $3x+2y=4$
$8x+5y=9$ [3]

(c) In a ΔABC, AB=AC=x , BC=10 cm and the area of $\Delta ABC=60$ cm^2.
Find the value of x. [4]

Q.3. (a) Prove that : $(a+b)^{-1}\left(a^{-1}+b^{-1}\right)=\frac{1}{ab}$ [3]

(b) Solve for x : $x=\frac{\log 125}{\log 25}$ [3]

(c) Four years ago Meenal was three times as old as her daughter. Six years from now the mother will be twice as old as her daughter. Find their present ages. [4]

Q.4. (a) A person invests ₹ 10000 for two years at a certain rate of interest, compounded annually. At the end of one year this sum amounts to ₹ 11200. Calculate :
(i) the rate of interest per annum
(ii) the amount at the end of second year. [3]

(b) If $a^2 - 3a+1=0$ find $a^2+\frac{1}{a^2}$ [3]

(c) Solve by crossmultiplication method : $3x+2y=4$, $8x+5y=9$ [4]

SECTION - II [40 Marks]
(Attempt Any Four questions from this section)

Q.5. (a) Simplify : $\left(\frac{x^m}{x^n}\right)^{m+n}\left(\frac{x^n}{x^\ell}\right)^{n+\ell}\left(\frac{x^\ell}{x^m}\right)^{\ell+m}$ [3]

(b) Find the value of k if the point P(2, 4) is equidistant from the points A(5, k) and B(k, 7) [3]

(c) If log (m+n)=log m+log n then prove that : $n = \frac{m}{m-1}$ [4]

Q.6 (a) The value of a machine with ₹ 500000 is depreciating at the rate of 10% per year. In how many years will its value be reduced to ₹ 364500 ? [3]

(b) If a+b+2c=0, prove that $a^3+b^3+8c^3=6abc$ [3]

(c) The sum of two numbers is 43. If the larger is doubled and the smaller is tripled, the difference is 36. Find the two numbers. [4]

Q.7. (a) In an isosceles triangle ABC, AB=AC, D is a point on BC produced. Prove that $AD^2=AC^2+BD\times CD$ [4]

(b) A triangle is formed by the lines x+2y-3=0, 3x-2y+7=0 and y+1=0. Find graphically : [6]

(i) the coordinates of the vertices of the triangle

(ii) the area of the triangle.

Q.8. (a) Expand $(5x - 3y)^3$ [3]

(b) If $\log_3 x=a$, find 81^{a-1} in terms of x. [3]

(c) A boat takes 2 hrs to go 40 km down the stream and it returns in 4 hrs. Find the speed of boat in still water and the speed of stream. [4]

Q.9. (a) Using distance formula, show that the points A(3, 1), B(6, 4) and C(8, 6) are collinear. [3]

(b) If $3^x = 5^y = (75)^z$, show that $z = \frac{xy}{2x+y}$ [3]

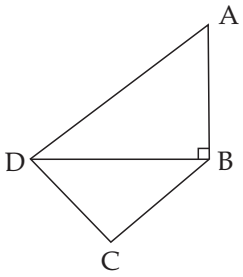
(c) Solve the following pairs of linear equation : [4]

$$\frac{3}{x+y}+\frac{2}{x-y}=3, \quad \frac{2}{x+y}+\frac{3}{x-y}=\frac{11}{3}$$

Q.10. (a) If $\frac{x}{y}+\frac{y}{x}=-1\,(x, y \neq 0)$, find the value of $x^3 - y^3$ [3]

(b) Solve for x : $(13)^{\sqrt{x}} = 4^4 - 3^4 - 6$ [3]

(c) In the given figure ABCD is a quadrilateral in which AD=13 cm, DC=12 cm, BC=3 cm, $\angle ABD = \angle BCD = 90^\circ$. Calculate the length of AB [4]



Q.ll. (a) If $x^2 + y^2 = 23xy$ prove that [3]

$$\log\frac{x+y}{5}=\frac{1}{2}(\log x+\log y)$$

(b) Solve : $83x - 67y = 383$
$67x - 83y = 367$ [3]

(c) Solve the system of equations graphically 4x - y=5, 5y - 4x=7 [4]

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