HALF YEARLY EXAMINATION : 2022-23

CLASS - IX (ICSE)

MATHEMATICS

Time: 2½ hrs. 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.
Attempt all the questions from Section A and any four questions from Section B.
All working including rough work, must be shown, and should be done on the same sheet as the rest of the answer.
Omission of essential working including rough work will result in loss of marks. The time given at the head of this paper is the time allowed for writing the answers.
The intended marks for questions or parts of questions are given in brackets [ ].

SECTION 'A' [40 Marks]

(Attempt all questions from this section)

Q.1. a) Evaluate : [3]

$$\sqrt{\frac{1}{4}}-\left(\frac{1}{100}\right)^{-\frac{1}{2}}-(27)^{\frac{2}{3}}$$

b) If $a^2+b^2+c^2 = 125$ and $ab+bc+ca=50$, find $a+b+c$. [3]

c) Find the amount and compound interest on ₹ 8000 for 2 years if the rate of interest for the first and second year are respectively 4% and 5% per annum. [4]

Q.2. a) Factorise : [3]

$$8x^3-\frac{1}{27y^3}$$

b) Solve the following pair of equations : [3]

$3x+4y=10$
$2x-2y=2$

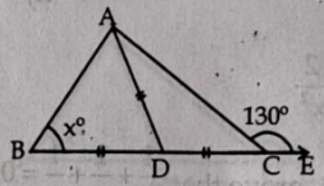
c) Construct a parallelogram ABCD with AB=5 cm, BC=3.6 cm and $\angle ABC=60^\circ$ [4]

Q.3. a) If $a=\log\frac{2}{3}$, $b=\log\frac{3}{5}$ and $c=2\log\sqrt{\frac{5}{2}}$, find the value of [3]

i) $a+b+c$
ii) 5^{a+b+c}

b) Check whether the points A(5, –2), B(6, 4) and C(7, –2) are the vertices of an isosceles triangle. [3]

c) In the adjoining figure, $\angle ABD=x^\circ$, $\angle ACE=130^\circ$ and AD=BD=DC. Find the value of x°. [4]



Q.4. a) Solve for x : [3]

$$\log_{\sqrt{3}}(x+1)=2$$

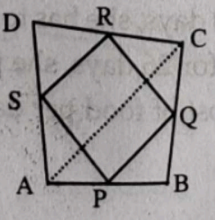
b) If an angle of a parallelogram is two-third of its adjacent angle, find the angles of the parallelogram. [3]

c) In the adjoining figures, ABCD is a quadrilateral in which P, Q, R and S are mid-points of AB, BC, CD and DA respectively. AC is it's diagonal. Show that : [4]

i) SR||AC and $SR=\frac{1}{2}AC$

ii) PQ=SR

iii) PQRS is a parallelogram



SECTION –B [40 Marks]

(Attempt any four questions from this section.)

Q.5. a) Factorise : [3]

$60x^2-70x-30$

b) Simplify : [3]

$(4x+3y)^2-(4x-3y)^2-48xy$

c) AD is an altitude of an isosceles triangle ABC in which AB=AC, show that : [4]

i) AD bisects BC

ii) AD bisects $\angle A$

Q.6. a) Simplify : [3]

$$\left(\frac{x^m}{x^n}\right)^{m+n}\left(\frac{x^n}{x^\ell}\right)^{n+\ell}\left(\frac{x^\ell}{x^m}\right)^{\ell+m}$$

b) In how many years will ₹ 4000 amount to ₹ 5324 at 10% compound interest ? [3]

c) Prove that bisectors of any two adjacent angles of a parallelogram are at right angles. [4]

Q.7. a) Factorise : [3]

x^3-3x^2-x+3

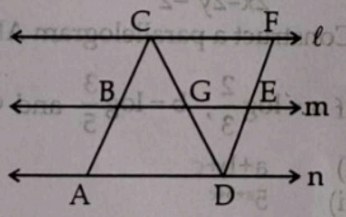
b) A sum compounded annually becomes $\frac{25}{16}$ times of itself in two years.

Determine the rate of interest per annum. [3]

c) Ratio of two numbers is 2 : 3 . If 2 is subtracted from the first and 8 from the second ratio becomes reciprocal of the original ratio. Find the numbers. [4]

Q.8. a) Given $\log_{10} a = m$ and $\log_{10} b = n$, express $\frac{a^3}{b^2}$ in terms of m and n. [3]

b) In the adjoining figure, the lines ℓ, m and n are parallel to each other, and G is midpoint of CD. Calculate : [3]



i) BG if AD=6 cm

ii) CF if GE=2.3 cm

c) If $x^2+\frac{1}{x^2}=7$, find the value of [4]

i) $x+\frac{1}{x}$ ii) $x-\frac{1}{x}$

iii) $2x^2-\frac{2}{x^2}$

Q.9. a) If $2^x = 3^y = 6^{-z}$, prove that $\frac{1}{x}+\frac{1}{y}+\frac{1}{z}=0$ [3]

b) Express as a single logarithm [3]

$$2+\frac{1}{2}\ell\log_{10}9-2\ell\log_{10}5$$

c) A part of monthly hostel charges is fixed and the remaining depends on the number of days one has taken food in the mess. When Bhawana takes food for 20 days, she has to pay ₹ 2600 as hostel charges ; where as when Divya takes food for 26 days, she pays ₹ 3020 as hostel charges, Find the fixed charges and the cost of food per day. [4]

Q.10. a) If $x-\frac{2}{x}=3$, find the value of $x^3-\frac{8}{x^3}$ [3]

b) Solve the following system of simultaneous linear equations : [3]

$41x + 53y = 135$

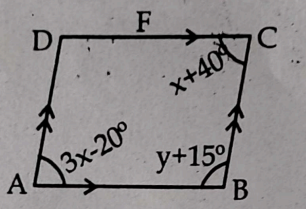
$53x + 41y = 147$

c) On what sum of mony will the difference between the compound interest and simple interest for 2 years be equal to ₹ 25, if the rate of interest charged for both is 5% p.a. ? [4]

Q.11. a) Solve for x : [3]

$$\frac{\ell og8}{\ell og2} \times \frac{\ell og3}{\ell og\sqrt{3}} = 2\,\ell ogx$$

b) In the adjoing figure ABCD is a parallelgoram. Find the values of x and y. [3]



c) Solve the following equations graphically : [4]

$4x - y = 5$, $5y - 4x = 7$

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