ANNUAL EXAMINATION : 2021-2022

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 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. Answer all questions from Section 'A' and any four questions from Section 'B'.
All working including rough work must be clearly shown and must be done on the same sheet as the rest of the answer, any omission of essential working will result in the loss of marks.
The intended marks for questions or parts of questions are given in the brackets [ ].

SECTION 'A'

(Attempt all questions)

Q.1. (a) If $a+b+c=12$ and $a^2+b^2+c^2=100$ find the value of $ab+bc+ca$ [3]

(b) Rationalize the denominator and simplify to find the value of : [3]

$\frac{4}{\sqrt{5}+\sqrt{3}}$ given that $\sqrt{5}=2.236$ and $\sqrt{3}=1.732$

(c) Express $2\log 3-\frac{1}{2}\log 16+\log 12$ as a single logarithms. [4]

Q.2. (a) The area of a semicircle is 308 cm². Calculate : [3]

(i) the radius of the circle

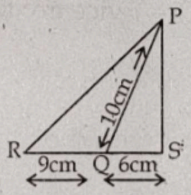
(ii) perimeter of the circle

(b) If $5\tan\theta=4$, find the value of : $\frac{5\sin\theta-3\cos\theta}{5\sin\theta+2\cos\theta}$ [3]

(c) If the length of the two parallel chords of a circle are 6 cm and 8 cm. If the smaller chord is at a distance of 4 cm from the centre, what is the distance of the other chord from the centre ? [4]

Q.3. (a) Construct a rhombus PQRS whose diagonals are 8 cm and 6 cm respectively. [3]

(b) In the figure $\angle PSR=90°$, PQ=10 cm, QS=6 cm and RQ=9 cm, calculate the legnth of RP. [3]



(c) Mr. Ram borrows ₹ 20000 for 2 years compounded annually. The rate of interest for the two successive years are 9% and 10% respectively. If he repays ₹ 1200 at the end of first year, ₹ 1660 at the end of second year, find the amount outstanding at the beginning of the third year. [4]

Q.4. (a) Calculate the mean and median of the following date : [3]

2, 3, 4, 3, 0, 5, 1, 1, 3, 2

(b) Factorize : $3x^2-11x+6$ [3]

(c) Solve the following system of simultaneous linear equations by cross multiplication method : [4]

$3x-5y=4$, $9x-2y=7$

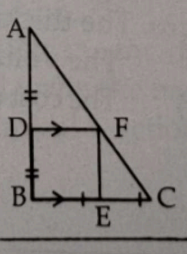
SECTION 'B'

(Attempt any four questions)

Q.5. (a) Evaluate : $\left[\frac{1}{4}\right]^{-2}-3(8)^{\frac{2}{3}}\times 4^0+\left[\frac{9}{16}\right]^{-\frac{1}{2}}$ [3]

(b) A is a point on x-axis and B is (-7, 9). Distance between the points A and B is 15 units. Find the coordinates of point A. [3]

(c) In the given figure, D and E are mid points of AB, BC respectively and DF || BC. Prove that DBEF is a parallelogram. Calculate AC if AF=2 cm. [4]



Q.6. (a) Write the numbers in descending order : [3]

$3\sqrt{2}, 2\sqrt{3}, \sqrt{14}, 4$

(b) Sangram purchased an old motorbike for ₹ 16000. If the value of the motorbike after 2 years is ₹ 14440. Find the rate of depreciation. [3]

(c) Each equal sides of an isesceles triangle is 2 cm greater than its height. If the base of the triangle is 12 cm, find the area of triangle. [4]

Q.7. (a) If $\cos(A+B) = \frac{1}{2} = \sin(A-B)$ where $0^\circ \le A+B \le 90^\circ$, $\angle A > \angle B$ find value of A and B. [3]

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

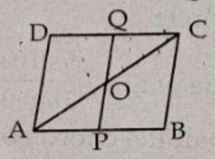
(c) Find graphically the coordinates of the vertices of the triangle formed by the lines y=0, y=x and 2x+3y=10. [4]

Q.8. (a) Factorize : x^3-3x^2-x+3 [3]

(b) Simplify : $\frac{3^{n+1}}{3^{n(n-1)}} \div \frac{9^{n+1}}{\left(3^{n+1}\right)^{n-1}}$ [3]

(c) A room is 8 m long and 5 m broad. Find the cost of covering the floor of the room with 80 cm wide carpet at the rate of ₹ 22.50 per metre. [4]

Q.9. (a) Points P and Q have been taken on opposite sides AB and CD respectively of a parallelogram ABCD such that AP=CQ. Show that AC and PQ bisect each other. [3]



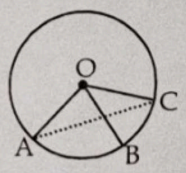
(b) Without actually calculating the cubes find the value of $(27)^3+(-17)^3+(-10)^3$. [3]

(c) Prove that the diagonals of a parallelogram divide it into four triangles of equal area. [4]

Q.10. (a) In the figure, arc AB= twice arc BC and $\angle AOB = 80^\circ$. Find : [3]

(i) $\angle BOC$

(ii) $\angle OAC$

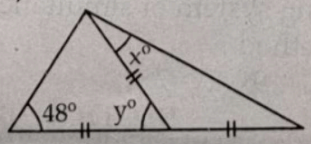


(b) Evaluate : $\tan 20^\circ \tan 40^\circ \tan 50^\circ \tan 70^\circ$ [3]

(c) Draw a combined histogram and frequency polygon for the following data : [4]

Class intervals	20-30	30-40	40-50	50-60	60-70	70-80
Frequency	5	10	20	25	20	15

Q.11. (a) From the following figure, find the value of x and y. [3]



(b) If 1 is subtracted from the numerator of a fraction it becomes $\frac{2}{3}$, but if 5 is added to the denominator of the fraction it becomes $\frac{1}{2}$. Find the fraction. [3]

(c) The length, breadth and height of a closed wooden box are 20 cm, 12 cm and 8 cm. The thickness of the wood used to make the box is 10 mm. Find : [4]

(i) The volume of the wood

(ii) The cost of the wood required to make the box, if 1 cm^3 of wood casts ₹ 8.50.

#####