U.S.OSTWAL ENGLISH ACADEMY (ICSE), MIRA RD

SUMMATIVE ASSESSMENT-I (2019-20)

STD: X MATHEMATICS TIME: 2 ½ hrs

DATE: 23 /09 /2019 MARKS: 80

SECTION A (Attempt all the questions)

Q1 a) If $\frac{8a-5b}{8c-5d} = \frac{8a+5b}{8c+5d}$, prove that $\frac{a}{b} = \frac{c}{d}$. (3)

b) If $A = \begin{bmatrix} 3 & x \\ 0 & 1 \end{bmatrix}$ and $B = \begin{bmatrix} 9 & 16 \\ 0 & -y \end{bmatrix}$, find x and y when $A^2 = B$. (3)

c) Is 205 a term of the sequence 8, 12, 16, 20.....? (4)

Q2 a) Find the sum of 10 terms of the geometric progressions..... (3)

$1 + \sqrt{3} + 3 + 3\sqrt{3} + \ldots$

b) Use a graph paper, plot the points A (6,4) and B (0,4). (3)

i) Reflect A and B in the origin to get the images A' and B'.

ii) Write the co-ordinates of A' and B'.

iii) State the geometrical name for the figure ABA'B'.

iv) Find its perimeter.

c) The midpoint of the line segment joining (3 m, 6) and (-4, 3n) is (1, 2m -1).

Find the values of m and n. (4)

Q3 a) In triangle ABC, A (3,5), B (7,8) and C (1,-10). Find the equation of the median through A. (3)

b) Use ruler and compasses only for this question: (3)

i) Construct Triangle ABC, where AB = 3.5 cm, BC = 6 cm and ABC = 60°.

ii) Construct the locus of points inside the triangle which are equidistant from BA and BC.

iii) Construct the locus of points inside the triangle which are equidistant from B and C.

iv) Mark the point P which is equidistant from AB, BC and also equidistant from B and C.

Measure and record the length of PB.

c) Construct a regular hexagon of side 4 cm. Construct a circle circumscribing the hexagon. (4)

Q4 a) Prove that : $\frac{\sin\theta - 2\sin^3\theta}{\cos\theta - 2\cos^3\theta} = \tan\theta$ (3)

b) An aeroplane at an altitude of 250m observes the angle of depression of two boats on the opposite banks of a river to be 45° and 60° respectively. Find the width of the river. Write the answer correct to the nearest whole number. (3)

c) 6 is the mean proportion between 2 numbers x and y and 48 is third proportion to x and y. Find the numbers. (4)

SECTION B (Attempt any four questions)

Q5 a) If $A = \begin{bmatrix} 5 & 7 \\ 2 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 0 & 2 \\ 5 & 3 \end{bmatrix}$ and $C = \begin{bmatrix} 1 & -5 \\ -4 & 6 \end{bmatrix}$. (3)

Find : AB – 5C.

b) In an AP the third term is 21 and the ninth term is 39. Find the sum of the first twelve terms. (3)

c) Find three terms in a G.P such that their product is 64 and their sum is 14. (4)

Q6 a) Use graph paper for this question: (3)

i) The point P (5,3) is reflected in the origin to get the image P'.

Write down the co – ordinates of P'.

ii) If M is the foot of the perpendicular from P to the x – axis, Find the co- ordinates of M.

iii) If N is the foot of the perpendicular from P' to the x – axis, Find the co-ordinates of N.

iv) Name the geometrical figure PMP'N.

b) ABCD is a parallelogram whose vertices A, B and C have the co-ordinates (-3,2), (1,5) and (2, -4) respectively.

Find the co-ordinate of the fourth vertex. (3)

c) For what value of 'a' lines $2x + ay = 5$ and $5x - y + 1 = 0$ (4)

are : i) Parallel ii) Perpendicular

Q7 a) A straight line AB is 8 cm long. Draw and describe the locus of a point which is: (3)

i) always 4 cm from the line AB. ii) equidistant from A and B.

b) Draw a circle of radius 3 cm. Mark a point P at a distance of 5 cm from the center of the circle drawn. Draw two tangents PA and PB to the given circle and measure the length of each tangents. (3)

c) Prove that: $\frac{\cos A}{1-\tan A} + \frac{\sin A}{1-\cot A} = \sin A + \cos A$ (4)

Q8 a) The length of the shadow of a vertical tower on level ground increases by 10m, when the altitude of the sun changes from 45° to 30°. Calculate the height of the tower, correct to the two decimal places. (3)

b) What least number must be added to each of the numbers 6, 15, 20 and 43 to make them proportional. (3)

c) Let $A = \begin{bmatrix} 2 & 1 \\ 0 & -2 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 1 \\ -3 & -2 \end{bmatrix}$ and $C = \begin{bmatrix} -3 & 2 \\ -1 & 4 \end{bmatrix}$.

Find $A^2 + AC - 5B$. (4)

Q9 a) Determine the A.P whose 3rd term is 16 and 7th term exceeds the 5th term by 12. (3)

b) Find the 8 th term of the geometric progression:

5,10,20,40,..... (3)

c) If the point P(-1, 2) divides the join of points A (2, 5) and B (a,b) in the ratio 3:4. Find the value of a x b – a. (4)

Q10 a) In triangle ABC, A (3,5), B (7,8) and C (1, -10) Find the equation of the median through A. (3)

$\begin{bmatrix} 2 & 1 \\ -3 & 4 \end{bmatrix} \cdot X = \begin{bmatrix} 7 \\ 6 \end{bmatrix}$ → order of X

b) Construct a regular hexagon of side 5 cm. (3)

c) Prove that: $\sqrt{\frac{1-cosA}{1+cosA}} = \frac{\sin A}{1+cosA}$ (4)

Q11 a) The length of the shadow of a vertical tower is $\sqrt{3}$ times its height. Find the angle of elevation of the sun. (3)

√3 times

b) Find the 9th term of the series: 1, 4, 16, 64, ... (3)

c) Construct a triangle ABC with BC = 6.5 cm, AB = 5.5 cm and AC = 5 cm. Construct the incircle of the triangle . (4)