****

**MAYO COLLEGE GIRLS’SCHOOL**

**HALF YEARLY Examination-2018**

**Subject:Mathematics**

**Time: 2** $\frac{1}{2}$ **hrs Class:X MM:80**

(*Candidates are allowed additional 15 minutes for only reading the paper. They must* **NOT** *start writing during this time)*

 **Section A** 40 Marks

**Answer all the questions**

1. Rahim has a recurring deposit account in a bank. He deposits Rs.2500 per month for 2 years. If he gets Rs. 66250 at the time of maturity. Find the
2. The interest paid by the bank.
3. The rate of interest. (3)
4. Laila holds 1800 , Rs 100 shares of the company that pays 15% dividend annually. Calculate her annual dividend if she bought these shares at 40% premium, what percentage return does she get on her investment? (3)
5. Find the set of values of x satisfying 7x + 3 $\geq $ 3x – 5 and $\frac{x}{4}$ -5 $\leq \frac{5}{4}$ – x where

 n$\in N$. Also graph the solution set on the number line (4)

1. Solve x2 – 4x = 8 upto one decimal place. (3)
2. The polynomials ax3-7x2+7x-2 and x3-2ax2+ 8x-8 when divided by x-2 leave the same remainder. Find ‘a’. (3)
3. If x,y and z are in continued proportion, prove that $\frac{x^{2}-y^{2}}{x^{2}+y^{2}}=\frac{x-z}{x+z}$ (3)
4. If A=$\left[\begin{matrix}2&a\\-3&5\end{matrix}\right]$, B=$\left[\begin{matrix}-2&3\\7&b\end{matrix}\right]$, C=$\left[\begin{matrix}c&9\\-1&-11\end{matrix}\right]$. Find the values of a, b, c if 5A+2B=C. (3)
5. Find the 31st term of an A.P whose 11th term is 38 and 6th term is 73. (3)
6. In what ratio does the point (-4,b) divide the line segment joining the points

P (2,-2) Q (-14, 6). Find the value of ‘b’. (3)

1. Use a graph paper. Use 1cm=1unit on both the axes.
2. Plot the points A (3, 5) and B (-2,-4).
3. A’ is the image of A when reflected in the x axis. Write down the coordinates of A’.
4. B’ is the image of B when reflected in the y-axis, followed by reflection in the origin. Write the coordinates of B’.
5. Name the figure AA’BB’.
6. Write down the invariant points under reflection in the x-axis. (4)
7. A model of a ship is made to a scale 1:250. Calculate :
8. The length of the ship, if the length of the model is 1.6m
9. The area of the deck of the ship if the area of the deck of the model is 2.4m2.
10. Volume of the model if the volume of the ship is 1km3.
11. In the figure, AC is the diameter of the circle with centre O. If AB=BC and angle AED =118°. Then find (i) angle DEC and (ii) angle DAB. (3)



 (or)

The area of the curved surface of a cylinder is 4,400 sq.cm and the circumference os its base is 110 cm. Find: (i) the height of the cylinder (ii) the volume of the cylinder.

1. The median of the following numbers arranged in ascending order is 25. Find x: 11,13, 15, 19, x+2, x+4, 30,35,39,46. (2)

**Section B**  40 marks

 Answer any 4 out of 7 questions

1. (i) Prove the following identity

 $\frac{1+secA}{secA}$ = $\frac{sin^{2}A}{1-cosA}$ (3)

(ii) If the third, sixth and last terms of the G.P are 6, 48 and 3072 respectively, find the first term and the number of terms of the G.P. (3)

1. The mean of the following distribution is 62.8. Find the value of p. (4)

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Classes | 0-20 | 20-40 | 40-60 | 60-80 | 80-100 | 100-120 |
| Frequency | 5 | 8 | p | 12 | 7 | 8 |

1. (i)A juicer seller was serving his customers using glasses as shown in the adjoining figure. The inner diameter of the cylindrical glass was 5cm, but the bottom of the glass had a hemispherical portion raised which reduces the capacity of the glass. If the height of the glass was 10cm, find the apparent capacity of the glass and its actual capacity.(use π=3.14) (3)

 

(ii) If A=$\left[\begin{matrix}2&3\\0&-2\end{matrix}\right]$ and B=$[\begin{matrix}-8\\8\end{matrix}]$, find the matrix X such that 2AX=B. (3)

(iii)Use the factor theorem to factorise completely. (4)

2x3 + x2 – 13x + 6.

1. (i) A man wants to buy 124 shares available at Rs.66(par value=Rs.50)
2. How much he needs to invest?
3. If the dividend is 7.5%, what will be his annual income?
4. If he wants to increase his income by Rs.600, how much extra shares should he buy? (4)

(ii) If the speed of a car is increased by 10km/hr it takes 18 minutes less to cover a distance of 36km. Find the speed of the car. (3)

(iii)In the figure, find the value of AE if AE is perpendicular to BC and AB=5cm, BD=4cm, CD=9cm (3)



(or)

A solid metallic hemisphere of diameter 28cm is melted and recast into a number of identical solid cones, each of diameter 14cm and height 8cm. Find the number of cones so formed.

1. (i) Two poles of equal heights are standing opposite to each other on either of the road which is 80m wide. From a point between them on the road, the angle of elevation of the top of the poles are 60° and 30° respectively. Find the height of the poles and the distances of the point from the poles. (4)

(ii)The diameter of a metallic sphere is 42 cm. It is melted and drawn into a cylindrical wire of 28cm diameter. Find the length of the wire. (3)

1. Find x from the following equations:

$\frac{\sqrt{x+4}+\sqrt{x-10}}{\sqrt{x+4}-\sqrt{x-10}}$ = $\frac{5}{2}$ (3)

1. (i) In a school, students stand in rows. If 30 students stand in the first row, 27 in the second row, 24 in the third row and 6 in the last row. Find how many rows are there and what is the total number of students? (3)

(ii) The marks of 200 students in a test were recorded as follows:

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Marks% | 10-19 | 20-29 | 30-39 | 40-49 | 50-59 | 60-69 | 70-79 | 80-89 |
| Number of students | 7 | 11 | 20 | 46 | 57 | 37 | 15 | 7 |

Draw the cumulative frequency table. Draw the ogive and use it to find

1. The median
2. Lower quartile
3. The number of students who scored more than 35% (5)

(iii) If 6x+5y-7=0 and 2px+5y+1=0 are parallel lines, find the value of p. (2)

1. (i) Using ruler and compasses only, construct a quadrilateral ABCD in which AB=6cm, BC=5cm and angle B=60°, AD=5cm and D is equidistant from AB and BC. Measure CD. (4)

(ii) The points A(7,3) and C(0,-4) are the two opposite vertices of a rhombus ABCD. Find the equation of the diagonal BD. (3)

(ii) Tickets are numbered 3,5,7,9,……,29 are placed in a box and mixed thoroughly. One ticket is drawn at random from the box. Find the probability that the number on the card is

 (a) prime number

(b) a number less than 16

(c) a number is divisible by both 2 and 3. (3)

20. (i) Inscribe a circle in regular hexagon of sides 3.5 cm (4)

(or)

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

(ii)The daily wages of 30 employees in a establishment are distributed as follows:

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Daily wages(Rs.) | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 | 50-60 |
| No of employees | 1 | 8 | 10 | 5 | 4 | 2 |

Find the modal daily wages for this distribution by graphical method. (3)

(iii)In the given figure, MN is parallel to QR. If PN=3.6cm, NR=2.4cm and PQ=5cm, find PM. (3)