Time: 2 Hrs
Class IX

ANNUAL EXAMINATION 2022-23
MATHEMATICS

Dt. 24/02/2023
M. Marks: 80

SECTION A [40 Marks] [Compulsory]

(Answer all the question from this section)

Question 1

a) Is $\sqrt{100}+\sqrt{36}$ the same as $\sqrt{100+36}$? Give reason. [3]

b) Point A(5,1) is the centre of a circle with 13 radius units. AB is perpendicular to the chord PQ. B is (2, -3). Calculate the length of 1) PB 2) PQ 3) AB [3]

c) Use a graph paper for this question. Draw a graph of 3x-y-2=0 and 2x+y-8=0. Write down the coordinates of the point of intersection and the area of the triangle formed by the lines and the x axis. [4]

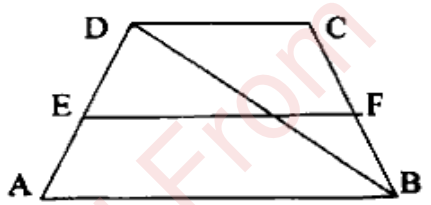
Question 2

a) Find the amount and compound interest on RS 24000 for $1\frac{1}{2}$ year at 10% per annum, the interest being compounded half yearly. [3]

b) If $\tan\beta = \frac{p}{q}$ Show that [3]

$$\frac{p\sin\beta - q\cos\beta}{p\sin\beta + q\cos\beta} = \frac{p^2 - q^2}{p^2 + q^2}$$

c) In the given figure, E is the midpoint of side AD of a trapezium ABCD, with AB || CD, A line through E parallel to AB meets BC in F. Show that F is the midpoint of BC. [4]



Question 3

a) In triangle ABC, side AC is greater than side AB. If the internal bisector of angle A meets the opposite side at point D. Prove that angle ADC is greater than angle ADB. [3]

b) The length of common chord of two intersecting circle is 30cm.if the diameters of these two circle be 50 cm and 34 cm. Calculate the distance between their centers. [3]

c) Draw a frequency polygon from the following data, giving the age of doctor working in C.G.H.S in a city. [4]

Age in years	25-30	30-35	35-40	40-45	45-50
No. of observation	40	60	50	35	20

Question 4 :

1) The median of observation 10,11,13,17, x+5, 20, 22, 24 and 53 (arranged in ascending order) is 18. Find the value of x. [3]

2) If a square is inscribed in a circle. Find the ratio of the area of the circle and the square. [3]

3) The dimension of a car petrol tank are 50cm*32 cm*24cm which is full of petrol. If a car's average consumption is 15km per litre. Find the maximum distance that can be covered by the car. [4]

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SECTION B [40 Marks] [Any four]

Question 5

a) If $x = \sqrt{3} - \sqrt{2}$. Find the value of $x^2 + 1/x^2$ [3]

b) A $4x^2 + y^2 = a$ and $xy = b$. Find the value of $2x + y$. [3]

c) PQRS is a parallelogram L and M are points on PQ and SR respectively such that PL = MR. Show that LM and QS bisect each other. [4]

Question 6

a) Draw a line segment of length $\sqrt{8}$ cm. [3]

b) Factorise: $12(3x-2y)^2 - 3x + 2y - 1$. [3]

c) Pooja and Ritu can do a piece of work in $17\frac{1}{7}$ days. If one day work of Pooja be ¾ of one day work of Ritu, Find in how many days each will do work alone? [4]

Question 7

a) Solve: $\frac{9}{x} - \frac{4}{y} = 8 \quad \frac{13}{x} + \frac{7}{y} = 101$ [3]

b) If $5^{x-1} = 25^{x-2}$. Find the value of $3^{x-3} \times 2^{3-x}$ [3]

c) Equal sides AB and AC of an isosceles triangle ABC are produced. The bisector of exterior angles so formed meet at D. Prove that AD bisects angle A. [4]

Question 8

a) Show that $\log_a m \div \log_{ab} m = 1 + \log_a b$ [3]

b) If the sides of a triangle are in the ratio $1 : \sqrt{2} : 1$. Show that it is a right-angled triangle. [3]

c) In a trapezium ABCD, sides AB and CD are parallel to each other. E is midpoint of AD and F is midpoint of BC. Prove that AB + DC = 2*EF. [4]

Question 9

a) The radii of two circles are in the same ratio 3: 8. If the difference between their area is $2695\ \pi cm^2$. Find the area of the smaller circle. [3]

b) The volume of a cube is $729cm^2$. find its total surface area. [3]

c) A horse pipe of cross section area 2 cm^2 delivers 1500 litres of water in 5 minutes. What is the speed of water in m/s through the pipe.? [4]

Question 10

a) A square is inscribed in a circle of radius 7 cm. Find the area of square. [3]

b) The radius of a circle is 13cm and the length of one of chord is 24cm. Find the distance of the chord from the centres. [3]

c) Express in terms of log2 and log3

a) $\log \sqrt{8}/27$ b) $\log(\sqrt{54} \times \sqrt[3]{243})$ [4]

Question 11

a) Factorise: $98(a+b)^2 - 2$ [3]

b) The area of a circular ring enclosed between two concentric circle is 286 cm^2. Find the radii of two circle, given that their difference is 7cm. [3]

c) If $\cot A = \frac{12}{5}$ verify [4]

$$\tan^2 A - \sin^2 A = \sin^4 A * \sec^2 A$$

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