BOMBAY INTERNATIONAL SCHOOL

MATHEMATICS- Std. X

2 December 2005

(Two hours and a half)

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.

The time given at the head of this Paper is the time allowed for writing the answers.

---

*Attempt 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. Omission of essential working will result in the loss of marks.

The intended marks for questions or parts of questions are given in brackets [ ].

Mathematical tables are provided.

SECTION A (40 marks)

Attempt all questions from this section

Question 1.

a) If $(x + a)$ is a factor of $x^3 + x^2 - 4x - 4$, find a. Hence, find the other factors of the given expression. [3]

b) Divide Rs.2244 amongst A, B and C such that the ratio of what A gets to what B gets is 2:3 and the ratio of what B gets to what C gets is 1:2. [3]

c) In what time will Rs.16000 earn compound interest of Rs.2522 at 10% p.a., reckoned semi-annually. [4]

Question 2.

a) Mr. Naik gets Rs.300 as the interest at the end of 1 year 3 months at the rate of 5% per annum in a recurring deposit account. Find the monthly instalment and the maturity amount. [3]

b) Solve the following inequation and graph it on a real number line.

$$14 < 4 - 2x \leq -6, x \in R.$$ [3]

c) Prove that: The angle inscribed in a semi circle is a right angle. [4]

Question 3.

a) Point P is reflected in x-axis to get P'. P' is then reflected in the line x+2=0 to get P''. If the coordinates of P'' are (-3,-2). Find the coordinates of P. [3]

b) The raw data 2, 3, 3, 3, p, 5, 7, 9 is arranged in ascending order of its magnitude. If the median of the data is 3.5, find the mode and the mean of the above data. [3]

c) O is the centre of two concentric circles. AB is the chord of the larger circle that is a tangent to the smaller circle. If the length of AB is 28 cm, find the area of the ring formed between the two concentric circles. [4]

Question 4.

a) Construct a regular hexagon in a circle of radius 4 cm. Construct all the lines of symmetry of the regular hexagon. [3]

b) Prove that $\sqrt{\sec\theta - 1} \cdot \sqrt{\sec\theta + 1} = \tan\theta$ [3]

c) Amit bought a colour TV and a DVD player for an advertised price of Rs. 16,000/-. He had paid 4% sales tax on the TV and 3% sales tax on the DVD player. He thus paid Rs.600 as the total sales tax. Calculate the selling price of the colour TV only. [4]

SECTION B (40 marks)

Attempt any four questions from the section.

Question 5.

a) Solve the following equation and give your answer upto two decimal places:

$$3x^2 - 4x - 1 = 0$$ [3]

b) AB and CD are two parallel chords in a circle of diameter 30 cm. If AB = 18 cm and CD = 24 cm, find the distance between the chords if:

i) they lie on the same side of the centre.

ii) they lie on the opposite side of the centre. [3]

c) A and B are two points in a Cartesian plane such that A(-3, -5) and B(3, 4). Find

i) the equation of line AB,

ii) the equation of the line through B and perpendicular to AB,

iii)the equation of line through the origin and parallel to line AB. [4]

Question 6.

a) The length of the direct common tangent to the two circles of radii 8 cm and 6 cm, is 15 cm. Calculate the distance between their centres. [3]

b) Find the matrix B, if $B.\begin{bmatrix} 2 & 0 \\ -4 & 3 \end{bmatrix} = \begin{bmatrix} -14 & 9 \end{bmatrix}$ [3]

c) Given that R is a linear relation and few of the elements of R are

{(1, 2), (2, 5), (3, 8), (4, 11).....}

i) Write R in set builder form,

ii) Write down the domain and range of R,

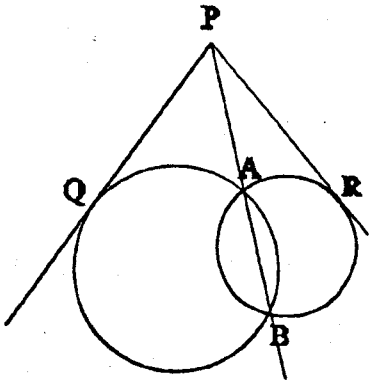
iii) Is R a function? If so, state its type. [4]

Question 7.

a) How much should Mr. Joshi invest in 12%, Rs. 50 shares available at a premium of 10% to get an annual income of Rs. 1500. [3]

b) From an aeroplane at a height of 800 m, the angle of depression of two ships on the opposite side are 37° and 64° respectively. If the aeroplane is vertically above the straight line joining the two ships, find the horizontal distance between the two ships. [4]

c) In the adjoining diagram, two circles intersect each other at A and B. PQ and



PR are tangents to the two circles from a point P on the line joining A and B. Show that PQ= PR. [3]

23

Question 8.

a) Rohan has an annual income of Rs 1,56,000 (excluding HRA). During the year, he contributed Rs. 2500 per month towards provident fund and paid an annual premium of Rs 8400 to LIC. An amount of Rs 10,000 has been deducted by the employer as the tax at source. What amount will be refunded by the income tax department to him? For calculation of income tax assume the following:

standard deduction	1/3 of the income subject to a maximum of Rs.25000
slab	**income tax**
upto 50,000	no tax
50,001-60,000	10% of the amount above Rs. 50,000
60,001-1,50,000	Rs 1000 + 20% of the amount above Rs. 60,000
above Rs 1,50,000	Rs 19,000+ 30% of the amount above Rs.1,50,000
Rebate on tax	15% of the total investment in PF, LIC etc or Rs. 9000 whichever is less.
surcharge	5% of the tax payable.

[6]

b) When fifty marbles each of diameter 3.5 cm are immersed in a cylindrical vessel containing water upto a certain height. If the diameter of the cylindrical vessel is 14 cm, calculate the rise in the water level. [4]

Question 9.

a) Using a ruler and compass only:

i) draw a circle of radius 3 cm. Draw AB, a diameter of the circle. Produce it to point C, such that BC= 3cm.

ii) construct another circle to touch AC at C and to touch the first circle. Measure and record the radius of this circle constructed. [6]

b) Find the mean of the following data using step-deviation method: [4]

Class interval	150-160	160-170	170-180	180-190	190-200
Frequency	6	13	15	8	8

Question 10.

a) In a rhombus PQRS, the coordinates of P, Q and R are (4, 6), (-1, 5) and (3, 1) respectively. Find the coordinates of the vertex S. [3]

b) Evaluate: $\frac{\sin^2 20° + \sin^2 70°}{\sec^2 57° - \cot^2 33°}$ [3]

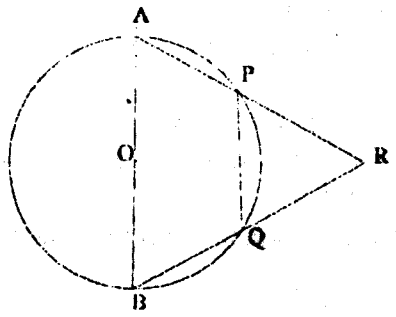
c) Rahil's saving bank account's passbook entries are as follows:

Date	Particulars	Debit in Rs	Credit in Rs	Balance in Rs
January 9	By cash		800	800
February 19	To cheque	250		550
March 9	By cheque		600	1150
March 18	To cheque	220		930
April 9	By cash		1200	2130
July 29	To cheque	660		1470
August 9	By cheque		800	2270
September 9	By cash		600	2870

If the interest is paid at the rate of 5% per annum at the end of September every year, calculate the total he will get if he closes the account in October of the same year. [4]

Question 11.

a) In the given diagram, AB is a diameter. The length of the chord PQ equals to



the radius of the circle. AP and BQ are produced to intersect at R. Prove that angle ARB = 60°. [3]

b) Using the properties of proportion, solve the following:

$$\frac{\sqrt{x+1}+\sqrt{2x+1}}{\sqrt{x+1}-\sqrt{2x+1}} = 2.$$ [3]

c) Ramesh bought a number of articles for Rs. 720. If the price of each article was reduced by Rs. 2, he would have got 5 more articles. Taking the number of articles as x, form an equation in x and solve it. [4]

25