

Second Pre-Board Examination-2007
Class - X
Subject - Maths

MM-80

Time- 3Hrs

General Instructions

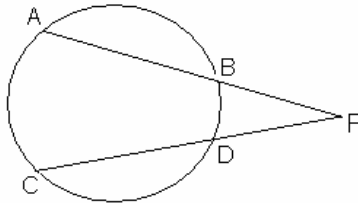
- i) All questions are compulsory
- ii) The question paper consists of 25 questions divided into three sections A, B, and C. Section A contains 7 questions of 2 marks each, section B is of 12 questions of 3 marks each and section C is of 6 questions of 5 marks each.

SECTION - A

1. Solve the following system of equations: $\frac{5}{x} - 2y = \frac{17}{3}$; $\frac{2}{x} + 3y = \frac{-16}{3}$; $x \neq 0$.

OR

- Solve for x and y: $ax + by = 2ab$; $bx + ay = a^2 + b^2$.
2. The HCF and LCM of two polynomials p(x) and q(x) are (x+3) and $x^3 + 4x^2 + x - 6$ respectively. If $p(x) = x^2 + 5x + 6$, find q(x).
 3. Solve the following quadratic equation for x: $x^2 - 2(a+2)x + (a+1)(a+3) = 0$.
 4. If the second term of an A.P is 4 and seventh term is -11, find the A.P. and its 6th term.
 5. A washing machine is available at Rs.6400 cash or Rs.1400 cash down payment and five monthly instalments of Rs.1030 each. Calculate the rate of interest charged under the investment.
 6. In the given figure AP=6cm, CD=2.8cm and DP=4.2cm. Find the length of BP



OR .Prove that a cyclic parallelogram is a rectangle.

7. Cards numbered 3, 4, 5, 6, ----- 17 are put in a box and mixed thoroughly. A card is drawn at random from the box. Find the probability that the card drawn bears i)An even perfect square number, ii) A number divisible by 3 or 5.

SECTION - B

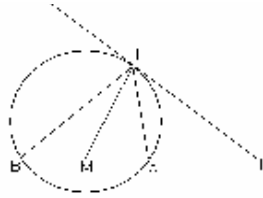
8. Solve the following system of linear equations graphically; $3x + y - 12 = 0$; $x - 3y + 6 = 0$, also find the coordinates of the points where the lines meet the x-axis.
9. Express the following expression as a rational expression in lowest terms.

$$\frac{1}{x+y} \times \frac{x^3 + 8y^3}{x^2 - 3xy + y^2} \times \frac{2x^2 + 3xy + y^2}{x^2 - 2xy + 4y^2} \div \frac{2x^2 + 5xy + 2y^2}{x^2 - 3xy + y^2}$$
10. When the price of an article is reduced by Rs.2, 5 more articles could be bought for Rs.120. Find the original price of each article.
11. Find the sum of all three digit numbers each of which leave the remainder 3 when divided by 5.

OR

Find the middle term of the A.P: 1, 8, 15, -----, 505.

12. Ram borrowed a sum of money and returned it in three equal quarterly instalments of Rs.17576 each. Find the sum borrowed, if the rate of interest charged was 16% per annum compounded quarterly. Find also the total interest charged.
13. In the figure PT is a tangent and PAB is a secant to the circle. If bisector of $\angle ATB$, meets AB at M, prove that $\triangle MPT$ is isosceles.



14. Construct a $\triangle ABC$ in which $AB=4\text{cm}$, $\angle C=60^\circ$ and the length of altitude from the vertex C on AB is 3cm. How many such triangles are possible.
15. Show that: $(\sin \theta + \operatorname{cosec} \theta)^2 + (\cos \theta + \sec \theta)^2 = 7 + \tan^2 \theta + \cot^2 \theta$

OR

Without using trigonometric tables evaluate the following:

$$\frac{2 \sin 68^\circ}{\cos 22^\circ} - \frac{2 \cot 15^\circ}{5 \tan 75^\circ} - \frac{3 \tan 45^\circ \times \tan 20^\circ \times \tan 40^\circ \times \tan 50^\circ \times \tan 70^\circ}{5}$$

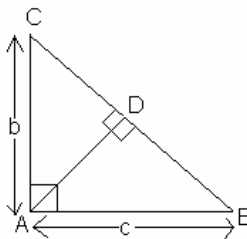
16. Find the coordinates of the point P on y-axis, equidistant from two points A(-3,4) and B(3,6) on the same plane.
17. A solid iron spherical ball is melted and recast into smaller balls of equal size. If the radius of smaller ball is $1/8^{\text{th}}$ of the original ball, then find the number of smaller balls made, assuming that there is no wastage of metal in the process.
18. Find the value of k for which the point A(-5,1), B(1,k) and C(4,-2) are collinear. Also find the ratio in which B divides AC.
19. The number of hours spent by a school going student on various activities on a working day are given below:

Activity	Number of Hours
School	7
Sleep	8
Home Work	5
Other Jobs	4

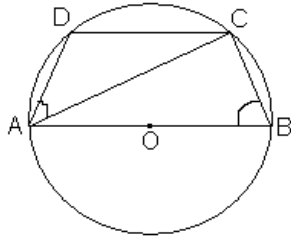
Represent the above information by a pie chart.

SECTION-C

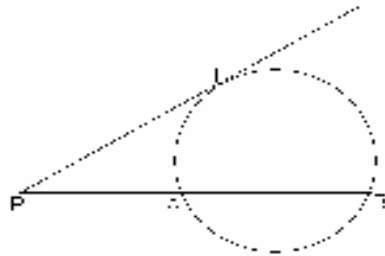
20. Prove that in a right triangle the square of the hypotenuse is equal to the sum of the squares of the other two sides. Using the above, Theorem, determine the length of AD in terms of b and c.



OR. Prove that the sum of either pair of the opposite angles of a cyclic quadrilateral is 180° . Using the above Theorem, find the angles ACD and BAC, if AB is a diameter of the circle in the given figure



21. If PAB is a secant to a circle intersecting it at A and B and PT is a tangent, then $PA \times PB = PT^2$. Using the above Theorem, find PA, if $PT=6\text{cm}$, and $AB=5\text{cm}$.



22. If the mean of the following frequency distribution is 188, find the missing frequencies f_1 and f_2 .

Classes	0-80	80-160	160-240	240-320	320-400	Total
Frequency	20	25	f_1	f_2	10	100

23. A vertical flagstaff stands on the top of a building. The height of the flagstaff above the building is 6cm. The angles of elevation of the top and bottom of the flagstaff at a point on the level ground are 45° and 30° respectively. Find the height of the building.
24. Mr. Roy, an executive officer in a company, earns a monthly salary of Rs.101500. He contributes Rs.8000 per month towards Provident Fund and pays Rs.4800 as L.I.C premium half-yearly. He donates Rs.20000 to Prime Minister's relief fund (eligible for 100% tax exemption) and Rs.11000 to a religious trust(eligible for 50% tax exemption). If Rs.25000 per month has been deducted as income tax from his salary for the first 11 months, find the income tax he has to pay in the last month of the financial year. Use the following to calculate income tax:
- Savings: 100% exemption for permissible savings up to Rs.100000.
 - Rate of income tax:

Slab	Rate of income Tax
i) Up to Rs.100000	No Tax
ii) From Rs.100001 to Rs.150000	10% of income exceeding Rs.100000
iii) From Rs.150001 to Rs.250000	Rs.5000 +20% of income exceeding Rs.150000
iv) Above Rs.250000	Rs.25000 +30% of income exceeding Rs.250000

c) Surcharge: 10% of the income tax if the taxable income is above Rs.1000000. d) Education cess: 2% of income tax.

25. A solid toy is in the form of a hemisphere surmounted by a right circular cone. If the height of the cone is 4cm and diameter of the base is 6cm. Calculate:

- The volume of the toy.
- Surface area of the toy.

OR

A bucket of height of 8cm and made up of copper sheet is in the form of frustum of a right circular cone with radii of its lower and upper ends as 3cm and 9cm respectively. Calculate:

- The height of the cone of which the bucket is a part.
- The volume of water which can be filled in the bucket.
- The area of copper sheet required to make the bucket(leave the answer in terms of π).