



Code No. **Series AG-F2**

TMG-D/79/89

- Please check that this question paper contains 3 printed pages.
- Code number given on the right hand side of the question paper should be written on the title page of the answer-book by the candidate.
- Please check that this question paper contains 30 questions.

General Instructions: -

1. All questions are compulsory.
2. The question paper consists of 30 questions divided into three sections A, B, C and D. Section A contains 10 questions of 1 marks each, Section B is of 5 questions of 2 marks each, Section C is of 10 questions of 3 marks each and Section D is of 5 questions of 6 marks each.
3. Write the serial number of the question before attempting it.
4. If you wish to answer any question already answered, cancel the previous answer.
5. In questions where internal choices is provided. You must attempt only one choice.

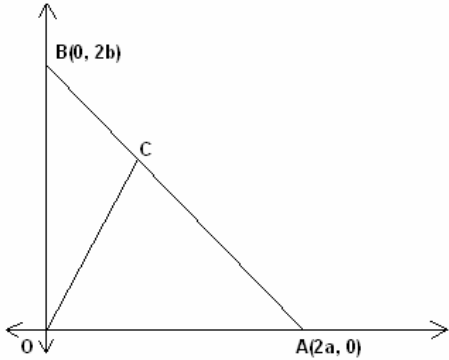
Pre-Board Examination 2009 -10

Time: 3 hrs.

M.M.: 80

CLASS – X MATHEMATICS

Q.1	How do you find median of the data using graph of less than and more than ogive.
Q.2	What is the ratio of the area of a circle and an equilateral triangle whose diameter and a side are respectively equal.
Q.3	What is the perimeter of a sector of angles 45° of a circle with radius 7 cm? (Use $\pi = \frac{22}{7}$).
Q.4	Two tangents TP and TQ are drawn from an external point T to a circle with centre O, as show in fig. If they are inclined to each other at angle 100° the what is the value of $\angle POQ$
Q.5	Express $\sin 67^\circ + \cos 75^\circ$ in terms of trigonometric ratios of angles between 0° and 45°
Q.6	If in ΔABC , $DE \parallel BC$, $AD=2.4$, $DB=3.6$, $AC=5$ find AE.

Q.7	A box contains cards marked with numbers 5 to 20. A card is drawn from the bag at random. Find the probability of getting a number which is a perfect square.
Q.8	For what value of k, does $(k-12)x^2 + 2(k-12)x + 2 = 0$ have equal roots?
Q.9	Two friends were born in the year 2000. What is the probability that they have the same birthday?
Q.10	The foot of perpendicular drawn from the origin to the plane is $(4, -2, -5)$. Find the equation of the plane.
Section B	
Q.11	All cards of Ace, jack and Queen and removed from a deck of playing cards. One card is drawn at random from the remaining cards. Find the probability that the card drawn is: a) a face card b) not a face and.
Q.12	A circle touches the side BC of a ΔABC at P and AB and AC when produced at Q and R respectively. Show that $AQ = \frac{1}{2}$ (perimeter of ΔABC)
Q.13	Solve for x and y: $\frac{ax}{b} - \frac{by}{a} = a + b$ and $ax - by = 2ab$
Q.14	If the polynomial $x^4 - 6x^3 + 16x^2 - 25x + 10$ is divided by another polynomial $x^2 - 2x + k$, find the value of k and a if the remainder $x + a$.
Q.15	Rahul saved Rs 5 the first week of the year and then increased his weekly savings by Rs 1.75 each week. In what week will his saving be Rs 20.75? OR A sum of Rs 280 is to be used to award four prizes. If each prize after the first is Rs 20 less than the next most valuable one, find the value of each of the prizes.
Q.16	Construct an isosceles triangle, whose base is 10 cm and altitude 5 cm and then and the another triangle whose sides are $1\frac{1}{2}$ times the corresponding sides of the isosceles triangle.
Q.17	A square field and an equilateral triangular park have equal perimeter. If cots of ploughing the field at rate of Rs. 5/m ² is Rs. 720 find the cost of maintaining the park at the rate of Rs.10/m ²
Q.18	In the given figure, a right triangle AOB is given. C is the mid point of the hypotenuse AB. Show that it is equidistant from the vertices O, A and B.  Or

	Given two fixed points P(-3, 4) and Q(5, -2). Calculate the co-ordinates of points A and B in between PQ, such that 5PA=3PQ and 3PB=2PQ.														
Q.19	Prove that $2(\sin^6 \theta + \cos^6 \theta) - 3(\sin^4 \theta + \cos^4 \theta) + 1 = 0$.														
Q.20	Prove that: $\frac{\alpha^3}{2} \operatorname{cosec}^2\left(\frac{1}{2} \tan^{-1} \frac{\alpha}{\beta}\right) + \frac{\beta^3}{2} \sec^2\left(\frac{1}{2} \tan^{-1} \frac{\beta}{\alpha}\right) = (\alpha + \beta)(\alpha^2 + \beta^2)$.														
	Or														
	Prove that $\tan^{-1}\left(\frac{\sqrt{a-b}}{\sqrt{a+b}} \tan \frac{\theta}{2}\right) = \frac{1}{2} \cos^{-1}\left(\frac{b + a \cos \theta}{a + b \cos \theta}\right)$.														
Q.21	If $(a + b x) e^{y/x} = x$, then show that $x^3 \frac{d^2 y}{dx^2} = (x \frac{dy}{dx} - y)^2$.														
Q.22	Prove that the image of the point (3,-2,1) in the plane $3x - y + 4z = 2$ lies on the plane $x + y + z + 4 = 0$.														
	Or														
	Find the equation of the plane passing through the line of intersection of the planes $x - 2y + z = 1$ and $2x + y + z = 8$ and parallel to the line with direction ratio 1,2,1. Also find the distance of P(1,-2,-2) from this plane measured along a line parallel to $r = t(i - 2j - 5k)$.														
	Section C														
Q.23	Determine graphically the co-ordinates of the vertices of the triangle formed by the lines representing the equations: $x+y=5$; $x-y=5$; $x=0$.														
Q.24	A diet for a sick person must contain at least 4000 units of vitamins, 50 units of minerals and 1400 calories. Two foods X and Y are available at a cost of Rs 4 and Rs 3 per unit respectively. One unit of food X contains 200 units of vitamins, 1 unit of minerals and 40 calories, whereas 1 unit of food Y contains 100 units of vitamins, 2 units of minerals and 40 calories. Find what combination of foods X and Y should be used to have least cost, satisfying the requirements. Make it an LPP and solve it graphically.														
Q.25	Evaluate: $\int_0^1 \cot^{-1}(1 - x + x^2) dx$.														
Q.26	The height (in cm) of 60 persons of different age groups are shown in the following table: <table border="1" style="width:100%; border-collapse: collapse; margin-top: 5px;"> <tr> <td>Height (in cm)</td> <td>145-150</td> <td>150-155</td> <td>155-160</td> <td>160-165</td> <td>165-170</td> <td>170-175</td> </tr> <tr> <td>Number of Persons</td> <td>8</td> <td>10</td> <td>9</td> <td>15</td> <td>10</td> <td>8</td> </tr> </table> <p>Using the above table, draw (i) less than ogive (ii) more than ogive on the same graph and find median also.</p>	Height (in cm)	145-150	150-155	155-160	160-165	165-170	170-175	Number of Persons	8	10	9	15	10	8
Height (in cm)	145-150	150-155	155-160	160-165	165-170	170-175									
Number of Persons	8	10	9	15	10	8									
Q.27	The height of a house subtends a right angle at the opposite window. The angle of elevation of the window from the base of the house 60° . If the width of the road is 6 m, find the height of the house.														

	<p style="text-align: center;">OR</p> <p>A straight highway leads to the foot of tower. A man standing at the top of the tower observes a car at an angle of depression of 30°, which is approaching the foot of the tower with a uniform speed. Six second later, the angle of depression of car is found to be 60°. Find the time taken by car to reach the foot of the tower from this point.</p>
<p>Q.28</p>	<p>Find the foot of the perpendicular from P(1, 2, 3) on the line $\frac{x-6}{3} = \frac{y-7}{2} = \frac{z-7}{-2}$. Also obtain the equation of the plane containing the line and the point (1, 2, 3).</p> <p style="text-align: center;">Or</p> <p>Find the equation of the line of shortest distance (S.D.) between the lines $\frac{x-8}{3} = \frac{y+19}{-16} = \frac{z-10}{7}$ and $\frac{x-15}{3} = \frac{y-29}{8} = \frac{z-5}{-5}$, Find also the S.D. and the points where the line of S.D. intersects the given lines.</p>
<p>Q.29</p>	<p>In a class test, the sum of Gagan's marks in Mathematics and English is 45. If he had 1 more mark in Mathematics and 1 less in English, the product of marks would have been 500. Find the original marks obtained by Gagan in Mathematics and English separately.</p>
	<p>A solid consisting of a right circular cone of height 120 cm and radius 60 cm surmounted on a hemisphere of radius 60 cm is placed upright in a right circular cylinder full of water such that it touches the bottom. Find the volume of water left in the cylinder, if the radius of the cylinder is 60 cm and its height is 180 cm.</p> <p style="text-align: center;">OR</p> <p>A circular tent of total height 50 meters is to be made in the form of right circular cylinder surmounted by a right circular cone. If the height and radius of the conical portion of the tent are 15 m and 20 m respectively, find the cost of the cloth required, at the rate of Rs 14 per square meter to make the tent.</p>
	<p>Prove that in a right angle triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides.</p> <p>Using the above result prove the following: In $\triangle ABC$, D is mid point on BC, $AE \perp BC$. If $AC > AB$ then show that $AB^2 = AD^2 - BC \cdot DE + \frac{1}{4} BC^2$.</p>