



CODE:- AG-7-3679

REG.NO:-TMC -D/79/89/36

- Please check that this question paper contains 4 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 34 questions.

GENERAL INSTRUCTIONS :

1. All question are compulsory.
2. The question paper consists of 34 questions divided into four sections A,B,C and D. Section – A comprises of 10 question of 1 mark each. Section – B comprises of 8 questions of 2 marks each. Section – C comprises of 10 questions of 3 marks each and Section – D comprises of 6 questions of 4 marks each.
3. Question numbers 1 to 10 in Section – A are multiple choice questions where you are to select one correct option out of the given four.
4. There is no overall choice. However, internal choice has been provided in 1 question of two marks, 3 questions of three marks each and 2 questions of four marks each. You have to attempt only one If the alternatives in all such questions.
5. Use of calculator is not permitted .
6. An additional 15 minutes time has been allotted to read this question paper only.

सामान्य निर्देश :

1. सभी प्रश्न अनिवार्य हैं।
2. इस प्रश्न पत्र में 34 प्रश्न हैं, जो चार खण्डों में अ, ब, स व द में विभाजित हैं। खण्ड – अ में 10 प्रश्न हैं और प्रत्येक प्रश्न 1 अंक का है। खण्ड – ब में 8 प्रश्न हैं और प्रत्येक प्रश्न 2 अंको के हैं। खण्ड – स में 10 प्रश्न हैं और प्रत्येक प्रश्न 3 अंको का है। खण्ड – द में 6 प्रश्न हैं और प्रत्येक प्रश्न 4 अंको का है।

3. प्रश्न संख्या 1 से 10 बहुविकल्पीय प्रश्न हैं। दिए गए चार विकल्पों में से एक सही विकल्प चुनें।
4. इसमें कोई भी सर्वोपरि विकल्प नहीं है, लेकिन आंतरिक विकल्प 1 प्रश्न 2 अंको में, 3 प्रश्न 3 अंको में और 2 प्रश्न 4 अंको में दिए गए हैं। आप दिए गए विकल्पों में से एक विकल्प का चयन करें।
5. कैलकुलेटर का प्रयोग वर्जित है।
6. इस प्रश्न-पत्र को पढ़ने के लिए 15 मिनट का समय दिया गया है। इस अवधि के दौरान छात्र केवल प्रश्न-पत्र को पढ़ेंगे और वे उत्तर-पुस्तिका पर कोई उत्तर नहीं लिखेंगे।

Pre-Board Examination 2011 -12

Time : 3 to 3 1/4 Hours

अधिकतम समय : 3 से 3 1/4

Maximum Marks : 80

अधिकतम अंक : 80

Total No. Of Pages : 4

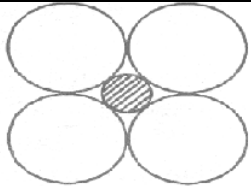
कुल पृष्ठों की संख्या : 4

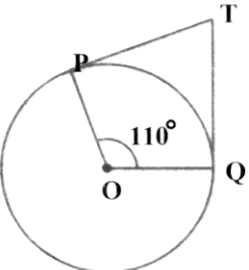
MATHEMATICS

CLASS X

(SA-2)

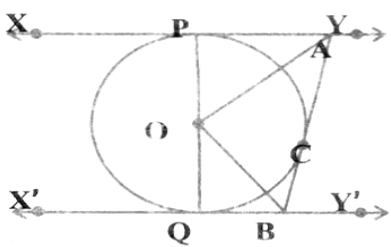
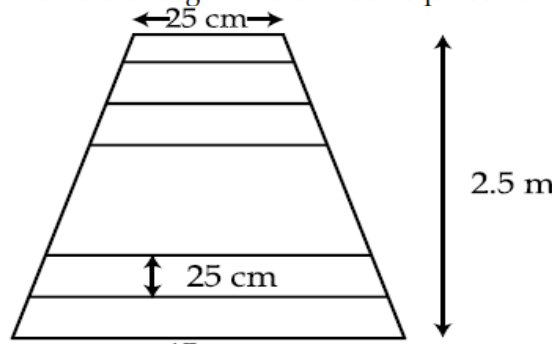
SECTION - A

Q.1	A tree breaks due to storm and broken part bends so that the top of the tree touches the ground making an angle of 30° with ground. If the distance between the foot of the tree to the point where the top touches the ground is 8m, then the height of the tree is (a) $\frac{8}{3}$ (b) $\frac{3}{8}$ (c) $\frac{8}{\sqrt{3}}$ (d) $8\sqrt{3}$ Ans d
Q.2	For an A.P. if $T_{25} - T_{18} = 63$, then d = (a) 9 (b) -9 (c) 18 (d) 23 Ans a
Q.3	If A and B are two points having coordinates (3, 4) and (5, - 2) respectively and P is a point such that $PA = PB$ and area of triangle PAB = 10 square unit, then the coordinates of P are (a) (7,2) or (1,0) (b) (7,2) or (13,4) (c) (2,7) or (4,13) (d) none Ans. a
Q.4	 In the adjoining figure, the radius of the inner circle, if other circles are of radii 1 m, is :

	(A) $(\sqrt{2}-1)m$ (B) $\sqrt{2} m$ (C) $\frac{1}{\sqrt{2}} m$ (D) $\frac{2}{\sqrt{2}} m$ Ans a
Q.5	To divide a line segment AB in the ratio 4 : 7, a ray AX is drawn first such that $\angle BAX$ is an acute angle and then points A_1, A_2, A_3, \dots are located at equal distances on the ray AX and the point B is joined to (A) A_{12} (B) A_{11} (C) A_{10} (D) A_9 Ans b
Q.6	Two unbiased dice are thrown. The probability that the total score is > 5 is (a) $\frac{1}{18}$ (b) $\frac{7}{18}$ (c) $\frac{13}{18}$ (d) $\frac{11}{18}$ Ans c
Q.7	The curved surface area of a cylinder is 264 m^2 and its volume is 924 m^3 . the ratio of its diameter to its height is (a) 3:7 (b) 7:3 (c) 6:7 (d) 7:6 Ans b
Q.8	If (3,2), (6,3), (x,y) and (6,5) are the vertices of a ll gm, then $x + y =$ (a) 13 (b) 14 (c) 16 (d) 15 Ans d
Q.9	For an A.P. 8, 10,12,, 126, the 10 th term from the end is (a) 80 (b) 108 (c) 50 (d) 60 Ans b
Q.10	In Fig., If TP and TQ are the two tangents to a circle with centre O so  that $\angle POQ = 110^\circ$, then $\angle PTQ$ is equal to (A) 60° (B) 70° (C) 80° (D) 90° Ans.b
SECTION - B	
Q.11	Find the sum of all three digit numbers which leave the same remainder 2 when divided by 5.

	The required A.P. is 102, 107,997 which leave the same remainder 2 when divided by 5, $a = 102, d = 5, a_n = 997$ $\frac{1}{2}$ $\Rightarrow a + (n-1)d = 997$ $102 + (n-1)5 = 997$ $900 = 5n, n = 900/5 = 180$ $S_n = n/2[a+l] = 180/2 \times [102+997] = 90 \times 1099 = 98910$ $\frac{1}{2}$ OR For an A.P. show that $a_p + a_{p+2q} = 2 a_{p+q}$ $a_p + a_{p+2q} = a + (p-1)d + a + (p+2q-1)d$ $= a + pd - d + a + pd + 2qd - d$ $= 2a + 2pd + 2qd - 2d$ $= 2[a + (p+q-1)d] - (i)$ $2a_{p+q} = 2[a + (p+q-1)d] - (ii)$ From (i) and (ii) $a_p + a_{p+2q} = 2a_{p+q}$ $\frac{1}{2}$
Q.12	Find the area of the sector of a circle with radius 4 cm and of angle 30° . also find the area of the corresponding major sector. Ans 46.1 cm
Q.13	Determine the ratio in which the line $2x + y - 4 = 0$ divides the line segment joining A(2,-2) and B(3,7). Ans 2:9
Q.14	A letter of English alphabets is chosen at random. Determine the probability that the latter is a consonant. Ans 21/26
Q.15	The measure of the minor arc of a circle is $\frac{1}{5}$ of the measure of the corresponding major arc. If the radius of the circle is 10.5 cm, find the area of the sector corresponding to the major arc. Take $\left(\pi = \frac{22}{7}\right)$. { Ans.288.78 cm² }

Q.16	<p>Show that the point P(-4, 2) lies on the line segment joining the points A(-4, 6) and B(-4, -6). Ans If p (-4,2) lies on the line segment joining the points A(-4,6) and B(-4,-6), then points P, A and B are collinear. The area of triangle formed by these points will be zero. Now area</p> $\Delta PAB = \frac{1}{2}[-4(+6+6) + (-4)(2-6)]$ $= \frac{1}{2}[-48 + 32 + 16] = 0$ <p>$x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2)$ Point P, A, B are collinear.</p>
Q.17	<p>Find the roots of the following quadratic equation : $\frac{2}{5}x^2 - x - \frac{3}{5} = 0$. Ans</p> $\frac{2}{5}x^2 - x - \frac{3}{5} = 0 \Rightarrow 2x^2 - 5x - 3 = 0$ <p>We have $\Rightarrow 2x^2 - 6x + x - 3 = 0 \therefore 2x(x-3) + 1(x-3) = 0$ $\Rightarrow (2x+1)(x-3) = 0 \therefore$ Either $(2x+1) = 0$ or $x-3 = 0 \Rightarrow x = -\frac{1}{2}$ or $x = 3$</p> <p>The roots of the quadratic equation are $-\frac{1}{2}$ and 3</p>
Q.18	<p>Geeta and Sita are friends. What is the probability that both will have (i) different birthdays ? (ii) the same birthday ? (ignoring a leap year) ans : (i) $\frac{364}{365}$ (ii) $\frac{1}{365}$</p>
SECTION - C	
Q.19	<p>Let ABC be a right triangle in which AB = 3CM ; BC = 4 CM and $\angle B = 90^\circ$. BD is perpendicular from B on AC . The circle through B , C , D is drawn . construct the tangent from A to this circle .</p>
Q.20	<p>Find the probability of getting 53 Sunday and Monday in a leap year.</p>

	<p>Ans 1 / 7</p>
Q.21	<p>A tower stands vertically on the ground. From a point on the ground which is 20 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 60°. Find the height of the tower. Ans Let AB be vertical tower, C is point 20m away from the foot of the tower at which top of tower makes an angle of elevation 60° as shown in the figure . In right angled triangle ABC, $\tan 60^\circ = \frac{AB}{20} \Rightarrow \sqrt{3} = \frac{AB}{20} = AB = 20\sqrt{3}m$. The height of tower = $20\sqrt{3}m$</p>
Q.22	<p>In Fig., XY and X'Y' are two parallel tangents to a circle with centre O and another tangent AB with point of contact C intersecting XY at A and X'Y' at B. Prove that $\angle AOB = 90^\circ$.</p> 
Q.23	<p>A ladder has rungs 25 cm apart. The rungs decrease uniformly in length from 45 cm at the bottom to 25 cm at the top (see figure). If the top and bottom rungs are 2.5 m apart, what is the length of the wood required for the rungs ?</p> 

	<p>Gap between two consecutive rungs = 25 cm</p> <p>Number of rungs = $\frac{250}{25} + 1 = 11$ 1</p> <p>(as total distance between top and bottom rung is 2.5 m = 250 cm) Rungs are decreasing uniformly in length from 45 cm at bottom to 25 cm at the top.</p> <p>\therefore A.P. will form with 1 $a = 45, a_{11} = 25$</p> <p>length of the wood required = $S_{11} = \frac{11}{2}(45+25)$ $= 385$ cm $= 3.8$ m 2</p> <p style="text-align: center;">OR</p> <p>A spiral is made up of successive semi-circles, with centers alternately at A and B, starting with centre at A, of radii 0.5cm, 1.0cm, 1.5cm, 2.0</p> <div style="text-align: center;"> </div> <p>cm,....as shown in Figure . What is the total length of such a spiral made up of thirteen consecutive semi-circles ? {Take $\pi = \frac{22}{7}$ } Ans :</p> <p>$l_1 = \pi r_1 = \frac{\pi}{2}; l_2 = \pi r_2 = 2\left(\frac{\pi}{2}\right); l_3 = \pi r_3 = 3\left(\frac{\pi}{2}\right); \dots$</p> <p>$l_1 + l_2 + l_3 + \dots + l_{13} = \frac{\pi}{2}(1 + 2 + 3 + \dots + 13) = 143$ cm</p>
Q.24	<p>A bucket of height 8 cm 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 3 cm and 9 cm respectively. Calculate:</p> <p>(a) the height of the cone of which the bucket is a part.</p>

	<p>(b) the volume of water which can be filled in the bucket. (c) the area of copper sheet required to make the bucket.(Leave the answer in terms of π) Ans (a) 12 cm (b) $312\alpha\pi m^3$ (c) $129\pi m^2$</p>
Q.25	<p>There are 1000 sealed envelopes in a box, 10 of them contain a cash price of ₹ 100 each, 100 of them contain a cash prize of ₹ 50 each and 200 of them contain a cash price of ₹ 10 each and rest do not contain any cash prize. If they are will shuffled and an envelope is picked up out, what is the probability that it contain no cash price? Ans 0.69</p>
Q.26	<p>Find the sum of all two digit numbers greater than 50 which when divided by 7 leaves a remainder of 4. Ans : 53 + 60 + 67 + ----- + 95 = 518 (number of term = 7)</p> <p style="text-align: center;">OR</p> <p>A man repays a loan of Rs. 3250 by paying ₹ 20 in the first month and then increases the payment by ₹ 15 every month. How long will it take him to clear the loan? Ans : 20 + 35 + 50 + ----- nterm = 3250 then n = 20</p>
Q.27	<p>Prove that the diagonals of a rectangle bisect each other and are equal (Using coordinate geometry).</p>
Q.28	<p>The vertices of a ΔPQR are P (4, 6), Q (1, 5) and R (7, 2). A line is drawn to intersect sides PQ and PR at S and T respectively, such that $\frac{PS}{PQ} = \frac{PT}{PR} = \frac{1}{4}$. Calculate the area of the ΔPST and compare it with the area of ΔPQR .Ans:S(13/4 , 23/4) T(19/4 ,20/4) & $A(\Delta PST) = \frac{15}{32}$ & $A(\Delta PQR) = \frac{15}{2}$; Raito = 1:16</p> <p style="text-align: center;">OR</p> <p>The Points A(2, 9), B(a, 5), C(5, 5) are the vertices of a triangle ABC right angled at B. Find the value of 'a' and hence the area of ΔABC .Ans</p>

	<p>ΔABC is right angled triangle ; right angled at B, BY pythagoras theorem , we get $(AC)^2 = (AB)^2 + (BC)^2$ Using distance formula , we have $\{(5-2)^2 + (5-9)^2\} = \{a-2\}^2 + (5-9)^2 + \{(5-a)^2 + (5-5)^2\}$ $9 + 16 = a^2 + 4 - 4a + 16 + 25 + a^2 - 10a$</p> <p>$25 = 2a^2 - 14a + 45$ $2a^2 - 14a + 20 = 0 = a^2 - 7a + 10 = 0$ Either $a - 2 = 0$ or $a - 5$ $a^2 - 5a - 2a + 10 = 0$ $a(a - 5) - 2(a - 5) = 0 \Rightarrow (a - 2)(a - 5) = 0 \Rightarrow$ $= 0. a = 2$ or $a = 5$ but a cannot be 5 . [if $a = 5$, then point B and C coincides $a = 2$ Now $area(\Delta ABC) = \frac{1}{2} \times AB \times BC =$ $\frac{1}{2} \sqrt{[(2-2)^2 + (9-5)^2]} \times \sqrt{[(5-2)^2 + (5-5)^2]} = \frac{1}{2} \times 4 \times 3 = 6sq.units$</p>
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SECTION - D

Q.29	A two-digit number is such that product of its digits is 18. Where 63 is subtracted from the number, the digits interchange their places. Find the number. Ans 92
Q.30	How many terms of the A.P. $- 6, - \frac{11}{2}, - 5, \dots$ are needed to give the sum $- 25$? Explain double answer. Ans : $- 25 = \frac{n}{2} \left[2 \times (-6) + (n-1) \frac{1}{2} \right] \Rightarrow n^2 - 25n + 100 = 0 \therefore n = 5, 20$ Explanation : - Sum of first 5 terms of an AP is same the sum of its 20 terms because the sum of last 15 terms is equal to zero
Q.31	A well of diameter 3 m and 14 m deep is dug. The earth, taken out of it, has been evenly spread all around it in the shape of a circular ring of width 4 m to form an embankment. Find the height of the embankment. Diameter of well = 3m

	<p>Radius of well = $\frac{3}{2}m$. Depth of well = 14m. The volume of earth taken out from well = $\pi r^2 h = \pi \cdot \left(\frac{3}{2}\right)^2 \times 14 \dots\dots\dots(i)$ This earth is used to made the embankment around the well of width 4m. The volume of embankment = $\pi \left[\left(\frac{11}{2}\right)^2 - \left(\frac{3}{2}\right)^2 \right] \times h$</p> <p>The volume of embankment = Volume of earth taken out from well [where h is the height of the embankment] . From (i) and (ii) $\pi \times \frac{9}{4} \times 14 = \pi \left[\frac{121}{4} - \frac{9}{4} \right] \times h =$ Height of embankment = $9/8m$</p> <p align="center">OR</p> <p>A field is in the form of a circle. A fence is to be erected around the field. The cost of fencing would be Rs. 2640 at the rate of Rs. 12 per metre. Then the field is to be thoroughly ploughed at the cost of Rs. 0.50 per m^2. What is the amount required to plough the field ? Ans Rs 1925</p>
Q.32	A boy standing on a horizontal plane finds a bird flying at a distance of 100m from him at an angle of elevation 30° . A girl standing on the roof of 10m high building finds the angle of elevation of the same bird, at the same time, to be 45° . Both the boy and the girl are on opposite sides of the bird. Find the distance of bird from the girl. Ans $40\sqrt{2}m$ OR The angle of elevation of a cloud from a point 60m above the lake is 30° and the angle of depression of the reflection of the cloud in the lake is 60° . Find the height of the cloud. Ans 120m
Q.33	A sphere, of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}cm$. Find the

	diameter of the cylindrical vessel. Ans 18cm
Q.34	From a point P, two tangents PA and PB are drawn to a circle with centre O. If OP is equal to the diameter of the circle, prove that ΔPAB is equilateral.
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	<u>HAPPINESS IS NOTHING MORE THAN GOOD HEALTH AND A BAD MEMORY.</u>