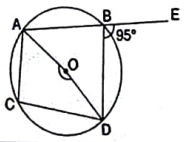
FUTURES, BUILDING LEGACIES

ST KABIR PUBLIC SCHOOL
SECTOR 26, CHANDIGARH
PRACTICE PAPER, 2023-24

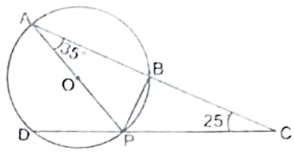
X **Duration-3 Hours**
-Mathematics (041) **Max. Marks - 80**

l Instructions:

e following instructions very carefully and strictly follow them:
*uestion paper contains **38** questions. **All** questions are **compulsory.***
*question Paper is divided into **five** Sections - **A, B, C, D** and **E.***
***ection A**, Questions no. **1** to **18** are multiple choice questions (MCQs) and questions number **19** and e Assertion-Reason based questions of 1 mark each.*
***ection B,** Questions no. **21** to **25** are very short answer (VSA) type questions, carrying 2 marks.*
***ction C,** Questions no. **26** to **31** are short answer (SA) type questions, carrying 3 marks each.*
***ction D,** Questions no. **32** to **35** are long answer (LA) type questions, carrying 5 marks each*
***ction E,** Questions no. **36** to **38** are case study-based questions carrying 4 marks each. Internal e is provided in 2 marks questions in each case- study*
re is no overall choice. However, an internal choice has been provided in 2 questions in Section B, uestions in Sections in Section C, 2 questions in Section D and 3 questions in Section E.
aw neat diagrams wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.
*(x) Use of calculators is **not** allowed.*

	SECTION A	
01	If $x = 7 + 4\sqrt{3}$,then $\left(x + \frac{1}{x}\right) =$ (a) 10 (b) 12 (c) 14 (d) 16	**1**
02	An isosceles right triangle has area 8 cm^2.Them, the length of the hypotenuse is: (a) $2\sqrt{2}$ cm (b) $4\sqrt{2}$ cm (c) $6\sqrt{2}$ cm (d) $8\sqrt{2}$ cm	**1**
03	Linear equation such that each point on its graph has its ordinate equal to twice its abscissa is: (a) x+y=2 (b) y=2x (c) x=2y (d) x-y=2	**1**
04	In the given figure, O is the centre of the circle. ABE is a straight line. If ∠DBE= 95°, then ∠AOD is equal to: (a) 160° (b) 170° (c) 175° (d) 210° 	**1**
05	The radius of hemispherical balloon increases from 6 cm to 12 cm as air is being pumped into it. The ration of the surface areas of the balloon in the two cases is : (a) 1 : 4 (b) 1 : 3 (c) 2 : 3 (d) 2 : 1	**1**
06	The value of the polynomial $5x - 4x^2 + 3$, when x = -1 is: (a) -6 (b) 6 (c) 2 (d) -2	**1**

ST KABIR PUBLIC SCHOOL
SECTOR 26, CHANDIGARH
PRACTICE PAPER, 2023-24

07	The lateral surface area of a cone is 60π cm^2. If the slant height of the cone be 8 cm, then the diameter of the base is: (a) 25 cm (b) 18 cm (c) 12 cm (d) 15 cm	**1**
08	Angles x and y form a linear pair such that $x + 2y = 254°$, then value of y is : (a) 62° (b) 64° (c) 70° (d) 74°	**1**
09	In the given figure, AP is a diameter of the circle. ABC and DPC are straight lines. If $\angle A = 35°$ and $\angle C = 25°$, then the measure of $\angle BPD$ is: (a) 115° (b) 120° (c) 135° (d) 145 	**1**
10	If a, b and c are the sides of a triangle and s = semi perimeter, then is s is equal : (a) $\frac{a+b+c}{2}$ (b) 2(a + b + c) (c) 2(a – b + c) (d) $\frac{a+b-c}{2}$	**1**
11	It is known that, if x + y = 10, then x + y + z = 10 + z. The Euclid's axiom that illustrates this statement is : (a) first axiom (b) second axiom (c) third axiom (d)fourth axiom	**1**
12	If AB = QR, BC = PR and CA = PQ, then: (a) $\Delta ABC \cong \Delta PQR$ (b) $\Delta CBA \cong \Delta PRQ$ (c) $\Delta BAC \cong \Delta RPQ$ (d) $\Delta PQR \cong \Delta BCA$	**1**
13	Which of the following is not true for a parallelogram? (a) opposite sides are equal (b) opposite angles are equal (c) opposite angles are bisected by the diagonals (d) diagonal bisect each other	**1**
14	0.9999…= (a) 1 (b) 2 (c) 3 (d) 4	**1**
15	If the surface area of two hemispheres are in the ratio 25:49. The ratio of their radii= (a) 3:7 (b) 4:7 (c) 5:7 (d) 5:9	**1**
16	Point on the graph of the equation 2x+5y=19 , whose ordinate is 3/2 times its ordinate : (a) (3,2) (b) (2,3) (c) (-3,2) (d) (2,-3)	**1**
17	The range of the data: 25.7,16.3,2.8,21.7,24.3,22.7 and 24.9 is : (a) 21.6 (b) 22.9 (c) 23.9 (d) 22.1	**1**

ST KABIR PUBLIC SCHOOL
SECTOR 26, CHANDIGARH
PRACTICE PAPER, 2023-24

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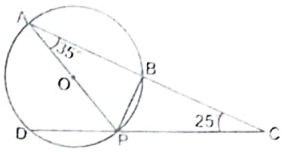
09	In the given figure, AP is a diameter of the circle. ABC and DPC are straight lines. If $\angle A = 35°$ and $\angle C = 25°$, then the measure of $\angle BPD$ is: (a) 115° (b) 120° (c) 135° (d) 145 	**1**
10	If a, b and c are the sides of a triangle and s = semi perimeter, then is s is equal : (a) $\frac{a+b+c}{2}$ (b) 2(a + b + c) (c) 2(a – b + c) (d) $\frac{a+b-c}{2}$	**1**
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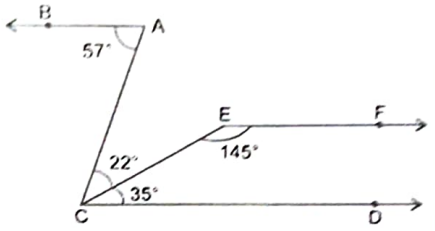
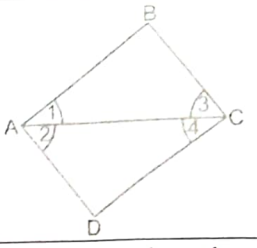
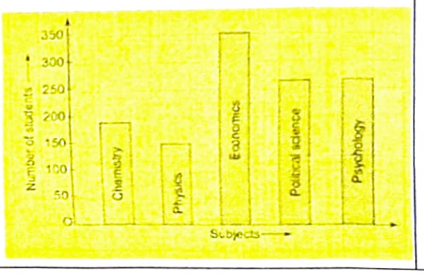
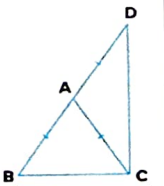
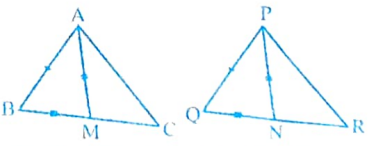
17	The range of the data: 25.7,16.3,2.8,21.7,24.3,22.7 and 24.9 is : (a) 21.6 (b) 22.9 (c) 23.9 (d) 22.1	**1**

18	Area of the shaded region in the given figure is : (a) 1400 m^2 (approx.) (b) 1500 m^2 (approx.) (c) 1550 m^2 (approx.) (d) 1440 m^2 (approx.) 	**1**
19	DIRECTION: In the question number 9 and 10, a statement of **Assertion (A)** is followed by a statement of **Reason (R)**. Choose the correct option **Statement A (Assertion):** In the given figure, BA ∥ CD. **Statement R (Reason):** if two lines are intersected by a transversal and pair of alternate interior angles are equal, then lines are parallel.  (a)Both (A) and (R) are true and reason (R) is the correct explanation of assertion (A) (b) Both (A) and (R) are true but (R) is not a correct explanation of (A) (c) (A) is true but (R) is false. (d) (A) is false but (R) is True.	**1**
20	**Statement A (Assertion):** If $x + y = 12$ and $xy = 27$, then the value of $x^3 + y^3$ is 756. **Statement R (Reason)**: $x^3 + y^3 = (x + y)(x^2 - xy + y^2)$ (a) Both (A) and (R) are true and reason (R) is the correct explanation of assertion (A) (b) Both (A) and (R) are true but (R) is not a correct explanation of (A) (c) (A) is true but (R) is false (d) (A) is false but (R) true	**1**
	Section B	
21	Find all the angles of a parallelogram, if its one angle is four-fifth if its adjacent angle. **OR** Show that each angle of a rectangle is a right angle.	**2**

ST KABIR PUBLIC SCHOOL
SECTOR 26, CHANDIGARH
PRACTICE PAPER, 2023-24

22	If two lines are intersected by a transversal in such a way that the bisectors of a pair of corresponding angles are parallel, then prove that the two lines are parallel. **OR** If two lines intersect each other, then vertically opposite angles are equal. Prove	**2**
23	In the adjoining figure, we have, $\angle 1 = \angle 3$ and $\angle 2 = \angle 4$. Show that $\angle A = \angle C$. 	**2**
24	If circles are drawn taking two sides of a triangle as diameters, prove that the point of intersection of these circles lie on the third side.	**2**
25	Read the bar graph given below: Answer the following questions: (i) Which course has the most students enrolled in it? (ii) How many more students are there in Economics than in Physics? 	**2**
	Section –C	
26	(i) If $x = 7 - 4\sqrt{3}$, then the value of $\sqrt{x} + \frac{1}{\sqrt{x}}$: (ii)Prove that $\left(\frac{x^{q+1}}{x^{p+1}}\right)^{q+p} \cdot \left(\frac{x^{r+1}}{x^{q+1}}\right)^{r+q} \cdot \left(\frac{x^{p+1}}{x^{r+1}}\right)^{p+r} = 1$	**3**
27	ΔABC is an isosceles triangle in which AB = AC. Side BA is produced to D such that AD = AD in the given figure. Show that $\angle BCD$ is a right angle.  **OR** Two sides AB and BC and median AM of one triangle ABC are respectively equal to sides PQ and QR and median PN of ΔPQR. Show that (i) $\Delta ABM \cong \Delta PQN$ (ii) $\Delta ABC \cong \Delta PQR$ 	**3**

ST KABIR PUBLIC SCHOOL
SECTOR 26, CHANDIGARH
PRACTICE PAPER, 2023-24

<table>
<tr><td>28</td><td>Find the percentage decrease in the area of a triangle, if each of its side is halved.
OR
Find the area of the triangle whose perimeter is 180 cm and its two sides are 80 cm and 18 cm. Also, calculate the length of the longest altitude.</td><td>3</td></tr>
<tr><td>29</td><td>The following table gives the distribution of students of two sections according to the marks obtained by them:
<table>
<tr><th colspan="2">Section A</th><th colspan="2">Section B</th></tr>
<tr><th>Marks</th><th>Frequency</th><th>Marks</th><th>Frequency</th></tr>
<tr><td>0-10</td><td>3</td><td>0-10</td><td>5</td></tr>
<tr><td>10-20</td><td>9</td><td>10-20</td><td>19</td></tr>
<tr><td>20-30</td><td>17</td><td>20-30</td><td>15</td></tr>
<tr><td>30-40</td><td>12</td><td>30-40</td><td>10</td></tr>
<tr><td>40-50</td><td>9</td><td>40-50</td><td>1</td></tr>
</table>
Represent the marks of the students of both the sections on the same graph by two frequency polygons. From the polygons compare the performance of the two sections.</td><td>3</td></tr>
<tr><td>30</td><td>(i) Write a linear equation in two variables whose solutions is x = 5 and y = 2.
(ii) Find the value of m, so that (2, -7) satisfies the equation 4x + my = 22.
(iii) Show that (4, 0) as well as (6, 1) is a solution of x – 2y = 4.</td><td>3</td></tr>
<tr><td>31</td><td>(i) If a, b, c are all non-zero and a + b + c = 0, Prove that: $\frac{a^2}{bc}+\frac{b^2}{ca}+\frac{c^2}{ab}=3$.
(ii) Factorise: (a) $1 + 64x^3$ (b) $a^3 - 2\sqrt{2}b^3$</td><td>3</td></tr>
<tr><td colspan="3">Section –D</td></tr>
<tr><td>32</td><td>Prove the following :
$$\frac{1}{1+x^{b-a}+x^{c-a}}+\frac{1}{1+x^{a-b}+x^{c-b}}+\frac{1}{1+x^{b-c}+x^{a-c}}=1$$
OR
Rationalise the following denominator:
$$\frac{1}{\sqrt{7}+\sqrt{6}-\sqrt{13}}$$</td><td>5</td></tr>
<tr><td>33</td><td>If the non-parallel sides of a trapezium are equal, prove that it is cyclic.
OR
Chords equidistant from the centre of a circle are equal in length. Prove</td><td>5</td></tr>
</table>