Please check this question paper contains 38 questions and 11 printed pages.

Roll No. _____

D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER - 10
CLASS: X
SUBJECT: MATHEMATICS (BASIC)

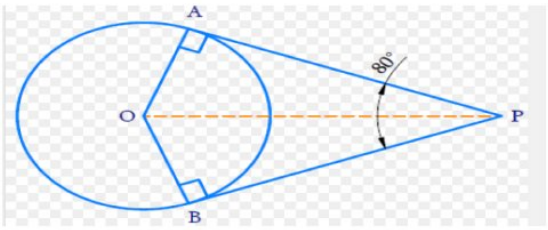
TIME: 3 HOURS MAX MARKS: 80

General Instructions:

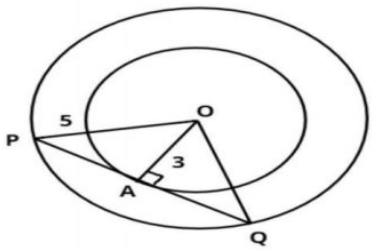
1. **This Question Paper has 5 sections A – E.**
2. **Section A has 20 MCQs carrying 1 mark each.**
3. **Section B has 5 questions carrying 2 marks each.**
4. **Section C has 6 questions carrying 3 marks each.**
5. **Section D has 4 questions carrying 5 marks each.**
6. **Section E has 3 case based integrated units of assessment (04 marks each) with sub-parts of the values of 1, 1 and 2 marks each respectively.**
7. **All questions are compulsory. However, an internal choice of 2 questions of 5 marks, 2 questions of 3 marks and 2 Questions of 2 marks has been provided. An internal choice has been provided in the 2 marks questions of Section E.**
8. **Draw neat figures wherever required. Take $\pi = \frac{22}{7}$ wherever required if not stated.**

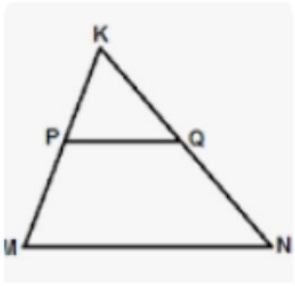
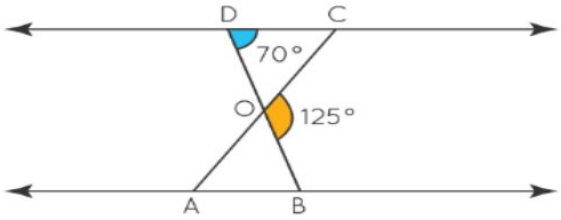
SECTION A		
Section A consists of 20 questions of 1 mark each.		
Q. No.		Marks
1	If the H.C.F. of A and B is 24 and that of C and D is 56, then the H.C.F. of A,B,C and D is: (A). 4 (B). 12 (C). 8 (D). 3	1

2	If $a = 2^3 \times 3$, $b = 2 \times 3 \times 5$, $c = 3n \times 5$ and LCM (a, b, c) $= 2^3 \times 3^2 \times 5$, then n = (A). 1 (B). 2 (C). 3 (D). 4	1
3	Which of the following polynomials with only one zero? (A). $p(x) = 2x^2 - 3x + 4$ (B). $p(x) = x^2 - 2x + 1$ (C). $p(x) = 2x + 3$ (D). $p(x) = 5$	1
4	The system of linear equations $\mathbf{x + 2y + 5 = 0}$ and $\mathbf{-3x - 6y + 1 = 0}$ have: (A). a unique solution (B). exactly two solutions (C). infinitely many solutions (D). no solution	1
5	If p = -7 and q = 12, then $\mathbf{x^2 + px + q = 0}$, then the value of 'x' is: (A). -3 and 4 (B). 3 and 4 (C). -3 and -4 (D). 3 and -4	1
6	The discriminant of the quadratic equation $\mathbf{2x^2 - 6x - 3 = 0}$ is: (A). 60 (B). $\sqrt{60}$ (C). 12 (D). $\sqrt{12}$	1
7	Two poles of height 8 m and 13 m are standing 12 m apart. The distance between their tops is: (A). 19 m (B). 17 m (C). 15 m (D). 13 m	1
8	In two triangles Δ**ABC and** Δ**DEF,** $\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD}$**,** then: (A). $\Delta FDE \sim \Delta CAB$ (B). $\Delta FDE \sim \Delta ABC$ (C). $\Delta CBA \sim \Delta FDE$ (D). $\Delta BCA \sim \Delta FDE$	1
9	The point where the perpendicular bisector of the line segment joining the points A(2, 5) and B(4, 7) is: (A). (2, 5) (B). (6, 3) (C). (0, 0) (D). (3, 6)	1
10	If A and B are acute angles and **sinA = cosB**, then the value of **(A + B)** is: (A). 30^0 (B). 0^0 (C). 90^0 (D). 60^0	1

11	$\frac{2\tan\tan 30^0}{1-\tan^2 30^0}$ is equal to: (A). $\cos 60^0$ (B). $\sin 60^0$ (C). $\tan 60^0$ (D). $\sin 30^0$	1
12	If tangents PA and PB from a point P to a circle with centre O are inclined to each other at an angle of 80^0, then find ∠POA  (A). 60^0 (B). 40^0 (C). 100^0 (D). 50^0	1
13	If the difference between the circumference and radius of a circle is 37cm, then the circumference of the circle is given by: (A). 33cm (B). 22cm (C). 44cm (D).55cm	1
14	The area of a ring having 'R' as outer radius and 'r' as inner radius is: (A). $\pi(R^2 + r^2)$ (B). $\pi(R + r)$ (C). $\pi(R^2 - r^2)$ (D). $\pi(R - r)$	`1
15	The diameter of the moon is approximately one-fourth of that of the earth. What is the (approximate) ratio of the volume of the moon to that of the earth? (A). $\frac{1}{16}$ (B). $\frac{1}{32}$ (C). $\frac{1}{48}$ (D). $\frac{1}{64}$	1
16	In a frequency distributions, mode is 7.88, mean is 8.32 then median is: (A). 8.17 (B). 7 (C). 7.17 (D). 8.27	1

17	The median class of the following distribution is: x | 5 - 10 | 10 - 20 | 20 - 30 | 30 - 40 | 40 - 50 | 50 - 60 F | 4 | 8 | 12 | 16 | 9 | 5 (A). 20 - 30 (B). 5 - 10 (C). 50 - 60 (D). 30 - 40	1
18	Two dice are thrown simultaneously. What is the probability of getting two numbers whose product is even? (A). $\frac{1}{4}$ (B). $\frac{3}{4}$ (C). $\frac{1}{2}$ (D). $\frac{1}{8}$	1
19	**Assertion (A):** The point (0,4) lies on the y-axis. **Reason (R):** The x-coordinate on the point on the y-axis is zero. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A). c) Assertion (A) is true but Reason (R) is false. d) Assertion (A) is false but Reason (R) is true.	1

20	**Assertion (A):** The HCF of two numbers is 5 and their product is 150, then their LCM is 30. **Reason (R):** For any two positive integers 'a' and 'b', HCF (a, b) + LCM (a, b) = a × b. a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A). c) Assertion (A) is true but Reason (R) is false. d) Assertion (A) is false but Reason (R) is true.	1
	SECTION B	
	Section B consists of 5 questions of 2 marks each.	
21	Two concentric circles are of radii 5 cm and 3 cm. Find the length of the chord of the larger circle which touches the smaller circle.  	2

22	In fig., PQ is parallel to MN. If $\frac{KP}{PM} = \frac{4}{13}$ and KN = 20.4cm. Find KQ.  **OR** In the given figure, ΔODC ~ ΔOBA, ∠BOC = 125^0 and ∠CDO = 70^0. Find:  (i). ∠DOC (ii). ∠DCO (iii). ∠OAB (iv). ∠AOB	2
23	Find the values of α and β for which the following system of linear equations has infinite number of solutions, 2x + 3y = 7, 2αx + (α + β)y = 28.	2
24	Find the circumference of a circle of diameter 14cm. **OR** Find the area of a quadrant of a circle whose circumference is 22cm.	2
25	Prove that: $\cos^{2\theta} + \frac{1}{1+cot^2\theta} = 1$.	2
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	

26	Find the probability that a number selected at random from the numbers 1,2,3,4,5,6,……,35 is a (i). prime number, (ii). multiple of 7, (iii). multiple of 3 or 5.	3
27	Prove that the lengths of two tangents drawn from an external point to a circle are equal.	3
28	Given $\sec\theta = \frac{13}{12}$, calculate all other trigonometric ratios. **OR** If $3\cot A = 4$, check whether $\frac{1-\tan^2 A}{1+\tan^2 A} = \cos^2 A - \sin^2 A$ or not.	3
29	In a cyclic quadrilateral ABCD, $\angle A = (2x + 4)^0$, $\angle B = (y + 3)^0$, $\angle C = (2y + 10)^0$ and $\angle D = (4x - 5)^0$,. Find all four angles. **OR** The sum of a two-digit number and the number obtained by reversing the order of digits is 99. If the digits offer by 3, find the number.	3
30	Prove that in $\sqrt{n}$ is not a rational number. If 'n' is not a perfect square.	3
31	If the sum of the squares of zeroes of the quadratic polynomial $f(x) = x^2 - 8x + k$ is 40. Then find the value of 'k'.	3
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	

<table>
<tr><td>32</td><td>The diagonal of a rectangular field is 60 m more than the shorter side. If the longer side is 30 m more than the shorter side, find the sides of the field.

OR

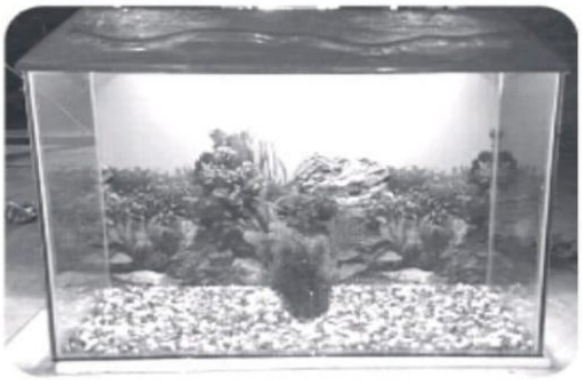
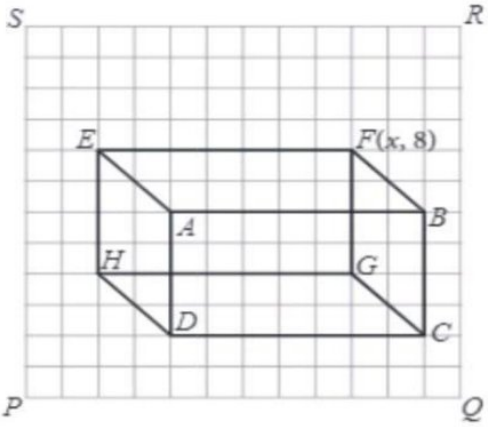
The length of the hypotenuse of a right-angled triangle exceeds the length of the base by 2 cm and exceeds twice the length of the altitude by 1cm. Find the length of each side of the triangle.</td><td>5</td></tr>
<tr><td>33</td><td>Prove that if a line is drawn parallel to one side of a triangle to one side of a triangle to intersect the other two sides in distinct points, then the other two sides are divided in the same ratio. By using this theorem, prove that in ΔABC, if DE || BC, then $\frac{AD}{AB} = \frac{AE}{AC}$.</td><td>5</td></tr>
<tr><td>34</td><td>A copper wire, 3 mm in diameter, is wound about a cylinder whose length is 12 cm and diameter 10 cm, so as to cover the curved surface of the cylinder. Find the length and mass of the wire, assuming the density of copper to be 8.88g per cm^3.

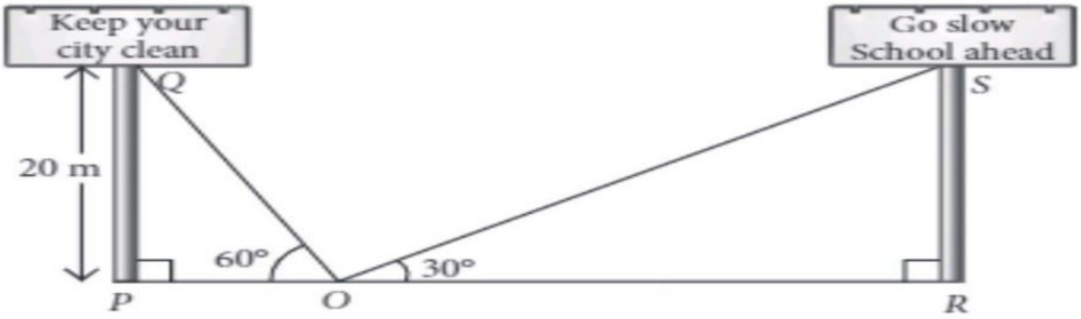
OR

A solid iron pole consists of a cylinder of height 220 cm and base diameter 24cm, which is surmounted by another cylinder of height 60 cm and radius 8 cm. Find the mass of the pole, given that 1 cm^3 of iron has approximately 8g mass. (Use π = 3.14)</td><td>5</td></tr>
<tr><td>35</td><td>A student noted the numbers of cars passing through a spot on a road for 100 periods each of 3 minutes and summarized in the table given below. Find the mode of the data.

<table>
<tr><td>No. of cars</td><td>0 - 10</td><td>10 - 20</td><td>20 - 30</td><td>30 - 40</td><td>40 - 50</td><td>50 - 60</td><td>60 - 70</td><td>70 - 80</td></tr>
<tr><td>Frequency</td><td>7</td><td>14</td><td>13</td><td>12</td><td>20</td><td>11</td><td>15</td><td>8</td></tr>
</table>
</td><td>5</td></tr>
<tr><td></td><td>SECTION E</td><td></td></tr>
<tr><td></td><td>Section E consists of 3 questions of 4 marks each.</td><td></td></tr>
</table>

36	While playing a treasure hunt game, some clues(numbers) are hidden in various spots collectively forming an A.P. If the number on the nth spot is 20 + 4n, then answer the following questions to help the player in spotting the clues.  (i). Which number is on the first spot?	1
	(ii) Which number is on the $(n - 2)^{th}$ spot?	1
	(iii). What is the sum of all the numbers on the first 90 spots?	2
	OR Which spot is numbered as 116 and Which number is on the 34 th spot?	

37	According to medical science and research, keeping an aquarium in the house help in treating stress, anxiety and health problems associated with blood pressure. It also provides visual stimulation that boosts your focus and creativity. A sketch of an aquarium is drawn, which is given in the following figure.   (i). Write the coordinates of point H. (ii). Find the distance of point G from the y-axis. (iii) Find length of the diagonal FD and the value of x. **OR** If Q is considered as origin, then find the coordinates of midpoint of BC and length of side HG.	1 1 2

38	Two hoardings are put on two poles of equal heights standing on either side of the road. From a point between them on the road the angle of elevation of the top of poles are 60^0 and 30^0 respectively. Height of each pole is 20 m.  Based on the above information, answer the following questions. (Take $\sqrt{3} = 1.73$). (i). Find the length of PO. (ii). Calculate the length of RO. (iii). If the angle of elevation of the top of pole PQ changed to 45^0, then find the length of PO. **OR** Find the width of the road?	1 1 2