Please check that this question paper contains 38 questions and 8 printed pages.

Roll No. :_____

D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER-3
CLASS: X
SUBJECT: MATHEMATICS (BASICi)

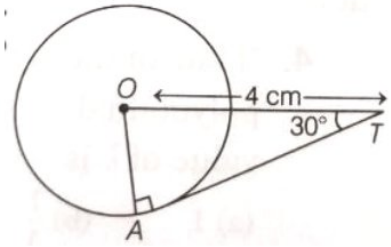
TIME: 3 HOURS MAX MARKS: 80

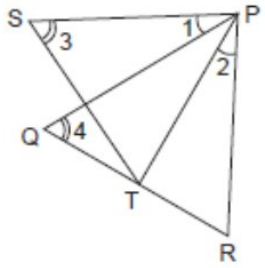
General Instructions:

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 x = 0.2 is a root of the equation $x^2 - 0.4k = 0$, then k = (a) 1 (b) 10 (c) 0.1 (d) 100	1
2	The product of the HCF and LCM of the smallest prime number and the smallest composite number is (a) 2 (b) 4 (c) 6 (d) 8	1
3	A number was chosen at random from the first 300 three-digit natural numbers. The probability	

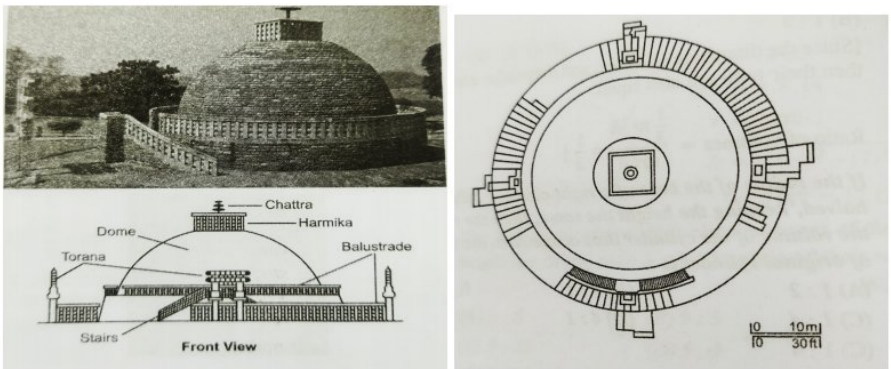
	that the selected number has zero at units place is (a) $\frac{1}{15}$ (b) $\frac{1}{25}$ (c) $\frac{1}{10}$ (d) $\frac{1}{20}$	1
4	The zeros of the polynomial $x^2 + \frac{1}{6}x - 2$ are (a) -3 ,4 (b) $-\frac{3}{2}, \frac{4}{3}$ (c) $-\frac{4}{3}, \frac{3}{2}$ (d)) $-\frac{4}{3}, -\frac{3}{2}$	1
5	If area of a circle inscribed in an equilateral triangle is 48π square units , then perimeter of the triangle is (a)$17\sqrt{3}$ units (b) 36 units (c) 72 units (d) $48\sqrt{3}$ units	1
6	Given that $\sin A = \frac{\sqrt{3}}{2}$ and $\cos B = \frac{\sqrt{3}}{2}$, the value of (A+B) is (a)60° (b) 105° (c) 75° (d) 90°	1
7	The probability of getting a bad apple in a box of 400 apples is 0.035.The total number of bad apples is (a)7 (b) 14 (c) 21 (d) 28	1
8	The median and the mode of a frequency distribution are 33 and 39 respectively, then the mean is (a) 40 (b) 60 (c) 65 (d) 70	1
9	If in ΔABC , DE || BC , AC = 4.8 cm and AD : DB = 3:5 , then the length of EF is (a)1.8 cm (b) 1.6 cm (c) 3.2 cm (d) 3.6 cm	1
10	If $\Delta ABC \sim \Delta DEF$ but ΔABC is not similar to ΔDEF , then which of the following is not true ? (a) BC × EF = AC × FD (b) AB × EF = AC × DE (c) BC × DE = AB × EF (d) BC × DE = AB × FD	1

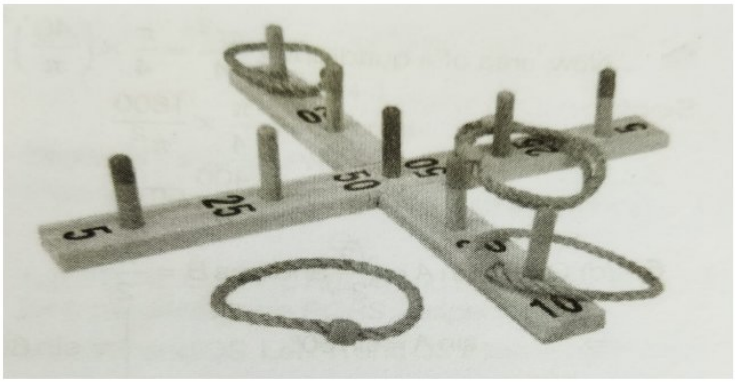
11	In the given figure, AT is a tangent to the circle with centre O such that OT= 4 cm and ∠ OTA = 30° , then AT is equal to  (a) 4 cm (b) 2 cm (c) $2\sqrt{3}$ cm (d) $4\sqrt{3}$ cm	1
12	The pair of equation 3x+5y = 3 and 6x+ky = 8 do not have a solution, if (a) k =5 (b) k =10 (c) k ≠ 5 (d) k ≠ 10	1
13	The angle of elevation of the sun when the shadow of a $12\sqrt{3}$ m long pole is 12m is (a) 60° (b) 30° (c) 45° (d) 90°	1
14	The 4th term from the end of the AP -11 , -8 , -5 ,..,49 is (a) 37 (b) 40 (c) 6 (d) 58	`1
15	The least number that is divisible by all the numbers from 1 to 10 (both exclusive) is (a) 10 (b) 100 (c) 504 (d) 2520	1
16	If 0° < θ < 90° , then the value of θ in tan 5θ = 1 is (a) 6° (b) 12° (c) 9° (d) 0°	1
17	The root of the given equation (x+2)(3x-5) = 0 is (a) 5 ,1 (b) 4 , 3/2 (c) -2 , 5/3 (d) 1 ,1	1
18	If the zeroes of the quadratic polynomial $x^2 + (a + 1) x + b$ are 2 and –3, then (a) a = –7, b = –1 (b) a = 5, b = –1 (c) a = 2, b = –6 (d) a = 0, b = –6	1
	DIRECTION: In question number 19 and 20, a statement of assertion (A) is followed by a statement of Reason (R). Choose the correct option.	

19	**Assertion (A):** The mean of the first fifty nine natural numbers is 30. **Reason (R):** The sum of first n natural numbers is $\frac{n(n+1)}{2}$. 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 length of a tangent from an external point to a circle is 18 cm, then length of the other tangent from the same point is 18 cm. **Reason (R):** Length of tangents drawn from an external point to a circle are not equal. 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	In figure, $\angle 1 = \angle 2$ and $\angle 3 = \angle 4$. Show that $PT \times QR = PR \times ST$.  	2
22	If the points A(4, 3) and B(x, 5) are on the circle with the centre O(2, 3), find the value of x. **OR** A parallelogram has vertices P(1, 4) , Q(7, 11), R(a , 4) , S (1, -3). Find the value of a.	2

<table>
<tr><td>23</td><td>A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is thrice that of a red ball, then find the number of blue balls in the bag.</td><td>2</td></tr>
<tr><td>24</td><td>If α and β are the zeroes of the quadratic polynomial f(x) = x² - 4x +3, then find the value of $(\alpha^4\beta^2 + \beta^4\alpha^2)$</td><td>2</td></tr>
<tr><td>25</td><td>A circus artist is climbing a 40 m long rope, which is tightly stretched and tied from the top of a vertical pole to the ground. Find the height of the pole, if the angle made by the rope with the ground level is 60°.
OR
A kite is flying at a height of 30 m from the level ground, attached to a string inclined at 30° to the horizontal. Find the length of the string.</td><td>2</td></tr>
<tr><td></td><td>SECTION C</td><td></td></tr>
<tr><td></td><td>Section C consists of 6 questions of 3 marks each.</td><td></td></tr>
<tr><td>26</td><td>The total surface area of a solid cylinder is 231 cm^2. If the curved surface area of this solid cylinder is $\frac{2}{3}$ of its total surface area, find its radius and height. [Use $\pi = \frac{22}{7}$]
OR
A vessel is in the form of an inverted cone. Its height is 8 cm and the radius of its top, which is open, is 5 cm. It is filled with water up to the brim. When lead shots, each of which is a sphere of radius 0.5 cm, are dropped into the vessel, one-fourth of the water flows out. Find the number of lead shots dropped in the vessel.</td><td>3</td></tr>
<tr><td>27</td><td>A health officer took the initiative of organising a medical camp in a remote village. The medical checkup of 400 students of the age group of 10 years and their heights were recorded as follows
<table>
<tr><th>Height (in cm)</th><th>Frequency</th></tr>
<tr><td>160 - 162</td><td>15</td></tr>
<tr><td>163 - 165</td><td>117</td></tr>
<tr><td>166 - 168</td><td>136</td></tr>
<tr><td>169 - 171</td><td>118</td></tr>
<tr><td>172 - 174</td><td>14</td></tr>
</table>
Then, find the median height of students.</td><td>3</td></tr>
<tr><td>28</td><td>The sum of the reciprocals of Varun's age (in years) 3 years ago and 5 years from now is $\frac{1}{3}$ .Find his present age.</td><td></td></tr>
</table>

		3
29	In a circle of radius 21 cm, an arc subtends an angle of 45° at the centre. Find the length of the arc and the area of the sector.	3
30	Find the largest positive integer that will divide 398, 436 and 542 leaving remainders 7, 11 and 15, respectively. **OR** There are 156, 208 and 260 students in groups A, B and C, respectively. Buses are to be hired to take them for a field trip. Find the minimum number of buses to be hired, if the same number of students should be accommodated in each bus.	3
31	Prove that $\sqrt{\frac{cosec\ A-1}{cosec\ A+1}}+\sqrt{\frac{cosec\ A+1}{cosec\ A-1}}=2\ \sec A$.	3
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32	Diagonals AC and BD of a trapezium ABCD with AB || DC intersect each other at the point O. Using similarity criterion for two triangles , show that $\frac{OA}{OC}=\frac{OB}{OD}$ **OR** In a triangle ABC, AD is the median of BC and E is the mid-point of AD. If BE produced, it meets AC in F. Prove that AF = $\frac{1}{3}$ AC.	5
33	Prove that the points A(2 , 3), B(-2 , 2), C(-1 , -2), D(3 , -1) are the vertices of a square ABCD.	5
34	The length of the shadow of a tower standing on level ground is found to be 2x metres longer when the sun's altitude is 30° than when it was 45°. Prove that the height of the tower is $(\sqrt{3}+1)x$ metres. **OR** The angles of depression of the top and bottom of a 50 m high building from the top of a tower are 45° and 60° respectively. Find the height of the tower and the horizontal distance between the tower and the building. (Use $\sqrt{3}$ = 1.73)	5
35	Two circles with centres O and O' of radii 3 cm and 4 cm, respectively intersect at two points P and Q such that OP and O'P are two perpendicular tangents to the two circles. Find the length of the common chord PQ.	5
	SECTION E	
	Section E consists of 3 questions of 4 marks each.	

36	Niharika Singh wants to participate in a 400 m race, in her school's annual sports day. She can currently run 400 m in 65 seconds. With each day of practice it takes her two seconds less. She wants to do it in 45 seconds.  Based on the above information, answer the following questions: i). Write the first three terms of the given A.P. ii). What is the minimum number of days she needs to practice till her goal is achieved ? iii). If in an A.P. the sum of the first 10 terms is 210 and the difference between the last term and the first term is 36, then find the first term. **OR** If a, 2a + 10 and 8a-10 are in A.P., find the value of a.	1 1 2
37	The Great Stupa at Sanchi is one of the oldest stone structures in India, and an important monument of Indian Architecture. It was originally commissioned by the emperor Ashoka in the 3rd century BCE. Its nucleus was a simple hemispherical brick structure built over the relics of the Buddha. It is a perfect example of a combination of solid figures. A big hemispherical dome with a cuboidal structure mounted on it. (Take $\pi = 22/7$)  i). Calculate the volume of the hemispherical dome if the height of the dome is 21m.	1

	ii) .Find the volume of the cuboidal shaped top with dimension 8m , 6m and 4m. iii). Find the area of cloth required to cover the hemispherical dome if the radius of its base is 14 m. **OR** Find the total surface area of the combined figure i.e. hemispherical dome with radius 14m and cuboidal shaped top with dimension 8m × 6m × 4m.	1 2
38	Palak went to a mall with her mother and enjoyed rides on the giant wheel and played hoopla (a game in which you throw a ring on the items kept in a stall and if the ring covers any object completely you get it). The number of times she played hoopla is half the number of times she rides the giant wheel. If each ride costs Rs. 3 and a game of hoopla costs Rs. 4 and she spends Rs. 20 in the fair.  On the basis of above information, answer the following questions. (i) Write the representation of a given statement algebraically. (ii) Graphically, if the pair of equations intersect at one point, then the pair is consistent or inconsistent. (iii) Find the intersection point of two lines. **OR** Find the intersection points of the line 3x+4y=20 on x and y-axes.	 1 1 2