

Please check this question paper contains 38 questions and 7 printed pages.

Roll No. : _____

**D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER-7**

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.

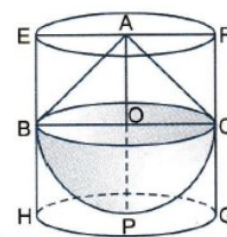
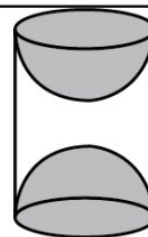
Q. No.		Marks
1	If we join two hemispheres of same radius along their bases, then we get a (a) Cone (b) cuboid (c) sphere (d) cylinder	1

2	The HCF of two numbers is 116 and their LCM is 1740. If one number is 580, then the number is (a) 348 (b) 448 (c) 580 (d) 680	1
3	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
4	If 2 is a zero of polynomial $f(x) = 4x^2 + 4x - 4a$, then the value of a is (a) 8 (b) 6 (c) 4 (d) 2	1
5	If the system of equations $5x + 2y = k$ and $10x + 4y = 3$ has infinitely many solutions, then the value of k is (a) $\frac{3}{2}$ (b) $\frac{1}{2}$ (c) $\frac{1}{3}$ (d) 2	1
6	If α and β are zeros of the polynomial $p(x) = 4x^2 + 3x + 7$, then the value of $\frac{1}{\alpha} + \frac{1}{\beta}$ is (a) $-\frac{7}{3}$ (b) $\frac{7}{3}$ (c) $-\frac{3}{7}$ (d) $-\frac{3}{4}$	1
7	If ΔABC and ΔDEF are similar such that $3AB = DE$ and $BC = 6$ cm, then EF is (a) 18cm (b) 15 cm (c) 12 cm (d) 6 cm	1
8	If the distance between two points (2,3) and (x,0) is 3, then x is equal to (a) -3 (b) -2 (c) 2 (d) 3	1
9	If A(-1,2), B(0,0) and C(2,1) are the vertices of ΔABC , then the length of median through vertex A is (a) $\frac{3}{2}$ units (b) $\frac{5}{2}$ units (c) 5 units (d) 10 units	1
10	If point P, which internally divides the line segment joining the points A(-2,1) and B(1,4) in the ratio 2:1 then the coordinates of point P is (a) (1.5, 2) (b) (0,3) (c) (-1,2) (d) (-0.5, 2.5)	1
11	If $\tan\theta = \frac{a}{b}$, then the value of $\sec\theta$ is	1

	(a) $\frac{b}{a}$ (b) $\frac{\sqrt{a^2+b^2}}{b}$ (c) $\frac{\sqrt{a^2-b^2}}{b}$ (d) $\frac{b\sqrt{a^2+b^2}}{a^2+b^2}$	
12	If $2 \sin 3\theta = \sqrt{3}$, then the value of θ is (a) 15° (b) 20° (c) 30° (d) 60°	1
13	If $a = 2\operatorname{cosec}^2\theta - 1$ and $b = \cot^2\theta - 3$, then $a - 2b$ is equal to (a) 6 (b) 7 (c) -7 (d) 5	1
14	AB is a chord of the circle and AOC is its diameter such that $\angle BCP = 60^\circ$. If CP is the tangent to the circle at the point C, then $\angle BCP$ is equal to (a) 50° (b) 60° (c) 70° (d) 80°	1
15	If $d_i = x_i - 20$, $\sum f_i d_i = 300$ and $\sum f_i = 40$, then the value of \bar{x} is (a) 20.3 (b) 32 (c) 27.5 (d) 22.9	1
16	A fair dice is rolled. Probability of getting a number greater than 3 is (a) 0 (b) $\frac{1}{3}$ (c) $\frac{1}{4}$ (d) $\frac{1}{2}$	1
17	If median = 143 and mean = 143.06, then mode is (a) 143.18 (b) 142.94 (c) 142.88 (d) 143	1
18	The area of quadrant of a circle whose circumference is 44 cm, is (a) $77/4 \text{ cm}^2$ (b) 77 cm^2 (c) 154 cm^2 (d) $77/2 \text{ cm}^2$	1
19	Assertion (A): In a circle of radius 6 cm, the angle of a sector is 60° , then area of the sector is $132/7 \text{ cm}^2$. Reason (R): Area of the circle with radius r is πr^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	<p>Assertion (A): $\sqrt{2}$ is an irrational number.</p> <p>Reason (R): If p be a prime, then \sqrt{p} is an irrational number.</p> <p>a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A).</p> <p>b) Both Assertion (A) and Reason (R) are true and Reason (R) is not the correct explanation of Assertion (A).</p> <p>c) Assertion (A) is true but Reason (R) is false.</p> <p>d) Assertion (A) is false but Reason (R) is true.</p>	1
SECTION B		
Section B consists of 5 questions of 2 marks each.		
21	<p>For what values of k, will the system of equations $2x + 3y = 4$ and $(k+2)x + 6y = 3k + 2$ have infinitely many solutions?</p> <p style="text-align: center;">OR</p> <p>Sum of the ages of a father and his son is 40 years. If the father's age is three times that of his son, then find their ages.</p>	2
22	E is a point on the side CB produced of an isosceles triangle ABC with $AB = AC$. If $AD \perp BC$ and $EF \perp AC$, prove that $\triangle ABD \sim \triangle ECF$	2
23	If $\frac{\cot\theta - 1}{\cot\theta + 1} = \frac{1 - \sqrt{3}}{1 + \sqrt{3}}$, then find the acute angle θ .	2
24	Prove that the length of tangents drawn from an external point of a circle are equal.	2
25	<p>A chord of a circle of radius 15 cm subtends an angle of 60° at the centre. Find the area of the sector.</p> <p style="text-align: center;">OR</p> <p>The radii of two circles are 8 cm and 6 cm respectively. Find the radius of the circle having an area equal to the sum of the areas of the two circles.</p>	2
SECTION C		
Section C consists of 6 questions of 3 marks each.		
26	Prove that $\sqrt{3}$ is an irrational number.	3

27	Find the zeros of the quadratic polynomial $x^2 + 7x + 12$, and verify the relation between the zeros and its coefficients.	3
28	Solve the quadratic equation $\frac{1}{x+4} - \frac{1}{x+7} = \frac{3}{10}$, $x \neq -4, -7$ OR Using quadratic formula, solve for x: $9x^2 - 3(a+b)x + ab = 0$	3
29	Prove that the parallelogram circumscribing a circle is a rhombus	3
30	Prove that $\frac{\cos\theta - \sin\theta + 1}{\cos\theta + \sin\theta - 1} = \operatorname{cosec}\theta + \cot\theta$ OR Prove that $\frac{\cos\theta}{\operatorname{cosec}\theta + 1} + \frac{\cos\theta}{\operatorname{cosec}\theta - 1} = 2\tan\theta$	3
31	Cards numbered 1, 2, 3, 4, 5, 17 are put in a box and mixed thoroughly. One person draws a card from the box. Find the probability that the number on the card is (i) Divisible by 2 and 3 (ii) A multiple of 3 or 5 (iii) A prime number	3
SECTION D		
Section D consists of 4 questions of 5 marks each.		
32	If 2 is a root of the quadratic equation $3x^2 + px - 8 = 0$ and the quadratic equation $4x^2 - 2px + k = 0$ has equal roots, find the value of k.	5
33	A wooden article was made by scooping out a hemisphere from each end of a solid cylinder. If the height of the cylinder is 20 cm and its base is of radius 5 cm, find the total surface area of the article. OR A solid toy is in the form of a hemisphere surmounted by a right circular cone. The height of the cone is 2 cm and the diameter of the base is 4 cm. Determine the volume of the toy, find the difference of the volume of the cylinder and the toy.	5



34 Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio. 5

35 The following frequency distribution shows the daily savings of 64 children in a locality. 5

Daily savings (in Rs.)	1-3	3-5	5-7	7-9	9-11	11-13	13-15
Number of children	7	6	x	13	y	5	4

If mean savings is 8, then find the missing values x and y.

OR

An incomplete distribution is given as follows.

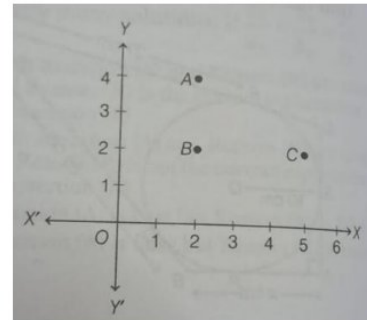
Class interval	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency	10	20	a	40	b	25	15

The median value is 35 and the sum of all the frequencies is 170. Using the median formula, find the missing frequencies.

SECTION E

Section E consists of 3 questions of 4 marks each.

36 Raman and Vishnu are friends living on the same street in Laxmi Nagar . Vishnu’s house is at the intersection of one street with another street on which there is a café. They both work in the same office and that is not far from Vishnu’s house. Suppose the office is situated at point ‘O’ i.e origin. Raman’s house is at point ‘A’. Vishnu’s house is at point B and café is at point C.




Based on the above information, answer the following questions:

- (i) How far is Raman’s house from Vishnu’s house?
- (ii) How far is the office from the café?
- (iii) Find the perimeter of the triangle formed by Raman’s, Vishnu’s house and the café.

OR

There is a tower between the line joining A and C which divides Ac in the ratio 2:3. Find the coordinates of the tower.

1
1
2

37	<p>India's literacy rate has increased six times since the end of the British rule in 1947. From 12% to 74% in recent times. Yet India has the world's largest population of illiterate people according to a report of oxfam.</p> <p>Ram asks the labour to dig a well up to a depth of 10 m. Labour charges Rs. 150 for the first metre and Rs. 50 for each subsequent metres. As labour was uneducated, he claims Rs. 550. For the whole work.</p> <p>On the basis of the above information, answer the following questions:</p> <p>(i) What should be the actual amount to be paid to the labour? 1</p> <p>(ii) How much money will Ram save, if labour agrees with Rs. 550? 1</p> <p>(iii) If the nth term of an A.P is $(4n-10)$, then find its 16th term 2</p> <p style="text-align: center;">OR</p> <p>Find the middle term of the A.P 10,7,4,... -62</p>	
38	<p>From a point 100m above a lake, the angle of elevation of a stationary helicopter is 30° and the angle of depression of reflection of the helicopter in the lake is 60°.</p> <div style="text-align: center;">  </div> <p>On the basis of above situation answer the following questions:</p> <p>(i) If any point above the lake is at height h, then what is the depth of reflection of a point in the lake? 1</p> <p>(ii) If the observer moves away from the perpendicular line (tower/building) then check whether the angle of elevation increases or decreases 1</p> <p>(iii) Find the height of the helicopter 2</p> <p style="text-align: center;">OR</p> <p>Find the distance between the helicopter and the given position of point.</p>	