D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER - 8
CLASS: X
SUBJECT: MATHEMATICS (BASIC)
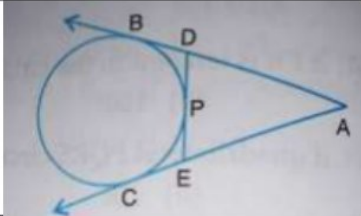
TIME: 3 HOURS   MAX MARKS: 80
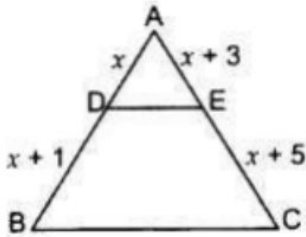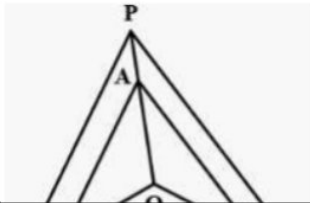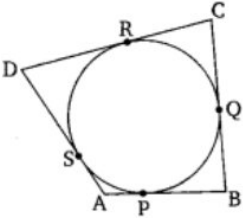
General Instructions:

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 two positive integers a and b are written as a = x^3y^2 and b = xy^3; where x, y are prime numbers, then LCM (a, b) is a) x^3y b) x^2y^2 c) xy^2 d) x^3y^3	1
2	The HCF of 18, 21 and 27 is a) 7 b) 6 c) 9 d) 3	

3	If one root of $kx^2 - 3x + k = 0$ is 2, then the value of k is a) $\frac{5}{6}$ b) $\frac{6}{5}$ c) $-\frac{5}{6}$ d) $-\frac{6}{5}$	
4	If a pair of linear equations is consistent, then the lines will be a) parallel b) always coincident c) intersecting or coincident d) always intersecting	1
5	The value(s) of k for which the quadratic equation $2x^2+kx+8=0$ has equal roots, is a) 8 b)± 8 c) -8 d) 0,8	1
6	The distance between the points (0,0) and (a - b , a + b) is a) a^2+b^2 b) $a^2 - b^2$ c) $\sqrt{a^2 + b^2}$ d) $\sqrt{a^2 - b^2}$	1
7	D and E are respectively the points on the sides AB and AC of a triangle BC such that AD = 2 cm, BD = 3 cm, BC = 7.5 cm and DE ∥ BC. Then, length of DE (in cm) is- a) 2.5 b) 3 c) 5 d) 6	1
8	If in two triangles DEF and PQR, $\angle D = \angle Q$ and $\angle R = \angle E$, then which of the following is not true? a) EF/PR = DF/PQ b) DE/PQ = EF/RP c) DE/QR = DF/PQ d) EF/RP = DE/QR	1
9	If AB= 14cm and PE=5cm, then AE=? a) 7cm b) 8cm c) 19cm d)9cm	1
10	If $\frac{1}{2}$ then the value of cot A is a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{\sqrt{3}}{2}$ d)1	
11	$9\sec^2 A - 9\tan^2 A =$ a) 1 b) 0 c) 8 d) 9	1

12	A pole 6 m high casts a shadow $2\sqrt{3}$ m long on the ground, then the Sun's elevation is – a) 60° b) 45° c) 30° d) 90°	1
13	If θ is the angle (in degrees) of a sector of a circle of radius r, then area of the sector is a) $\dfrac{\pi r^2 \theta}{360^0}$ b) $\dfrac{\pi r^2 \theta}{180^0}$ c) $\dfrac{2\pi r \theta}{360^0}$ d) $\dfrac{2\pi r \theta}{180^0}$	1
14	The area of the square is the same as the area of the circle. What will be ratio of their perimeters a) 1:1 b) π: $\sqrt{2}$ c) 2: $\sqrt{\pi}$ d) 2: π	`1
15	If the probability of an event is P, the probability of its complementary event will be: a) p b) p - 1 c) 1 - p d) 1- $\dfrac{1}{p}$	1
16	If the mean and the median of a data are 12 and 15 respectively, then its mode is : a) 13.5 b) 14 c) 17 d) 21	1
17	The volume of a right circular cone whose area of the base is 156 cm² and the vertical height is 8cm, is a) 2496 cm³ b) 1248 cm³ c) 1664cm³ d) 416 cm³	1

18	For the following distribution,	

Class interval	0-5	5-10	10-15	15-20	20-25
Frequency	10	15	12	20	9

the sum of lower limits of the median class and modal class is

a) 15   b) 20   c) 25   d) 30

| 19 | **Assertion (A):** The number 5^n cannot end with the digit 0, where n is a natural number.

Reason (R): Prime factorisation of 5 has only two factors, 1 and 5.

a) Both Assertion (A) and Reason (R) are true and Reason (R) is the correct explanation of Assertion (A). | 1 |

	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.	
20	**Assertion (A):** The origin is the only point equidistant from (2, 3) and (- 2,-3). **Reason (R):** The origin is the mid-point of the line joining (2, 3) and (- 2,-3). 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
	<center>**SECTION B**</center>	
	<center>**Section B consists of 5 questions of 2 marks each.**</center>	
21	Find the value of k for which the system of linear equations x + 2y = 3, 5x + k y + 7 = 0 is inconsistent.	2
22	In $\triangle ABC$, DE $\parallel$ BC, find the value of x. <center>OR</center> A, B and C are points on OP, OQ and OR respectively such that AB$\parallel$PQ and AC$\parallel$PR. Then show that BC$\parallel$QR. 	2

<center>4</center>

23	The length of the tangent to a circle from a point P, which is 17 cm away from the centre, is 15 cm. What is the radius of the circle?	2
24	A quadrilateral ABCD is drawn to circumscribe a circle. Prove that AB + CD = AD + BC. 	2
25	Evaluate : $\sin^2 30^0 + \sin^2 45^0 + \tan^2 45^0 + \cos^2 45^0$	2
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
26	Prove that $\sqrt{2}$ is an irrational number.	3
27	Find zeros of the quadratic polynomial $x^2 + 7x + 10$ and verify the relationship with zeros and coefficients.	3
28	A train covered a certain distance at a uniform speed If the train could have been 10 km/hr. faster, it would have taken 2 hours less than the scheduled time. And, if the train were slower by 10 km/hr, it would have taken 3 hr more than the scheduled time. Find the distance covered by the train. **OR** A two-digit number is obtained by either multiplying the sum of digits by 8 and then subtracting 5 or by multiplying the difference of digits by 16 and adding 3. Find the number	3
29	A chord of a circle of radius 10 cm subtends a right angle at the centre. Find the area of the corresponding: (i) minor segment (ii) major sector. (Use $\pi=3.14$)	3
30	Two different dice are tossed together. Find the probability that (i) the number on each die is even	3

	(ii) the sum of numbers appearing on the two dice is 5. (iii) is doublet	
31	Prove that $\dfrac{cosA}{1-tanA} - \dfrac{sinA}{1-cotA} = sinA - cosA$ **OR** Show that $\sqrt{\dfrac{1+sin\,\theta}{1-sin\,\theta}} + \sqrt{\dfrac{1-sin\,\theta}{1+sin\,\theta}} = 2\,sec\,\theta$	3
	SECTION D	
	Section D consists of 4 questions of 5 marks each.	
32	The hotel bill for a certain number of people for overnight stay is Rs 4800. If there were 4 people more, the bill each has to pay would have reduced by Rs 200. Find the number of people staying overnight. **OR** Find the values of k for which the quadratic equation $(k+4)x^2 +(k+1)x + 1=0$ has equal roots. Also, find the roots.	5
33	Prove that a line is drawn parallel to one side of a triangle intersecting the other two sides in distinct points, then the other two sides are divided in the same ratio"	5
34	A tent is in the shape of a cylinder surmounted by a conical top of same diameter. If the height and diameter of cylindrical part are 2.1 m and 3 m respectively and the slant height of conical part is 2.8 m, find the cost of canvas needed to make the tent if the canvas is available at the rate of Rs.500 per square meter. **OR** A solid is in the form of a cylinder with a hemispherical end. The total height of the solid is 20 cm and the diameter of the cylinder is 7 cm. Find the total volume of the solid. (Use $\pi = \dfrac{22}{7}$)	5

35	The median of the following data is 525. Find the values of x and y, if the total frequency is 100.	5

Class	Frequency
0-100	2
100-200	5
200-300	x
300-400	12
400-500	17
500-600	20
600-700	y
700-800	9
800-900	7
900-1000	4

SECTION E

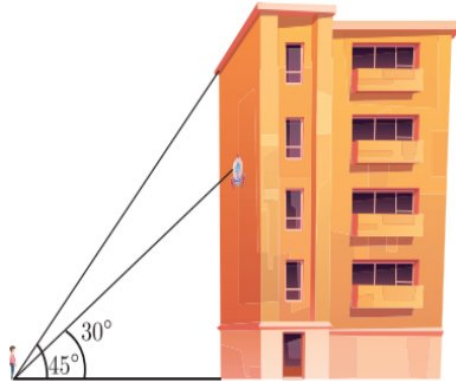**Section E consists of 3 questions of 4 marks each.**

36   Case study -1

Your friend Veer wants to participate in a 200m race. He can currently run that distance in 51 seconds and with each day of practice it takes him 2 seconds less. He wants to do it in 31 seconds to win the race.

	Based on the above information, answer the following questions	
	i) Write an AP for Veer's Practice session	1
	ii) Check whether 30 seconds be a term in the above AP?	1
	iii) If the nth term of an AP is given by $a_n = 2n + 3$ then Find a_1, a_2 and d.	2
	OR	
	What is the minimum number of days he needs to practice till his goal is achieved?	
37	Case study-2	
	To raise the social awareness about the hazards of smoking, a school decided to start a 'No smoking' campaign. Grade-10 students are asked to prepare campaign banners in the shape of a triangle. The vertices of the triangles are P(-3,4), Q(3,4) and R(-1,-2). S, T and U are the midpoints of line segments PQ, QR and PR respectively.	
	i) Find the coordinate of the point S and U.	1
	ii) Find the length ST.	1
	iii) Check whether ΔPQR is an isosceles triangle.	2
	OR	
	Check whether ΔSTU is an isosceles triangle.	
38	Case study -3	
	Ravish got a clinometer from the school lab and started measuring the elevation angle in the surroundings. He saw a building on which the society logo is painted on the wall of the building.	
	From a point P on the ground level, the angle of elevation of the roof of the	

building is 45^0 The angle of elevation of the center of the logo is 30^0 from the same point. The point P is at a distance of 24 m from the base of the building.

i)   . What is the height of the building logo from ground?   1

ii)   What is the height of the building?   1

iii)   What is the aerial distance of the point P to the top of the building

OR   2

If the point of observation P is moved 9 m towards the base of the building, Find the angle of elevation to the center of the logo.