Roll No. :_____

D.A.V. INSTITUTIONS, CHHATTISGARH
PRACTICE PAPER (7)
CLASS: X
SUBJECT: MATHEMATICS (STANDARD)

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.
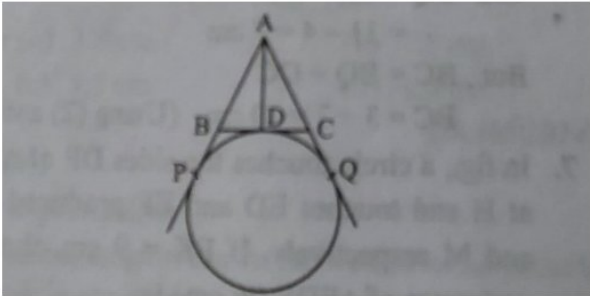
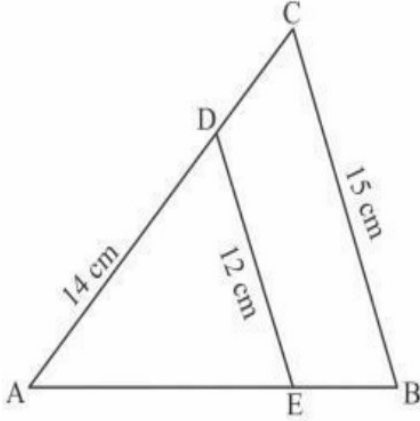| SECTION A	
Section A consists of 20 questions of 1 mark each.	
Q. No.		Marks
1	Which of the following is not irrational? (a) $(2 - \sqrt{3})^2$ (b) $(\sqrt{2} + \sqrt{3})^2$ (c) $(\sqrt{2} - \sqrt{3})(\sqrt{2} + \sqrt{3})$ (d)None of these	1
2	The graph of a quadratic polynomial is (a) straight line (b) parabola (c) circle (d)None of these	1

3	If x = a, y = b is the solution of the equations x + y = 5 and 2x – 3y = 4, then the values of a and b are respectively (a) 6, -1 (b) 2, 3 (c) 1, 4 (d) 19/5, 6/5	1
4	The polynomial equation x (x + 1) + 8 = (x + 2) {x – 2) is (a) linear equation (b) quadratic equation (c) cubic equation (d) bi-quadratic equation	1
5	If the common difference of an A.P. is 3, then $a_{20}-a_{15}$ is (a) 6 (b) 3 (c) 15 (d) 20	1
6	If $\Delta ABC - \Delta DEF$, AB = 4 cm, DE = 6 cm, EF = 9 cm and FD = 12 cm, find the perimeter of ABC. (a) 18 cm (b) 20 cm (c) 21 cm (d) 22 cm	1
7	The coordinates of a point A. where AB is diameter of a circle whose centre is (2,-3) and B is (1,4) are (a)(3,-10) (b)(3,10) (c)(-3,10) (d)(4,5)	1
8	If the point (x, y) is equidistant from the points A (5,1) and B (-1,5), then relation between x and y is (a)2x = 3y (b)3x = 2y (c)x = y (d)4x = 5y	1
9	If x and y are complementary angles, then (a) sin x = sin y (b) tan x = tan y (c) cos x = cos y (d) sec x = cosec y	1
10	If $\sin \theta + \sin^2 \theta = 1$, then $\cos^2 \theta + \cos^4 \theta = ..$ (a) -1 (b) 0 (c) 1 (d)none of these	1
11	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
12	If a chord AB subtends an angle of 60° at the centre of a circle, then angle between the tangents at A and B is: (a) 60° (b) 120° (c) 20° (d) 100°	1
13	The sides AB, BC and AC of a triangle ABC touch a circle at P, Q and R respectively.If PA=4cm,BP=3cm and AC=11cm the length of BC (in cm) is:- (a) 11 cm (b) 10 cm (c) 14 cm (d) 15 cm	1

14	The circumference of a circle is equal to the sum of the circumference of two circles having diameters 34 cm and 28 cm. The radius of the new circle is (a) 30 cm (b) 31 cm (c) 32 cm (d) 25cm	`1
15	The length of the pendulum swinging through 60° describing an arc of 8.8 cm is (a) 8.5 cm (b) 8.4 cm (c) 17 cm (d) 25cm	1
16	Two cones have their heights in the ratios 1:3 and radii in the ratio 3:1. the ratio of their volume is (a) 3:5 (b) 1:4 (c) 3:1 (d) 1:2	1
17	The mean of a set of numbers is $\bar{x}$ If each number is divided by 3, then the new mean is (a) $\bar{x}$ (b) $\bar{x}+3$ (c) $3\bar{x}$ (d) $\bar{x}/3$	1
18	A coin is tossed 3 times. The probability of getting not more than two heads is (a) $\frac{1}{8}$ (b) $\frac{7}{8}$ (c) $\frac{3}{8}$ (d) $\frac{5}{8}$	1
19	Assertion (A):184 is the 60th term of the A.P. 3,7,11… Reason (R): nth term of A.P. whose sum to n terms is S_n is given by $a_n = S_n - S_{n-1}$. 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):** Probability of getting a prime number greater than 5 on a single throw of die is 1/6. **Reason (R):** Probability of getting a number greater than 6 on a single throw of die 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
	SECTION B	

	Section B consists of 5 questions of 2 marks each.	
21	There are 312, 260 and 156 students in class X, XI and XII respectively. Buses are to be hired to take these students to a picnic. Find the maximum number of students who can sit in a bus if each bus takes an equal number of students.	2
22	In the given figure DE‖AC and DF‖AE Prove that $\dfrac{BF}{FE} = \dfrac{BE}{EC}$ The diagonals of a quadrilateral ABCD intersect each other at the point O such that $\dfrac{AO}{CO} = \dfrac{BO}{DO}$ Show that ABCD is a trapezium.	2
23	If two tangents inclined at an angle of 60º are drawn to a circle of radius 5 cm ,then find the length of each tangent. **OR** The length of a tangent drawn from a point P at distance 13 cm from the centre of the circle is 12 cm. Find the radius of the circle.	2
24	If cos α=$\dfrac{1}{2}$ and cos β=$\dfrac{1}{\sqrt{3}}$,then find sin (α + β), where α and β are acute angles.	2
25	A road which is 7 m wide surrounds a circular park whose circumference is 88 m. Find the area of the road.	2
	SECTION C	
	Section C consists of 6 questions of 3 marks each.	
26	Prove that 5-$\sqrt{3}$ is an irrational number. Assume that $\sqrt{3}$ is an irrational number.	3
27	Find the value of k such that the polynomial $x^2 - (k + 6)x + 2(2k - 1)$ has the sum of its zeroes equal to half of their product.	3

28	A natural number, when increased by 12, equals 160 times its reciprocal. Find the number. **OR** Rohini had scored 10 more marks in her mathematics test out of 30 marks, 9 times these marks would have been the square of her actual marks. How many marks did she get in the test?	3
29	Two circles touch each other externally at P, AB is a common tangent to the circles touching them at A and B find value of $\angle APB$. **OR** If a circle touches the side BC of a triangle ABC at P and extended sides AB and AC at Q and R respectively, prove that $AQ = \frac{1}{2}(AB+BC+CA)$ 	3
30	Prove that $(A - \sin \sin A)(\sec \sec A - \cos \cos A) = \dfrac{1}{\tan \tan A + \cot \cot A}$	3
31	The distribution below gives the weights of 30 students of a class. Find the median weight of the students. <table><tr><td>Weight (in kg)</td><td>40-45</td><td>45-50</td><td>50-55</td><td>55-60</td><td>60-65</td><td>65-70</td><td>70-75</td></tr><tr><td>No.of students</td><td>2</td><td>3</td><td>8</td><td>6</td><td>6</td><td>3</td><td>2</td></tr></table>	3

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SECTION D

Section D consists of 4 questions of 5 marks each.

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32	Mother's age is 3 times the sum of ages of her 2 children. After 5 years her age will be twice the sum of ages of the two children. Find the age of the mother. **OR** Difference of the areas of two squares is 544 m². If the difference of their perimeters is 32 m, find the sides of the two squares.	5

33	(a) State and prove Basic proportionality theorem. (b)In triangle ABC , DE‖ BC and AD=14 cm ,DE=12 cm and BC=15cm , Determine AC. C D 15 cm 14 cm · 12 cm A · E · B	5
34	From a solid cylinder whose height is 2.4 cm and diameter is 1.4 cm a conical cavity of the same height and same diameter is hollowed out.Find the total surface area of the remaining solid . **OR** A farmer connects a pipe of internal diameter 20 m from a canal into a cylindrical tank which is 10 m in diameter and 2 m deep.If the water flows through the pipes at the rate 4km/hr , in how much time will the tank be filled completely ?	5
35	Find the Arithmetic mean of the following frequency distribution table 	Marks	below 10	below 20	below 30	below 40	below 50	below 60	below 70	below 80	below 90	below 100
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Number of students	12	22	35	50	70	86	97	104	109	115		5
	SECTION E	
	Section E consists of 3 questions of 4 marks each.	

36	The satellite image of Himalaya Mountain is shown below .The angle of elevation of the top of a hill from the foot of a tower is 60° and the angle of elevation of the top of the tower with height 50 meter from foot of the hill is 30°	
	On the basis of the above information, answer the following questions.	
	(i)Find the horizontal distance between hill and tower.	1
	OR	1
	Find the height of the hill , if the distance between bottom of hill and tower is $50\sqrt{3}$.	2
	(ii)Find the distance from the foot of the tower to the top of the hill.	
	(iii)Find the distance from the foot of the hill to the top of the tower.	
37	The school auditorium was to be constructed to accommodate at least 1500 people. The chairs are to be placed in concentric circular arrangement in such a way that each succeeding circular row has 10 seats more than the previous one.	

i) If the first circular row has 30 seats, how many seats will be there in the 10th row? — 1

ii) For 1500 seats in the auditorium, how many rows need to be there? — 2

OR

If 1500 seats are to be arranged in the auditorium, how many seats are still left to be put after 10th row?

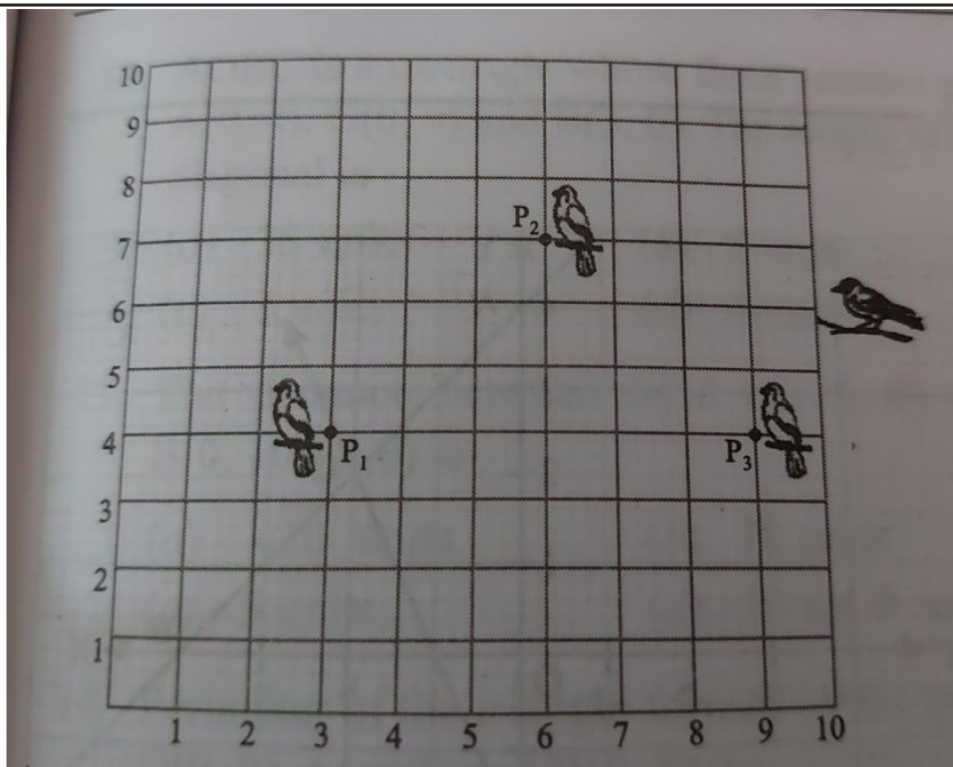iii) If there were 17 rows in the auditorium, how many seats would be there in the middle row? — 1

| 38 | A playground is marked with 10X10 grid as shown in figure .Three parrots are sitting at points $P_1(3,4)$, $P_2(6,7)$, $P_3(9,4)$ respectively .A koel 'K' joins them and sit somewhere in the triangular region described by $\Delta P_1P_2P_3$ consider O as the origin.. | |

On the basis of above situation answer the following question

(i) If koel sits exactly on mid-point of P_1P_2, what are its coordinates?

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OR

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Find distance between P_1 and P_2.

(ii) If koel sits at centroid of $\Delta P_1P_2P_3$, what are its coordinates?

(iii) Find distance of koel from P_1

2

1

1