

This Question Paper contains 12 printed pages.

(Section - A, B, C & D)

Sl.No.

12 (E)

(MAY, 2021)

(New Course)

Time : 3 Hours]

[Maximum Marks : 80

Instructions :

- 1) Write in a clear legible handwriting.
- 2) This question paper has four sections A, B, C & D and Question Numbers from 1 to 53.
- 3) All questions are compulsory. There are only internal options.
- 4) The numbers to the right represent the marks of the question.
- 5) Draw neat diagrams wherever necessary.
- 6) New sections should be written in a new page. Write the answers in numerical order.

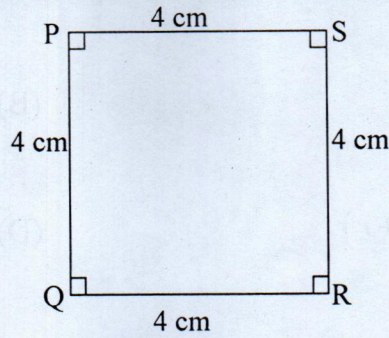
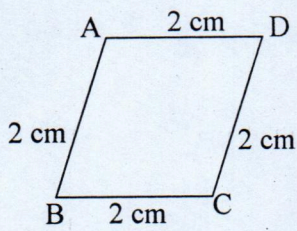
SECTION - A

- Answer the following questions as directed (Questions 1 to 24) (Each question carries 1 mark). [24]
 - State whether the following statements are true or false : (Questions 1 to 4)
- 1) The HCF of $20a^2b$ and $30ab^2$ is $10a^2b^2$. [1]
 - 2) The solution of Quadratic Equation $x^2 - 7x + 12 = 0$ is $\{(3, 4)\}$. [1]
 - 3) The quadratic polynomial $p(x) = x^2 + x$ has 2 real zeroes. [1]

- 4) A pair of linear equations in two variables which has no solution is called an inconsistent pair of linear equations. [1]
- Fill in the blanks so as to make each of the following statements true : (Questions 5 to 10)
- 5) If $\text{HCF}(10, 15) = 2a + 1$ then $a =$ _____. [1]
(1, 2, $\frac{1}{2}$)
- 6) The perpendicular distance of the point $(-2, -3)$ from Y-axis is _____. [1]
(2, 3, -2)
- 7) All squares are _____. [1]
(Similar, Congruent)
- 8) The standard form of the equation $\frac{x}{3} + \frac{y}{2} = 7$ is _____. [1]
($2x + 3y + 42 = 0$, $2x + 3y - 42 = 0$, $2x - 3y - 42 = 0$)
- 9) The formula to find n^{th} term of an Arithmetic Progression is _____. [1]
[$a + (n + 1)d$, $a + d$, $a + (n - 1)d$]
- 10) The discriminant of the quadratic equation $4x^2 - 12x + 9 = 0$ is _____. [1]
(144, 0, 72)
- Answer the following in one sentence or a word or number : (Questions 11 to 16)
- 11) What is the common point of a tangent to a circle and the circle called? [1]
- 12) What is the value of $10 \operatorname{cosec}^2 45^\circ - 10 \cot^2 45^\circ$? [1]
- 13) Find the common difference of the AP : $-5, -1, 3, 7, \dots$ [1]
- 14) Say whether $(y + 1)^2 = 2(y - 3)$ is a quadratic equation or not? [1]

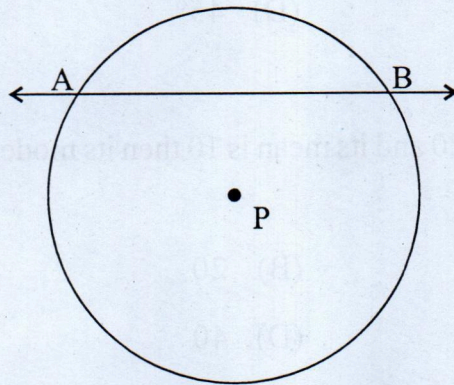
15) State whether the following quadrilaterals are similar or not?

[1]



16) In the figure given below, what is line AB called?

[1]



■ Answer the following by choosing the correct option given below : (Questions 17 to 22)

17) If the perimeter and the area of a circle are numerically equal, then the diameter of the circle is _____.

[1]

(A) 4 units

(B) 2 units

(C) 7 units

(D) None of the given

18) What is the formula to find the total surface area of a 10 rupee coin? [1]

(A) $\frac{1}{3}\pi r^2 h$

(B) $2\pi r h$

(C) $2\pi r(h+r)$

(D) $\pi r^2 h$

19) $\sin 2\theta = 2\sin\theta$ is true when $\theta =$ _____. [1]

(A) 60°

(B) 0°

(C) 30°

(D) 45°

20) If the median of any data is 20 and its mean is 10 then its mode will be _____. [1]

(A) 10

(B) 20

(C) 30

(D) 40

21) The probability that Mona gets 80 out of 80 marks in a maths question paper is _____. [1]

(A) $\frac{1}{81}$

(B) $\frac{1}{80}$

(C) 0

(D) 1

22) The volume of a sphere with radius π unit is _____ (unit)³. [1]

(A) $\frac{4}{3}\pi r^3$

(B) $\frac{4}{3}\pi^4$

(C) $\frac{2}{3}\pi^4$

(D) $\frac{4}{3}\pi^3$

■ Match the following : (Questions 23 to 24)

23)	Section-A	Section-B		[1]
(1)	$1 + 3 + 5 + \dots + 2n - 1$	(a)	$n(n + 1)$	
		(b)	n^2	

24)	Section-A	Section-B		[1]
(1)	In the formula $\bar{x} = a + \frac{\sum f_i u_i}{\sum f_i} \times h$ $u_i = \underline{\hspace{2cm}}$	(a)	$u_i = \frac{x_i - a}{h}$	
		(b)	$u_i = x_i - a$	

SECTION - B

■ Answer any nine of the following questions by doing calculations (Questions 25 to 36) (Each question carries 2 marks). [18]

25) Find the 15th term of the AP : 2, 7, 12, [2]

26) Using Euclid's division algorithm, find the HCF of 65 and 169. [2]

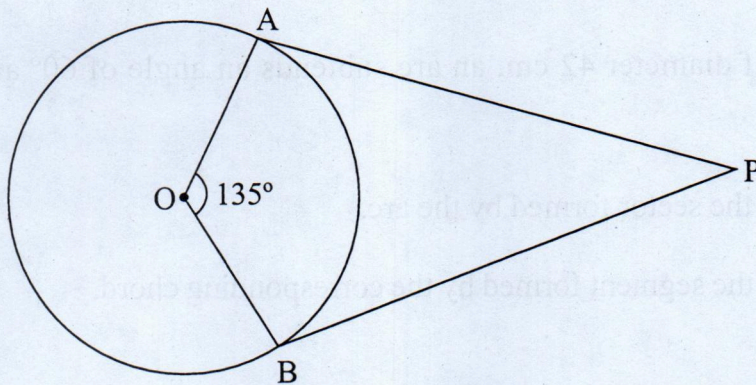
- 27) A survey conducted on 40 households in a locality by a group of students resulted in the following frequency table for the number of family members in a household : [2]

Family size	1-3	3-5	5-7	7-9	9-11
Number of families	14	16	4	4	2

Find the mode of this data.

- 28) Find a quadratic polynomial, the sum and product of whose zeroes are 9 and 14 respectively. [2]
- 29) Evaluate : $2\cot^2 45^\circ + \sin^2 30^\circ - \cos^2 60^\circ$. [2]
- 30) A box contains 5 red marbles, 8 white marbles and 4 green marbles. One marble is taken out of the box at random. What is the probability that the marble taken out will be [2]
 i) red ii) not green
- 31) Two concentric circles are of radii 13 cm and 5 cm. Find the length of the chord of the larger circle which touches the smaller circle. [2]
- 32) 2 cubes each of volume 1000 cm^3 are joined end to end. Find the surface area of the resulting cuboid. [2]
- 33) Given that $\text{HCF}(306, 657) = 9$, find $\text{LCM}(306, 657)$. [2]

- 34) Find the sum of the first 30 terms of AP : 16, 6, -4, [2]
- 35) The length of a tangent from a point A at distance 10 cm from the centre of the circle is 8 cm. Find the diameter of the circle. [2]
- 36) In the given figure, PA and PB are the two tangents to a circle with centre O. If $\angle AOB = 135^\circ$, find $\angle OPA$. [2]



SECTION - C

- Answer any six of the following questions by doing calculations (Questions 37 to 45) (Each question carries 3 marks). [18]

- 37) A motor boat whose speed is 18 km/h in still water takes 1 hour more to go 24 km upstream than to return downstream to the same spot. Find the speed of the stream.

[3]

- 38) Find the zeroes of the polynomial $x^2 - 7$ and verify the relationship between the zeroes and the coefficients. [3]
- 39) Solve $2x + 3y = 11$ and $x - 2y = -12$ and hence find the value of k for which $y = kx + 9$. [3]
- 40) Find the coordinates of the points of trisection of the line segment joining $(4, -1)$ and $(-2, -3)$. [3]
- 41) In a circle of diameter 42 cm, an arc subtends an angle of 60° at the centre. Find [3]
- i) area of the sector formed by the arc.
 - ii) area of the segment formed by the corresponding chord.
- 42) Find the zeroes of the quadratic polynomial $6x^2 - 3 - 7x$ and verify the relationship between the zeroes and the coefficients. [3]
- 43) Check whether $(5, -2)$, $(6, 4)$ and $(7, -2)$ are the vertices of an isosceles triangle. [3]
- 44) The cost of fencing a circular field at the rate of ₹ 12 per metre is ₹ 2,640. The field is to be ploughed at the rate of ₹ 2.50 per m^2 . Find the cost of ploughing the field. $\left(\text{Take } \pi = \frac{22}{7} \right)$ [3]

- 45) A box contains 90 discs which are numbered from 1 to 90. If one disc is drawn at random from the box, find the probability that it bears [3]

- i) a two-digit number
- ii) a perfect square number
- iii) a number divisible by 5.

SECTION - D

- Answer any five of the following questions by doing calculations (Questions 46 to 53) (Each question carries 4 marks). [20]

- 46) The following distribution shows the daily pocket allowance of children of a locality. The mean pocket allowance is ₹ 18. Find the missing frequency f . [4]

Daily pocket allowance (in ₹)	11-13	13-15	15-17	17-19	19-21	21-23	23-25
Number of children	7	6	f	13	20	5	4

- 47) In $\triangle ABC$, if $\angle A = 90^\circ$ then prove that $BC^2 = AB^2 + AC^2$. [4]
- 48) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle 30° with it. The distance between the foot of the tree to the point where the top touches the ground is 15m. Find the height of the tree. [4]
- 49) Draw a line segment of length 6.5 cm and divide it in the ratio 3 : 5. Write the steps of construction. [4]

- 50) The distribution below gives the weights of 30 students of a class. Find the median weight of the students. [4]

Weight (in kg)	40-45	45-50	50-55	55-60	60-65	65-70	70-75
Number of Students	2	3	8	6	6	3	2

- 51) Prove that : The ratio of the areas of two similar triangles is equal to the square of the ratio of their corresponding sides. [4]

- 52) Heyansh, an engineering student was asked to make a model shaped like a cylinder with two cones attached at its two ends by using a thin aluminium sheet. The diameter of the model is 3 cm and its length is 12 cm. If each cone has a height of 2 cm, find the volume of air contained in the model that Heyansh made. (Assume the outer and inner dimensions of the model to be nearly the same) [4]

- 53) Draw a circle of radius 4.5 cm. From a point 7.5 cm away from its centre, construct the pair of tangents to the circle and measure their lengths. (Steps of construction not necessary) [4]

