

*This Question Paper contains 12 printed pages.*

*(Section - A, B, C & D)*

Sl.No.

**12 (E)**

**(MAY, 2021)**

**(New Course)**

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***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.**
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**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  $n^{\text{th}}$  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]

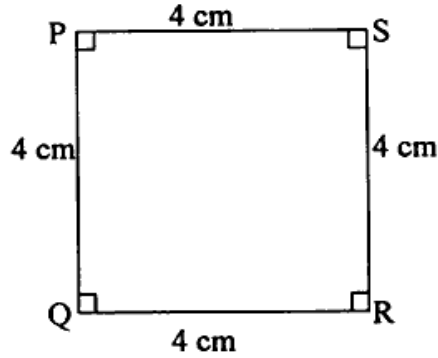
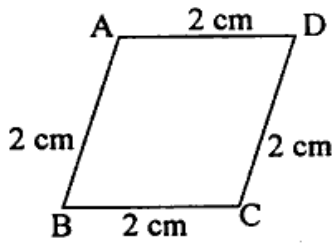
- 12) What is the value of  $10 \operatorname{cosec}^2 45^\circ - 10 \cot^2 45^\circ$ ? [1]

- 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]

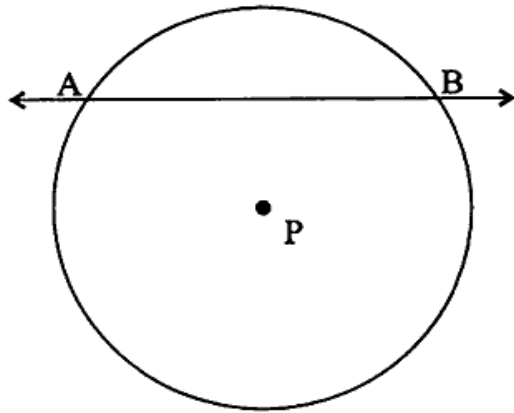
15) State whether the following quadrilaterals are similar or not?

[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)  $60^\circ$  (B)  $0^\circ$

(C)  $30^\circ$  (D)  $45^\circ$

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  $\pi$  unit is \_\_\_\_\_ (unit)<sup>3</sup>. [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 15<sup>th</sup> 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]

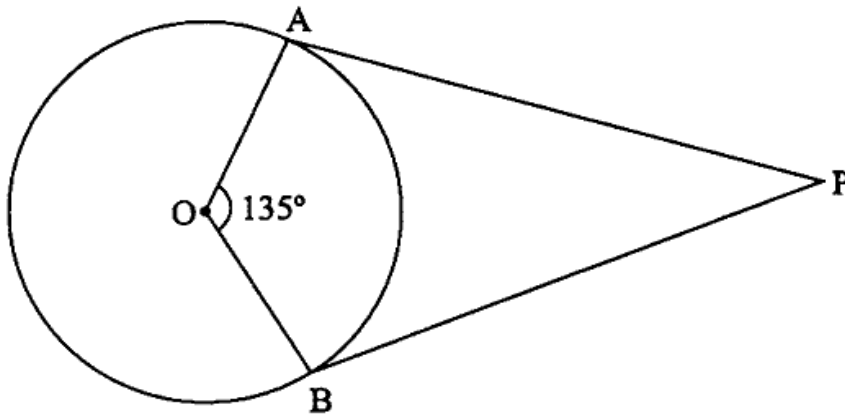
Family size	1-3	3-5	5-7	7-9	9-11
Number of families	14	16	4	4	2

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  $1000 \text{ cm}^3$  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  $60^\circ$  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]
- a two-digit number
  - a perfect square number
  - 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

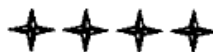
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- 47) In  $\Delta ABC$ , if  $\angle A = 90^\circ$  then prove that  $BC^2 = AB^2 + AC^2$ . [4]
- 48) A tree breaks due to storm and the broken part bends so that the top of the tree touches the ground making an angle  $30^\circ$  with it. The distance 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]



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