

This Question Paper contains 12 printed pages.  
(Section - A, B, C & D)

Sl.No. 04361

12 (E)

(AUGUST, 2020)  
(New Course)

Time : 3 Hours]

[Maximum Marks : 80

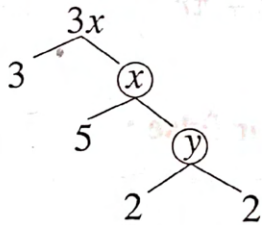
Instructions :

- 1) All the questions in this question paper are compulsory. Internal options are available for some questions.
- 2) All the thirty nine questions are divided into four Sections A, B, C and D.
- 3) Figures to the right of the questions indicate the marks.
- 4) Draw figures wherever necessary, and retain the arcs in construction.
- 5) Start each section from a new page. Write the answers in order.
- 6) Use of calculator is not allowed.

SECTION - A

- Answer the following questions as directed (Questions 1 to 16) (Each question carries 1 mark). [16]
- Answer the following by choosing the correct option given below :

1) From the given factor tree,  $x + y =$  \_\_\_\_\_.



(A) 4

(B) 20

(C) 24

(D) 80

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2) For the given pair of Linear equations,  $a - b = 2$  and  $a + b = 4$ , if  $a = x$  and  $b = y$  find the value of  $x$  and  $y$ .

(A)  $x = 3, y = 1$

(B)  $x = 1, y = 3$

(C)  $x = -3, y = 1$

(D)  $x = 3, y = -1$

3) In  $\triangle ABC$ ,  $\angle A = 90^\circ$  ( $AD \perp BC$ ), From the options given below \_\_\_\_\_ is correct.

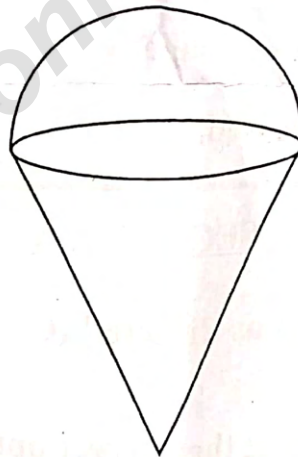
(A)  $BC^2 = AB \cdot AC$

(B)  $AD^2 = BD \cdot CD$

(C)  $AD^2 = AB \cdot AC$

(D)  $BC^2 = BC \cdot DC$

4) The formula to find the total CSA of the playing top shown in the figure is \_\_\_\_\_.



(A)  $\pi r(2r + l)$

(B)  $\pi r^2(2r + l)$

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

(D)  $\pi r l + \pi r$

■ State whether the following statements are true or false :

5)  $(\sqrt{2} - \sqrt{3})(\sqrt{3} + \sqrt{2})$  is an irrational number.

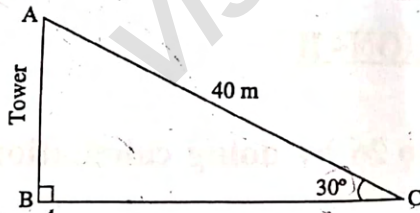
6) The maximum value of  $\sec\theta$  is always equal to 1.

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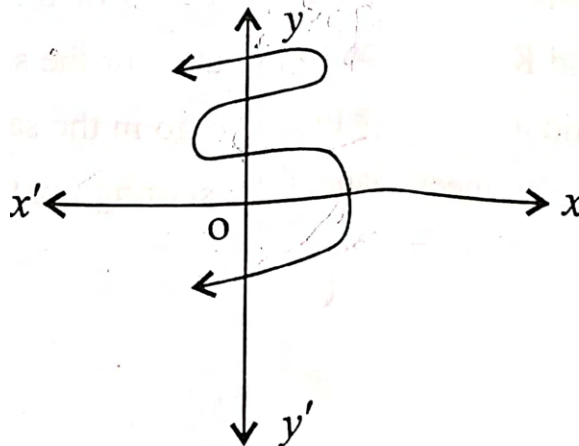
- 7) At the most two tangents can be drawn from the endpoints of the diameter of a circle.
- 8) Circumference of a circle bears a constant ratio with its diameter.

■ Fill in the blank so as to make each of the following statements true :

- 9) The probability of Mukesh winning a lottery ticket is 0.07. If the total number of lottery tickets sold are 6000 then Mukesh must have purchased \_\_\_\_\_ number of tickets.
- 10) The price of an apple of radius 3 cm is Rs. 8, then the price of an apple of radius 6 cm will be \_\_\_\_\_
- 11) The height of the tower AB in the given figure is \_\_\_\_\_



- 12) For the graph given below,  $x = p(y)$  has \_\_\_\_\_ zeros.

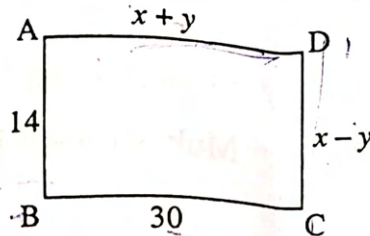


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■ Answer the following in one sentence or a word or number :

13) The roots of the quadratic equation  $6x^2 - 13x + m = 0$  are reciprocal of each other. Find  $m$ .

14) In the given figure ABCD is a rectangle. Find  $x$  and  $y$ .



15) The common difference of an A.P. is  $-6$ . Find  $a_{16} - a_{12}$ .

16) The foot of the perpendicular drawn from the point  $P(-3, 2)$  on Y-axis is  $M$ . Find the co-ordinates of  $M$ .

### SECTION - B

■ Answer the following questions 17 to 26 by doing calculations. (Each question carries 2 marks). [20]

17) Trusha, Rameez and Khush are going around a circular ground in Dream village. Trusha takes 9 minutes to complete one round of the ground while Rameez takes 12 minutes and Khush takes 15 minutes for the same, Suppose they start at the same point and at the same time and go in the same direction, after how many minutes will they meet again at the starting point.

OR

17) Prove that  $3 + 2\sqrt{5}$  is irrational.

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- 18) Find a quadratic polynomial, the sum and product of whose zeros are  $\sqrt{3}$  and  $\frac{1}{\sqrt{3}}$  respectively.

- 19) Solve  $2x + 3y = 11$  and  $2x - 4y = -24$  and hence find the value of 'm' for which  $y = mx + 3$ .

OR

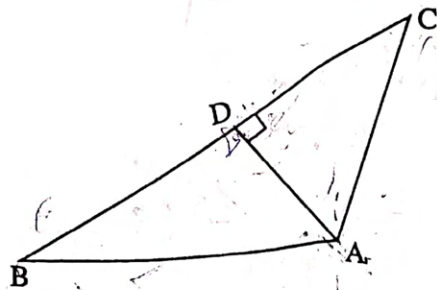
- 19) For what value of  $k$  will the following pair of Linear equations have infinitely many solutions.

$$kx + 3y - (k - 3) = 0$$

$$12x + ky - k = 0$$

- 20)  $p$  and  $q$  are the roots of the quadratic equation,  $mx^2 - 5x + n$  and  $p + q = p \cdot q = 10$ . Find the value of  $m$  and  $n$ .

- 21) In the given figure, if  $AD \perp BC$  prove that  $AB^2 + CD^2 = BD^2 + AC^2$ .



- 22) Prove that  $\sqrt{\frac{1 + \sin A}{1 - \sin A}} = \sec A + \tan A$ .

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23) If A, B and C are interior angles of a triangle ABC, then show that

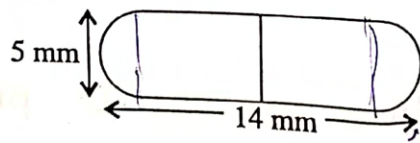
$$\sin^2 \frac{A}{2} + \sin^2 \left( \frac{B+C}{2} \right) = 1.$$

24) Two concentric circles are of radii 13 cm and 12 cm. Find the length of the chord of the larger circle which touches the smaller circle.

25) Prakhar on his birthday distributes cake, of length 50 cm, breadth 25 cm and height 10 cm, equally among his 50 friends. How much of cake each friend gets?

OR

25) A medicine capsule is in the shape of a cylinder with two hemispheres stuck to each of its ends. The length of the entire capsule is 14 mm and the diameter of the capsule is 5 mm. Find its surface area.



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26) The following data gives the information on the observed life times (in hours) of 225 electrical components :

Life times (in hours)	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	10	35	52	61	38	29

Determine the modal lifetimes of the components.

OR

- 26) Marks obtained, out of 50, by 100 students in a test are given in the frequency table given below. Find the median of the data.

Marks obtained	20	29	28	33	42	38	43	25
Number of students (Frequency)	6	28	24	15	2	4	1	20

**SECTION - C**

- Answer the following questions number 27 to 34 with calculations. (Each question is of 3 marks). [24]

27) Find all the zeroes of  $2x^4 - 3x^3 - 3x^2 + 6x - 2$  if you know that two of its zeroes are  $\sqrt{2}$  and  $-\sqrt{2}$ .

28) Find the two roots of the quadratic equation  $ax^2 + bx + c = 0$  ( $a \neq 0$ ).

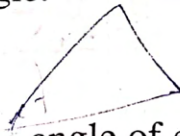
29) Nitya has to send her daughter to school after 12 weeks. She requires Rs. 3,150 for the same. She saves Rs. 100 in the first week and then increased her weekly savings by Rs. 30. Find whether Nitya will be able to fulfil her requirements.

OR

29) Which term of the A.P. 3, 15, 27, 39, ..... will be 132 more than its 54<sup>th</sup> term.

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- 30) Find the area of the triangle formed by joining the mid-points of the sides of the triangle whose vertices are  $(0, -1)$ ,  $(2, 1)$  and  $(0, 3)$ . Find the ratio of this area to the area of the given triangle.



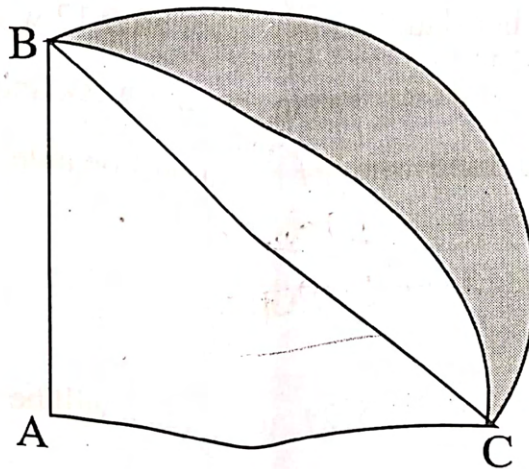
- 31) From the point P on the ground the angle of elevation of the top of a 10 m tall building is  $30^\circ$ . A flag is hoisted at the top of the building and the angle of elevation of the top of the flagstaff from P is  $45^\circ$ . Find the length of the flagstaff and the distance of the building from the point P. ( $\sqrt{3} = 1.732$ ).

- 32) Prove that the lengths of tangents drawn from an external point to a circle are equal.

OR

- 32) Prove that the parallelogram circumscribing a circle is a rhombus.

- 33) In the given figure ABC is a quadrant of a circle of radius 14 cm, and a semicircle is drawn with BC as diameter. Find the area of the shaded region.



OR

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33) A chord of a circle of a radius 10 cm subtends a right angle at the centre. Find the area of the corresponding :

- i) Minor segment.
- ii) Major sector.

(Use  $\pi = 3.14$ )

34) Five cards - the ten, jack, queen, king and ace of diamonds, are well-shuffled with their face downwards. One card is picked up at random.

- i) What is the probability that the card is the queen?
- ii) If the queen is drawn and put aside, what is the probability that the second card picked up is (a) an ace? (b) a queen?

#### SECTION - D

■ Answer the following questions no. 35 to 39. (Each carries 4 marks). [20]

35) 2 women and 5 men can together finish an embroidery work in 4 days while 3 women and 6 men can finish it in 3 days. Find the time taken by 1 woman alone to finish the work and also the time taken by 1 man alone.

36) State the Pythagoras theorem and prove its converse.

OR

36) CD and GH are respectively the bisectors of  $\angle ACB$  and  $\angle EGF$  such that D and H lie on sides AB and FE of  $\triangle ABC$  and  $\triangle EFG$  respectively. If  $\triangle ABC \sim \triangle EFG$  show that :

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i)  $\frac{CD}{GH} = \frac{AC}{FG}$

ii)  $\triangle DCB \sim \triangle HGE$

iii)  $\triangle DCA \sim \triangle HGF$

- 37) Construct an isosceles triangle whose base is 8 cm and altitude 4 cm and then another triangle whose sides are  $1\frac{1}{2}$  times the corresponding side of the isosceles triangle.

OR

- 37) Draw a line segment AB of length 8 cm. Taking A as centre, draw a circle of radius 4 cm and taking B as centre draw another circle of radius 3 cm. Construct tangents to each circle from the centre of the other circle.

- 38) A farmer connects a pipe of internal diameter 20 cm from a canal into a cylindrical tank in his field, which is 10 m in diameter and 2 m deep. If water flows through the pipe at the rate of 3 km/h, in how much time will the tank be filled?

- 39) The mean of the following 125 observations is 22.12. Find the missing frequencies.

Class	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44
Frequency	3	8	12	-	35	21	-	6	2

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