

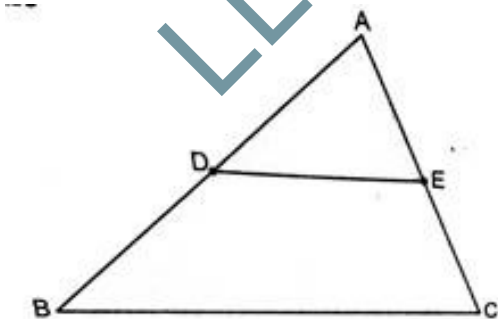
MATHEMATICS

General Instructions:

- All questions are compulsory.
- The question paper consists of 30 questions divided into four sections A, B, C and D.
- Section A contains 6 questions of 1 mark each. Section B contains 6 questions of 2 marks each. Section C contains 10 questions of 3 marks each. Section D contains 8 questions of 4 marks each.
- There is no overall choice. However, an internal choice has been provided in four questions of 3 marks each and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
- Use of calculators is not permitted.

Section-A

1. In which quadrant or on which axis do each of the points $(-2,4)$, $(3,-1)$, $(-4,0)$, $(2,3)$ lie?
2. Find the value of k if $(x - 1)$ is factor of $4x^3 + 3x^2 - 4x + k$.
3. Find the curved surface area of a right circular cone whose slant height is 21 cm. and base radius is 10 cm.
4. Write the radius of a circle in which a longest chord of the circle is of length 10.6 cm.
5. In figure D and E are the mid-points of the sides AB and AC respectively of $\triangle ABC$. If $BC = 5.6$ cm, find DE.

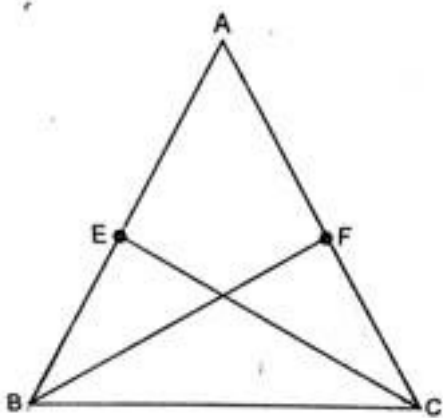


6. In figure $AD = BC$. Prove that $AC = BD$



Section B

7. Find the value of a and b for $\frac{\sqrt{3}-1}{\sqrt{3}+1} = a + b\sqrt{3}$. where a and b are rational numbers.
8. If $x + \frac{1}{x} = 4$, then find $x^3 + \frac{1}{x^3}$.
9. In figure $AB = AC$, E is mid-point of AB and F is mid-point of AC . Show that $BF = CE$.



10. In figure, C is mid-point of the segment AB . P and Q are mid-point of the segment AC and BC respectively. Prove that $AP = BQ = \frac{1}{4} AB$



11. Find the length of a chord of a circle which is at distance of 6 cm. from the centre of the circle. The radius of circle is 10cm.
12. The sides of triangle are in ratio 3:5:7 and its perimeter is 300 m. Find its area.

Section C

13. Plot the points $(3,-3)$, $(0,4)$, $(-2,4)$ and $(-3,-3)$ in the Cartesian plane. Use the scale $1\text{cm} = 1$ unit on the Cartesian axes.
14. Construct $\triangle ABC$ in which $BC = 8$ cm, $\angle B = 30^\circ$ and $AB + AC = 12$ cm.

15. If $x = \sqrt{3} + 2\sqrt{2}$ and $y = \sqrt{3} - 2\sqrt{2}$, evaluate $x^4 + y^4 + 6x^2y^2$.
16. Express the following recurring decimal expansion in the form $\frac{p}{q}$, where p and q are integers and $q \neq 0$.

(i) $2.\overline{124}$

OR

If $x = \frac{1}{2-\sqrt{3}}$, find the value of $x^3 - 2x^2 - 7x + 5$

17. If the perimeter of a rectangle be 24 units and the length exceeds the breadth by 4 units, then find the area of the rectangle.

OR

Prove that:

$$\frac{0.87 \times 0.87 \times 0.87 + 0.13 \times 0.13 \times 0.13}{0.87 \times 0.87 - 0.87 \times 0.13 + 0.13 \times 0.13} = 1$$

18. On a graph paper draw the two straight lines which represent the equation $2x - y = 3$ and $3x + 2y = 1$. Also find the point of intersection of the two lines on the graph paper.
19. A rhombus has perimeter 100m and one of its diagonal is 40m. Find the area of the rhombus.

OR

The length of the sides of the triangle are 5cm, 12cm and 13cm. Find the length of perpendicular from the opposite vertex to the side whose length is 13 cm.

20. Coins of same size are placed one above the other as shown in figure and a cylindrical block is formed. The volume of this block is 49.28 cm^3 . If diameter of each coin be 28 cm and thickness 0.2 cm, then find the number of coins arranged in the block.

$$\left(\text{Take } \pi = \frac{22}{7} \right)$$

21. Compare the academic standard of two classes A and B each of 40 students on the basis of the following data by making bar diagram.

Marks :	0 – 10	10 – 30	30 – 60	60 – 100
No. of student in A :	5	10	20	5
No. of student in B :	10	15	10	5

OR

Find the median of the following data : 19, 25, 59, 48, 35, 31, 30, 32, 51. If 25 is replaced by 52, what will be the new median.

22. The monthly salaries (in thousand rupees) of 50 workers in a factory are given below :

Salary (in thousand rupees)	5.2	6.9	8.2	10.5	12.2	14.0
Number of workers	8	9	10	12	6	5

Find the mean salary of a worker.

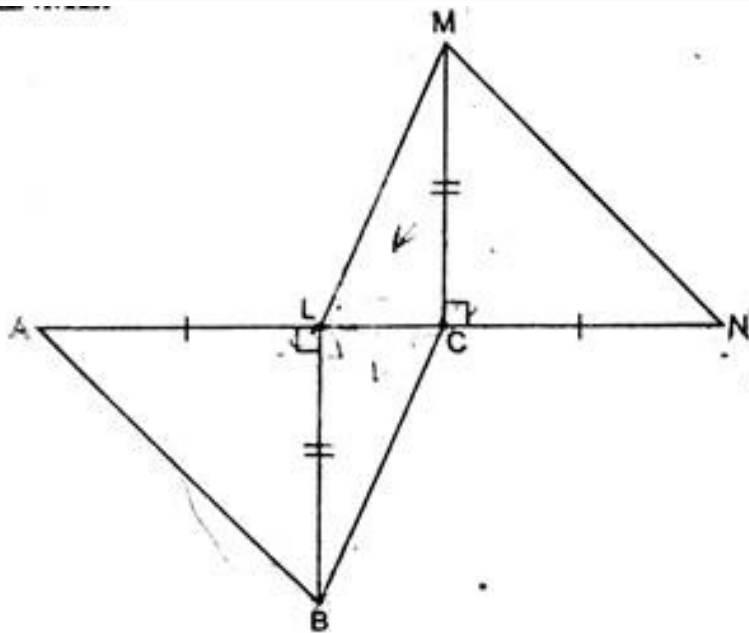
Section D

23. A rectangular water reservoir is 10.8 m by 3.75m at the base. Water flows into it at the rate of 18m per second through a pipe having cross section $7.5\text{cm} \times 4.5\text{cm}$. Find the height to which the level of water reach in 15 minutes.

OR

The circumference of base of a 10m high conical tent is 44 metres. Calculate the length of canvas used in making the tent if width of canvas is 2m. $\left(use \pi = \frac{22}{7} \right)$

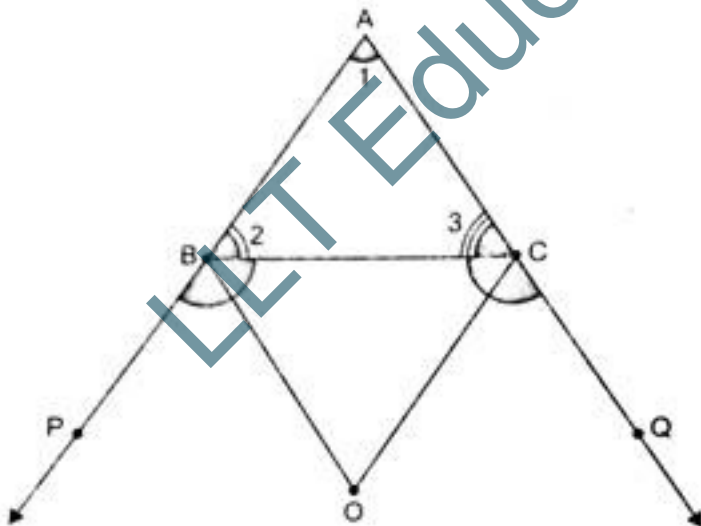
24. ABCD is a trapezium with $AB \parallel DC$. A line parallel to AC intersects AB at X and BC at Y. Prove that $ar(ADX) = ar(ACY)$.
25. In Figure $BL \perp AC$, $MC \perp LN$, $AL = CN$ and $BL = CM$ Prove that $\triangle ABC \cong \triangle NML$.



OR

If $\triangle ABC$ is an isosceles triangle with $AB = AC$. Prove that the perpendiculars from the vertices B and C to their opposite sides are equal.

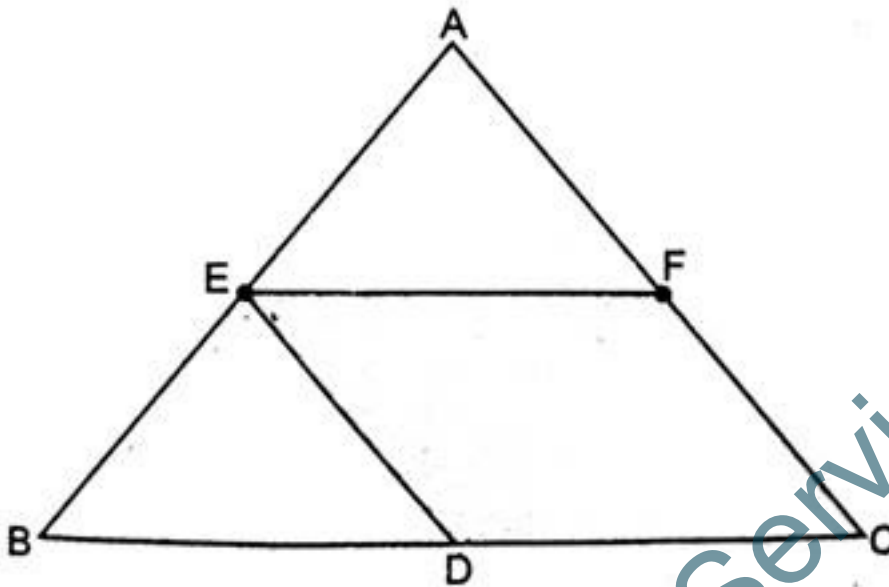
26. In figure the sides AB and AC are produced to point P and Q respectively. IF bisectors BO and CO of $\angle CBP$ and $\angle BCQ$ respectively, meet at point O, then prove that $\angle BOC = 90^\circ - \frac{1}{2} \angle BAC$.



27. Factorise $x^3 - 23x^2 + 142x - 120$.

28. In $\triangle ABC$, D, E and F are the mid-point of BC, BA and AC

- i. Prove that $\triangle AEF \cong \triangle EBD$
- ii. Prove that CDEF is a parallelogram.



29. Temperature of a body can be measured in Celsius units as $x^{\circ}\text{C}$ or in Fahrenheit unit as $y^{\circ}\text{F}$. The relation between the two systems of measurement of temperature is given by the linear equation $y = \frac{9}{5}x + 32$.
- i. Draw the graph of the linear equation.
- ii. From the linear equation find the temperature of the body in Fahrenheit if the temperature of the body is 30°C .
- iii. If the temperature is 95°F , then find the temperature in Celsius.
30. A die is tossed 120 times and the outcomes are recorded as below:

Outcomes	1	Even number less than 6	Odd number greater than 1	6
Frequency	20	35	30	15

Find the probability in a trial of getting

- (1) The number 1

- (2) The number 6
- (3) The even number less than 6
- (4) The odd number greater than 1

OR

Two coins are tossed simultaneous 1000 times with the following frequencies of different outcomes:

Two heads	One head	No head
210 times	550 times	240 times

Find the probability of occurrence of each of these events.

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