

General Instructions

1. This question paper contains 4 printed pages.
2. This question paper consists of 30 questions in all. All questions are compulsory.
3. This question paper consists of four sections. Section – A carries 1 mark each, Section – B carry 2 marks each, Section – C carry 3 marks each and Section – D carry 4 marks each.

(Section – A)

Q 1: An army contingent of 616 members is to march behind an army band of 32 members in a parade. The two groups are to march in the same number of columns. What is the maximum number of columns in which they can march?

Q 2: If $px^2 + 3x + q = 0$ has two roots $x = -1$ and $x = -2$, find $p - q$.

Q 3: Divide the polynomial $p(x)$ by the polynomial $g(x)$ and find the quotient and remainder:

$$p(x) = x^3 - 3x^2 + 5x - 3, \quad g(x) = x^2 - 2$$

Q 4: On comparing the ratios $\frac{a_1}{a_2}$, $\frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the following pair of linear equations are consistent or inconsistent:

$$\frac{3}{2}x + \frac{5}{3}y = 7; \quad 9x - 10y = 14$$

Q 5: The 17th term of an AP exceeds its 10th term by 7. Find the common difference.

Q 6: Evaluate the following:

$$2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ$$

(Section – B)

Q 7: ABC is an isosceles triangle right angled at C. prove that $AB^2 = 2 AC^2$.

Q 8: The length of a tangent from point A at distance 5 cm from the centre of the circle is 4 cm. find the radius of the circle.

Q 9: If the corresponding Medians of two similar triangles are in the ratio 5:7, then find the ratio of their sides.

Q 10: Is 144 a term of the A.P. 3, 7, 11... Justify your answer.

Q 11: Find the value of x if the mode of the following data is 25:
15, 20, 25, 18, 14, 15, 25, 15, 18, 16, 20, 25, 20, x , 18

Q 12: If the probability of winning a game is 0.3, what is the probability of losing it?

(Section – C)

Q 13: A rectangular sheet of paper 44 cm × 18 cm is rolled along its length and a cylinder is formed find the volume of the cylinder. [Use $\pi = \frac{22}{7}$]

Q 14: Solve for x :

$$4x^2 - 4a^2x + (a^4 - b^4) = 0$$

Q 15: Find the co-ordinates of the point which divides the line segment joining the points (1, -3) and (-3, 9) in the ratio 1:3 internally.

Q 16: Prove that:

$$\frac{2 \cos^2 \theta - 1}{\sin \theta \cos \theta} = \cot \theta - \tan \theta$$

Q 17: In a ΔABC , $AB = AC$ and D is a point on side AC , such that $BC^2 = AC \times CD$. Prove that $BD = BC$.

Q 18: A coin is tossed. If it shows head, we draw a ball from a bag consisting of 3 red balls and 4 black balls. If it shows a tail, we throw a dice. What is the sample space of this experiment? What are the favourable cases representing the events: (i) the throw of the coin resulted in a head. (ii) a red ball is drawn.

OR

Cards marked with numbers 1, 2, 3... 25 are placed in a box and mixed thoroughly and one card is drawn at random from the box. What is the probability that the number on the card is:

- | | |
|----------------------|--|
| (i) a prime number? | (ii) a multiple of 3 and 5? |
| (iii) an odd number? | (iv) neither divisible by 5 nor by 10? |

Q 19: Using Euclid's division algorithm, find H.C.F of 125 and 425.

OR

State whether 10.064 is rational or not. If rational, express in $\frac{p}{q}$ form.

Q 20: Using division algorithm, find the quotient and remainder on dividing $8x^4 + 14x^3 - 2x^2 + 8x - 12$ by $4x^2 + 3x - 2$.

Q 21: If S_1, S_2, S_3 are the sum of n terms of three A.P.'s. The first term of each being unity and the respective common difference being 1, 2, 3, prove that $S_1 + S_3 = 2S_2$.

Q 22: Show that:

$$\frac{1}{\sec x - \tan x} - \frac{1}{\cos x} = \frac{1}{\cos x} - \frac{1}{\sec x + \tan x}$$

OR

Evaluate:

$$\sin \theta \cos \theta - \frac{\sin \theta \cos(90^\circ - \theta) \cos \theta}{\sec(90^\circ - \theta)} - \frac{\cos \theta \sin(90^\circ - \theta) \sin \theta}{\operatorname{cosec}(90^\circ - \theta)}$$

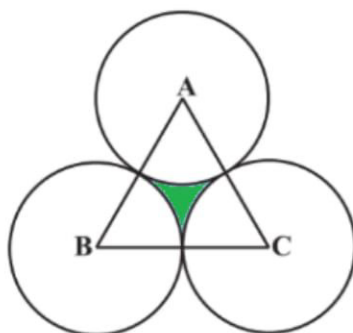
(Section – D)

Q 23: Show that the points A(-3, 2), B(-5, -5), C(2, -3) and D(4, 4) are the vertices of a rhombus.

OR

Find the value of m for which the points with coordinates $(3, 5)$, $(m, 6)$ and $(\frac{1}{2}, \frac{15}{2})$ are collinear.

Q 24: The area of an equilateral triangle ABC is 17320.5 cm^2 . With each vertex of the triangle as centre, a circle is drawn with a radius equal to half the length of the side of the triangle (see figure). Find the area of the shaded region. (Use $\pi = 3.14$ and $\sqrt{3} = 1.73205$)



OR

A toy is in the form of cone of radius 3.5 cm mounted on a hemisphere of same radius. The total height of the toy is 15.5 cm. Find the total surface area of the toy.

Q 25: Draw the graph of the following equations: $3x - 4y + 6 = 0$; $3x + y - 9 = 0$. Also determine the co-ordinates of the vertices of the triangle formed by these lines and the $x -$ axis.

Q 26: A plane left 30 minutes later than the scheduled time and in order to reach its destination 1500 km away in time it has to increase its speed by 250 km/hr from its usual speed. Find its usual speed.

OR

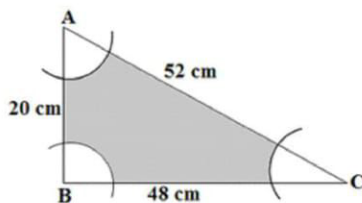
Some students planned a picnic. The budget for food was ₹ 480. But eight of these failed to go and thus the cost of food for each member increased by ₹ 10. How many students attended the picnic?

Q 27: The angles of elevation of the top of a tower from two points P and Q at distance of a and b , respectively from the base and in the same straight line with it are complementary. Prove that the height of the tower is \sqrt{ab} .

OR

A statue 1.6 m tall stands on the top of a pedestal. From a point on the ground, the angle of elevation of the top of the statue is 60° and from the same point, the angle of elevation of the top of the pedestal is 45° . Find the height of the pedestal.

Q 28: With vertices A, B and C of a triangle ABC as centres, arcs are drawn with radii 6 cm each (as shown in figure). If $AB = 20$ cm, $BC = 48$ cm and $CA = 52$ cm, then find the area of the shaded region. [Use $\pi = 3.14$]



Q 29: The following table gives the marks obtained by 80 students in a selection test:

Marks	Below 10	Below 20	Below 30	Below 40	Below 50	Below 60
No. of Students	3	12	27	57	75	80

Find the median marks.

Q 30: Let ABC be a right triangle in which $AB = 6$ cm, $BC = 8$ cm and $\angle B = 90^\circ$. BD is the perpendicular from B on AC. The circle through B, C, D is drawn. Construct the tangents from A to this circle.



Answers

Section A

1. 8 2. 1 3. Quotient = $x - 3$, Remainder = $7x - 9$
4. Pair is consistent 5. 1 6. 2

Section B

8. 3 cm 9. 5:7 10. No
11. 25 12. 0.7

Section C

13. 2772 cm^3 14. $x = \frac{a^2+b^2}{2}$ and $\frac{a^2-b^2}{2}$ 15. (0, 0)
18. (i) $\frac{1}{2}$ (ii) $\frac{3}{14}$ **OR** (i) $\frac{9}{25}$ (ii) $\frac{1}{25}$ (iii) $\frac{12}{25}$ (iv) $\frac{4}{5}$ 19. 25 **OR** Terminating decimal
20. Quotient = $2x^2 + 2x - 1$, Remainder = $15x - 14$ 22. **OR** 0

Section D

23. **OR** $m = 2$ 24. 1620.5 cm^2 **OR** 214.5 cm^2 25. Vertices (2, 3), (3, 0) and (-2, 0)
26. $x = 750 \text{ km/hr}$ **OR** 16 27. **OR** 2.19 m (approx.)
28. Area of shaded region = area of triangle – area of 3 sectors = $480 - 113.04 = 366.96 \text{ cm}^2$
29. Median = 34.3

All questions are done properly and answers are calculated accurately. For any correction, you're welcome.