

Section A

Question number 1-20 carries - 1 mark each

1. If $n = 2^3 \times 3^4 \times 5^4 \times 7$, then the number of consecutive zeros in n , where n is a natural number, is
 - a. 2
 - b. 3
 - c. 4
 - d. 7

2. If the angle of elevation of a tower from a distance of 100 meters from the foot is 60° , then what is the height of the tower is
 - a. $100\sqrt{3}$
 - b. $100\sqrt{3}m$
 - c. $50\sqrt{3}m$
 - d. $\sqrt{200}/3m$

3. If the first term of an A.P. is a and n th term is b , then its common difference is
 - a. $\frac{b-a}{n+1}$
 - b. $\frac{b-a}{n-1}$
 - c. $\frac{b-a}{n}$
 - d. $\frac{b+a}{n+1}$

4. The length of the tangent drawn from a point 8 cm away from the centre of a circle of radius 6 cm is
 - a. $\sqrt{7}$
 - b. $2\sqrt{7}$
 - c. 14 cm
 - d. 10 cm

5. Two dice are rolled simultaneously, the probability that they show different faces is
 - a. $\frac{2}{3}$
 - b. $\frac{1}{6}$
 - c. $\frac{5}{6}$
 - d. $\frac{1}{2}$

6. The line $3X+Y-9=0$ divides the line joining the points $(1,3)$ and $(2,7)$ internally in the ratio
 - a. 3:4
 - b. 3:2
 - c. 2:3
 - d. 4:3

7. Which of the rational number is terminating decimal expansion:

- a. $\frac{17}{450}$
- b. $\frac{23}{360}$
- c. $\frac{31}{70}$
- d. $\frac{51}{300}$

8. HCF of 240 and 160 is

- a. 40
- b. 60
- c. 80
- d. 160

9. Greatest integer that divides 24 and 60 is :

- a. 12
- b. 24
- c. 50
- d. 60

10. The value of $\sin^2 30^\circ \operatorname{cosec}^2 30^\circ + \cos^2 45^\circ \sec^2 45^\circ$ is

- a. 1
- b. 2
- c. 0
- d. none of these

The value of $\frac{1}{\operatorname{cosec}^2 \theta} + \frac{1}{1 + \tan^2 \theta}$ will be _____

11. The radii of the top and bottom of a bucket of slant height 13 cm are 9 cm and 4 cm respectively the height of the bucket is _____

12. The volume of the Sphere is 4851 cm^3 its diameter is _____

13. The area sector of a circle with radius 6cm and angle 60° is _____

14. The number of two digits divisible by 3 are _____

15. The area of two similar triangles is 25 sq cm and 121 sq cm Find the ratio of the corresponding sides.

16. Write the common difference of the AP $\sqrt{3}, \sqrt{12}, \sqrt{27}, \sqrt{48}, \dots$

17. Find A if $\tan 2A = \cot(A - 24^\circ)$

18. Find the value of K does the quadratic equation $4x^2 - 12x - k = 0$ have no real roots.

19. Find the distance between the two points (a, b) and (-a, -b)

20. From an external point P, the length of tangent drawn to a circle is 15 cm and the distance of point P from the centre of circle is 17 cm. Find the radius of the circle.

Section B

Question number 21 - 26 carries 2 marks each

21. A bag contains 15 balls , out of which some are white and others are black , if the probability of drawing black ball at random from the bag is $\frac{2}{3}$, then find how many balls are there in the bag ?
22. Find Euclid's division algorithm to find HCF of 255 and 867.
23. Find the solution of the pair of equations: $\frac{3}{x} + \frac{8}{y} = -1$; $\frac{1}{x} - \frac{2}{y} = 2$, $x, y \neq 0$.
24. Show that any positive odd integer is of the form $6m+1$ or $6m+3$.
25. Find all the zeros of the polynomial $x^3 + 3x^2 - 2x - 6$, if two of its zeros are $-\sqrt{2}$ and $\sqrt{2}$.
26. If $\cot \theta = \frac{15}{8}$, then evaluate $\frac{(2+2 \sin \theta)(1-\sin \theta)}{(1+\cos \theta)(2-2 \cos \theta)}$

Section C

Questions 27 to 36 carries 3 marks.

27. A spherical glass vessel has a cylindrical neck 8 cm long, 2cm in diameter and then diameter of the spherical part is 8.5 cm. by measuring the amount of water it holds , a girl finds its volume to be 345 cm³ , check whether she is correct , taking the above as the inside measurements. Take $\pi = 3.14$.
28. Solve for x, $9^{x+2} - 6.3^{x+1} + 1 = 0$.
29. From the top of a 7 m high building the angle of elevation of the top of the tower is 60° and the angle of depression of its foot is 45°, determine the height of the tower?
30. Prove $\frac{\tan \theta}{1-\tan \theta} - \frac{\cot \theta}{1-\cot \theta} = \frac{\cos \theta + \sin \theta}{\cos \theta - \sin \theta}$
31. If $\cos \theta + \sin \theta = \sqrt{2} \cos \theta$ show that $\cos \theta - \sin \theta = \sqrt{2} \sin \theta$.

32. A part of monthly hostel charges in a college hostel are fixed and the remaining depends on the number of days one has taken food in the mess. When a student A takes food for 25 days, he has to pay Rs 4500, whereas the student B, who takes for 30 days has to pay Rs. 5200. Find the fixed charges per month and the cost of food per day.

OR

Find the mean of the following frequency distribution

class	0-20	20-40	40-60	60-80	80-100
Frequency	17	28	32	24	19

33. Find the value of P for which the points (-5, 1), (1, p) and (4, -2) are collinear.

34. ABC is a right angle triangle in which $\angle B = 90^\circ$, if AB=8 cm and BC=6 cm, find the diameter of the circle inscribed in the triangle.

OR

Water in the canal is 6m wide and 1.5 m deep is flowing with a speed of 10km/hour, How much area will it irrigate in 30 minutes. If 8 cm standing water is needed?

Section D

Questions 35 to 30 carry 4 marks

35. Prove that $\frac{\tan^2 A}{\tan^2 A - 1} + \frac{\operatorname{cosec}^2 A}{\sec^2 A - \operatorname{cosec}^2 A} = \frac{1}{1 - 2\operatorname{cosec}^2 A}$
36. Construct a ΔABC with side BC = 6 cm, $\angle B = 45^\circ$, $\angle A = 105^\circ$. Then construct another triangle whose sides are $\frac{3}{4}$ times the corresponding sides of ΔABC .
37. A container opened at top and made up of a metal sheet, is in the form of a frustum of a cone of height 16 cm with radii of its lower and upper ends as 8 cm and 20 cm respectively, Find the cost of milk which can fill completely at the rate of Rs 50 per liter. Also find the cost of metal sheet used to make the container, if it costs Rs 10 per 100 cm^2 (take $\pi = 3.14$)

OR

Angle of elevation of an aero plane from a point A on the ground is 60° . After a flight of 30 seconds, the angle of elevation changes to 30° . If the flight is flying at a height of $3600\sqrt{3}$ meter, Find the speed of the aero plane.

38. If $a \neq b \neq c$, then prove that the points (a, a^2) , (b, b^2) and (c, c^2) can never be collinear.

39. A cone of radius of 8 cm and height of 12 cm is divided in to two parts by a plane through a mid point of its axis parallel to its base. Find the ratios of the volumes of the two parts.

OR

A chord AB of a larger of two concentric circles is tangent to the smaller circle at the point C , show that C is the midpoint of the Chord AB.

40. Draw a circlr of radius 2 cm take two points A and B on one of its extended diameter each at a distance of 5cm from its centre. Draw tangent to the circle points A and B.