Time: 3 Hours

Maximum Marks: 80

General Instructions:

1. All the questions are compulsory.
2. Please write down the Serial Number of the question before attempting it.
3. The question paper consists of 40 questions and it is divided into four sections A, B, C and D.
4. Section A comprises of 20 questions carrying 1 mark each.
5. Section B comprises of 6 questions carrying 2 marks each.
6. Section C comprises of 8 questions carrying 3 marks each.
7. Section D comprises of 6 questions carrying 4 marks each.
8. There is no overall choice. However, an internal choice has been provided in two questions of 1 mark, two questions of 2 marks, three questions of 3 marks and three questions of 4 marks each. You have to attempt only one of the alternatives in all such questions.
9. Use of calculator is not permitted.

Section – A

1. If HCF of (26, 169) = 13, then LCM (26, 169) is
   (A) 26 (B) 52 (C) 338 (D) 13
2. If $\cos A + \cos^2 A = 1$, then the value of $\sin^2 A + \sin^4 A$ is
   (A) – 1 (B) 0 (C) 1 (D) 2
3. The decimal expansion of the rational number $\frac{14587}{125}$ will terminate after
   (A) One decimal place
   (B) Two decimal places
   (C) Three decimal places
   (D) Four decimal places
4. The distance between the points A (0, 6) and B (0, – 2) is
   (A) 6 units (B) 8 units (C) 4 units (D) 2 units
5. The pair of equation $5x - 15y = 8$ and $3x - 9y = \frac{24}{5}$ has
   (A) One solution
   (B) Two solutions
   (C) Infinite solutions
   (D) No solutions
6. The area of a triangle with vertices (3, 0), (7, 0) and (8, 4) is
   (A) 14 sq. units (B) 28 sq. units (C) 8 sq. units (D) 6 sq. units
7. A tower stands vertically on the ground. From a point on the ground which is 25 m away from the foot of the tower, the angle of elevation of the top of the tower is found to be 45^0. Then the height (in meters) of the tower is
   (A) $25\sqrt{2}$ (B) $25\sqrt{3}$ (C) 25 (D) 12.5
8. If P($\frac{a}{2}$, 4) is the mid-point of the line segment joining the points A (– 6, 5) and B (– 2, 3), then the value of a is
   (A) – 8 (B) 3 (C) – 4 (D) 4

9. If $4 \tan \alpha = 3$, then the value of $\left(\frac{4 \sin \alpha - \cos \alpha}{4 \sin \alpha + \cos \alpha}\right)$ is equal to

(A) $\frac{2}{3}$ (B) $\frac{1}{3}$ (C) $\frac{1}{2}$ (D) $\frac{3}{4}$

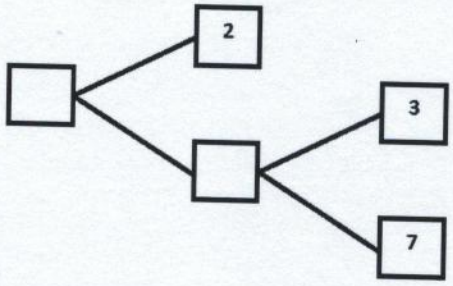
10. For the following distribution:

Class	0 – 8	8 – 16	16 – 24	24 – 32	32 – 40
Frequency	12	26	10	9	15

The sum of upper limits of the median class and modal class is

(A) 24 (B) 40 (C) 32 (D) 16

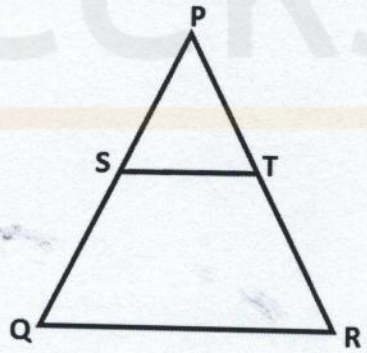
11. Complete the missing entries in the following factor tree:



12. If $\frac{4}{5}$, a, 2 are three consecutive terms of an A.P., then find the value of a.

13. If $x = -\frac{1}{2}$ is a solution of the quadratic equation $3x^2 + 2kx - 3 = 0$, find the value of k.

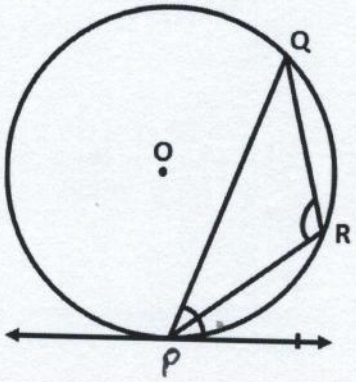
14. In figure, S and T are points on the sides PQ and PR, respectively of ΔPQR, such that PT = 2 cm, TR = 4 cm and ST is parallel to QR. Find the ratio of the areas of ΔPST and ΔPQR.



15. Two concentric circles of radii a and b (a > b) are given. Find the length of the chord of the larger circle which touches the smaller circle.

OR

In figure, PQ is a chord of a circle with centre O and PT is a tangent. If $\angle QPT = 60^0$, find $\angle PRQ$.



16. A _____ is a polynomial of degree zero.

OR

A quadratic polynomial, whose zeroes are –3 and 4, is _____.

17. A card is drawn from a deck of 52 cards. The event E is that card is not an ace of hearts. The number of outcomes favourable to E is _____.
18. The nth term of an A.P. whose first term, a and common difference, d is _____.
19. The total surface area of a solid hemisphere having radius r is _____.
20. The perimeters of two similar triangles ABC and XYZ are 26 cm and 39 cm respectively, then the ratio of the corresponding medians of two triangles is _____.

Section – B

21. In an A.P., the first term is 2, the last term is 29 and sum of the terms is 155. Find the common difference.
22. If sec 4A = cosec $(A - 20^0)$, where 4A is an acute angle, find the value of A.
23. A pair of dice is thrown once. Find the probability of getting the same number on each dice.

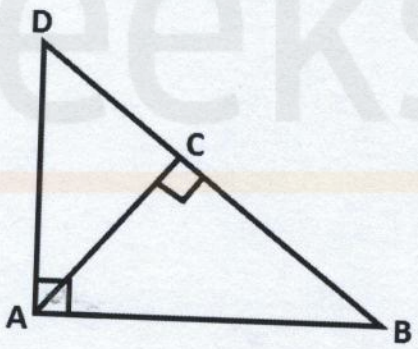
OR

Find the probability of 53 Fridays in a leap year.

24. E is a point on the side AD produced of a parallelogram ABCD and BE intersects CD at F. Show that $\Delta ABE \sim \Delta CFB$.

OR

In figure, ΔABD is a right angle triangle, right angled at A and AC⊥ BD. Prove that $AB^2 = BC.BD$.



25. Prove that the tangents drawn at the ends of a diameter of a circle are parallel.
26. A solid sphere of radius 10.5 cm is melted and recast into smaller solid cones, each of radius 3.5 cm and height 3 cm. Find the number of cones so formed. (Use $\pi = \frac{22}{7}$)

Section – C

27. In a A.P., if the 12^{th} term is – 13 and the sum of its four terms is 24, find the sum of its first ten terms.
28. Find all the zeros of the polynomial $x^4 + x^3 - 34x^2 - 4x + 120$, if two of its zeroes are 2 and – 2.
29. Solve for x and y:

$$\frac{ax}{b} - \frac{by}{a} = a + b$$

$$ax - by = 2ab$$

OR

The sum of numerator and denominator of a fraction is 3 less than twice the denominator. If each of the numerator and denominator is decreased by 1, the fraction becomes $\frac{1}{2}$. Find the fraction.

30. If P divides the line segment joining the points A (– 2, – 2) and B (2, – 4) such that $\frac{AP}{AB} = \frac{3}{7}$, find the coordinates of P.

31. Prove that $2 - 3\sqrt{5}$ is an irrational number.

OR

Use Euclid's Division Lemma to show that the square of any positive integer is either of the form 3m or (3m + 1) for some integer m.

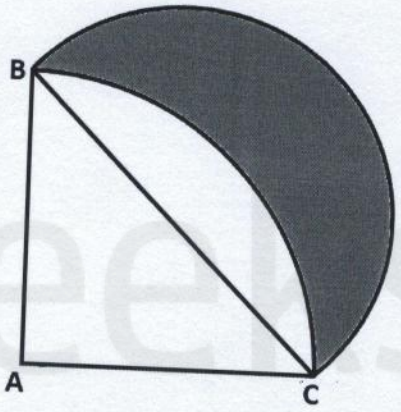
32. Prove that

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

OR

Find the value of $\frac{5\cos^2 60^0 + 4\cos^2 30^0 - \tan^2 45^0}{\cos^2 60^0 + \sin^2 30^0}$

33. In figure, ABC is a quadrant of a circle of radius 14 cm and a semi circle is drawn with BC as diameter. Find the area of the shaded region. (Use $\pi = \frac{22}{7}$)



34. If the median of the following frequency distribution is 32.5, then find the values of x and y.

Class	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	Total
Frequency	x	5	9	12	y	3	2	40

Section - D

35. Solve the following for x:

$$\frac{1}{2a+b+2x} = \frac{1}{2a} + \frac{1}{b} + \frac{1}{2x}$$

OR

In a flight of 2800 km, an aircraft was slowed down due to bad weather. Its average speed is reduced by 100 km/h and time increased by 30 minutes. Find the original duration of the flight.

36. Prove that if a line is drawn parallel to one side of a triangle to intersect the other two sides in distinct points, the other two sides are divided in the same ratio.

37. The angle of elevation of an aeroplane from a point A on the ground is 60^0. After a flight of 30 seconds, the angle of elevation changes to 30^0. If the aeroplane is flying at a constant height of $3600\sqrt{3}$ m, find the speed of the aeroplane in km/hour.

38. Find the mean and mode for the following data:

Classes	10 – 20	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 – 80
Frequency	4	8	10	12	10	4	2

39. An open metallic bucket is in the shape of a frustum of a cone. If the diameters of the two circular ends of the bucket are 45 cm and 25 cm and the vertical height of the bucket is 24 cm, find the area of the metallic sheet used to make the bucket. Also find the volume of the water it can hold. (Use $\pi = \frac{22}{7}$)

OR

A field is in the form of rectangle of length 20 m and width 14 m. A 10 m deep well of diameter 7 m is dug in one corner of the field and the earth taken out of the well is spread evenly over the remaining part of the field. Find the rise in the level of the field. (Use $\pi = \frac{22}{7}$)

40. Draw a right triangle in which the sides containing the right angle are 5 cm and 4 cm. Construct a similar triangle whose sides are $\frac{5}{3}$ times the sides of the above triangle.

OR

Draw a pair of tangents to a circle of radius 3 cm, which are inclined to each other at an angle of 60^0.