PRERNA EDUCATION

Time: 3 hours   **Max. Marks: 80**

GENERAL INSTRUCTIONS:
1. Section A questions of 2 marks each.
2. Section B questions of 3 marks each
3. Section C questions of 5 marks each.

SECTION-A

1. Solve $b(a-b)x - a(b-a)y = a^2-b^2 ax[1/a-b - 1/a+b] + by [1/b-a - 1/b+a] = 2$
2. If 5th term and 12th term of an A.P are -4 and -18 respectively. Find the 15th term and nth term of an A.P
3. The sum of the first six terms of an AP is zero and its fourth term is 2. Find the sum of its first 30 terms.
4. Kamal borrowed a sum of money and returned it in three equal quarterly instalments of Rs.8788 each. Find the sum borrowed if the rate of interest charged was 16 % per annum compounded quarterly. Find the total interest charged also.
5. BL and CM are the medians of triangle ABC right angled at A. Prove that $4(BL^2 + CM^2) = 5BC^2$
6. Show that the quadrilateral formed by an angle bisector of a cyclic quadrilateral is also cyclic.
7. A bag contains 5 red balls 4 white balls 8 green balls and 7 black balls. If one ball is drawn at random, find the probability that it is   (i) not a black ball. (ii) Red or green ball.

SECTION-B

8. Solve the following system of equations graphically. $4x-3y+4=0$, $4x+3y-20 = 0$ Also determine the ordered pairs where the line cut the x axis. Hence determine the area of a triangular region so formed by these lines with x axis.

9. If $(x^2- x - 2)$ is the HCF of the polynomials $(x+1) (2x^2 +ax+2)$ and $(x-2)(3x^2 +bx+1)$. Find the value of a and b.

10. If P = $x^4 -8x$, Q = $x^2 + 2x+1$ and R = $2x^2 +4x+8$ Find the value of $(P \times Q) \div R$.

11. Find the centre of a circle passing though the points (5, 7), (6, 6) and (2,-2). Also find the radius.

12. A ceiling fan is available for Rs.970 cash or for Rs.210 cash down payment followed by 3 equal instalments of Rs.260 each. Find the rate of interest charged under installment plan

13. A cylindrical tub of radius 12cm contains water to a depth of 20 cm. A spherical iron ball is dropped into the tub which rises the level of water in the tub by 6.75 cm. Find the radius of the spherical ball.

14. If $7cosec\theta-3cot\theta=7$, prove that $7cot\theta-3cosec\theta=3$

15. Construct a quadrilateral with AB=6.cm, AD=4cm, BD=4.5cm, ∟B=120º and BC=5cm .Construct a quadrilateral with its sides $7/5^{th}$ of the corresponding sides   ABCD.

16. Find the ratio in which the line x-y-2 =0 divides the line segment joining the points (3,-1), (8, 9). Find the coordinate of that point also.

17. If PQ and RS are the parallel tangents to a circle with centre O and another tangent XY with point of contact C intersect PQ at A and RS at B. Prove that ∟AOB = 90º

18. If (3,2),(4,4) and (1,3) are the mid point of the sides of a triangle, find the coordinates of the vertices of the triangle.

19. The number of students in a hostel speaking different languages is given below. Present data in a pie chart.

language	No.of students
Hindi	40
English	12
Marathi	9
Tamil	7
Bengali	4
Total	72

SECTION.C

20. If PAB is a secant to a circle intersecting the circle at A and B and PT is a tangent to the circle at T then prove that PT ^{2} = PA . PB Using above result Prove DP = DQ
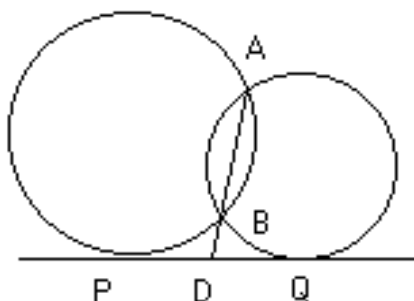
21. Prove that "the sum of either pair of the opposite angles of a cyclic quadrilateral is 180°"using the above result prove that "a cyclic parallelogram is a rectangle"

22. A bucket , made of aluminium sheet, is of height 20cm and its upper and lower ends of radius 36cm and 12 cm respectively. Find the cost of preparing the bucket if the aluminium sheet costs Rs 50 per 100 sq.m. Also find its volume.

23. A bird is sitting on the top of a tree, which is 80m high. The angle of elevation of the bird, from a point on the ground is 45. The bird flies away from the point of the observation horizontally and remains at a constant height. After 2 seconds, the angle of elevation of the bird from the point of observation becomes 30. Find the speed of the flying of the bird.

24. A solid is in the shape of a cone standing on a hemisphere with both their radii being equal to 7 cm and the height of the cone is equal to its diameter. Find the volume of the solid. [Use $= ^{22}/_7$]

25. The total number of marks scored by class in test is given below. Find the mean

Below 20	4
Below 40	12
Below 60	30
Below 80	44
Below 100	50