NAME Saloni
CLASS X SEC A

MATA GUJRI PUBLIC SCHOOL
HALF YEARLY EXAMINATION (2017-18)
SUBJECT: MATHEMATICS
SET B

MM: 80
TIME: 3 HRS
DATE: 19.9.17

SECTION A (1x6=6)

Q1. If tan A = 4/3 find the value of cosA.

Q2. Find the length of an arc of a circle of radius 21cm and central angle 120^0.

Q3. Find the area of the largest triangle that can be inscribed in a semicircle of radius a cm

Q4. Find HCF of $2^3 \times 3^2$ and $2^2 \times 3^3$

Q5. Find the value of $\sin 45^0 + \cos 45^0$

Q6. Find the coordinates of centroid of a triangle whose vertices are (–1 ,–1), (0 ,–4) (2, 1).

SECTION B (2x6=12)

Q7. Which term of the A.P. 8 ,14, 20, 26 .... will be 72 more than its 41st term.

Q8. Express 32760 as the product of its prime factors.

Q9. Find a cubic polynomial whose zeroes are –1, 2 and –3 respectively.

Q10. If the distance of P (x , y) from A (5 , 1) and B(–1 , 5) are equal, then prove that 3x = 2y.

Q11. If A, B and C are interior angles of a triangle ABC, then show that

$$\sin \frac{B+C}{2} = \cos \frac{A}{2}$$

Q12. If perimeter of a semicircular protactor is 72 cm, find its radius.

SECTION C (3x10=30)

Q13. Solve the following pair of linear equations.

231 x + 148 y = 527.
148 x + 231y = 610.

Q14. 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.

Q15. Prove that $3\sqrt{5}$ is an irrational number.

Q16. If the equation $(1 + m^2) x^2 + 2mcx + (c^2 – a^2) = 0$ has equal roots, then show that $c^2 = a^2 (1 + m^2)$.

Q17. If the fifth term of the A.P. is zero , show that its 33rd term is four times its 12th term.

Q18. A point P divides the line segment joining A(3 ,–5) and B(– 4 , 8) such that $\frac{AP}{PB} = k : 1$. If P lies on x+y=0 then find the value of k.

Q19. Find the value of $\cos 45^0$ geometrically.

Q20. Evaluate

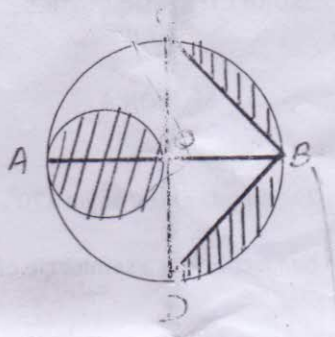
$$\frac{\tan^2 60^0 + 4 \cos^2 45^0 + 3 \sec^2 30^0 + 5 \cos^2 90^0}{\text{cosec } 30^0 + \sec 60^0 - \cot^2 30^0}$$

Q21 Prove that

$(\sin A + \text{cosec } A)^2 + (\cos A + \sec A)^2 = 7 + \tan^2 A + \cot^2 A.$

Set B

Q22. In the figure given below AB and CD are two diameters of a circle (with centre O) perpendicular to each other and OA is the diameter of the smaller circle . If OA = 7 cm, find the area of the shaded region.



SECTION D (4x8=32)

Q23 An old lady while boarding a plane got hurt and the captain immediately called for the medical aid, thus the plane left with the lady 30 minutes later than the scheduled time. Thus in order to reach its destination 1500 km away in time, it has to increase its speed by 250 km/hr than its usual speed . Find the usual speed of the plane and the value depicted by the captain.

Q24. Obtain all the zeroes of the polynomial $2x^4 - 10x^3 + 5x^2 + 15x - 12$, if two of its zeroes are $\sqrt{\frac{3}{2}}$ and $-\sqrt{\frac{3}{2}}$.

Q25. If S_1, S_2 and 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 $S_1 + S_3 = 2S_2$

Q26. Draw the graph of equation $4x - 3y - 6 = 0$ and $x + 3y - 9 = 0$. Determine the vertices of the triangle formed by these lines and y – axis. Shade the triangle.

Q27 The angle of elevation of a cloud from a point 60m above the surface of a the water of a lake is 30^0 and the angle of depression of its shadow in water of the lake is 60^0 . Find the height of the cloud from the surface of water.

Q28. Two poles of equal height are standing opposite each other on either side of the road which is 8 m wide. From a point between them on the road, the angle of elevation of the top of the poles are 60^0 and 30^0, respectively. Find the height of the poles and the distance of the point from the poles.

Q29. Find the area of quadrilateral formed by joining A(3 , –1), B (9 , –5), C(14 , 0) and D(9 , 19).

Q30. In the figure given below , ABC is a quadrant of a circle of radius 14 cm and semicircle is drawn with BC as diameter. Find the area of shaded region.