MATHS TEST PAPER

Section-A

Time- 3 Hours

Q1. If the pth, qth and the rth term of an A.P. are a,b and c, then prove that a(q-r) +b(r-p)=cq-cp

Q2. A Factory kept increasing its output by same percentage every year. Find the percentage if it is known that output is doubled last two years.

Q3. A sector of a circle of radius 12cm has angle 120^0. It is rolled up so that two bounding radii are joined to form a cone. Find the volume of the cone.

Q4. Prove that the perpendiculars from the vertices of a triangle on opposite sides are concurrent.

Q5. A hemispherical tank of radius $1^3/4$ m is full of water. A pipe connected to it empties it at the rate of 7 liters per second. How much time will it take to empty the tank?

Q6. A T.V. set is available for Rs. 7000 cash or (24+22/7) % cash down followed by six equal installments. If the rate of interest is 2.5% per month, find each installment.

Q7. The mean of *n* observations x1,x2,x3…….xn is X. If (a-b) is added to each observation, then find the new mean.

Q8. A firm employs 3750 people. One person is chosen at random. What is the probability that the person's birthday will fall on Monday if the year is 2000.

Q9. If (x-k) be the HCF of ax^2+bx+c and cx^2+ax+b, then show that $a^3 +b^3 +c^3 -3abc=0$

Q10. A man borrows Rs 8200 on Compound Interest and returns it in *n* years. If the rate of interest is 5% and each installment is Rs. 4410, then find *n*.

`

Section-B

Q11. Given two fixed points P(-3,4) and Q(5,-2). Calculate the co-ordinates of points A and B such that 5PA=3PQ and 3PB=2PQ.

Q12. (a) Solve the following equations graphically,

2x-3y+6=0

2x+3y-18=0

(b) Also find the area of the triangle formed.

Q13. Prove that the bisectors of the angles formed by producing the opposite sides of a cyclic quadrilateral are perpendicular to each other.

Q14.A solid cone of height 12cm and base 6cm has the top 4cm removed. Find the whole surface area of the remainder.

Q15. If (-2,3),(4,-3) and (4,5) are the mid points of the sides of a triangle, then find the co-ordinates of its centroid.

Q16. Derive Quadratic Formula.

Q17. Construct a triangle ABC in which BC=4cm, angle A=50 and altitude AD=3cm. How many such triangles can be drawn? Draw its incircle and write the steps of constructions.

Q18. If (SecA+TanA)(SecB+TanB)(SecC+TanC) = (SecA-TanA)(SecB-TanB)(SecC-TanC), then show that each side is equal to ±1.

Q19. Find the real values of x and y which make:
$(2x-3y-13)^2 + (3x+5y+9)^2$

Q20. Simplify:
$$\left\{\frac{a-b}{(a+b)^2 - 2ab} \cdot \frac{a^4 - b^4}{(a+b)^3 - 3ab(a+b)}\right\} \Big/ \frac{(a+b)^2 - 4ab}{(a+b)^2 - 3ab}$$

Section –C

Q21. Prove that if an arc subtends angle 'x' at the centre of the circle, then it will subtend x/2 on other part of the circle.
Using it, prove that a triangle with one angle 30^0 has the opposite side equal to the circum-radii of the circum-circle of the triangle.

Q22.(a) "The ratio of the areas of two similar triangles are equal to the ratio of the squares of their corresponding sides." Prove.
(b) ABC is a triangle with XY//AC divides the triangle into two parts equal in areas. Determine AX/AB.

Q23. The Semi-annual income of Neera is Rs. 90000. She contributes Rs. 150 towards PF daily and pays LIC of Rs. 8000. Calculate the tax payable and deductions for last month if she pays Rs. 450 fortnight.

Q24. If the angle of elevation of a cloud from a point *h* metres above a lake is A and the angle of its reflection is B, then prove that the height of the cloud is given by $h\frac{(\tan B + \tan A)}{(\tan B - \tan A)}$

Q25. Draw a pie-diagram representing the relative frequencies (expressed as percentage) of the eight classes:
12.6, 18.2, 17.5, 20.3, 2.8, 4.2, 9.8 and 4.7.