Question Paper 2007 Delhi Set-3

CBSE Class-12 Mathematics

General Instructions:

The question paper consists of three Sections A, B and C. Section. In addition to Section as, every student has to attempt either Section B or Section C.

1. For Section A

Question numbers 1 to 8 are of 3 marks each.

Question numbers 9 to 15 are of 4 marks each.

Question numbers 16 to 18 are of 6 marks each.

2. For Section B/Section C

Question numbers 19 to 22 are of 3 marks each.

Question numbers 23 to 25 are of 4 marks each.

Question numbers 26 is of 6 marks.

3. All questions are compulsory.

4. Internal choices have been provided in some questions. You have to attempt only one of the choices in such questions.

5. Use of calculator is not permitted. However, you may ask for logarithmic and statistical tables, if required.

Section- A

Question numbers 1 to 7 carry 2 marks each.

Q1. If x - p is the GCD of $x^2 + x - 12$ and $2x^2 – 3x – 9$, find the value of p.

Q2. P and Q are points on sides CA and CB respectively of right angled at C.

Prove that

$AQ^2 + BP^2 = AB^2 + PQ^2$

Or

In Fig.1, DE II AB and FE II DB. Prove that DC2 = CF. AC

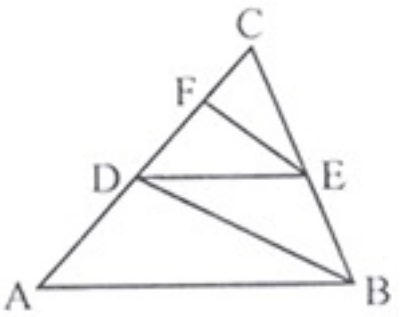

Fig. 1

Q3. Find the sum of first 32 terms of an A.P. whose n^{th} term is 5 - 2n.

Q4. A washing machine is available for Rs.13, 500 cash or Rs. 6,500 as cash down payment followed by three monthly installments of Rs.2, 500 each. Find the rate of interest charged under installment plan.

Q5. Solve for x and y:

$$X + \frac{6}{Y} = 6$$

$$3x - \frac{8}{y} = 5$$

Or

solve for x and y :

$$\frac{x+1}{2} + \frac{y-1}{3} = 8$$

$$\frac{x-1}{3} + \frac{y+1}{2} = 9$$

Q6. Cards marked with numbers 3, 4, 5……., 50 are placed in a box and mixed thoroughly. One card is drawn at random from the box. Find the probability that number on the drawn card is.

1. Divisible by 7.
2. a number which is a perfect square.

Q7. The mean of the following frequency distribution is 62.8. Find the missing frequency x.

Class	0 - 20	20 - 40	40 - 60	60 - 80	80 - 100	100 - 120
Frequency	5	8	X	12	4	8

Section- B

Question numbers 8 to 19 are of 3 marks each.

Q8. Solve the following system of equations graphically.

2x + 3y = 2; x - 2y = 8

Q9. Simplify:

$$\frac{x^2-x-6}{x^2-9}+\frac{x^2-16}{x^2-x-12}$$

Q10. A man borrows money from a finance company and has to pay it back in two equal half-yearly installment of Rs. 7,396 each. If the interest is charged by the finance company at the rate of 15% per annum, compounded semi-annually, find the principal and the total interest paid.

Q11. Show that the points (7, 10), (-2, 5) and (3, - 4) are the vertices of an isosceles right triangle.

Q12. Draw a with base QR = 6 cm, vertical angle P = 600 and median through P to the base is of length 4.5 cm.

Q13. Prove that

$$\frac{\cos A}{1-\tan A}+\frac{\sin A}{1-\cot A}=\sin A+\cos A$$

Or

Evaluate without using trigonometric tables:

$$\frac{3\cos 55^0}{7\sin 35^0} - \frac{4(\cos 70^0 . \operatorname{cosec} 20^0)}{7(\tan 5^0 . \tan 25^0 . \tan 45^0 . \tan 65^0 . \tan 85^0)}$$

Q14. Which term of the A.P. 3, 15, 27, 39..... Will be 132 more than its 60^{th} term?

Q15. A bag contains 5 red balls and some blue balls. If the probability of drawing a blue ball from the bag is four times that of a red ball, find the number of blue balls in the bag.

Q16. In Fig. 2, TA is a tangent to the circle from a point T and TBC is a secant to the circle. If AD is the bisector of $\angle CAB$ prove that ΔADT is isosceles.

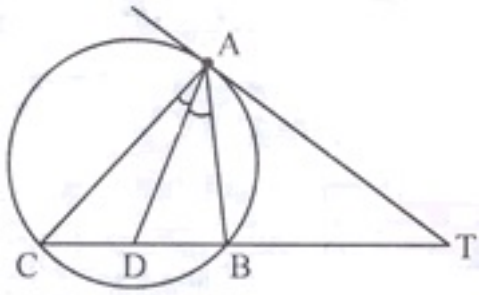

Fig. 2

In $\Delta\ ABC$, AD $AD \perp$BC and AD^2 = BD.DC. Prove that $\angle ABC$ is a right angle.

Q17. A toy is in the form of a cone mounted on a hemisphere of common base radius 7 cm. The total height of the toy is 3 1 cm. Find the total surface area of the toy.

$$\left[Use\ \pi = \frac{22}{7}\right]$$

Q18. Find the ratio in which the point (- 3, k) divides the line segment joining the points (- 5, - 4) and (- 2, 3). Hence find the value of k.

Q19. The enrollment of a secondary school in different classes is given below:

Class	VI	VII	VIII	IX	X
Enrollment	800	500	400	700	200

Draw a pie chart to represent the above data.

Section- C

Question numbers 20 to 25 carry 5 marks each.

Q20. A sphere, of diameter 12 cm, is dropped in a right circular cylindrical vessel, partly filled with water. If the sphere is completely submerged in water, the water level in the cylindrical vessel rises by $3\frac{5}{9}$ cm. Find the diameter of the cylindrical vessel.

Or

A solid right circular cone of diameter 14 cm and height 8 cm is melted to form a hollow sphere. If the external diameter of the sphere is 10 cm, find the internal diameter of the sphere.

Q21. Prove that the sum of either pair of opposite angles of a cyclic quadrilateral is 180°. Using the above, find x and y in Fig. 3.

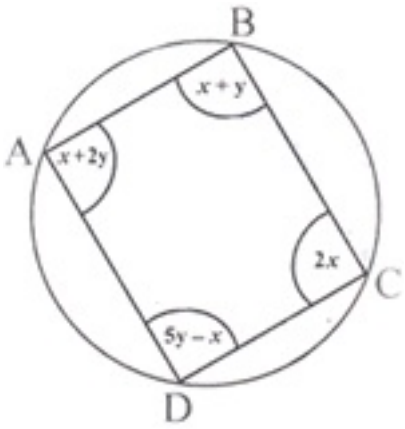

Fig. 3

Q22. A passenger train takes 2 hours less for a journey of 300 km, if its speed is increased5 km/hour from its usual speed. Find its usual speed.

Or

By increasing the list price of a book by Rs. 10, a person can buy 10 books less for Rs. 1,200. Find the original list price of the book.

Q23. A boy standing on a horizontal plane finds a bird flying at a distance of 100 m from him at an elevation of 300. A girl standing on the roof of 20 metre high building, finds the angle of elevation of the same bird to be 45°. Both the boy and the girl are on opposite sides of the

bird. Find the distance of bird from the girl.

Q24. If a line is drawn parallel to one side of a triangle, to intersect the other two sides in distinct points, prove that the other two sides are divided in the same ratio.
Using the above, prove the following:

In Fig. 4, DE I I BC and BD = CE. Prove that ABC is an isosceles triangle.

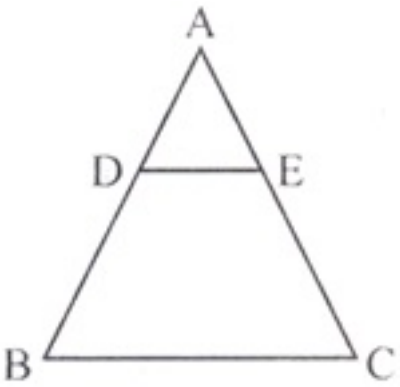

Fig. 4

Q25. Ms. Shahnaz earns Rs. 35,000 per month (excluding HRA). She donates Rs. 30,000 to Prime Minister Relief Fund (100% exemption) and Rs. 40,000 to a Charitable Hospital (50% exemption). She contributes Rs. 5,000 per month to Provident Fund and Rs. 25,000 per annum towards LIC premium. She purchases NSC worth Rs. 20,000. She pays Rs. 2,300 per month towards income tax for 11 month. Find the amount of income tax she has to pay in 12 month of the year.

Use the following to calculate income tax:

a. Saving:	100% exemption for permissible saving upto Rs. 1, 00,000.
b. Rates of income tax for ladies	
Slab	**Income tax**
Upto Rs. 1,35,000	No tax
From Rs. 1,35,001 to Rs. 1,50,000	10% of taxable income Exceeding Rs. 1, 35,000
From Rs. 1,50,00 1 to Rs. 2,50,000	Rs. 1,500 + 20% of the amount Exceeding Rs. 1, 50,000
Rs.2,50,00 land above	Rs. 21,500 + 30% of the amount exceeding Rs. 2, 50,000

c. Education Cess:	2% of income tax payable