Sample Paper 4

[Time Allowed: 3 Hours]	[Maximum Marks: 80]

General Instructions :

(i) All questions are compulsory.
(ii) The question paper consists of 30 questions divided into four sections – A, B; C and D.
(iii) Section A contains 6 questions of 1 mark each, Section B contains 6 questions of 2 marks each, Section C contains 10 questions of 3 "marks each and Section D contains 8 questions of 4 marks each-
(iv) There is no overall choice.
(v) Use of calculators is not permitted.

Section 'A'

Question numbers 1 to 6 carry 1 mark each.

1. Find the values of m and n for which the following system of linear equations has infinitely many solutions:

$$3x + 4y = 12$$
$$(m + n)x + 2(m - n)y = (5m - 1)$$

2. Find the median of the following data :

x	10	20	30	40	50
f	2	3	2	3	1

3. If tan x = sin 45° cos 45° + sin 30°, then find the value of x.

4. If sin $= \frac{a}{b}$, then find cos .

5. If the surface areas of two spheres are in the ratio 9 : 16, then find the ratio of their radii.

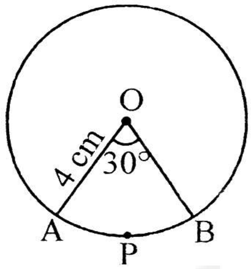
6. Find the sum of all natural numbers from 1 to 100.

Section 'B'

Question numbers 7 to 12 carry 2 marks each.

7. Prove that in two concentric circles, the chord of the larger circle, which touches the smaller circle is bisected at the point of contact.

8. Find the area of the sector of a circle with radius 4 cm and of angle 30°. Also, find the area of the corresponding major sector. [Use = 3.14]



9. If the 10th term of an A.P. is 47 and its first term is 2, find the sum of its 15 terms.

10. Find the value of p so that the quadratic equation $px(x - 3) + 9 = 0$ has two equal roots.

11. Three coins are tossed simultaneously, find the probability of getting exactly one head.

12. Explain why $(5 \times 7 \times 13 + 7)$ is a composite number.

Section 'C'

Question numbers 13 to 22 carry 3 marks each.

13. AD is an altitude of an equilateral triangle ABC. On AD as base another equilateral triangle ADE is constructed. Prove .that ar(MDE) : ar(ABC) = 3 : 4.

14. In an equilateral triangle ABC, D is a point on side BC such that $BD = \frac{1}{3} BC$. Prove that $9AD^2 = 7AB^2$.

15. Prove that: $\frac{\tan A}{1 - \cot A} \quad \frac{\cot A}{1 - \tan A} = 1 + \sec A . \operatorname{cosec} A$.

16. Prove that: $\frac{\sin \quad - \cos \quad 1}{\sin \quad \cos \quad - 1} \quad \frac{1}{\sec \quad - \tan}$

17. If   and   are the zeroes of the quadratic polynomial : $p(x) – 3x^2 – 4x + 1$, find a quadratic polynomial whose zeroes are $\frac{\alpha^2}{\beta}$ and $\frac{\beta^2}{\alpha}$.

18. Construct a ABC in which $BC = 6.5$ cm, $AB = 4.5$ cm and $ACB = 60°$. Construct another triangle similar to ABC such that each side of new triangle is $\frac{4}{5}$ of the corresponding sides of   ABC.

19. Solve the following pair of equations graphically and find the vertices of the triangle formed by these lines and the x-axis:

    $4x – 3y + 4 = 0, 4x + 3y – 20 = 0.$

20. Find the coordinates of the points which divide the line segment joining $A(2, – 3)$ and $B(– 4, – 6)$ in to three equal parts.

21. Find the area of the quadrilateral $ABCD$ whose vertices are $A(3, – 1)$, $B(9, – 5)$, $C(14, 0)$ and $D(9, 19)$.

22. A hemispherical bowl of internal diameter 30 cm contains some liquid. This liquid is to be filled into cylindrical shaped bottles each of diameter 5 cm and height 6 cm. Find the number of bottles necessary to empty the bowl.

Section 'D'

Question numbers 23 to 30 carry 4 marks each.

23. A train travelling a distance of 1200 km at a constant speed. When driver of the train learnt that he is getting late, he increased the speed by 5 km per hour. Now the journey took 8 hours less and reached in time. Find the original speed of the train.

24. How many multiples of 4 lie between 10 and 250 ? Also find their sum.

25. Prove that the tangent at any point of a circle is perpendicular to the radius through the point of contact.

26. The angle of elevation of the top of a vertical tower from a point on the ground is 60°. From another point 10 m vertically above the first, its angle of elevation is 30°. Find the. height of the tower.

27. The king, queen and jack of clubs are.removed from a deck of 52 playing cards,and the remaining cards are shuffled. A card is drawn from the remaining cards. Find the probability of getting a card of (i) heart (ii) queen (iii) club.

28. The mean of the following frequency distribution is 25.2 and total frequency is 50. Find the missing frequenciesx and y.

C.I.	0 – 10	10 – 20	20 – 30	30 – 40	40 – 50
Ferquency	8	x	10	y	9

29. Water is flowing at the rate of. 15 km/hour through a pipe of diameter 14 cm into a cuboidal pond which is 50 m long and 44 m wide. In what time will the level of water in the pond rise by 21 cm ?

30. Show that any positive odd integer is of the form

$6q + 1$ or $6q + 3$ or $6q + 5$, where q is a positive integer.

ANSWERS

Section 'A'

1. $m = 5$ and $n = 1$ 2. 30 3. 45°

4. $\frac{\sqrt{b^2 - a^2}}{b}$ 5. 3 : 4 6. 5050

Section 'B'

8. Area of sector = 4.186 cm^2, Area of major sector = 46.054 cm^2

9. 555 10. $p = 4$ 11. $\frac{3}{8}$

12. 7 is a factor of the given number. So it is a composite number.

Section 'C

17. $f(x) = k \;\; x^2 - \frac{28}{9} x \;\; \frac{1}{3}$, where k is non-zero real number

19. $x = 2,\ y = 4$; Vertices of the formed with thex-axis are (5, 0), (2, 4) and (– 1,0) respectively.

20. (0, – 4), (– 2, – 5)

21. 182 sq. units

22. Number of bottles = 60

Section 'D'

23. 25 km/h. Yes. 24. $S_{60} = 7800$ 26. 15 m

27. (i) $\frac{13}{49}$ (ii) $\frac{3}{49}$ (iii) $\frac{10}{49}$

28. Missing frequencies are $x = 12,\ y = 11$

29. 2 hours