



I. Answer any 10 of the following questions:

[10 x 2 = 20]

1. Determine the value of d such that $15 \equiv 3 \pmod{d}$.
2. What is the time 100 hours after 7 a.m.?
3. Find the intercepts made by the line $4x - 9y + 36 = 0$ on the coordinate axes.
4. Find the equation of a line whose intercepts on the x and y axes are given below.
(I) $4, -6$ (II) $-5, \frac{3}{4}$
5. Find the slope of the following straight lines $7x - \frac{3}{17} = 0$
6. The horizontal distance between two buildings is 70 m. The angle of depression of the top of the first building when seen from the top of the second building is 45° . If the height of the second building is 120 m, find the height of the first building.
7. The angle of elevation of the top of a cell phone tower from the foot of a high apartment is 60° and the angle of depression of the foot of the tower from the top of the apartment is 30° . If the height of the apartment is 50 m, find the height of the cell phone tower. According to radiations control norms, the minimum height of a cell phone tower should be 120 m. State if the height of the above mentioned cell phone tower meets the radiation norms.
8. The external radius and the length of a hollow wooden log are 16 cm and 13 cm respectively. If its thickness is 4 cm then find its T.S.A.
9. 4 persons live in a conical tent whose slant height is 19 m. If each person require 22 cm^2 of the floor area, then find the height of the tent.
10. A 14 m deep well with inner diameter 10 m is dug and the earth taken out is evenly spread all around the well to form an embankment of width 5 m. Find the height of the embankment.
11. If the standard deviation of a data is 4.5 and if each value of the data is decreased by 5, then find the new standard deviation.
12. If the standard deviation of a data is 3.6 and each value of the data is divided by 3, then find the new variance and new standard deviation.

II. Answer any 5 of the following questions:**[5 x 3 = 15]**

13. If $3 + k$, $18 - k$, $5k + 1$ are in A.P. then find k .
14. If $1^3 + 2^3 + 3^3 + \dots + k^3 = 44100$ then find $1 + 2 + 3 + \dots + k$.
15. If the three points $(3, -1)$, $(a, 3)$ and $(1, -3)$ are collinear, find the value of a .
16. A bag contains 6 green balls, some black and red balls. Number of black balls is as twice as the number of red balls. Probability of getting a green ball is thrice the probability of getting a red ball. Find (i) number of black balls (ii) total number of balls.
17. If A is an event of a random experiment such that $P(A) : P(\bar{A}) = 17:15$ and $n(S) = 640$ then find
(i) $P(\bar{A})$ (ii) $n(A)$.
18. In a class of 50 students, 28 opted for NCC, 30 opted for NSS and 18 opted both NCC and NSS. One of the students is selected at random. Find the probability that
(i) The student opted for NCC but not NSS.
(ii) The student opted for NSS but not NCC.
(iii) The student opted for exactly one of them.

III. Answer any 7 of the following questions:**[7 x 5 = 35]**

19. The 104^{th} term and 4^{th} term of an A.P. are 125 and 0. Find the sum of first 35 terms.
20. A brick staircase has a total of 30 steps. The bottom step requires 100 bricks. Each successive step requires two bricks less than the previous step.
i. How many bricks are required for the top most step?
ii. How many bricks are required to build the stair case?
21. Show that the given points form a parallelogram :
 $A(2.5, 3.5)$, $B(10, -4)$, $C(2.5, -2.5)$ and $D(-5, 5)$
22. Find the equation of the median and altitude of $\triangle ABC$ through A where the vertices are $A(6, 2)$, $B(-5, -1)$ and $C(1, 9)$.
23. Prove the following identities
$$\frac{\sin^3 A + \cos^3 A}{\sin A + \cos A} + \frac{\sin^3 A - \cos^3 A}{\sin A - \cos A} = 2$$
24. If $\sin \theta (1 + \sin^2 \theta) = \cos^2 \theta$, then prove that $\cos^6 \theta - 4\cos^4 \theta + 8\cos^2 \theta = 4$
25. A right angled triangle whose sides are 6 cm, 8 cm and 10 cm is revolved about the sides containing the right angle in two ways. Find the difference in volumes of the two solids so formed.

26. In a study about viral fever, the number of people affected in a town were noted as Find its standard deviation.

Age in years	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Number of people affected	3	5	16	18	12	7	4

27. A box contains cards numbered 3, 5, 7, 9, ... 35, 37. A card is drawn at random from the box. Find the probability that the drawn card have either multiples of 7 or a prime number.

-----ALL THE BEST-----

70 marks will be converted to 100 marks

Test should be written under the supervision of your parents and get the answer paper signed from them.

No corrections should be made after the test timings. We expect your honesty.

Test Papers have to be submitted after the completion of all the 4 tests.

Submission Date of Test Papers: 6th January, 7th January, 8th January

Timings: 9.30 AM – 12.30 PM / 5 PM- 8.30 PM