Math model paper
(Surface Area and Volume, Statistics & Probability)
Class – IX

Time- 1hr.30min   **Full marks-40**

General instructions:
i.   *All the questions are compulsory.*
ii.   *Attempt the questions in a sequence.*
iii.   *Questions in sec-A carry 1mark each, Sec-B carry 2 marks, Sec-C carry 3 marks and Sec-D carry 4 marks each.*
iv.   *Don't use calculator.*

SECTION – A

1.   *Select the correct option.*

i.   The diameter of base and the height of a conical house are 14 m and 18 m respectively and the capacity of a rice bag is 33 m3. The number of such rice bags required to fill the conical house is _____.
     A.   14   B.   24   C.   28   D.   25

ii.   The radius and slant height of a cone are in the ratio 21 : 24. If the curved surface area of the cone is 1188 cm^2, then its radius is _____.
     A.   38.14 cm   B.   21 cm   C.   18.18 cm
     D.   10.5 cm

iii.   If the median of the data $\frac{x}{4}, \frac{x}{5}, x, \frac{x}{3}, \frac{x}{2}$ is 5, then the value of x is _____.
     A.   12.   B.   15   C.   17   D.   18

iv.   The median of the observations 11, 12, 14, 18, $x + 3, x + 9$, 30, 32, 35, 41 arranged in ascending order is 24. The value of x is _____.
     A.   22   B.   18   C.   23   D.   20

v.   A coin is tossed 200 times with the following frequencies.
     Heads: 114
     Tails: 86
     The probability of getting tails is _____.
     A.   0.42   B.   0.43   C.   0.44   D.   0.45

vi.   Three coins are tossed simultaneously 150 times with the following frequencies of different outcomes.

Outcome	Frequency
3	40
2	20
1	80
No head	10

     The probability of 1 head coming up is _____.
     A. $\frac{3}{5}$ B. $\frac{8}{15}$ C. $\frac{7}{15}$ D. $\frac{1}{15}$

SECTION- B

2..   A cuboid having dimension 9 cm x 6 cm x 4 cm is melted and is made into a cube, then find the edge of the cube so formed.

3.   The height and radius of the base of a cone are in the ratio 21 : 5. If the volume of the cone is 4400 cm^3, then the find the base of the cone.

4.   The radius of the hemisphere is decreased to $\frac{2}{3}$rd of its original radius. Find the ratio between old and new curved surface areas.

5. The distance (in km) of 40 engineers from their residence to their place of work were found as follows:
    5 3 10 20 25 11 13 7 12 31 19 10 12 17 18 11 32 17 16 2 7 9 7 8 3 5 12 15 18 3
    12 14 2 9 6 15 15 7 6 12
    Construct a grouped frequency distribution table with class size 5 for the data given above taking the first interval as 0-5 (5 not included). What main features do you observe from this tabular representation?

6. The record of a weather station shows that out of the past 250 consecutive days, its weather forecasts were correct 175 times.
    (i) What is the probability that on a given day it was correct?
    (ii) What is the probability that it was not correct on a given day?

SECTION – C

7. Hameed has built a cubical water tank with lid for his house, with each outer edge 1.5 m long. He gets the outer surface of the tank excluding the base, covered with square tiles of side 25 cm. Find how much he would spend for the tiles, if the cost of the tiles is Rs 360 per dozen.

8. Find
    (i) the lateral or curved surface area of a closed cylindrical petrol storage tank that is 4.2 m in diameter and 4.5 m high.
    (ii) How much steel was actually used, if 1/12 of the steel actually used was wasted in making the tank.

9. The height of a cone is 16 cm and its base radius is 12 cm. Find the curved surface area and the total surface area of the cone (Use π = 3.14).

10. A right circular cylinder just encloses a sphere of radius r (see Fig. 13.22). Find
    (i) surface area of the sphere,
    (ii) curved surface area of the cylinder,
    (iii) ratio of the areas obtained in (i) and (ii).
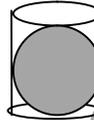
SECTION – D

11. A wall of length 10 m was to be built across an open ground. The height of the wall is 4 m and thickness of the wall is 24 cm. If this wall is to be built up with bricks whose dimensions are 24 cm × 12 cm × 8 cm, how many bricks would be required?9

12. Monica has a piece of canvas whose area is 551 m2. She uses it to have a conical tent made, with a base radius of 7 m. Assuming that all the stitching margins and the wastage incurred while cutting, amounts to approximately 1 m2, find the volume of the tent that can be made with it.

13. An insurance company selected 2000 drivers at random (i.e., without
    any preference of one driver over another) in a particular city to find a relationship between age and accidents. The data obtained are given in the following table:

Age of drivers	Number of accidents				
(in years)	0	1	2	3	Over 3
18-29	440	160	110	61	35
30-50	505	125	60	22	18
Above 50	360	45	35	15	9

Find the probabilities of the following events for a driver chosen at random from the city:
(i) being 18-29 years of age *and* having exactly 3 accidents in one year.
(ii) being 30-50 years of age *and* having one or more accidents in a year.
(iii) having no accidents in one year.