CBSE EXAMINATION PAPER-2022

MATHEMATICS

(Solved)

Time allowed : 3 hours | Maximum Marks : 43

General Instructions :

Read the following instructions carefully and follow them :

i. This question paper contains **19 questions.** All questions are **compulsory.**

ii. This question paper is divided into **4 sections.**

iii. **Section A** – questions number **1 to 3** are case based questions

iv. **Section B** – questions number **4 to 11** are very short answer

v. **Section C** – questions number **12 to 16** are short answer

vi. **Section D** – questions number **17 to 19** are long answer

vii. There is no overall choice given in the question paper. However, an internal choice has been provided in few questions.

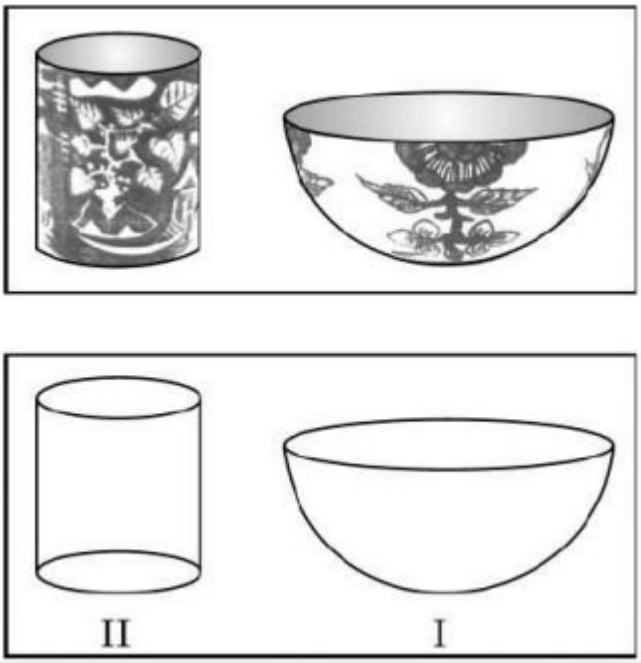
viii. Use of calculator is NOT allowed.

Section A

Question 1.

Khurja is a city in the Indian state of Uttar Pradesh famous for the pottery. Khurja pottery is traditional Indian pottery work which has attracted Indians as well as foreigners with a variety of tea-sets, crockery and ceramic tile works. A huge portion of the ceramics used in the country is supplied by Khurja and is also referred as 'The Ceramic Town'. One of the private schools of Bulandshahr organised an Educational Tour for class 10 students to Khurja. Students were very excited about the trip. Following are the few pottery objects of Khurja.

Students found the shapes of the objects very interesting and they could easily relate them with mathematical shapes viz sphere, hemisphere, cylinder etc. Maths teacher who was accompanying the students asked following questions :



(1)

The internal radius of hemispherical bowl (filled completely with water) in I is 9 cm and radius and height of cylindrical jar in II is 1.5 cm and 4 cm respectively. If the hemispherical bowl is to be emptied in cylindrical jars, then how many cylindrical jars are required ?

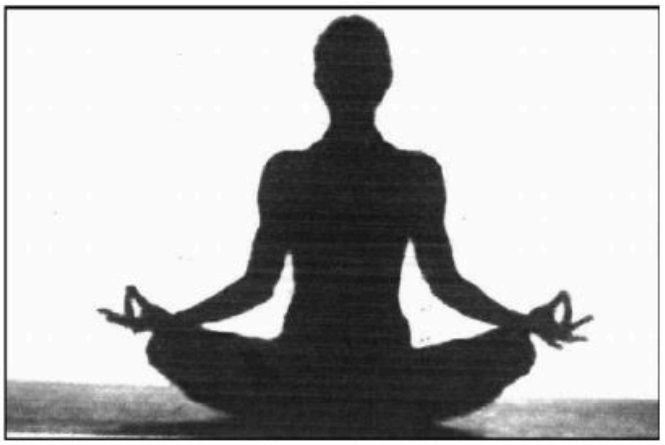
[2 Marks]

(2)

If in the cylindrical jar full of water, a conical funnel of same height and same diameter is immersed, then how much water will flow out of the jar ?

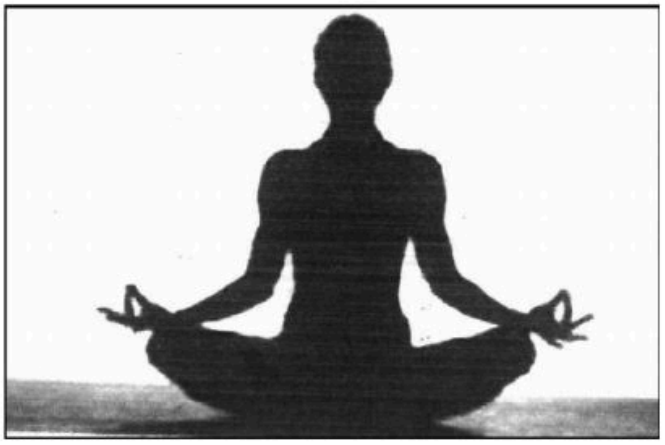
[2 Marks]

Question 2. Yoga is an ancient practice which is a form of meditation and exercise. By practising yoga, we not even make our body healthy but also achieve inner peace and calmness. The International Yoga Day is celebrated on 21st of June every year since 2015. To promote Yoga, Green park society in Pune organised a 7-day Yoga camp in their society. The number of people of different age groups who enrolled for this camp is given as follows : Based on the above, find the following :



Age Group	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75	75 – 85
Number of People	8	10	15	25	40	24	18

Question 3. Yoga is an ancient practice which is a form of meditation and exercise. By practising yoga, we not even make our body healthy but also achieve inner peace and calmness. The International Yoga Day is celebrated on 21st of June every year since 2015. To promote Yoga, Green park society in Pune organised a 7-day Yoga camp in their society. The number of people of different age groups who enrolled for this camp is given as follows :



Age Group	15 – 25	25 – 35	35 – 45	45 – 55	55 – 65	65 – 75	75 – 85
Number of People	8	10	15	25	40	24	18

(1) Find the median age of people enrolled for the camp.

[2 Marks]

(2)

If x more people of age group 65 — 75 had enrolled for the camp, the mean age would have been 58. Find the value of x.

[2 Marks]

Section B

Question 4.

How many odd numbers are there between 1 and 1000 which are divisible by 5 but not by 2 ?

[2 Marks]

Question 5.

If the sum of the roots of the quadratic equation $ky^2 - 11y + (k - 23) = 0$ is 13/21 more than the product of the roots, then find the value of k.

[2 Marks]

Question 6.

If x= -2 s the common solution of quadratic equations $ax^2+x-3a= 0$,and $x^2+ bx + b = 0$, then find the value of a^2b.

[2 Marks]

Question 7.

If in Fig. 1 there are two concentric circles with centre O. If ARC and AQB are tangents to the smaller circle from the point A lying on the larger circle, find the length of AC, if AQ =5 cm.

[2 Marks]

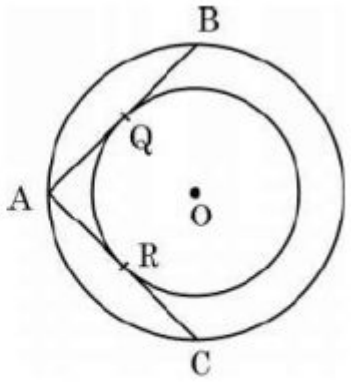


Fig. – 1

Question 8. The curved surface area of a right circular cylinder is 176 cm^2 and its volume is 1232 cm^3. What is the height of the cylinder?

[2 Marks]

Question 9.

The largest sphere is carved out of a solid cube of side 21 cm. Find the volume of the sphere.

[2 Marks]

Question 10.

Find the mean of the following frequency distribution :

[2 Marks]

Class	1 – 5	5 – 9	9 – 13	13 – 17
Frequency	4	8	7	6

Question 11.

The mode of a grouped frequency distribution is 75 and the modal class is 65-80. The frequency of the class preceding the modal class is 6 and the frequency of the class succeeding the modal class is 8. Find the frequency of the modal class.

[2 Marks]

Section C

Question 12. Construct a pair of tangents to a circle of radius 4 cm which are inclined to each other at an angle of 60°.

[3 Marks]

Question 13.

Find the value of 'p' for which the quadratic equation $p(x-4)(x-2) + (x-1)^2 = 0$ is shas real and equal roots.

[3 Marks]

Question 14. Had Aarush scored 8 more marks in a Mathematics test, out of 35 marks, 7 times these marks would have been 4 less than the square of his actual marks. How many marks did he get in the test?

[3 Marks]

Question 15.

If the last term of an AP. of 30 terms is 119 and the 8^{th} term from the end (towards the first term) is 91, then find the common difference of the AP. Hence find the sum of all the terms of the AP.

[3 Marks]

Question 16.

An aeroplane when flying at a height of 3125 m from the ground passes vertically below another plane at an instant when the angles of elevation of the two planes from the same point on the ground are 30° and 60° respectively. Find the distance between the two planes at that instant.

[3 Marks]

Section D

Question 17.

In Fig. 2, if a circle touches the side QR of ΔPQR at S and extended sides PQ and PR at M and N respectively, then

prove that PM = ½(PQ + QR - PR).

[4 Marks]

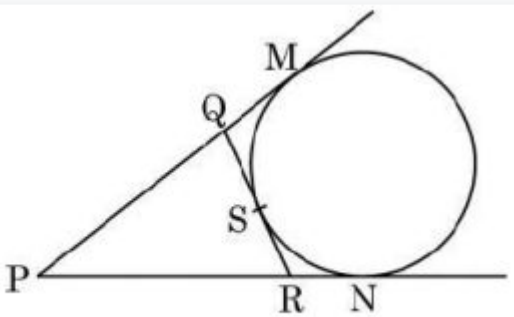


Fig. 2

Question 18. In Fig. 3, a triangle ABC is drawn to circumscribe a circle of radius 4 cm such that the segments BD and DC into which BC is divided by the point of contact D are of lengths 6 cm and 8 cm respectively. If the area of ΔABC is 84 cm², find the lengths of sides AB and AC.

[4 Marks]

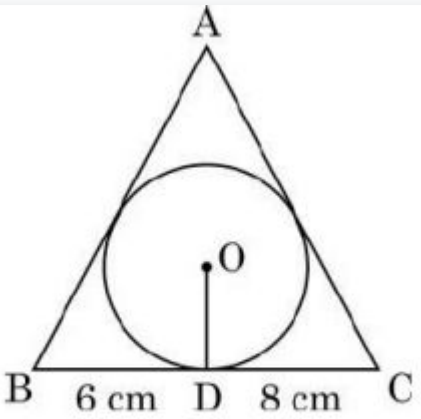


Fig. 3

Question 19.

From the top of an 8 m high building, the angle of elevation of the top of a cable tower is 60° and the angle of depression of its foot is 45°. Determine the height of the tower. (Take √3= 1.732).

[4 Marks]