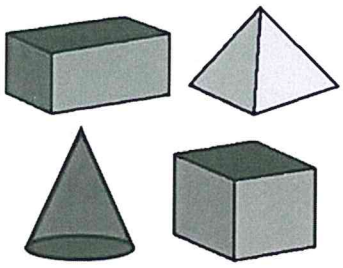


5th year Ordinary Level Maths

Area and Volume Class Test

Name: Solutions

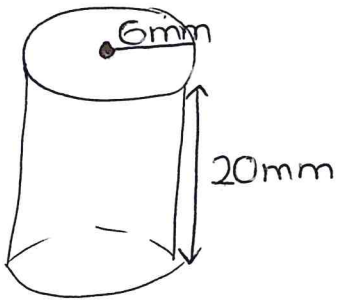
Total: 65 marks

Q. 1

Find the volume of a cylinder of radius 6 mm and height 20 mm.
Give your answer in two forms, as follows:

(i) in terms of π, and

(ii) correct to two decimal places.



(i) Vol: $\pi r^2 h$

$= \pi \times (6)^2 \times (20)$

$= 720\pi \text{ mm}^3$. (5)

(ii) Vol: $\pi r^2 h$

$(3{\cdot}14) \times (6)^2 \times (20)$

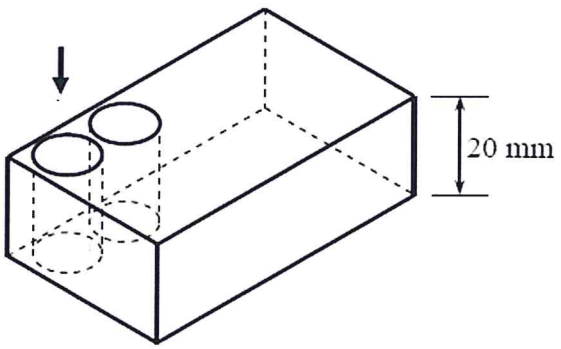
$= 2{,}260{\cdot}80 \text{ mm}^3$. (5)

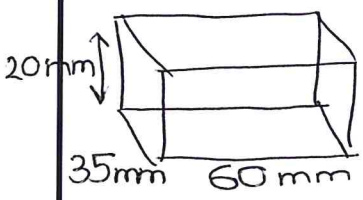
Q. 2

A solid rectangular block measures 60 mm × 35 mm × 20 mm.

Cylindrical holes of radius 6 mm are drilled, one at a time, through the block, in the direction shown.

After how many holes will more than half of the original block have been removed?

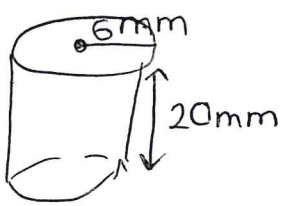




Vol block: $l \times b \times h$

$60 \times 35 \times 20 = 42{,}000 \text{ mm}^3$.

$\frac{42{,}000}{2} = 21{,}000 \text{ mm}^3$ → half of block.



Vol cyl: $\pi r^2 h$

$(3{\cdot}14) \times (6)^2 \times (20)$

$= 2{,}260{\cdot}80 \text{ mm}^3$.

$\therefore \frac{21{,}000}{2{,}260{\cdot}80}$

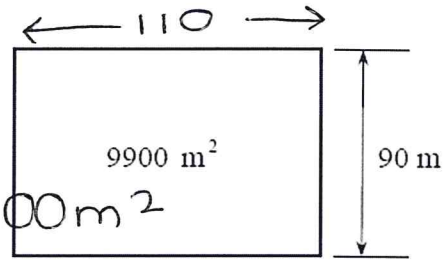
$= 9{\cdot}2887$

$\Rightarrow$ 10 holes

(15)

Q. 3

The area of a rectangular playing pitch is 9900 m^2.
The width of the playing pitch is 90 m.



(i) Find the length of the playing pitch.

Area = l x w / Area = 9,900 m^2

l x w = 9,900

l x 90 = 9,900

$l = \frac{9,900}{90}$ => l = 110m. (5)

(ii) Find the perimeter of the playing pitch.

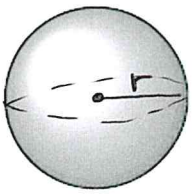
Perimeter: l + l + w + w

= 110 + 110 + 90 + 90

= 400m. (5)

Q. 4

(i) The volume of a sphere is 36π cm^3.
Find the radius of the sphere.



Vol = 36π

Vol = $\frac{4}{3}\pi r^3$

$\frac{4}{3}\pi r^3 = 36\pi$

$\frac{4}{3} r^3 = 36$

$r^3 = 36 / \frac{4}{3}$

$r^3 = 27$

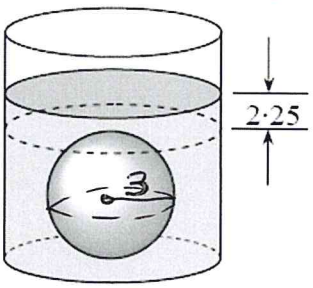
$r = \sqrt[3]{27}$

r = 3cm

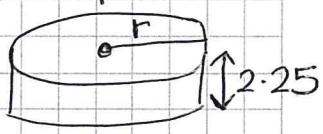
(10)

(ii) When the sphere is fully immersed in a cylinder of water, the level of the water rises by 2·25 cm.

Find the radius of the cylinder.



Vol of sphere = Vol of



$36\pi = \pi r^2 h$

$36 = r^2 (2 \cdot 25)$

$\frac{36}{2 \cdot 25} = r^2$

$16 = r^2$

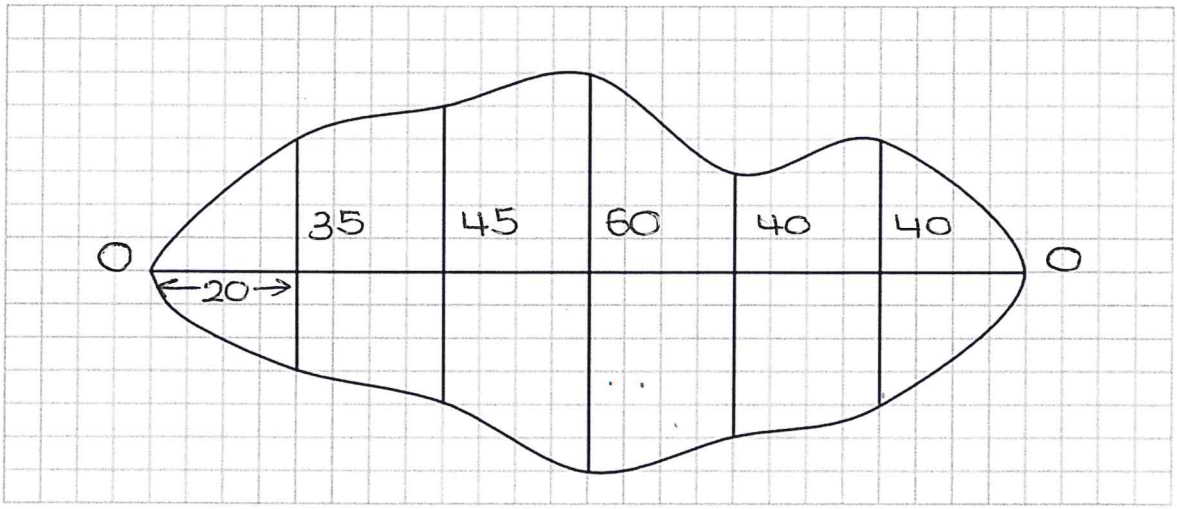
$r = \sqrt{16}$

r = 4cm.

(10)

Q. 5

In order to estimate the area of the irregular shape shown below, a horizontal line was drawn across the widest part of the shape and five offsets (perpendicular lines) were drawn at equal intervals along this line.



(i) Find the lengths of the horizontal line and the offsets, taking each grid unit as 5 mm, and record the lengths on the diagram.

(ii) Use the trapezoidal rule to estimate the area of the shape.

$\frac{h}{2}[F + L + 2(\text{Everything Else})]$

$\frac{20}{2}[0 + 0 + 2(35 + 45 + 60 + 40 + 40)]$

$10[2(220)]$

$10(440)$

$4,400\ mm^2$ (10)