

## LC 2015 (SET B): PAPER 2

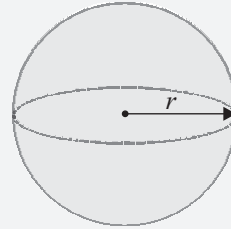
### QUESTION 8 (45 MARKS)

#### Question 8 (a)

- (i) Diameter  $d = 12$  m  
 Radius  $r = 6$  cm [ $d = 2r$ ]
- (ii)  $r = 6$  m:  $V = \frac{4}{3}\pi r^3 = \frac{4}{3}\pi(6)^3 = 288\pi \text{ m}^3 \approx 905 \text{ m}^3$

#### FORMULAE AND TABLES BOOK

Surface area and volume:  
**Sphere** [page 8]



$$A = 4\pi r^2$$

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

#### MARKING SCHEME NOTES

##### Question 8 (a) (i) [Scale 5A (0, 5)]

5: • Accept a correct answer without work (6 m)

##### Question 8 (a) (ii) [Scale 10B (0, 4, 10)]

Note: Accept correct /consistent answer from (a)(i)

- 4: • Any work of merit e.g. writes the correct formula, identifies correct/consistent radius
- Treats as  $k\pi(r)^3$  with correct/consistent radius substituted and stops
  - Correct answer given in terms of  $\pi$  ...  $288\pi$

Note: [ $905 \cdot 14(\frac{22}{7})$ ,  $904 \cdot 32(3 \cdot 14)$ ]

10: • Accept a correct/consistent answer without work

#### Question 8 (b)

- (i)  $r = 6$  m: Surface area  $= 4\pi r^2 = 4\pi(6)^2$   
 $= 144\pi \text{ m}^2 \approx 452 \cdot 4 \text{ m}^2$
- (ii) Number of litres  $= \frac{452 \cdot 4 \text{ m}^2}{3 \cdot 5 \text{ m}^2} \approx 129$  litres
- (iii) Number of tins of paint  $= \frac{129 \text{ litres}}{25 \text{ litres}} = 5 \cdot 17$  tins [You need to purchase 6 tins of paint.]  
 Cost:  $6 \times \text{€}180 = \text{€}1080$

**MARKING SCHEME NOTES**

**Question 8 (b) (i) [Scale 5C (0, 3, 4, 5)]**

**Note:** Accept correct/consistent answer from (a)(i)

- 3: • Any work of merit e.g. writes the correct formula, identifies correct/consistent radius  
 • Treats as  $k\pi(r)^2$  with correct/consistent radius substituted and stops
- 4: • Correct formula with correct/consistent substitution and stops  
 • Correct answer given in terms of ...  $144\pi$   
 • Finishes with only one error...e.g.  $k\pi(r)^2$

**Note:**  $[452 \cdot 57(\frac{22}{7}), 452 \cdot 57(3 \cdot 14)]$

- 5: • Accept a correct/consistent answer without work

**Question 8 (b) (ii) [Scale 5A (0, 5)]**

**Note:** Accept correct/consistent answer from (b)(i)

- 5: • Accept a correct/consistent answer without work

**Question 8 (b) (iii) [Scale 5C (0, 3, 4, 5)]**

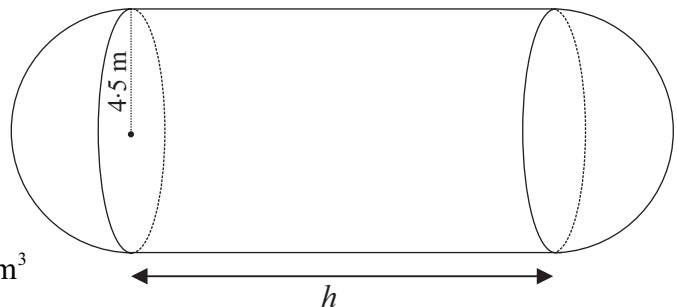
**Note:** Accept correct/consistent answer from (b)(ii)

- 3: • Any correct relevant work, e.g. Writes answer from (b) (ii), sets up division  
 • Calculates the required number of tins [Accept  $(5 \cdot 17)/(5 \cdot 2)$ ]
- 4: • Finishes with only one error...e.g. incorrect number of tins  
 • Sets up correct cost multiplication and stops

**Question 8 (c)**

- (i) The volume of a hemisphere is half the volume of a sphere of the same radius  $r$ .

$$\begin{aligned} \text{Volume of hemisphere} &= \frac{2}{3} \pi r^3 \\ &= \frac{2}{3} \pi (4 \cdot 5)^3 \approx 191 \text{ m}^3 \end{aligned}$$



- (ii) The tank consists of 2 **hemispheres** with a **cylinder** between them.

$$\begin{aligned} &\text{Volume of cylinder} \\ &= \text{Volume of tank} - 2(\text{Volume of hemisphere}) \\ &= 905 - 2 \times 191 = 523 \text{ m}^3 \end{aligned}$$

**CYLINDER**

$$V = 523 \text{ m}^3$$

$$r = 4 \cdot 5 \text{ m}$$

$$V = \pi r^2 h \Rightarrow h = \frac{V}{\pi r^2} = \frac{523}{\pi (4 \cdot 5)^2} = 8 \cdot 2 \text{ m}$$

**FORMULAE AND TABLES BOOK**  
**Surface area and volume:**  
**Cylinder [page 10]**

$A = 2\pi r h$   
 $V = \pi r^2 h$

**MARKING SCHEME NOTES**

**Question 8 (c) (i) [Scale 5B (0, 3, 5)]**

- 3:**
- Writes correct formula
  - Treats as  $\pi(r)^3$  with correct/consistent radius substituted
  - Correct formula with correct/consistent substitution and stops
  - Correct answer given in terms of  $\pi \dots \frac{243}{4}\pi$  or  $60.75\pi$
- 5:**
- Accept a correct/consistent answer without work

**Question 8 (c) (ii) [Scale 10D (0, 2, 5, 8, 10)]**

**Note:** Accept correct/consistent answer from (a)(ii) and (c)(i)

- 2:**
- Any correct or relevant work e.g. writes answers from (a)(ii) or (c)(i)
  - Work towards setting up relevant equation with or without substitution
- 5:**
- Calculates the volume of the cylinder (523)
  - Finishes with two errors... e.g. one incorrect volume and a transposition error
- 8:**
- Isolates  $h$  correctly and stops e.g.  $[h = \frac{523}{\pi(4.5)^2}]$
  - Finishes with only one error... e.g. index error, transposition error