

AREA AND VOLUME

Form 1

Vol 7

Part 8A – Water Problem (A)

1. Let the height of the tank be h cm.

$$\text{Volume of water} = (8)(5)\left(\frac{2}{3}h\right) = 160 \text{ cm}^3$$

$$h = 6 \text{ cm}$$

2. (a) The capacity = $\frac{(1+2.5) \times 60}{2} \times 50 = 5250 \text{ m}^3$

(b) The depth of water at the deeper end = $2.5 - (1 - 0.8) = 2.3 \text{ m}$

$$\text{The volume of water} = \frac{(0.8+2.3) \times 60}{2} \times 50 = 4650 \text{ m}^3$$

(c) Capacity of the swimming pool below point $B = \frac{(2.5-1)(60)}{2} \times 50 = 2250 \text{ m}^3$

$$\text{Thus, the volume of water above point } B = 3000 - 2250 = 750 \text{ m}^3$$

$$\text{Hence, the required depth of water} = 2.5 - 1 + \frac{750}{60 \times 50} = 1.75 \text{ m}$$

3. Drop of water level = $\frac{0.5 \times 24}{5 \times 4} = 0.6 \text{ cm}$

4. (a) The volume = $(30 \times 10 + 6 \times 12) \times 10 = 3720 \text{ cm}^3$

(b) Rise in water level = $\frac{480}{12 \times 10} = 4 \text{ cm}$

$$\text{New water level} = 4 + 6 + 10 = 20 \text{ cm}$$

5. The rise = $\frac{3 \times 20}{10 \times 5} = 1.2 \text{ m}$

6. The rise = $\frac{2 \times 4^3}{\frac{(11+17) \times 4}{2}} = \frac{16}{7} \approx 2.29 \text{ cm}$

$$7. \text{ The rise} = \frac{8 \times 2^3}{\frac{(4+2+2) \times 15}{2} + 4 \times 17} = 0.5 \text{ cm}$$

$$8. \text{ The rise} = \frac{2 \times 2^3}{8 \times 6 - (8-1-3)(6-1-2)} = \frac{4}{9} \approx 0.444 \text{ m}$$

$$9. \text{ (a) The capacity} = [15 \times 10 - 7 \times (15 - 3 - 3)] \times 8 = 696 \text{ m}^3$$

$$\text{(b) The rise} = \frac{8 \times 10}{15 \times 8} = \frac{2}{3} \approx 0.667 \text{ m}$$

$$10. \text{ (a) The volume} = 9 \times 2 \times 3 = 54 \text{ m}^3$$

$$\text{(b) New water level} = 3 + \frac{2 \times 1^3}{9 \times 2} = \frac{28}{9} \approx 3.11 \text{ m}$$

11. Let the new water level be h cm.

Volume of water + volume of the section of the rod immersed in water

$$= 5 \times 4 \times 3 + 1 \times 1 \times h$$

$$= 60 + h$$

$$60 + h = 5 \times 4 \times h$$

$$h = \frac{60}{19}$$

$$\text{Rise in water level} = \frac{60}{19} - 3 = \frac{3}{19} \approx 0.158 \text{ m}$$

$$12. \text{ The fall} = 4 - \frac{(8 \times 6 - 2 \times 2) \times 4}{8 \times 6} = \frac{1}{3} \approx 0.333 \text{ m}$$