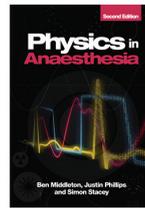


Chapter 14

Breathing systems and ventilation



Self-assessment questions

These questions and answers, in both MTF and SBA formats, accompany *Physics in Anaesthesia 2e* and link back to the book for guidance.

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Multiple true / false questions

For each of the following questions, mark all answers as either true or false

1. Regarding the disadvantages of various breathing systems:

- In Mapleson A, B and C the APL valve at the patient end can be difficult to operate
- A danger with coaxial circuits is a covert internal disconnection
- The use of corrugated tubing increases the kinks and thus the resistance to gas flow
- Mapleson E and F are difficult to scavenge waste from and require high fresh gas flow
- Mapleson B and C are inefficient for both spontaneously breathing and ventilated patients

Reminder

- Mapleson D is the most efficient breathing system for ventilated patients.
- Mapleson E and F are useful for patients under 30 kg as they have low resistance due to lack of an APL valve.

2. The removal of carbon dioxide from breathing circuits involves:

- The use of soda lime granules for physical removal
- The production of calcium hydroxide and potassium hydroxide
- Sodium hydroxide as a catalyst
- An APL valve for chemical removal
- The production of heat and water vapour

Did you know?

- The most common change of dye colour, on the exhaustion of a soda lime canister's activity, is from white to pink.
- Uneven distribution of soda lime granules in the canister can cause uneven gas flow and reduce the efficiency of the soda lime.

3. These ventilation modes allow for mandatory breaths to be delivered to patients:

- SIMV
- BiPAP
- CPAP
- Volume support
- PRVG

Did you know?

- Technically, CPAP is not an actual form of ventilation because there is no variation in pressure generation across the respiratory cycle.

4. Regarding ventilation methods and modes:

- HFOV stands for high force oscillatory ventilation
- The iron lung was the first form of positive pressure ventilation
- Pressure control is best for lightly sedated patients who are spontaneously breathing
- Lower tidal volumes help minimise the risk of volutrauma in ARDS
- Low flow anaesthetic machines are the most economical

Did you know?

- The last polio survivor still to use an iron lung in the UK died in 2017 at the age of 75.

Single best answer questions

For each of the following questions, select the single best answer – note that more than one answer may be true but only one option represents the best answer

1. The main components present in all breathing circuits are:

- Six unidirectional valves, three in each limb of the circuit
- Soda lime canister, high pressure gas flow, corrugated tubing, ventilator
- Fresh gas flow, APL valve, mask, tube, reservoir bag
- Reservoir bag, vaporizer, bellows, active scavenging system, microprocessing unit
- HFOV, APRV, IPAP, SIMV, PRVG

Pointer

- See Figure 14.7.

2. On attendance at a cardiac arrest, the anaesthetist on call intubates the patient and manually ventilates using which semi-closed breathing system:

- Bag valve mask
- Mapleson D
- Waters circuit
- Magill circuit
- Bain breathing system

Did you know?

- Ralph M. Waters is an American anaesthetist who, in addition to his accolades of inventing the Mapleson C (Waters) circuit and a metal oropharyngeal airway, is also known for 'introducing professionalism' into the practice of anaesthesia...

3. Keeping nitrous oxide content to less than 100 ppm in theatres is best achieved by:

- Passive scavenging using negative pressure over an 8 hour weighted average
- Filtering exhaust gases with a Cardiff Aldasorber
- A mechanically generated negative pressure to a vent outside the clinical area
- Minimising the use of nitrous oxide in procedures
- Using a circle breathing system free of leaks and low fresh gas techniques

Reminder

- A Cardiff Aldasorber does not absorb nitrous oxide.

4. What is the best definition of PEEP?

- CPAP
- EPAP
- The expiratory pressure given on each mandatory breath to collapse the alveoli
- The inspiratory pressure given on a triggered spontaneous breath to open the alveoli
- Constant background pressure throughout the cycle to hold dependent alveoli open

Did you know?

- Change in volumes expired on different PEEP settings can help determine the recruitability of ventilated lungs.
- Negative effects of high PEEP include alveolar overdistension, worsening intrapulmonary shunt, dead space, pulmonary vascular resistance, and haemodynamic impairment.

Answers to questions for Chapter 14 – Breathing systems and ventilation

Multiple true / false questions

The following answers are true:

1. a, b, d and e
2. c and e
3. a, b and e
4. d and e

Single best answer questions

The options below represent the single best answer, although other options may also be true:

1. c
2. c
3. c
4. e