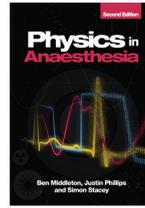


Chapter 7

Humidity



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 humidity:

- Relative humidity is inversely proportional to temperature
- As the humidity of air rises, the density decreases
- Human hair contracts in length as humidity rises
- As partial pressure of water vapour in air rises, the dew point decreases
- Absolute humidity can be derived by satellites using infrared radiation

Pointer

- See *Figure 7.1*.
- The molar mass of water is less than the molar mass of air (see worked example in *Section 9.2*).

2. Regarding saturated vapour pressure:

- It is the maximum amount of water at any given temperature that can be held in gaseous form
- It is directly proportional to temperature
- It is equivalent to a relative humidity of 50%
- The temperature when a sample of moist air is at its saturated vapour pressure is called the dew point
- It is a constant regardless of temperature

Reminder

- Dew point is the temperature at which clouds start to form; put more formally, the temperature to which air must be cooled for water to turn from water vapour into liquid water.
- Relative humidity is the percentage of actual humidity relative to the maximum humidity possible.

Did you know?

- Heat loss from sweating is impossible if the relative humidity is 100%.

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. An endotracheal tube bypasses the normal physiological humidification mechanisms. A heat and moisture exchange filter (HMEF) placed near the patient end of the breathing system restores this physiology by:

- a. Triggering the inferior turbinates to warm the air
- b. Humidifying the inhaled air for up to 72 h
- c. Avoiding the contamination of ventilators and breathing circuits with viruses and bacteria
- d. Adding dead space to the circulation
- e. Condensing warm moist air from the patient onto its hygroscopic material which in turn warms and humidifies the dry, cold gas provided from the ventilator and delivered to the patient

Did you know?

- Water baths should be used instead of HMEF in patients with ARDS, neonates, or those with a high work of ventilation or who are being weaned off ventilation.

2. A non-invasively ventilated patient with Covid-19 is prescribed salbutamol through an ultrasound driven nebulizer. With regard to this aerosol generating procedure:

- An HMEF is the only protection against the spread of Covid-19 needed in this situation
- The droplets that will take most effect are less than 1 μm in size
- The nebuliser generates micro-droplets of the drug which is delivered to the lungs
- High-pressure air is driven through a small orifice generating a negative pressure as a result of the Venturi effect
- The solution of salbutamol is broken into micro-droplets by the pressure oscillations of a flexible diaphragm in the nebulizer and this fine mist is then delivered to the patient's lungs

Did you know?

- Full personal protective equipment (PPE) must be worn at all times when working with patients with confirmed Covid-19 during aerosol generating procedures.

Answers to questions for Chapter 7 – Humidity

Multiple true / false questions

The following answers are true:

1. a, b, d and e
2. a, b and d

Single best answer questions

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

1. e
2. e