Questions 1-3

1) All are components of the alveolar gas equation except
   A) PaCO₂
   B) Barometric pressure of water
   C) PaO₂
   D) FiO₂

2) What is the expected PaO₂ in a healthy patient breathing room air at sea level?
   A) 60 mmHg
   B) 80 mmHg
   C) 90 mmHg
   D) 110 mmHg

3) A presumably healthy 18-year-old male intubated for appendicitis surgery and ventilated with 100% FiO₂. His ABG: PH 7.32, PaCO₂ 50, PaO₂ 450. What is the Alveolar-arterial (A-a) gradient?
   A) 10
   B) 50
   C) 100
   D) 200

4) For the patient above, the respiratory rate was increased. Repeat ABG shows PaCO₂ of 30 mmHg now. The PaO₂ would:
   A) Decrease by 25 mmHg
   B) Remains the same
   C) Increase by 20 mmHg
   D) Increase by 25 mmHg
5) The figure below shows volumetric capnometry of an intubated patient. What is the expected PaCO₂?

Valv: alveolar minute ventilation 3.9L/min, VCO₂: carbon dioxide production per 268 minute,

A) 30 mmHg  
B) 40 mmHg  
C) 50 mmHg  
D) 60 mmHg

6) A patient is mechanically ventilated with the volume-controlled mode with tidal volume 500 ml, PaCO₂ is 50 mmHg, PeCO₂ is 40 mmHg. What is the estimated total dead space?

A) 50 ml  
B) 100 ml  
C) 150 ml  
D) 200 ml

7) A patient with DKA, has ABG as follows on room air: PH 7.1, HCO₃ 10 mEq/L, Anion gap of 25, PaCO₂ 32 mmHg, PaO₂ of 80 mmHg. The patient has:

A) Normal ventilation  
B) Hypoventilation  
C) Hyperventilation

8) All of the following are components of the Oxygen content equation except:

A) Hemoglobin  
B) PaCO₂  
C) PaO₂  
D) SaO₂
9) A patient in ICU has cardiac output of 2.5 L/min, PaO\(_2\) of 70, SaO\(_2\) of 95\%, Hemoglobin 9 g/dl. Oxygen delivery DO\(_2\) equals:
   A) 200 ml/min
   B) 280 ml/min
   C) 300 ml/min
   D) 350 ml/min

10) A patient with ARDS is being ventilated with the volume-controlled mode. Settings are as follows:
   Peak inspiratory pressure 30 cmH\(_2\)O, Plateau pressure 23 cmH\(_2\)O, PEEP 8 cmH\(_2\)O, tidal volume 400 ml, RR 25/min, Inspiratory flow 50 L/min. What is the calculated mechanical power?
   A) 10 J/min
   B) 15 J/min
   C) 20 J/min
   D) 25 J/min