1) B
Estimation of Healthy FRC (Men) = 5.48 x Height (meters) – 7.05
Estimation of Healthy FRC in women = 1.39 x Height (meters) – 0.424

2) B
Static compliance = Tidal volume (ml) / Plateau pressure – Total PEEP
= 450 / 15
= 30 ml/cmH₂O or 0.03 L/ cmH₂O

3) C
Elastance is reciprocal of compliance (1/compliance)
= 1/0.03
= 33 cmH₂O/L

4) B
Resistance = Peak inspiratory pressure – Plateau pressure / Flow
= 35 – 25 / 1 LS (60 L/min)
= 10

5) C
Gross Estimation ARDS FRC = \[
\frac{Estimation\ of\ Healthy\ FRC\times Tidal\ Volume\ (Plat-PEEP)}{Estimation\ of\ Healthy\ FRC\times 32}
\]
6) B

**Total respiratory compliance**

\[ = \frac{VT}{Paw - PEEPT} \]

\[ = \frac{500}{27 - 15} \]

\[ = 41.6 \text{ ml/cmH}_2\text{O} \]

**Total respiratory resistance**

\[ = \frac{PPIP - Pplat}{V'} \]

\[ = \frac{31 - 27}{0.75} \text{ (45 L/min = 0.75 l/s)} \]

\[ = 5.3 \text{ cmH}_2\text{O/l/s} \]

**Chest wall compliance**

\[ = \frac{VT}{End inspiratory Pes - End expiratory Pes} \]

\[ = \frac{500}{17 - 12} \]

\[ = 100 \text{ ml/cmH}_2\text{O} \]

**Chest wall resistance**

\[ = \frac{Peak Pes - End inspiratory Pes}{V'} \]

\[ = \frac{18 - 17}{0.75} \]

\[ = 1.3 \text{ cmH}_2\text{O/l/s} \]

**Lung compliance**

\[ = \frac{VT}{End inspiratory PPL - End expiratory PPL} \]

\[ = \frac{500}{7} \]

\[ = 71.4 \text{ ml/cmH}_2\text{O} \]

**Lung resistance**

\[ = \frac{Peak PPL - End inspiratory PPL}{V'} \]

\[ = \frac{13 - 10}{0.75} \text{ (45 L/min = 0.75 l/s)} \]

\[ = 4 \text{ cmH}_2\text{O/l/s} \]


7) C

Trans-Pulmonary pressure \( P_{TP} \) = Alveolar pressure \( P_{ALV} \) or Plateau pressure – Pleural pressure \( P_{PL} \) or Esophageal pressure
8) B
Time constant (TC) = Resistance x Compliance
e.g. 10 x 50 = 0.5 seconds
It is the time taken for the flow to increase or decrease 37% from the original

9) A
Peak exp flow: 60 L/min. 60 x 37% = 22.2

10) C
Stress index is the slope of the airway pressure during VCV with constant flow in passive patient with no effort
SI < 1: alveolar recruitment → Increase PEEP
SI 1 → Adequate PEEP
SI > 1: alveolar distention → Decrease PEEP