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/cmH_2O or 0.03 L/ cmH_2O

3) C

Elastance is reciprocal of compliance (1/compliance)

= 1/0.03

= 33 cmH_2O/L

4) B

Resistance = Peak inspiratory pressure – Plateau pressure / Flow

= 35 – 25 / 1 LS (60 L/min)

= 10

5) C

$$\text{Gross Estimantion ARDS FRC} = \frac{\frac{Estimantion\ of\ Healthy\ FRC * Tidal\ Volume}{(Plat - PEEP)}}{Estimantion\ of\ Healthy\ FRC * 32}$$

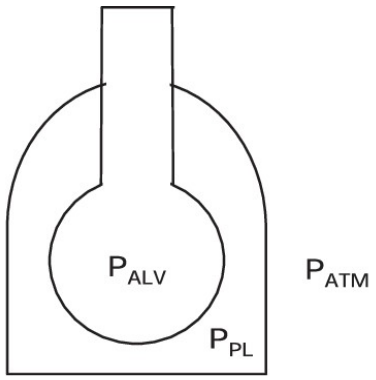
6) B

Total respiratory compliance
= VT / Paw - PEEPT
= 500 / 27 - 15
= 41.6 ml/cmH2O
Total respiratory resistance
= PPIP - Pplat / V'
= 31 - 27 / 0.75 (45 L/min = 0.75 l/s)
= 5.3 cmH2O/l/s
Chest wall compliance
= VT / End inspiratory Pes - End expiratory Pes
= 500 / 17 - 12
= 100 ml/cmH2O
Chest wall resistance
= Peak Pes - End inspiratory Pes / V'
= 18 - 17 / 0.75
= 1.3 cmH2O/l/s
Lung compliance
= VT / End inspiratory PPL - End expiratory PPL
= 500 / 7
= 71.4 ml/cmH2O
Lung resistance
= Peak PPL - End inspiratory PPL / V'
= 13 - 10 / 0.75 (45 L/min = 0.75 l/s)
= 4 cmH2O/l/s

Shokry M, Yamasaki K, Daoud EG. Can you calculate the total respiratory, lung, and chest wall respiratory mechanics? J Mech Vent 2020; 1(1):24-25. https://doi.org/10.53097/JMV.10007

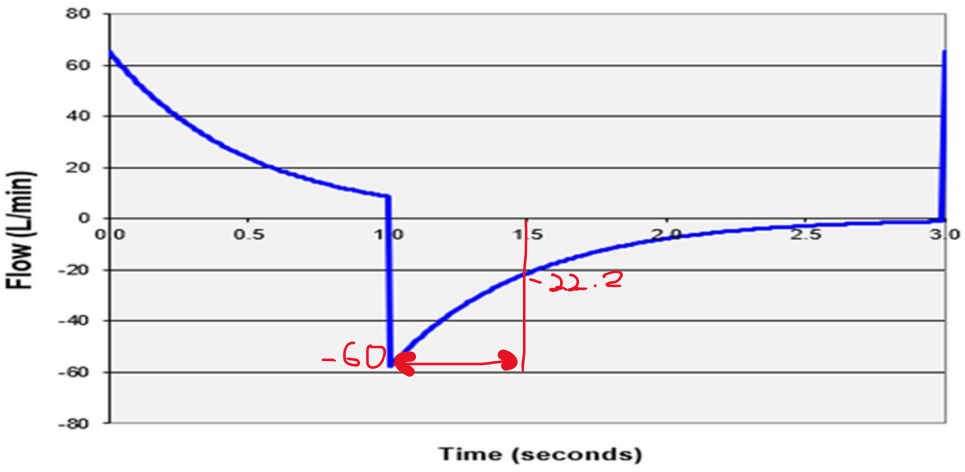
7) C

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