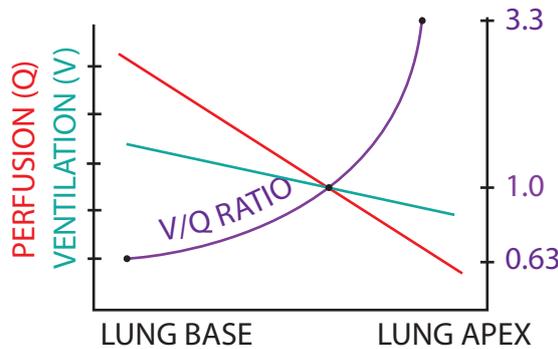


Second 2008
VIVA 8

This Station will explore aspects of respiratory physiology and related measurement. This Chest Xray shows complete collapse of the Left Lung. What patho-physiological processes might contribute to Hypoxia in this patient?

This viva explored the candidates' knowledge in relation to the following points
 Describe ventilation and perfusion to the lung and illustrate their relationship
 Significance of high and low V/Q Shunt and mechanisms to limit hypoxia,
 Effect of supplemental oxygen
 Pulmonary Vascular Resistance
 Pulse Oximetry, principles of measurement limitations

“Describe ventilation and perfusion to the lung and illustrate their relationship”



“What mechanisms are there to limit hypoxia”

the main mechanism is via hypoxic pulmonary vasoconstriction at reduced PaO₂ <50mmHg ventilation increases dramatically

“What are the underlying principles of pulse oximetry”

that oxyhaemoglobin and deoxyhaemoglobin have different absorption spectra
 pulsatile blood can be measured independent of non pulsatile blood and other tissues

“Describe the theoretical basis of pulse oximetry”

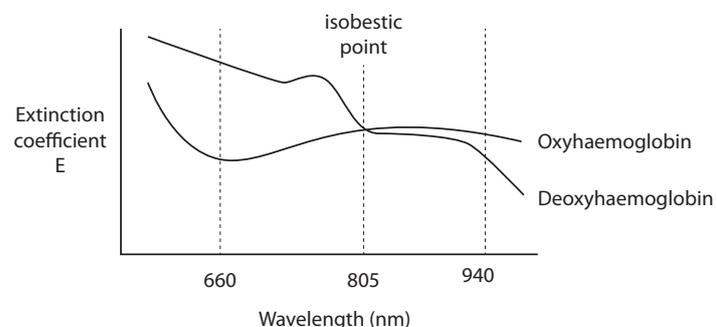
is the Beer Lambert law
 the absorption of light is dependent on two factors -
 concentration of the solution - Beer
 wavelength of light - Lambert

“Could you draw the extinction coefficient - wavelength graph used during pulse oximetry”

the pulsatile element of blood flow is called the pulse added absorption PAA
 between 660nm and 940nm there are significant differences between oxy and deoxyHb

the ratio of the PAA at 660 / 940 = R
 using healthy volunteers derived R values

Sats 100%	R = 0.4
Sats 85%	R = 1.0
Sats 0%	R = 3.4



“What are the limitations of pulse oximetry?”

Patient - abnormal Hbs, peripheral hypoperfusion, arrhythmias, venous congestion, dyes, nail polish
 Sensor - ambient light, not calibrated, one diode not attached
 CPU - different algorithms, based on healthy volunteers
 Display - over reliance on the numbers, misinterpretation by medical professionals