

Model Answers: Hard

1

The correct answer is **B** because:

- COPD includes emphysema (damage to alveoli leading to shortness of breath) and chronic bronchitis (long-term inflammation of the bronchi and bronchioles)
- These diseases often occur together and treatment rarely if ever reverse the progression of either disease as damage has occurred over time and cannot be repaired

As both emphysema and chronic bronchitis are attributed to damage occurring to the bronchioles and the alveoli over time, both are rarely seen in patients below the age of 30. Symptoms, once showing, do not change and are characterised by difficulty in oxygenating the blood. Overproduction of mucus and frequent coughing are common signs of COPD.

2

The correct answer is **C** because:

- Tar is a mixture of compounds (some of which are carcinogens) that settle on the lining of the airways in the lungs, stimulating an overproduction of mucus and inhibiting the action of cilia which leads to an accumulation of material in the lining
- Coughing to remove this material causes further damage, resulting in inflammation and increased presence of phagocytes which secrete elastase to reach the area of damage
- Nicotine is an addictive drug that stimulates the release of adrenaline in the body which increases blood pressure

3

The correct answer is **D** because:

- The bronchi of a sufferer of chronic bronchitis become scarred as a result of frequent coughing caused by an accumulation of mucus, dirt and infectious particles in the airways
- Lymph glands become swollen as a result of infection and alveoli are damaged by the increased presence of material in the airways which enhances phagocyte activity

The presence of tar in the airways increases secretions of mucus which lead to destruction of the cilia; resulting in scarred tissue and the knock-on effects of damage listed above.

4

The correct answer is **D** because the distance of the diffusion pathway for oxygen and carbon dioxide into and out of the bloodstream does not increase. The volume of oxygen diffusing decreases as the SA:V decreases directly as a result of a reduced number of alveoli (as loss of elasticity due to increased levels of elastase produced by phagocytes leads to them bursting).

5

The correct answer is **A** as the most common symptom of lung cancer is coughing up blood; this occurs as a result of tissue damage caused by the growth of tumours.

The other symptoms can be common in both COPD and lung cancer. Patients with COPD do not routinely cough up blood.