1: Multiple choice questions

1. The heart is a muscular pump situated in the thoracic cavity. Which one of the following blood vessels delivers oxygenated blood from the lungs to the left atrium?
   (a) Aorta
   (b) Inferior vena cava
   (c) Pulmonary artery
   (d) Pulmonary vein
   (e) Superior vena cava

2. The liver is a large organ situated in the upper region of the abdominal cavity. It is an accessory organ of the digestive system and has many functions, including which one of the following?
   (a) Clotting factor production
   (b) Erythrocyte production
   (c) Insulin production
   (d) Leucocyte production
   (e) Pepsin production

3. During respiration, the amount of oxygen and carbon dioxide within the lungs alters during the process of gaseous exchange. Which one of the following represents the approximate amount of carbon dioxide present in expired air?
   (a) 4%
   (b) 8%
   (c) 12%
   (d) 16%
   (e) 20%
4. Food is moved through various sections of the digestive tract by the involuntary action of its smooth muscle walls. These act rhythmically to create a wave-like movement along the gut that carries the food mass along. Which one of the following is the correct term for this movement?
   (a) Deglutition
   (b) Digestion
   (c) Dysphagia
   (d) Mastication
   (e) Peristalsis

5. The function of the lungs is to allow the uptake of oxygen from air into the blood, and the removal of carbon dioxide from the blood to the air. Which one of the following is the anatomical structure where this gaseous exchange process occurs?
   (a) Alveoli
   (b) Aorta
   (c) Bronchiole
   (d) Pulmonary artery
   (e) Trachea

6. The three main types of blood vessel found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in larger veins prevents the backflow of blood. Which one of the following is this feature?
   (a) Muscular walls
   (b) Rich blood supply
   (c) Thick elastic layer
   (d) Thin endothelium
   (e) Valves

7. A new patient attends the surgery for a routine dental examination. On completion of her medical history form it is noted that she is taking salbutamol. Which one of the following conditions is the patient most likely to have?
   (a) Angina
   (b) Asthma
   (c) Diabetes
   (d) Epilepsy
   (e) Fainting

8. A patient attending for an examination complains of a sore tongue, and the dentist diagnoses xerostomia. Which one of the following medications is most likely to be associated with this condition?
   (a) Analgesic
   (b) Antihistamine
   (c) Bisphosphonate
   (d) Diuretic
   (e) Hormone replacement
9. During respiration, the amount of oxygen and carbon dioxide within the lungs alters during the process of gaseous exchange. Which one of the following represents the approximate amount of oxygen in expired air?
   (a) 4%
   (b) 8%
   (c) 12%
   (d) 16%
   (e) 20%

10. A medication taken by a patient will eventually break down and be excreted. Which one of the following conditions is most likely to affect this detoxification process?
   (a) Duodenal ulcer
   (b) Gallstones
   (c) Kidney stones
   (d) Liver disease
   (e) Ulcerative colitis

11. On completing a medical history form, a patient has disclosed that he suffers from ulcerative colitis and is taking long-term steroids for the condition. Which one of the following areas of the digestive system is most likely to be affected by this condition?
   (a) Large intestine
   (b) Liver
   (c) Pancreas
   (d) Small intestine
   (e) Stomach

12. All body cells require oxygen in order to work and function. Which one of the following is the means by which it is transported from the lungs to the heart and then around the body?
   (a) Erythrocytes
   (b) Leucocytes
   (c) Plasma
   (d) Platelets
   (e) Thrombocytes

13. During the act of swallowing, the bolus of food is moved from the mouth into the throat by the voluntary action of the tongue muscles. Once beyond the mouth, the bolus is prevented from being inhaled instead of swallowed by an anatomical structure that seals the trachea. Which one of the following is the structure referred to?
   (a) Epiglottis
   (b) Larynx
   (c) Pharynx
(d) Tongue
(e) Vocal cords

14. Carbon dioxide is the waste product formed by cells as they work to produce energy. It is transported from the cells to the heart, and then to the lungs for removal from the body during expiration. Which one of the following is the means by which this is achieved?
(a) Erythrocytes
(b) Leucocytes
(c) Plasma
(d) Platelets
(e) Thrombocytes

15. On a medical history form a patient has disclosed that she has been diagnosed with type II diabetes and has been prescribed metformin. Which one of the following oral health problems may be caused by this condition?
(a) Angular cheilitis
(b) Aphthous ulcers
(c) Erosion
(d) Poor wound healing
(e) Stomatitis

16. Throughout the nervous system, nervous impulses are transmitted as electrical charges along specialised cells, the neurones. Which one of the following conditions is most likely to occur when electrical activity becomes suddenly disorganised?
(a) Grand mal
(b) Motor neurone disease
(c) Multiple sclerosis
(d) Myocardial infarction
(e) Stroke

17. A patient attends for root canal therapy and restoration of the upper right canine tooth following loss of vitality after a blow to the face. Which one of the following medical conditions must be ruled out before proceeding with the endodontic treatment?
(a) Asthma
(b) Bronchitis
(c) Eczema
(d) Latex allergy
(e) Penicillin allergy

18. Patients who have undergone surgery and have been incapacitated for a while are at risk of developing a deep vein thrombosis. Which one of the following blood vessels is most likely to become blocked if the thrombus becomes dislodged?
19. The nervous system is composed of the brain, spinal cord and the peripheral nerves. The peripheral nerves supplying the head and neck region are called the cranial nerves, and they consist of 12 pairs. Which one of the following pairs of cranial nerves is of most relevance to the inner structures of the oral cavity?
   (a) III and V  
   (b) III and X  
   (c) IX and XII  
   (d) V and XII  
   (e) VII and IX

20. A patient attends the surgery for a routine dental examination, and updates her medical history form as requested. On checking the form, the dentist notices that the patient has stated that she has recently been diagnosed with cirrhosis. Which one of the following organs is most likely to be affected by this condition?
   (a) Colon  
   (b) Gallbladder  
   (c) Liver  
   (d) Pancreas  
   (e) Stomach

21. The pancreas is an accessory organ of the digestive system and lies in the upper abdominal cavity near the stomach. It is essentially a glandular organ, and has many important functions including all except which one of the following options?
   (a) Bile production  
   (b) Carbohydrate digestion  
   (c) Fat digestion  
   (d) Insulin production  
   (e) Protein digestion

22. A patient attends the dental surgery for a surgical extraction of the upper right first molar tooth, under inhalation sedation. However, he has recently been diagnosed with bronchitis so the procedure is cancelled. Which one of the following is the most likely effect that this condition has on the bronchi?
   (a) Alveolar widening  
   (b) Blockage  
   (c) Dryness
(d) Hypersensitivity response
(e) Inflammation

23. Some patients develop blood clots within their circulation following surgery or after a period of immobility. These blood clots may eventually break free and pass throughout the circulation. Which one of the following is the most likely event when the clot becomes lodged in a cranial blood vessel?
(a) Angina attack
(b) Deep vein thrombosis
(c) Myocardial infarction
(d) Pulmonary embolism
(e) Stroke

24. On a medical history form a patient has disclosed that she contracted hepatitis B while on holiday abroad 3 years ago. Which one of the following conditions is most likely to develop due to this infection?
(a) Duodenal ulcer
(b) Leukaemia
(c) Liver carcinoma
(d) Oral carcinoma
(e) Pancreatitis

25. From time to time, a patient who carries an International Normalised Ratio (INR) card may attend the surgery for dental treatment. Which one of the following medical conditions does the patient suffer from?
(a) Angina
(b) Hypertension
(c) Hypotension
(d) Myocardial infarction
(e) Stroke

26. The base of the skull has numerous anatomical holes that allow the passage of nerves and blood vessels to and from the cranium. Which one of the following is the name of the anatomical hole through which the spinal cord passes?
(a) Foramen magnum
(b) Foramen ovale
(c) Foramen rotundum
(d) Mandibular foramen
(e) Mental foramen

27. On a medical history form a patient has disclosed that he suffers from gastric reflux and has been prescribed omeprazole. Which one of the following oral health problems may be caused by this condition?
(a) Aphthous ulcers
(b) Attrition
28. The coronary arteries are the blood vessels which supply oxygenated blood to the heart muscle itself. In some patients, these blood vessels may become partially blocked by fatty deposits within the arteries themselves. Which one of the following symptoms is a patient with this condition most likely to experience?
   (a) Hypotension  
   (b) Oedema  
   (c) Pain on exertion  
   (d) Slow heart rate  
   (e) Thready pulse

29. A new patient attends the dental surgery for a routine examination, and completes a medical history form. He states that he suffers from type II diabetes. Which one of the following organs is dysfunctional in patients with this condition?
   (a) Gallbladder  
   (b) Liver  
   (c) Pancreas  
   (d) Spleen  
   (e) Stomach

30. On a medical history form a patient has disclosed that she has recently been diagnosed with osteoarthritis, affecting her wrists, shoulders and neck. Which one of the following oral health problems may be caused by this condition?
   (a) Excess salivation  
   (b) Gagging  
   (c) Poor denture retention  
   (d) Poor oral hygiene  
   (e) Poor wound healing

31. Throughout the body, there are specialised areas of tissue that are responsible for the release of various chemicals directly into the bloodstream. These specialised areas of tissue are called endocrine glands. Which one of the following is classed as an endocrine gland?
   (a) Gallbladder  
   (b) Pancreas  
   (c) Parotid gland  
   (d) Sublingual gland  
   (e) Submandibular gland

32. During minor oral surgery procedures, the patient is likely to experience bleeding at the surgical site. In fit healthy patients this can easily be controlled by the dental team, but other patients with various medical conditions may
have to be treated with great caution. Which one of the following medical conditions would not cause concern in this instance?
(a) Angina
(b) Deep vein thrombosis
(c) Haemophilia
(d) Pulmonary embolism
(e) Stroke

33. When patients attend the dental surgery, they are required to complete a medical history form that requests information on any medications they receive. Which one of the following medications is most likely to require the use of a non-adrenaline local anaesthetic?
(a) Analgesics
(b) Antiepileptics
(c) Contraceptive pill
(d) Steroids
(e) Thyroxine

34. On a medical history form a patient has disclosed that he suffers from bronchial asthma. Which one of the following is the most likely effect that this condition has on the bronchi?
(a) Alveolar widening
(b) Blockage
(c) Dryness
(d) Hypersensitivity response
(e) Inflammation

35. The three main types of blood vessels found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in larger arteries prevents the backflow of blood. Which one of the following features is the one referred to?
(a) Muscular walls
(b) Rich blood supply
(c) Thick elastic layer
(d) Thin endothelium
(e) Valves

36. A 30-year-old patient attends the practice complaining of pain following recent extraction of a permanent first molar tooth. You notice from the patient’s medical history that she is allergic to penicillin. Which one of the following medications is most appropriate for this patient?
(a) Aciclovir
(b) Amoxicillin
(c) Erythromycin
(d) Nystatin
(e) Paracetamol
37. A new patient attends the surgery for a routine dental examination. Her medical history form notes that she has been prescribed glyceryl trinitrate. Which one of the following conditions is the patient most likely to suffer from?
   (a) Angina
   (b) Asthma
   (c) Diabetes
   (d) Epilepsy
   (e) Fainting

38. The three main types of blood vessels found throughout the body are arteries, capillaries and veins. An anatomical feature found specifically in capillaries allows rapid gaseous exchange to occur. Which one of the following features is the one referred to?
   (a) Muscular walls
   (b) Rich blood supply
   (c) Thick elastic layer
   (d) Thin endothelium
   (e) Valves

39. The heart is a muscular pump situated in the thoracic cavity. It receives deoxygenated blood from the head and neck region into the right atrium. Which one of the following is the vessel through which this occurs?
   (a) Aorta
   (b) Inferior vena cava
   (c) Pulmonary artery
   (d) Pulmonary vein
   (e) Superior vena cava

40. A 24-year-old patient has just had his lower right third molar tooth extracted and has been given the necessary postoperative advice. Which one of the following analgesics is the patient advised to avoid after this procedure?
   (a) Aspirin
   (b) Co-codamol
   (c) Codeine
   (d) Ibuprofen
   (e) Paracetamol

41. A patient attends the surgery with the upper left incisor teeth fractured at the gingival margin, following a car accident. Which one of the following medical conditions would persuade the dentist to recommend extraction rather than root canal therapy in order to avoid bacteraemia?
   (a) Angina
   (b) Emphysema
   (c) Epilepsy
   (d) Haemophilia
   (e) Valvular heart disease
42. It is a regulatory requirement to take a full medical history when a patient attends for dental treatment. Which one of the following medical conditions is the most likely to affect the oral cavity?
   (a) Angina
   (b) Diabetes
   (c) Hepatitis
   (d) Hyperthyroidism
   (e) Ulcerative colitis

43. Erythrocytes are disc-shaped cells that contain no nucleus, so they cannot divide and replace themselves as other cells do. A constant supply is therefore made throughout life. Which one of the following anatomical structures is where this occurs?
   (a) Bone marrow
   (b) Cartilage
   (c) Liver
   (d) Lymphatic system
   (e) Spleen

44. The trachea is part of the upper respiratory system and transports air from the throat to the bronchi. The trachea is prevented from collapsing during breathing movements by the presence of which one of the following anatomical features?
   (a) Cartilage rings
   (b) Cilia
   (c) Elastic layer
   (d) Muscular walls
   (e) Valves

Extended matching questions

General anatomy and physiology

For each of the following anatomy and physiology questions, select the single most appropriate anatomical structure from the option list below. Each option might be used once, more than once, or not at all.

(a) Bone marrow
(b) Gallbladder
(c) Heart
(d) Large intestine
(e) Liver
(f) Lungs
(g) Pancreas
(h) Small intestine
1. Several organs in the body have roles as glands, where hormones and enzymes are manufactured and released into the body. Hormones act to alter the specific action of their target cells, while enzymes initiate chemical reactions in various cells and tissues. Which one of the options listed is the anatomical structure that produces the enzyme pepsin?

2. Blood is composed of several different types of cells suspended in the fluid plasma. It has many functions, including the transport of oxygen and carbon dioxide to and from body tissues, the transport of hormones and nutrients around the body, defence against diseases, and the transport of waste products around the body. Which one of the options listed is the anatomical structure where oxygen-transporting cells are made?

3. During normal bodily functions, ingested food is broken down and absorbed into the circulatory system for transport around the body to be used as an energy source by the body cells. The resultant waste products are gradually collected and transported to various organs for elimination from the body. Which one of the options listed is the anatomical structure where the majority of food digestion occurs?

4. Several organs in the body have more than one function to perform in order for the cells and tissues of the whole body to work and grow correctly. The organs do not function in isolation from each other, rather they function together and alter their actions according to chemical or electrical messages received from other body areas, so that the body works together as a whole organism. Which one of the options listed is the anatomical structure responsible for the detoxification of drugs?

5. Several organs in the body have roles as glands, where hormones and enzymes are manufactured and released into the body. Hormones act to alter the specific action of their target cells, while enzymes initiate chemical reactions in various cells and tissues. Which one of the options listed is the anatomical structure that produces the hormone insulin?

**Medical conditions**

For each of the following medical history scenarios, select the single most appropriate medical condition from the option list below. Each option might be used once, more than once, or not at all.

(a) Angina  
(b) Asthma  
(c) Chronic bronchitis
1. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural ‘wearing out’ process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition that develops in patients who are exposed to high levels of atmospheric pollution, such as occurs in industrialised cities?

2. A patient attends the surgery for the extraction of a grossly carious molar tooth, which has been causing pain for some time. He has been unable to attend previously because of an illness that required hospitalisation. His medical history form notes that he takes warfarin and has regular blood tests for his INR score. Which one of the options listed is the medical condition that required the patient’s hospitalisation?

3. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural ‘wearing out’ process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition that develops over time and is linked to various risk factors, including obesity, increasing age and smoking?

4. Many drugs taken for certain medical conditions have unwanted side-effects that cause further medical problems for the patient. In severe cases, the patient may then have to be prescribed further medication to treat the side-effects, or may have to stop treatment with the initial drug altogether. Which one of the options listed is the medical condition most often associated with long-term use of NSAIDs, such as aspirin?

5. Some medical conditions have a genetic link, and can occur in several generations of a family. Other conditions may be present from birth, while others occur with increasing age as a natural ‘wearing out’ process. Many others develop due to the patient being exposed to risk factors, such as smokers who develop lung cancer. Which one of the options listed is a medical condition affecting the pancreas, which often has a genetic link and occurs in several generations of a family?
Answers

Multiple choice questions

1. **Correct answer: d.** The pulmonary vein is the only vein in the body to carry oxygenated blood, and it runs from the lungs to the left atrium of the heart. The other options are the various arteries and veins that run to or from the heart.

2. **Correct answer: a.** Insulin is made in the pancreas, pepsin in the stomach, and the red and white blood cells (erythrocytes and leucocytes respectively) are produced in various organs of the immune system. The liver is responsible for the production of several of the clotting factors that allow the blood to clot when exposed to air, as occurs following an injury to a blood vessel.

3. **Correct answer: a.** Inhaled air contains a minute amount of carbon dioxide, while the amount in expired air is 100 times greater, at 4%, due to the vast amounts formed as a waste product during normal cellular activities. Conversely, inspired air contains 20% oxygen which reduces to 16% in expired air, as the cells use 4% to carry out their activities.

4. **Correct answer: e.** Deglutition is the correct term for swallowing, digestion is the process of breaking down ingested foods for use as fuel for normal body functions, dysphagia is the medical condition of being unable to swallow, and mastication is the correct term for chewing of food.

5. **Correct answer: a.** The alveoli are the microscopic air bags that form the ends of the respiratory system. They form the majority of the tissue of the lungs, and allow gaseous exchange to occur effectively by being just one cell thick. Air passes through the tiny tube-like bronchioles to reach the alveoli.

6. **Correct answer: e.** Only veins contain valves, as they do not have the thick elastic layer and muscular walls of arteries that ‘pulse’ the blood along their length. A rich blood supply and thin endothelium are features of capillaries.

7. **Correct answer: b.** Salbutamol is a medicine provided as an inhaler for asthmatics, to be used as required. It is not provided for any other medical condition listed in the options list.

8. **Correct answer: d.** Diuretics are often referred to as ‘water tablets’ by the lay public, and are prescribed to patients with heart conditions where the fluid load needs to be reduced. The tablets therefore cause increased urination, as well as having the side-effect of reducing other bodily fluids, including saliva and tears. Some patients then tend to develop a ‘dry mouth’ or xerostomia. None of the other drugs in the options list have this side-effect.

9. **Correct answer: d.** Inspired air contains 20% oxygen, and 4% of it is used by the body tissues to work and produce energy for normal cellular activity. So only 16% is expired.
10. **Correct answer: d.** One of the main roles of the liver is to break down, or detoxify, drugs and medicines before they are excreted from the body either by the kidneys or the bowels. Any medical condition or disease process that affects the normal working of the liver will therefore have an impact on how successfully this detoxification process can occur. None of the other medical conditions in the options list will have an effect on this process.

11. **Correct answer: a.** Ulcerative colitis is a disease process affecting the colon of the large intestine. Together with Crohn’s disease, the two conditions are referred to collectively as inflammatory bowel disease. Ulcerative colitis does not affect any other section of the digestive tract except the colon.

12. **Correct answer: a.** The red blood cells – erythrocytes – transport oxygen around the body. Oxygen atoms attach to the iron-containing compound haemoglobin, forming the complex compound oxyhaemoglobin that gives arterial blood its distinctive cherry red colour. Oxygen is not transported in any other way throughout the circulatory system.

13. **Correct answer: a.** The epiglottis is an anatomical structure composed of cartilage, which lies in the throat. When the act of swallowing occurs, the larynx is raised so that the epiglottis falls across the top opening of the trachea, and prevents food and fluids from entering the respiratory system. Although all the other options in the list are situated in this anatomical area, they have no role in sealing off the trachea.

14. **Correct answer: c.** The majority of the waste product carbon dioxide, which is produced during normal cellular activity, is transported from the body tissues to the lungs for excretion as bicarbonate ions dissolved in the plasma. It does not become attached to any blood cells for transportation, as oxygen does.

15. **Correct answer: d.** Diabetics are notorious for developing poor wound healing, as their peripheral nerve and circulatory tissues are damaged by the condition, over time. They are therefore more prone to chronic diseases such as periodontitis too. Angular cheilitis and stomatitis are conditions that develop due to infection with the fungus *Candida albicans*, aphthous ulcers are thought to be diet or stress related, and erosion is the loss of tooth surface that occurs when teeth are exposed to dietary acids.

16. **Correct answer: a.** Grand mal is the severe form of epilepsy, where sufferers have tonic–clonic seizures due to a sudden disorganised burst of electrical activity in the brain. Motor neurone disease and multiple sclerosis are degenerative disorders affecting the fatty sheaths of the neurones themselves, while myocardial infarction and stroke are circulatory disorders.

17. **Correct answer: d.** It is best practice to use rubber dam during endodontic procedures in order to avoid recontamination of the root canal with oral bacteria, as well as to provide excellent moisture control. Although non-latex
dam sheets are available, many dental workplaces still use latex-based ones, so the patient must be screened for latex allergy before the dam is applied. Failure to do so could result in an anaphylactic reaction, which would put the patient’s life at risk. None of the other options listed would contraindicate endodontic treatment.

18. **Correct answer: e.** A deep vein thrombosis occurs on the venous side of the circulation, where the blood vessels transport deoxygenated blood to the right side of the heart and then to the lungs. The pulmonary artery is the only artery in the body that carries deoxygenated blood, and it does so from the right side of the heart directly to the lungs, where the blood becomes reoxygenated. As the vessel narrows in width, the thrombus will become stuck and block the vessel, resulting in death if not diagnosed and treated immediately as a medical emergency.

19. **Correct answer: d.** The main cranial nerve supplying the oral cavity is the trigeminal nerve (V), which supplies the majority of the sensation from the teeth and oral soft tissues to the brain. The hypoglossal nerve (XII) supplies the majority of the muscles of the tongue. Cranial nerve III, the oculomotor nerve, supplies the eye and has no relevance to the oral cavity.

20. **Correct answer: c.** Cirrhosis of the liver is a disease often, but not exclusively, associated with a high alcohol intake over several years, and is being diagnosed in younger patients nowadays. This is believed to be linked to ‘binge drinking’. The condition is also occasionally found in patients suffering from some blood disorders, and it does not affect any other organ except the liver.

21. **Correct answer: a.** Bile is the green liquid formed by the liver and stored in the gallbladder, and is associated with the emulsification of fats. The pancreas has many functions, including all the other options listed, as it is responsible for the manufacture and release of many digestive enzymes.

22. **Correct answer: e.** As with any medical condition ending in ‘itis’, bronchitis is the inflammation of the bronchi. Alveolar widening occurs in emphysema, blockage occurs when the patient has inhaled a foreign body and is choking, dryness occurs in cystic fibrosis, and a hypersensitivity response occurs during an asthma attack.

23. **Correct answer: e.** A stroke is the sudden loss of oxygenated blood supply to an area of the brain, usually due to a thrombus, as in this scenario. When the coronary arteries of the heart are affected, a myocardial infarction will occur. When the clot passes from the leg veins (a deep vein thrombosis) and becomes lodged in the pulmonary artery, it is referred to as a pulmonary embolism. An angina attack occurs during a partial blockage of the coronary arteries.

24. **Correct answer: c.** Hepatitis is inflammation of the liver, and that caused by certain viruses is referred to as hepatitis B, hepatitis C, etc. depending on the
infective organism involved. Up to 80% of primary liver cancers are due to infection with hepatitis B virus, and all clinical dental staff must be vaccinated against it before working in situations where they may come into contact with patients’ blood. None of the other options listed are linked to hepatitis B.

25. **Correct answer: e.** Warfarin is an anticoagulant drug prescribed to patients who have suffered, or are likely to suffer from, detachment of a thrombus within the circulatory system. Dislodgement of the thrombus may cause a stroke or a pulmonary embolism, depending on its position in the body. These patients will be on long-term warfarin and therefore require their INR to be checked regularly to avoid bleeding problems. Patients who have survived a myocardial infarction tend to be prescribed numerous other drugs for life, rather than warfarin.

26. **Correct answer: a.** The foramen magnum is the large bony opening in the occipital bone of the cranium that allows the passage of the spinal cord into the vertebral column. The foramen ovale and foramen rotundum are smaller bony openings that allow passage of some cranial nerves, and the mandibular and mental foramina are bony openings in the mandible, associated with the inferior dental nerve.

27. **Correct answer: c.** Gastric reflux is a condition where the acidic contents of the stomach are effectively regurgitated into the oesophagus or the mouth. It is due to disorders such as a hiatus hernia. As the refluxed material is acidic, it will have a demineralising effect on the enamel of the teeth, especially the labial or palatal surfaces of the upper incisors. This specific type of tooth surface loss is called erosion. Attrition is tooth surface loss due to heavy grinding of the teeth, aphthous ulcers are oral soft tissue lesions often associated with diet and stress, glossitis is inflammation of the tongue, and xerostomia is the medical term for a dry mouth.

28. **Correct answer: c.** These patients will suffer from angina, and the classic symptom of this condition is chest pain that occurs in relation to exercise, exertion and stress. In contrast, the chest pain associated with a myocardial infarction is crushing, of sudden onset and not related to exertion nor relieved by resting. None of the other options listed are symptoms that occur with angina.

29. **Correct answer: c.** Diabetes is a medical condition associated with dysfunction of the islets of Langerhans cells in the pancreas, which normally produce insulin. Insulin is required by the body to remove glucose from the circulatory system and allow its metabolism by the body tissues. Although the complications associated with diabetes can affect several organs, they are the result of the condition rather than the cause of it.

30. **Correct answer: d.** Any medical disorder or physical disability that limits the movements and use of the hands, arms or wrists is likely to make oral hygiene techniques more difficult for the patient to achieve to a satisfactory
level. Plaque control is likely to be reduced in these patients, making them more prone to dental caries and periodontal disease. None of the other options listed are specific to the presence of osteoarthritis.

31. Correct answer: b. The salivary glands are all exocrine glands – they release their secretions (saliva) into the oral cavity through ducts rather than directly into the bloodstream. The gallbladder is a storage organ for bile, and it also releases its contents into the digestive tract through a duct.

32. Correct answer: a. Patients at risk of an intravascular clot (thrombus) either forming or dislodging will be prescribed the anticoagulant warfarin, and are likely to have additional bleeding problems during or following minor oral surgery. They would require to have their INR score taken and recorded just before any procedure was performed in order to avoid bleeding complications. Haemophiliacs are patients who suffer from clotting disorders anyway, and would need to be treated under hospital conditions for these types of procedures. Angina poses no additional risk with regard to bleeding complications during minor oral surgery procedures.

33. Correct answer: e. Thyroxine is a medication given to patients with an underactive thyroid gland, and is required to replace the normal thyroxine secretion of that gland. The drug increases the overall metabolic rate of the patient, and so if adrenaline-containing local anaesthetics are also given, the overall effect can be to increase the heart rate to dangerous levels. Consequently, these types of local anaesthetic are avoided in these cases. Local anaesthetics containing adrenaline are not contraindicated with any of the other medications in the options list.

34. Correct answer: d. Bronchial asthma is a relatively common condition that affects the smaller bronchioles of the lungs, which react in an abnormal way to external allergens that have been inhaled. The allergens stimulate a hypersensitivity response, and sufferers have particular difficulty with expiration during an asthma attack. The options listed occur in various other respiratory disorders, but not bronchial asthma.

35. Correct answer: c. Each artery has a layer of smooth muscle running along its length, but it also has a thick elastic layer that prevents backflow as the surge of blood travels from the heart to the body tissues and organs. The pulse of blood passes through the stretched artery, and then the recoil of the elastic layer closes the lumen of the vessel so that the blood only travels onwards. The muscle layer provides strength to the vessel and prevents its collapse.

36. Correct answer: c. Erythromycin is the accepted alternative antibiotic prescribed to patients with a penicillin allergy, as the two drugs have a similar spectrum of action against bacteria. Amoxicillin is a penicillin-based antibiotic and would not be safe for this patient, as it would also stimulate an allergic reaction. Aciclovir is an antiviral drug, nystatin is an antifungal drug, and paracetamol is an analgesic.
37. **Correct answer: a.** Glyceryl trinitrate is provided as a sublingual spray for self-administration by patients suffering from angina. It is also a required medical emergency drug to be kept on the premises in all dental workplaces, in the event of a patient suffering an angina attack at the surgery, for administration by a member of the dental team. The drug is not used for any of the other options listed.

38. **Correct answer: d.** The endothelial walls of capillaries are just one cell thick to allow the rapid transfer of molecules and gases across their surfaces. This transfer occurs from the bloodstream into the surrounding tissues, as well as in the opposite direction. None of the other options listed are features of these microscopic vessels.

39. **Correct answer: e.** The superior vena cava and inferior vena cava are the large venous blood vessels that return deoxygenated blood from the whole body to the right atrium of the heart. The superior vessel transports blood from the upper areas of the body, and the inferior vessel from the lower areas of the body. The collected deoxygenated blood is transported from the heart to the lungs in the pulmonary artery, where it is reoxygenated. This then travels from the lungs to the left atrium via the pulmonary vein, and then out to the body tissues via the aorta.

40. **Correct answer: a.** Aspirin has anticoagulant properties and would likely cause bleeding complications if taken after a surgical procedure. Any of the other options listed would be suitable analgesics to be recommended to the patient as alternatives in these circumstances.

41. **Correct answer: e.** Patients with valvular heart disease have, by definition, either damaged heart valves or prosthetic replacements for them. The presence of either makes the heart valves more likely to allow their colonisation by bacteria present in the circulatory system (bacteraemia), as occurs after dental procedures such as endodontics. The patient could then develop the condition of bacterial endocarditis, which may be life-threatening. Consequently, these patients tend to be unsuitable for dental procedures where a bacteraemia may develop, such as root canal therapy. None of the other options listed are medical conditions that contraindicate this dental treatment.

42. **Correct answer: b.** The reduced peripheral circulation associated with diabetes leads to an increased predisposition to infections and poor wound healing, due to the inability to transport sufficient leucocytes to a diseased area and to initiate an adequate immune response. Consequently, diabetics tend to be more prone to periodontal destruction and localised oral infections, such as a dry socket. None of the other listed medical conditions will particularly affect the oral cavity.

43. **Correct answer: a.** Erythrocytes are the red blood cells responsible for the transport of oxygen around the body, and as with all other blood cells (except some lymphocytes) they are manufactured in the bone marrow. Of the options
listed, only the spleen represents another structure involved with blood cell production, as it is responsible for the manufacture of some lymphocytes.

44. Correct answer: a. Rings of cartilage circle the trachea and prevent its collapse during inhalation and expiration. The rings also extend into the two bronchi, and have the same purpose here. All the other options listed are features of other areas of the respiratory tract, but not the trachea.

Extended matching questions

General anatomy and physiology

1. Correct answer: j. The stomach produces this enzyme in its inactive form of pepsinogen, which is then converted to pepsin that acts to aid the digestion of proteins.

2. Correct answer: a. The red blood cells – erythrocytes – are responsible for the transport of oxygen around the body, and like the majority of blood cells they are made in the bone marrow.

3. Correct answer: h. Although the stomach is responsible for breaking up the food that is swallowed, by its churning actions and release of hydrochloric acid that chemically breaks food into smaller particles, the vast majority of the actual digestion of nutrients occurs in the small intestine. Its long length and extensive blood supply allow hours of digestive action and nutrient absorption to occur before the food mass passes into the large intestine.

4. Correct answer: e. The liver is the largest organ in the body and has many functions besides the detoxification of drugs. It is the main organ responsible for this important role, and any disease process affecting the functioning of the liver is likely to result in the sufferer becoming very seriously ill, as poisons and toxins accumulate in their body.

5. Correct answer: g. The pancreas is one of the accessory organs of the digestive system, like the liver. It is essentially a glandular organ, and is responsible for the production and release of the hormones insulin and glucagon, which act together to control blood sugar levels.

Medical conditions

1. Correct answer: c. Although a common disorder in smokers, chronic bronchitis also occurs in non-smokers who have lived extensively in areas of high atmospheric pollution. This pollution is linked to heavily industrialised areas, as occurs in large cities.

2. Correct answer: j. A stroke occurs when a cranial blood vessel suddenly becomes blocked by a blood clot, causing the area of brain tissue it supplies to die. If a casualty survives, the anticoagulant drug warfarin is given to prevent
further clot formation. Other medical conditions involving the use of warfarin in this way are deep vein thrombosis, pulmonary embolism and, in the short term, myocardial infarction.

3. Correct answer: h. Hypertension is a medical condition where the sufferer’s blood pressure is persistently raised above normal levels (around 120/80 mmHg in healthy adults). The higher pressure means that the heart has to work harder to pump blood effectively around the body, and this will gradually cause damage to the heart. Another risk factor of hypertension is stress.

4. Correct answer: g. Non-steroidal anti-inflammatory drugs (NSAIDs) are very useful medications for short-term use to ease a variety of problems, but they should not be taken over a long time because of their erosive effect on the stomach lining. In some cases, overuse of NSAIDs causes erosion through the stomach lining and leads to the formation of a gastric ulcer. Sufferers may then require further medication to treat the indigestion-type symptoms that this condition produces.

5. Correct answer: e. The pancreas produces the hormones insulin and glucagon, which act together in a healthy person to control blood glucose levels throughout life. Dysfunction of cells within the pancreas results in a lack of insulin production, and the patient develops diabetes. It is quite common for several members of a family to be diabetics.