

Doctors Unlimited A Summer in Colombia

Theory Examination



Administration and Marking Guide





Task 1- Fernando's Fatigue

Circulatory System

Function:

The primary function of the circulatory system is the transportation of materials throughout the body. This includes:

- *Carrying digested food from the small intestine to all areas in the body that need it*
- *Carrying oxygen from the lungs to the rest of the body*
- *Aiding in the disposal of wastes from the body*
- *Distributing heat*

In addition, the circulatory system fights diseases by using white blood cells to fight off infection.

Respiratory System

Function:

The primary function of the respiratory system is to supply the blood with oxygen and to provide a means by which the waste gas of metabolism, carbon dioxide, can be eliminated from the body.





Explanation of how cardiomyopathy affects the circulatory and respiratory systems and makes Fernando feel so tired:

The circulatory and the respiratory systems work together to deliver oxygen to the cells. The respiratory system brings oxygen into the lungs when we breathe in and provides the site for the oxygen to enter the bloodstream (the alveoli). The circulatory system then carries the oxygen to the cells.

The heart is the pump for the circulatory system. Cardiomyopathy causes the walls of the heart to thicken and become rigid so the pump can no longer work as well. A thicker heart wall means that there is not as much space in the heart chambers for blood. Therefore, less blood can be pumped out of the heart to the body each time the heart beats or contracts.

If the heart is not able to pump enough blood, it is harder to transport all of the digested food and oxygen that the body needs to function. Oxygen and glucose (digested food) is needed by the body for cellular respiration. Cellular respiration is a process that releases energy to the body.

Furthermore, the heart will not be pumping blood as efficiently to the lungs and the alveoli for gas exchange. Therefore, oxygen will not be entering the blood stream as quickly.

The heart will also have to beat faster in an effort to meet his body's need for oxygen and nutrients.

Therefore, Fernando is feeling tired because not enough oxygen and digested food is getting to his cells, to produce energy for his body.





Task 2- Fernando's Abdominal Pain

Explain how food is normally digested and absorbed within the digestive tract. You may support your answers with diagrams where appropriate.

Use the following key words in your answer:

Mechanical transformation, chemical transformation, stomach, small intestine, large intestine, proteins, carbohydrates, lipids, water.

Digestion begins in the mouth. When we chew food, our teeth tear and chop the food, starting the mechanical transformation of our food. Saliva is released into the mouth moistening it for easy swallowing. The saliva also contains enzymes that start to break down the carbohydrates (chemical transformation).


The food is swallowed and travels through the esophagus into the stomach. The mechanical and chemical transformation of food continues in the stomach. The stomach muscles churn and mix the food with acids and enzymes, breaking it into much smaller, more digestible pieces (mechanical transformation). The enzymes then start the digestion of proteins (chemical transformation).

The partially digested food moves into the small intestine, where the chemical transformation of proteins, carbohydrates, and lipids is completed.

The end products of this digestion are then absorbed into the bloodstream through the villi of the small intestine.

Waste products move into the large intestine. The function of the large intestine is to reabsorb water, which is always needed by the body. The solid waste is then excreted from the body through the rectum and anus.





Explain how an inflamed large intestine (colon) could interfere with the normal functioning of digestion.

The inflamed large intestine may the following effect:

The inflamed large intestine may make it difficult for food to move normally through the digestive tract. Since muscle tone is lost in the colon, the intestinal wall may not be able to contract and move the waste through the colon. The waste may gather in the inflamed area. Since water is reabsorbed in the large intestine, then the waste may become dried out and hard, blocking the system.

Task 3: A Blood Transfusion

Is it possible for Irene to safely receive a transfusion? If yes, which blood type(s) would you use? Justify your answer

☒ Yes, it is safe for Irene to receive a blood transfusion.

☐ No, it is not safe for Irene to receive a blood transfusion.

I would use blood type(s) ____ O⁻ blood. _____

Justify your answer:

Some blood types can clump when mixed with other blood types. This clumping of the blood can be very dangerous.

Blood will clump when an antigen in one blood type is mixed with an antibody for that antigen in another blood type.

Irene's blood type is A⁻. This means that her blood has "A" antigens, "B" antibodies, and antibodies for the Rh group. Therefore, it is not safe for Irene to receive blood that has A antibodies, B antigens, or the Rh group. Any blood type with "B" has B antigens, so it is not safe for Irene to receive type B blood. Any blood that is Rh + has Rh antigens, so it is not safe for Irene to receive that blood.

The only blood available that does not have B or Rh antigens is the O⁻ blood. Therefore, it is safe for Irene to receive the O⁻ blood.



Task 4: Money for Blood

Advantages of Paying Blood Donors	Disadvantages of Paying Blood Donors
<ul style="list-style-type: none">• <i>Paying blood donors can encourage more people to donate blood.</i>• <i>If more blood is collected, then more blood products can be used to save lives.</i>• <i>Blood supply shortages can be prevented.</i>• <i>Income can be provided for people who do not have many opportunities to earn money.</i>	<ul style="list-style-type: none">• <i>Blood collected from paid donors is more likely to be contaminated.</i>• <i>People who should not give blood may lie about their health in order to earn money.</i>• <i>People may risk their health by giving blood too frequently.</i>• <i>It costs money to run the program.</i>

What is your opinion?	
Blood banks should be allowed to pay blood donors.	
Agree <input type="checkbox"/>	Disagree <input type="checkbox"/>

Justify your opinion based on scientific or technological arguments.

Examples of arguments for:

- *Blood-screening techniques are well developed, so the safety of the blood supply is not really at risk.*
- *Blood banks can implement a screening process to eliminate high-risk donors.*
- *There is no substitute for blood components, so the blood supply must be maintained.*
- *Blood banks may be able to recruit donors with rare blood types.*

Examples of arguments against:

- *Safety of the blood supply is at risk.*
- *Many diseases can be transmitted through the blood and there can be errors in the screening process.*





Justify your opinion based on at least two other aspects (ethical, economic, social, or legal)

Ethical arguments can relate to

- *Whether it is “right” to sell body parts and products*

Ethical arguments against paying blood donors include:

- *People should give blood for altruistic reasons.*
- *People may lie in order to be paid for blood.*
- *Some blood banks may be unethical in collecting blood (too often, not screening blood) so they can earn money.*

Ethical arguments for paying blood donors include:

- *Lives are at stake. People need blood and governments should do something to make sure blood is available.*

Economic arguments against paying blood donors include:

- *It costs money to run the program.*
- *It would also be a waste of money to collect blood, screen it, and have to throw it away because it carries an infection (more paid donors have diseases than voluntary donors)*

Economic arguments for paying blood donors include:

- *It provides a source of income for people.*
- *In some ways, we already spend a lot of money getting people to donate blood (media campaigns, incentives such as scholarships) so paying blood donors would not cost more money.*
- *Donors do not have to be paid a lot of money.*

Social arguments for paying blood donors include:

- *Most people want to help others, so they just need to be reminded.*
- *A government should promote social responsibility.*

Social arguments against paying blood donors include:

- *People are just too busy to give blood — they need other reasons.*
- *Many people do not think about helping strangers.*

Legal arguments against blood donors include:

- *Even if laws are enacted to regulate blood donation, not everyone will follow them and they might be hard to enforce.*

Legal arguments for paying blood donors include:

- *Laws could be enacted to regulate the payment of blood donors.*



