



**Medical Equipment II (Part 2) Term Exam – 2013 SOLUTIONS**

**Solve as Much as You Can – Maximum Grade for Both Parts 1 and 2: 50 Points**

**Part I. Complete the following sentences [1 points each]:**

- Lower Oxygen solubility in alveolar wall results in **LOWER** efficiency of gas exchange.
- Triggered or supported breathing can be **SYNCHRONIZED** with mandatory breathing.
- Limit variable is one that can reach and maintain a preset value before **INSPIRATION** ends.
- To allow a patient to eat and drink while on a ventilator, Oxygen is administered using **NASAL CANULAE**
- Waste metabolites are removed from the patient’s blood in hemodialysis using a process called **DIFFUSION**
- To prevent cross-infection, blood line in hemodialysis is **DISPOSABLE**
- Detection of wrong input dialysate concentrates in hemodialysis can be done using **pH monitor** or **concentrate pump speed monitor** (any of them is a correct solution)
- Air bubble detection is usually implemented based on **ULTRASONIC** sensors.
- A tissue with half the attenuation coefficient of water will have a CT number of **-500**
- The highest efficiency CT scanning technology is called **CONE BEAM CT (CBCT)**

**Part II. Mark the following statements as True (T) or False (F):**

- Some Ventilators can work using a compressed air as energy source. **(T)**
- Mandatory breathing mode in NIV is triggered by spontaneous breathing. **(F)**
- By the end of the contact time, Oxygen partial pressure in capillary blood and alveolar gas is same. **(T)**
- The hysteresis in the pressure-volume curve of respiration represents the work done by the alveoli. **(F)**
- Expiratory cycling can be done using time or spontaneous breathing. **(F)**
- Spontaneous breathing is always allowed with CPAP treatment. **(T)**
- False blood leak and conductivity alarms can be caused by air bubbles in the dialysate. **(T)**
- Dialysate line is disposable for patient safety. **(F)**
- pH monitors can be added in some hemodialysis machines to ensure that the mixed dialysate is safe. **(T)**
- In hemodialysis machines, venous pressure must be higher than arterial pressure. **(T)**
- Integrity of the blood circuit in hemodialysis is monitored by blood leak detector. **(F)**
- In CT, all x-ray sources are present in the gantry and all detectors are included in table. **(F)**
- It is possible to display two images for bone and soft tissues from a single CT scan using windowing. **(T)**

**Part III. Answer the following problems:**

- [6 points] Solve the shown reconstruction problem using: the algebraic reconstruction technique

**14 16 18**  
**8 10 12**  
**2 4 6**

A single ART iteration on all equations will be a correct answer regardless of end result.

