


<p>Tanta University Faculty of Medicine Anesthesia, SCC&amp; Pain Medicine Dep. Date:12 / 8 / 2018</p>	<p>Exam: MD - 1<sup>st</sup> part : (Physics &amp; Measurements) No. of Questions: 4 Times allowed: 3 hours Total marks: 90</p>	
--	---	---

**Q1. Use of ultrasound has an important role in modern anesthesia and critical care practice:**

- A. Describe the physics of ultrasound, how is it generated, and what is the frequency used. (6 marks)
- B. How does the system know the depth of the reflection? (4 marks)
- C. What is the piezoelectric effect? (3 marks)
- D. Outline uses of ultrasound in anesthesia and ICU. (7 marks)

**Q 2. Missing any of basic anesthesia monitoring is considered a substandard practice:**

- A. Mention the normal values of the arterial blood pressure in the newborn, infant, child, adolescent, adult and elderly. (2 marks)
- B. Compare and contrast invasive and noninvasive arterial blood pressure measurements. (3 marks)
- C. Discuss the damping effect in invasive blood pressure measurement. (3 marks)
- D. Describe the physical principle of pulse oximetry? (4 marks)
- E. What is the clinical significance of a value of SpO<sub>2</sub> 95% in response to a value of FiO<sub>2</sub> > 0.35? (2 marks)
- F. Describe the physical principle of a capnogram? (4 marks)
- G. Interpret sudden loss of end-tidal CO<sub>2</sub> tracing in a patient undergoing laparoscopic bariatric surgery? (2 marks)

**Q 3. Safety in anesthesia practice should consider electrical safety in the operation room.**

- A. Define the following terms: resistance, inductance, and capacitance? (3 marks)
- B. Mention the difference between macro-shock and micro-shock? (2 marks)

- C. What are the effects of an electric current transmitted through the body? (2 marks)
- D. Contrast unipolar versus bipolar diathermy? (2 marks)
- E. How to prevent electrocution from a diathermy? (4 marks)
- F. Discuss the safety precautions to prevent fire in the operation room? (12 marks)

**Q 4. Anesthesia circuit should maintain adequate anesthetic concentration, adequate oxygenation, and effective elimination of CO<sub>2</sub>.**

- A. Discuss methods of elimination of CO<sub>2</sub> from anesthesia circuits. (10 marks)
- B. Define low flow anesthesia, what are its advantages? How you prevent its potential hazards? (8 marks)
- C. Outline the contraindications of low flow anesthesia (3 marks)
- D. Describe breathing circuit would you recommend for anesthetizing a 2-year-old child undergoing inguinal hernia repair? (4 marks)

.....GOOD LUCK.