Tanta University	1st part MD (Physics and measurements)	
Faculty of Medicine	Time: 3 hours	
Anesthesia & SICU Dep.	No. of Questions: 4	
Date: 26-2-2022	Total marks: 90	

Question 1   (25 marks)

Anesthesia machine is the most important equipment for the anesthesiologist.

a. What are the problems of variable bypass plenum vaporizer and how to overcome? (10 marks)

b. Discuss the disadvantages of the low flow and closed circuits? (5 marks)

c. Describe Oxygen pressure failure device and their limitations? (5 marks)

d. What is the Coanda effect and its clinical application in anesthesia? (5 marks)

Question 2   (25 marks)

a. Define Ostwald coefficient for blood–gas? (3marks) What does a high blood gas partition coefficient mean and the effect of hypothermia and hemodilution on it? (7marks)

b. Describe structure, mechanism of action and limitations of Clark electrode? (5 marks)

c. How does single stage pressure regulator (reducing valve) work? (5 marks)

d. Define Henry law, Dalton law and critical temperature and mention their clinical application in anesthesia? (5 marks)

Question 3   (20 marks)

a. Pulse oximeter is used for routine monitoring of oxygen saturation. Discuss reliability of pulse oximeter SpO_2 reading in case of sickle cell anemia? (5 marks) Both arterial and end tidal CO_2 are important in patient monitoring. Interpret $PaCO_2$ 55 mmHg in patient with $ETCO_2$ 35 mmHg ? (5 marks)

b. Mention ABG reading errors due to blood sampling and temperature and their prevention? (5 marks)