

Comprehensive Open Water Exam

Instructions: Do not write on this test; all answers should be written on a separate sheet of paper. You may use any of the materials from the course (Book, workbook, notes, etc) but you may not consult another person. When completed, drop off both the copy of the exam and your answer sheet at the divestore.

Good Luck.

Diving Equipment

- 1.) A NAUI Open Water Certification is a “License to learn” and certifies you to dive in conditions _____.
- 2.) What is the most important factor when selecting SCUBA equipment?
- 3.) What are the problems with snorkels that are over 15 inches in length?
- 4.) Of the two types of fins used in diving (Open Heel and Full Foot), which type is preferred for SCUBA Diving and why?
- 5.) The _____ stage of a regulator reduces the pressure from cylinder pressure to an _____ pressure. The _____ stage of a regulator reduces this _____ pressure to an _____ pressure.
- 6.) What must a diver do with his or her equipment after every dive? What special consideration is taken for regulators?
- 7.) What do these markings mean:
 - a. 3 AL :
 - b. 3 AA 2400:
 - c. P548067:
 - d. 5 Δ 03:
- 8.) What are the two exams performed on SCUBA Cylinders and how often must they be done?
- 9.) Cylinders are made from both Steel and Aluminum. What are the advantages and disadvantages of each of these?
- 10.) What is the purpose of a BC (Buoyancy Compensator)?

- 11.) Of the following accessories, which is absolutely necessary to enjoy a dive?
- a. Underwater Camera
 - b. Spear Gun
 - c. Dive Light
 - d. Dive Flag
 - e. All of the above
 - f. None of the above
- 12.) The invention of _____ made _____ unnecessary.
- a. Submersible Pressure Gauges; J Valves
 - b. Dive tables; Dive computer
 - c. Snorkel; Regulator
 - d. Dive Knives; bottle openers

Diving Physics

- 13.) Sound travels ____ times _____ in water.
- 14.) Because of refraction, objects underwater appear _____ and _____.
- 15.) What is the 5th color lost in the spectrum upon descent?
- 16.) Heat is absorbed ____ times _____ in water.
- 17.) Because air has weight, air exerts pressure. How much does air weigh per cubic foot?
- 18.) 1 ATA = ____ p.s.i
- 19.) 1 ATA = ____ fsw
- 20.) What is the formula for converting Depth to Absolute pressure?
- 21.) Using the formula defined above, convert the following depths to Absolute Pressure:
- a. 33 fsw
 - b. 132 fsw
 - c. 87 fsw
 - d. 45 fsw

- 22.) Archimede's Principle states that an object is buoyed up by a force equal to:
- 23.) How much does sea water weigh per cubic foot?
- 24.) A diver who displaces 2 cubic feet of water and weighs 135 will:
- sink
 - float
 - remain neutral
- 25.) A diver who displaces 3 cubic feet of water will have to weigh _____ lbs in order to remain neutrally buoyant.
- 26.) Boyle's law states that as _____ increases, _____ decreases. It is expressed formulaically as:
- $P_1V_1 = P_2V_2$
 - $P_1 / V_1 = P_2 / V_2$
 - $P_1T_1 = P_2T_2$
- 27.) A balloon with a volume of 10 cubic inches at the surface, will have a volume of _____ cubic inches at 99 fsw.
- 28.) A balloon with a volume of 8 cubic inches at 90 fsw will have a volume of 16 cubic inches at _____ fsw.
- 29.) Guy-Lussac's law states that as Pressure increases, Temperature _____.
- 30.) Dalton's Law states that as Pressure increases, the Partial Pressures of gases _____. The Partial Pressure of a gas is expressed formulaically as:
- $PP_G = F_G + P_T$
 - $PP_G = F_G - P_T$
 - $PP_G = F_G * P_T$
- Where PP_G = Partial Pressure of a gas, F_G = Fraction of a gas, and P_T = Total (or Absolute) Pressure.
- 31.) Air has a fraction of Nitrogen of .79. What is the Partial Pressure of Nitrogen at 99 fsw?
- 32.) A diver knows that she is affected by Nitrogen once it reaches a partial pressure of 3 to 3.5, therefore she should avoid dives in the _____ to _____ foot range.

Diving Physiology

- 33.) _____ is a protein in red blood cells that increases the Oxygen carrying ability of blood.
- 34.) The _____ are microscopic air sacks in the lungs where the exchange of gases takes place.
- 35.) Cells need this gas for metabolism. _____
- 36.) This gas is a waste product of human respiration. _____
- 37.) List 3 things that effect respiration:
- 38.) How do you equalize mask pressure?
- 39.) Why is diving with a cold not recommended?
- 40.) For each lung overpressure injury, please list the cause, symptoms, treatment and method of prevention:
- a. Pneumothorax
 - b. Mediastinal Emphysema
 - c. Subcutaneous Emphysema
 - d. Arterial Gas Embolism (AGE)
- 41.) Nitrogen Narcosis is an adverse physiological affect similar to inebriation caused by the _____ of Nitrogen. The only way to prevent Nitrogen Narcosis is to:
- 42.) What are the causes, symptoms, treatment, and prevention for DCS?

Dive Tables

- I. A diver dives to 75 fsw for 15 minutes.
- a. Letter Group Designation:
He then has a surface interval of 2 hours.
 - b. New Letter Group Designation:
He plans to dive again to 50 fsw
 - c. Adjusted Maximum Dive Time:
 - d. Residual Nitrogen Time:

II. A diver dives to 62 fsw for 35 minutes then has a surface interval of 3 hrs.
She plans to dive again to 70 fsw.

- a. Letter Group Designation after Dive 1:
- b. Letter Group after Surface Interval:
- c. Adjusted Max Dive Time for 2nd Dive:
- d. Residual Nitrogen Time:

III. Dive 1 – 70 fsw for 25 minutes. Surface Interval – 2 hrs.

- a. Letter Group Designation after Surface Interval

Diver plans to dive again to 50 fsw

- b. Adjusted Max Dive Time
- c. Residual Nitrogen Time

Diver has an actual dive time of 20 minutes

- d. Total Nitrogen Time

IV. Dive 1 – 120 fsw for 10 minutes. Surface Interval – 3 hrs 30 minutes

- a. Letter Group Designation after Surface Interval:

Plans second dive to 50 fsw

- b. Adjusted Maximum Dive Time:
- c. Residual Nitrogen Time:

Actual dive time to 50 fsw was 15 minutes

- d. Total Nitrogen Time:
- e. Letter Group Designation:

She remains on the surface for 2 hrs

- f. New Letter Group:

She plans to do a 3rd dive to 40 fsw

- g. Residual Nitrogen Time:

What will her Total Nitrogen Time be if her Actual Dive Time is equal to her Adjusted Max Dive Time?

- h. Total Nitrogen Time:

- 43.) Which of the following statements are **correct**:
- a. When planning a series of dives, always make the deepest dive first.
 - b. Recreational divers may attempt decompression dives if they feel psychologically prepared.
 - c. Divers should ascend no slower than 45 feet per minute.
 - d. Use the next greater dive time if your dive is particularly cold or strenuous
 - e. When using a computer, the risk of DCS is zero.

Environment, Communication, and Emergency Procedures

- 44.) True or False: Most animal aggression is defensive, and so divers should take care not to harass the sea life.
- 45.) When diving in a new environment, divers should receive an orientation from a local Divemaster or Instructor to be aware of and avoid:
- a. Possible dangers such as underwater obstacles, dangerous sea life or currents
 - b. Seedy bars and restaurants
 - c. Steve Irwin
- 46.) What are some possible factors that can affect visibility?
- 47.) Name some navigational aids that the diver employs in order to maintain his or her bearings while diving.
- 48.) The 'Thumbs Up' is a diving signal that indicates
- a. Good job
 - b. Up
 - c. It's 5 o'clock somewhere
- 49.) What is the proper response when given the 'Ok' signal?
- 50.) What is the difference between an Emergency Swimming Ascent and Emergency Buoyant Ascent?
- 51.) Out of Air Emergencies can be avoided by:

THE END