NOTE TO STUDENTS

Please record your answers on the answer sheet provided. Do not write on the exam. Read all of the questions carefully and answer accordingly. Some questions have several answers that should be indicated, whereas some questions have single answers. The marks available for each question are written to the right of each question. Your instructor will deduct marks for incorrect or incomplete answers. If you wish to complete this exam orally please speak with your instructor. If you have any questions about the exam your instructor will assist you.

Question 1 (2pts)

What should you do if you suspect that you suffered a perforated eardrum, and why?

Question 2 (2pts)

What is the partial pressure of Oxygen in air breathed in at the surface (in bar)?

Question 3 (2pts)

What is the partial pressure of that Oxygen if you then hold your breath and dive to 10m below the surface (in bar)?

Question 4 (2pts)

Blackout normally occurs on the shallower part of the ascent because... Circle the right answer.

A The diver's energy expenditure increases.
B The partial pressure of the alveolar oxygen rapidly decreases.
C The partial pressure of the alveolar carbon dioxide rapidly decreases.
D The pressure of the air in the ears and sinuses rapidly decreases.

Question 5 (4pts)

Which of the following might help a freediver who is suffering from cramp or tired muscles on his dives?
Choose all those that apply.

A Stretching before dive
B Drinking plenty of water
C Less time between dives so cramp does not set in
D Choosing a heavier fin

Question 6 (4pts)

Give two physiological reasons why hyperventilation can seriously increase the risk of Blackout.

Question 7 (5pts)

Write the full names of each of the lung measurements.

A TLC
B RV
C FRC
D VC
E TV

Question 8 (4pts)

Match up each part of the Mammalian Dive Response (MDR) with the correct definition.

A. Blood shift	1. Blood vessels in the extremities constrict and force blood to the core.
B. Peripheral Vasoconstriction	2. Breath-hold reduces the heart rate and metabolism. Facial immersion in water makes the response quicker.
C. Spleen effect	3. More red blood cells are released into the blood.
D. Bradycardia	4. The blood vessels around the alveoli expand and will take up the space that the air in the alveoli had, to equalize the pressure.

Question 9 (2pts)

Which of the following statements most accurately describes what happens as lung volume reduces with depth?

A As lung volume reduces with depth, Oxygen flows in to the airspaces in the lungs to equalize the pressure.
B As lung volume reduces with depth, blood plasma flows in to the airspaces in the lungs to equalize the pressure.
C As lung volume reduces with depth, blood flows in to fill the blood vessels in the lungs to equalize the pressure.

Question 10 (3pts)

Which of the following can occur as a result of the blood shift?

A Increased oxygen is available to the brain prolonging dive times.

B Reduced oxygen is available to the muscles causing a build up of lactic acid.

C Legs can weaken, feel heavy and tired.

Question 11 (3pts)

Match up each type of Blackout with its definition:

A. Shallow Water Blackout	1. Reduced blood flow to the brain due to low blood pressure caused by for example 'packing'.
B. Cerebral Hypoxic Blackout	2. Loss of consciousness due to quick reduction of pressure on ascent.
C. Cerebral Ischaemic Blackout	3. Loss of consciousness due to low ppO_2 in the brain.

Question 12 (5pts)

Create a suitable dynamic apnea (DYN) CO_2- table for yourself, based on a 25m pool.

Question 13 (5pts)

Create a suitable warm up table for yourself, attempting a maximum static apnea (STA) breath hold.

Question 14 (2pts)

At what approximate depth would you set your neutral buoyancy in each of the following situations: (Any sensible answer)

A Diving for fun to a maximum depth of 15m with a buddy who is new to freediving and can reach around 12m:_____m

B Diving in clear water for competition training with a counterbalance in use, to a depth of around 40m with a buddy who can easily safety you from 20m:_____m

Question 15 (3pts)

What would you advise a freediver who surfaces and coughs up blood to do, and why?

Question 16 (2pts)

What is the purpose of a CO_2 training table?

Question 17 (3pts)

Describe your interpretation of freediving in an ethical way towards each of the following:

A Your Buddy
B Yourself
C Your Environment

Question 18 (5pts)

List five elements of local conditions you would need to have information about to plan a freedive session at an open water site new to you.

Question 19 (4pts)

What is the difference between peripheral and cerebral vasoconstriction, and what causes each of them?

Question 20 (3pts)

If you had to give someone new to the sport ONE piece (and only ONE piece) of information about how to freedive, what would it be?

Question 21 (6pts)

Which of these are signs and symptoms of a lung squeeze?

A Tightness in the chest
B Wheezing sounds while breathing
C Loss of feeling in extremities
D Urge to cough
E Dizziness
F Fatigue

Question 22 (3pts)

Give three signs or symptoms of a perforated eardrum.

Question 23 (2pts)

Give two reasons why a freediver may have blood in their mouth or mask after surfacing from a dive.

Question 24 (7pts)

Which of the following will help you to conserve energy on a dive?

A Swim fast on the descent to save time.

B Use extra weights to make the descent easier.

C Adjust your weights to be neutral buoyant close to the turning point, to make the ascent easier.

D Gradually relax kicking/swimming beyond neutral buoyancy until stopping completely.

E Swim very slowly at the beginning of the ascent.

F Relax your swimming efforts on the last part of the ascent.

G Float up to the surface from around 5m.

Question 25 (5pts)

Name 5 symptoms of Hyperventilation.

Question 26 (2pts)

If a person suffers a BO and does not respond to the first steps of the rescue procedure. What is the maximum time you shall give the freediver to start breathing again before you start giving rescue breaths?

Question 27 (2pts)

Which physics law is this?
"The total pressure exerted by a mixture of gases is equal to the sum of the partial pressure of each of the different gases making up the mixture – each gas acting as if it alone were present and occupied the total volume."

Question 28 (2pts)

How small would the RV be on an average person with a TLC of 8L?

Question 29 (4pts)

Name 2 injuries that can occur if you keep descending despite not being able to equalize one (or both) of your ears.

Question 30 **(2pts)**

Which of the following describes diffusion.

A Diffusion is the natural tendency of a gas to move from an area of low concentration to an area of high concentration.

B Diffusion is the natural tendency of a liquid to move from an area of low concentration to an area of high concentration.

C Diffusion is the natural tendency of a gas to move from an area of high concentration to an area of low concentration.

D Diffusion is the natural tendency of a gas to dissolve in an area of low concentration rather than in an area of high concentration.

Exam Total: 100 Points

Good Luck