## 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 (1pt)

When we breathe in, air enters the lungs and travels to the alveoli where gas exchange between the lungs and blood takes place. The blood takes on $O_2$ and releases $CO_2$ back to the lungs.

A True
B False

### Question 2 (4pts)

Choose the correct answers:

A Most $CO_2$ is transported back to the lungs by red blood cells, bonded to haemoglobin.
B Oxygen is carried around the body by red blood cells, bonded to haemoglobin.
C Most $CO_2$ is transported back to the lungs dissolved in blood plasma.
D Oxygen is carried around the body dissolved in blood plasma.

### Question 3 (2pts)

The main muscles involved in breathing are the _____ and the _____ .

### Question 4 (1pt)

The most efficient muscle used for breathing is (choose one):

A Pectoral
B Diaphragm
C Biceps
D Intercostal muscles

## Question 5 (1pt)

While breathing, the saturation of your blood with Oxygen is between %98-96 at any time.

A True
B False

## Question 6 (1pt)

When the "urge to breathe" is felt the body still has $O_2$ available; therefore you can continue holding your breath for some time after this point.

A True
B False

## Question 7 (4pts)

Rising $CO_2$ level in your body can be experienced as (choose all correct answers):

A Contractions
B Light headedness
C A muscular burning sensation from the diaphragm
D A sharp pain in the diaphragm

## Question 8 (4pts)

Choose the correct answers:

A Hyperventilation lowers $CO_2$ levels delaying the urge to breath.
B Hyperventilation is a safe and effective breathing method for freediving.
C Hyperventilation is dangerous because if the urge to breathe is delayed you cannot effectively gauge your dive and can push the dive too far potentially having an LMC or BO without warning.
D Hyperventilation does not store more $O_2$

## Question 9 (4pts)

List 4 symptoms of hyperventilation.

**Question 10** **(1pt)**

If you experience symptoms of hyperventilation you should not dive and return to your relaxation exercise until the symptoms disappear.

A True
B False

**Question 11** **(4pts)**

Choose the correct answers:

A A loss of motor control (LMC) is a hypoxic fit triggered by low Oxygen levels (mild hypoxia)
B After an LMC you should immediately continue diving
C An LMC occurs on the surface after a dive or static breath-hold
D An LMC can be a series of uncontrollable muscle twitches and may be accompanied by confusion and/or a lack of responsiveness

**Question 12** **(1pt)**

A "full loss of consciousness caused by severe hypoxia towards the end of a breath hold" describes (choose one):

A LMC – Loss of Motor Control
B Hyperventilation
C BO – Blackout
D Cyanosis

**Question 13** **(4pts)**

Select the statements related to the prevention of Blackouts and LMCs:

A Self awareness and experience are the keys to prevent BOs and LMCs
B Do not hyperventilate before a dive!
C Adopt a slow progression approach when freediving, with repetitions before increasing depths or times.
D Using a relaxation exercise is the safest way to prepare for a breath hold

**Question 14** **(4pts)**

List 4 signs to identify that your buddy suffers from a Loss of Motor Control (LMC).

**Question 15** **(4pts)**

List 4 symptoms that may indicate to you an oncoming black out (BO) during a breath hold.

## Question 16 (1pt)

What is the most likely cause for a blackout (choose one)?

A Not enough preparation time
B Hyperventilation
C Bad fining technique
D The safety diver being too close on the ascent

## Question 17 (5pts)

Put the following in correct order for the LMC rescue procedure:

A Gently hold the freediver so the airways are out of the water
B Check for any injuries (pool edge impact)
C Tell the freediver to breathe
D Help to remove facial equipment if needed
E Advise the freediver to stop diving for the rest of the day

## Question 18 (7pts)

Put the following in correct order for the Blackout rescue procedure:

A Get the freediver to the surface
B Remove all facial equipment
C If the freediver does not start breathing within 15-10 seconds, give up to 5 rescue breaths
D Blow, Tap, Talk (BTT)
E The freediver should stop freediving for the day
F Hold the airways of the blacked out freediver clear out of the water
G If no recovery, remove the freediver from the water, start CPR; seek emergency medical assistance

## Question 19 (4pts)

List 4 factors how you can be prepared in case there might be a Blackout or an LMC.

## Question 20 (4pts)

List 4 factors to consider, which can affect your freediving.

**Question 21** **(2pts)**

Leave at least __hours after one scuba dive before freediving to avoid DCS and at least __hours after multiple dives.

**Question 22** **(1pt)**

On immersion into water, pressure increases at approx 1 bar for every 10m of seawater.

A True
B False

**Question 23** **(1pt)**

Which of the following statements describes Boyle's Law (choose one):

A "If temperature remains constant, the volume of a gas is inversely proportional to the absolute pressure"
B "If temperature remains constant, the volume of a gas is equal to the absolute pressure"
C "If pressure remains constant, the volume of a gas is inversely proportional to the absolute temperature"
D None of the above

**Question 24** **(3pts)**

List 3 air spaces that a diver needs to equalize on descent.

**Question 25** **(4pts)**

Which of the following are techniques used to equalize the ears and sinuses (choose the correct answers):

A Medulla Manoeuver
B Valsalva Manoeuver
C Forage Manoeuver
D Frenzel Manoeuver

**Question 26** **(4pts)**

To equalize the mask... (select the correct answers)

A ...release the pinched nose when you feel the mask pressing in
B ...exhale lightly through the nose if needed
C ...breathe in through your nose
D ...exhale forcefully against a pinched nose

## Question 27 (4pts)

List 4 ways to facilitate equalization.

## Question 28 (1pt)

It is important to keep your freedive equipment out of the sun. Most equipment is made from material sensitive to heat and UV rays.

A True
B False

## Question 29 (4pts)

What features are desirable in a freediving mask (choose the correct answers)?

A Low volume
B A flexible skirt so it can be compressed more without being uncomfortable
C Clear lenses enabling your buddy to see your eyes for safety
D Mirrored lenses

## Question 30 (4pts)

Which of the following statements describe characteristics of bi-fins for freediving?

A They are longer and more powerful than traditional fins
B They have half foot pockets and are worn with boots
C Freediving fins are made from plastic material only
D Blades are available in varying stiffness

## Question 31 (4pts)

Freediving weight belts... (choose the correct answers)

A ...are worn on the hips rather than the waist in order not to hinder breathing
B ...never have a quick release
C ...use large blocks of weight to limit the number of pieces on the belt
D ...are made from flexible material, so the belt stays on the hips when stretched tight

## Question 32 (4pts)

Fit the correct description to each freediving discipline! Choose from the following list:
Static Apnea, Dynamic Apnea, Constant Weight, Free Immersion, Variable Weight, No-Limits

A Horizontal distance covered on one breath in a pool
B Descend on a weighted sled and ascend with a lift bag or other device
C Pulling yourself down and back up a line with no fins
D Descend with weight or sled and ascend without weights
E Breath hold, face down in the pool
F Swim down and back up using the same amount of weight

## Question 33 (1pt)

Recovery breathing can be described as (choose one):

A Deep slow inhales from the diaphragm
B Passive exhalations followed by quick inhalations
C Full exhales followed by full inhales
D Shallow inhales and exhales

Exam Total: 100 Points

**Good Luck**