

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: October 2017

ANSWER GUIDELINES

Please note the answers provided here are for guidance only. The nature of the examination means that for some questions there may be other “correct answers”.

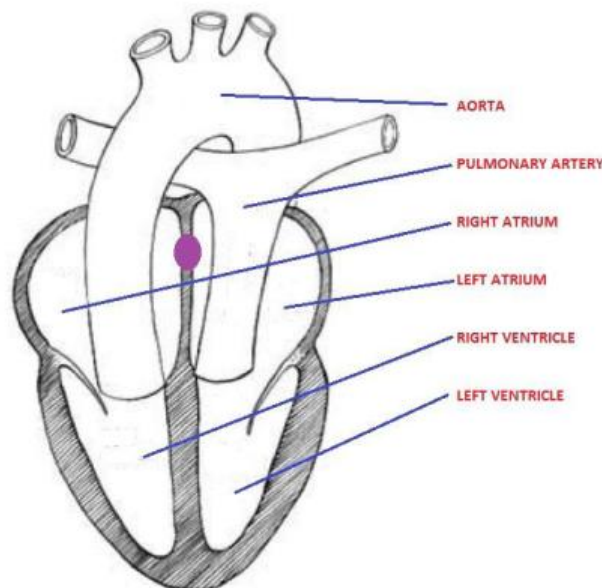
MEDICAL

- 1a) Hypovolaemic shock
 - b) Low resistance shock
 - c) Neurogenic shock
 - d) Cardiogenic shock
 - e) Anaphylactic shock
 - f) Immersion shock
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- 2a) Orientation
 - b) Eyes/Vision
 - c) Ears/Hearing
 - d) Face/symmetry
 - e) Mouth/tongue
 - f) Torso/sensations
 - g) Upper limbs/weaknesses
 - h) Lower limbs/weaknesses/walking
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- 3a) Yourself: Nausea, Fatigue, Dizziness, Headache
 - b) Buddy: Complaining on not feeling well, Unconsciousness

- 4a) Suspected heart attack or angina.
- b) Remove kit, Keep sitting up, Contact emergency services (Coastguard and ambulance – former to help extraction, later to deal with suspected heart attack), loosen neck seal (cut if required with trauma shears) and remove from drysuit, make comfortable, administer oxygen and prepare AED just in case, reassure casualty and keep comfortable, secondary assessment (Symptoms, Allergies, Medication, Past History, Last Meal, Events Leading up to incident).

- 5a) Yawning
- b) Swallowing
- c) Valsalva: Pinch nose and blow (most commonly used in diving)
- d) There are other techniques e.g. Toynbee: Pinch nose and swallow, Lowry (blow and swallow at same time), Edmonds, Frenzel.

- 6a)



DECOMPRESSION

- 7a) $6 \times 0.30 \times 0.179 + 6 \times 0.20 \times 1.428 + 6 \times 0.5 \times 1.251 = 0.32 + 1.712 + 3.75 = \mathbf{5.785}$
- b) 5.2 g/l to 6.9 g/l (max)
- c) 29m to 39m (max)

- 8a) Colder tissues absorb less inert gas (Charles Law). Warmer tissues off gas better. So slightly cold at the start and warm at the end (opposite to normal)
- b) Best to be warmer at the end of the dive to reduce gas uptake so turn vest on later on in the dive.

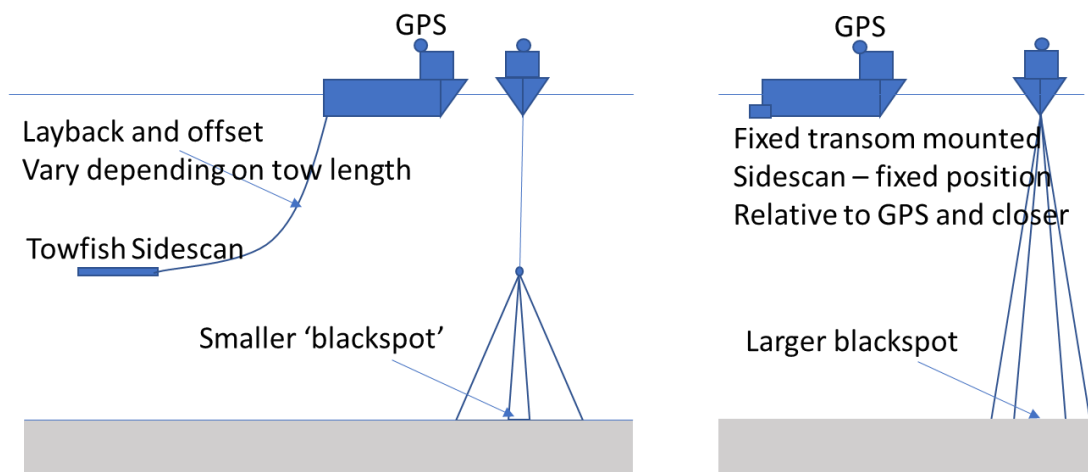
- 9a) The 30/90 gradient factor introduces significantly more stops at 6m. The 50/90 gradient factor reduces the amount of time at depth and so overall reduces the total time in the water. Interestingly the only difference in profile is 1 minute less at 9m.
- 10a) Reading across to 36m – 1min @ 9m and 7min @6m.
 b) $50\% \times 0.5 * 0.5 = 12.5\%$
- 11a) $1.25/4.6=27\%$
- 12a) Adopt a horizontal posture in the water, gently move around, maintain correct stop depth

EQUIPMENT

- 13a) Comply with revised version of BS EN 250A for Alternative Source Octopus than can be used below 30mtrs and in less than 10°C water temperature to ensure that user will get sufficient gas when two people are breathing of the same regulator system.
 b) Avoid storing in cold garage or boot of the car overnight, air temperature is often lower than water so submerge as soon as possible.
- 14a) Advantage: High level of detail, 3D image.
 b) Require large amount of computing power, require skill and good lighting and visibility for good results.
- 15a) RAW format is a file format for storing digital photographs.
 b) A key advantage of this format is that all the image information is retained to aid digital post processing unlike other formats e.g. jpeg where some image information is lost in the compression techniques.
 c) Disadvantage of RAW is that not all digital cameras offer the format and files sizes are large.
- 16a) Adiabatic expansion of air results in cooling, generally leading to build up of ice around pillar valve and general cooling of cylinder.
 b) Could lead to condensation on the inside of tanks.
 c) Also potential “cold burns” from anyone handling the pillar valve.
- 17a) Temperature sticks monitor temperature front in a rebreather scrubber and indicate use of the scrubber. It is not a critical element to the use of the rebreather so it provided the user was not relying on it for duration of scrubber for the dive, they would not necessarily need to bail out.
- 18a) It will weigh less in seawater but use 60kg as maximum weight. $60 \times 4.5 = 270\text{lt}$
 b) $270/12 = 22.5\text{bar}$

DIVE PLANNING & TECHNIQUES

- 19a) Use rule of twelfths. 13:45 is 2 hours before HW. 1 twelfth = $(4.6-1.0)/12 = 0.3\text{m}$
 $3 \times 0.3 = 0.9\text{m}$.
 Therefore, assuming seawater calibrated dive computer, chart datum = $20 - 4.6 + 0.9 = 16.3\text{m}$.
- 20a) Protected Places can be dived on a look but do not touch basis.
 b) Controlled Sites need a license issue by Secretary of State (or on their behalf) before diving takes place.
- 21a) Towfish type side scan better in deep water as there the fish can be flown closer to the seabed and therefore (see more) but need to manage catenary of tow and georeferenced the output is harder.
 b) Transom mounted side scan more easily managed and easily georeferenced (i.e. you can directed take a GPS position from the image). Good in shallow water but very limited in deeper water.



- 22a) Do not wear gloves, do not touch the coral or land on the coral, do not fin too close to the coral and disturb silt/sand or kick the coral with your fins, be careful not to launch your delayed SMB to close to the wall to avoid entanglement with the reef, maintain buoyancy control, stick to the house reef rules and the path.
- 23a) Until recently Ghost Fishing UK were operating on an understanding that a marine license was not required to remove old fishing nets as it was thought it was categorised as contemporaneous marine litter. MMO advise it is licensable and thus a fee would be due and are concerned about unintended damage to marine environment. They are working with BSAC to resolve the issue which has already antagonised elements of the diving community.

- 24a) Subject to your BSAC qualification and diving experience you are covered for the following: If someone brings a civil claim for compensation against you for causing injury/death/damage to property.
- b) Legal defence costs if you face a criminal charge or civil claim for manslaughter, corporate manslaughter, culpable homicide or abuse. Damage to the property of a member of the public/ premises owner. These are all in relation to a BSAC related incident/activity.
- c) Not covered for commercial activities
- d) Damage to club kit or boats, liability when using boats, travel policy.

WEATHER & SEAMANSHIP

- 25a) Safety of Life at Sea (SOLAS)
 - b) International Regulations for Prevention of Collisions at Sea (IPRCs).
The safety guidance and rules apply to dive boat operators as much as anyone else.
- 26a) Oc. - An occulting light is a rhythmic light in which the duration of light in each period is longer than the total duration of darkness.
 - b) Fl. – A flashing light is a rhythmic light in which the total duration of the light in each period is clearly shorter than the total duration of the darkness and in which the flashes of light are all of equal duration.
 - c) Iso. - An isophase light, is a light which has dark and light periods of equal length. The prefix derives from the Greek iso- meaning "same".
- 27a) Danforth good in sand/soft mud
 - b) CQR penetrates sand, mud, weed and hooks rocks
 - c) Bruce sand and rocks.
- 28a) A white flare is used to warn against collision or by emergency services for illuminating an area at night for searching.
 - b) A coastguard helicopter my request “make smoke” on an approach to a vessel – an orange smoke flare would be appropriate
 - c) Rocket parachute type flares should not be used with a helicopter overhead.
- 29a) Anchor the RHIB on top of the site all day and take water velocity measurements using a ships log – once on a neap tide and once on a spring tide. A basic tidal diamond could be constructed with reference to local port HW/LW.
- 30a) Corresponding inshore water forecast for Selsey Bill to Lyme Regis, not advisable to go diving
 - b) Wind: Southwest veering west 5 to 7.
 - c) Sea state: Moderate, occasionally rough.
 - d) Weather: Occasional rain later.
 - e) Visibility: Good.