The British Sub-Aqua Club

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: Mar 2017

ANSWER GUIDELINES

Please note that 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

1. (a) Continue on the spot with approximately 10 RBs per minute until support from rescue boat or helicopter arrives to take over the resuscitation.

(b) Give one minute of rescue breaths (10 RBs). If no spontaneous breathing returns. Then Tow the victim to shore as quickly as possible without further rescue breaths.

2. (a) A sprain is an injury to the ligament. Sprains are caused when a joint is moved beyond its normal range, such as twisting an ankle or wrenching a knee. Sprains are also likely as a result of falls, - stretching or tearing tissues at a joint - pain at joint - swelling - bruising and discolouration (later) - pain on movement - inability to move joint

A strain is an injury to a muscle or tendon, Strains usually occur as a result of strenuous activity. An example in diving might be lifting heavy cylinders and dive bags. - overstretching of a muscle - sudden sharp pain at site of injury - swelling in limb muscle.

b) RICE – Rest, Ice, Compression, Elevation

Rest - support in most comfortable position Rest prevents further injury, and relieves pain. Braces or splints can be used to give support when the casualty needs to continue using the injured area. Ice bag or cold water compress if applied soon after the injury, ice can prevent much of the swelling that would otherwise occur. Apply ice for about 20 minutes at a time. Compression with cotton wool and bandage. A compression bandage provides some support, and may help reduce swelling. However it may also cause discomfort if it becomes too tight. Elevation of injured area keeping the injured area as high as possible above the heart helps the body reabsorb fluid that is causing swelling.

3. a) Lie down
b) Give O2 and fluids
c) Contact hyperbaric centre for recompression chamber for further advice.
d) Casualty assessment

The hyperbaric unit will advise course of action which may be recompression.

4. a) Maximise distance between AED unit and casualty
b) No-one touching casualty when shock delivered
c) Turn off oxygen when delivering a shock
d) Do not use radio to transmit whilst AED is assessing the hearts electrical activity

5. See ukdmc.org/asthma

* The diver should do their peak flow (PF) twice a day for at least three days before diving & during the diving period. Should it drop 15% below that individuals normal best they must not dive, until it has been normal for 48 hours

* If the diver has had to use a reliever inhaler they must not dive until their PF has been normal for 48 hours

*Should the diver become short of breath or wheezy on the surface or underwater the dive should be abandoned

*If there is any change in the diver's overall asthma control they should seek further advice from their GP & then their diving physician before further diving

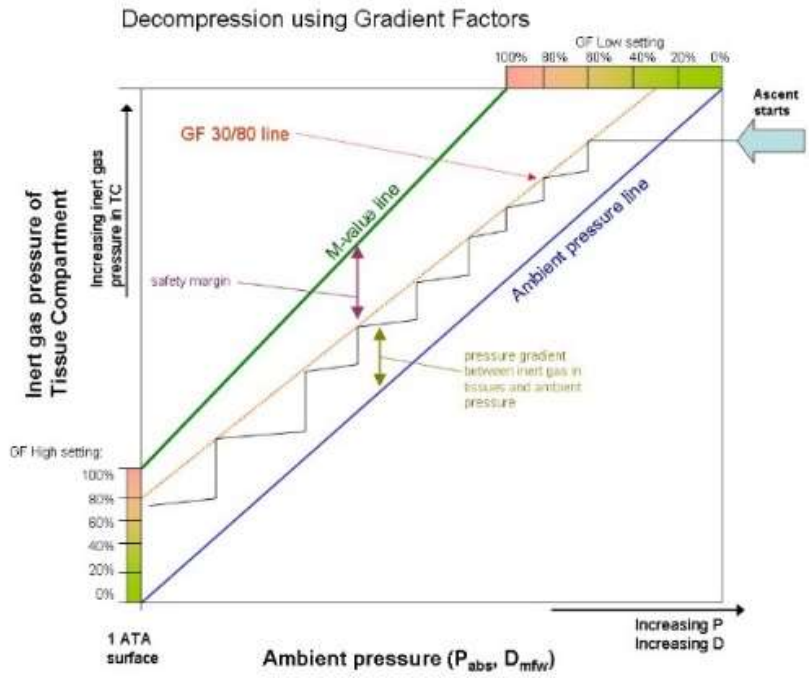
6. Fatigue, confusion, moody, heart racing, visual disturbances, hot flushes, feeling weak & shaky, looking pale, feeling hungry.

DECOMPRESSION

7. Central Nervous System, Oxygen Toxicity Units, Unit of Pulmonary Toxic Dose, Isobaric Counter Diffusion

8. Symptoms of HPNS include tremors, myoclonic jerking (involuntary muscle twitch), somnolence (sleepiness), visual disturbance, nausea, dizziness, and decreased mental performance. HPNS is a neurological and physiological diving disorder that results when a diver descends below about 500 feet (150 m) using a breathing gas containing helium.

9. Gradient Factors adjust the decompression profile to build in conservatism settings to Buhlmann's decompression model.



10. a) 2mins@9m, 5mins @6m
b) Dive can be planned on normal air tables so stops would be 2m @9 and 18 mins @ 6m.

11. Gas consumed: (24 * 120) = 2880 L, RMV = 2880 / (35*4.8) = 17.1 litres / minute

12. a) Maximum depth set by the MOD of the richest dive gas
b) Decompression plan on the weakest dive gas
c) Switch to decompression gas set no deeper than the MOD of each divers decompression gas
d) Divers to both ideally follow the same decompression profile

EQUIPMENT

13. Gas in twinset = 2 x 12 x 120 =2800lt. Gas in 15lt = 220 x 15 = 3300lt. Pressure at end = (3300+2800)/(12+12+15)=156bar

14. Fluxgate compass is an electronic device that senses the direction of the horizontal component of the earth's magnetic field. Find them on a boats, GPS units or modern dive computer.

Advantage: easy to read, work well in rough seas.

Disadvantage: require electrical supply (battery or otherwise to work). No power = no compass bearing.

15. i) A chirp sonar signal is made up of multiple frequencies, whereas a standard sonar pulse only contains one frequency.

ii) Improved signal-to-noise ratio and clutter to noise ratio, so can increase the sensitivity of the display to identify smaller features on the seabed.

16. i) To keep any moisture in the water trap (and away from the electronics) ii) Axial

17. Activities that do not require a licence include:
Deploying and recovering temporary shot lines for divers
Using delayed or permanently inflated SMBs
Using a lifting bag to recover items which have been underwater for less than 12 months
Conducting surveys of shipwrecks by hand
Using lifting bags for underwater litterpicks.
Using them inland

18. Snells window is a phenomena caused by the refraction of light as it enters the water forming what looks like an optical man hole of light through which above water scenery can be seen when looking towards the waters surface. Often used artistically by photographers, if taking photographs looking towards the waters surface so piece of equipment being used is a camera.

DIVE PLANNING AND TECHNIQUES

19. Monitoring, Anticipation, Predicting, Planning

20 Assuming slack <0.5 knots: i) 6 to 4 hrs before HW 05:00 to 07:00 and ii) 1 to 2 hours after (at least) so 12:00 to 13:00. iii) Later slack 17:00hrs to 19:00 hrs.

21. Press MOB button if a GPS unit is available to get a position. Quickly take two/three visual transits and jot them down to enable a return to the site to undertake an underwater search. Drop a shot at the marked position. Providing conditions are favourable and the current has not picked up, kit up two additional divers (with sufficient air/surface interval). Alternatively the site may be returned to at the next convenient slack water period.

22. Bravo Lima Uniform Echo Sierra Tango Romeo Alpha Tango Oscar Sierra

23. Suitable drawing showing: line approximately 10m long, sufficient weight at the end of the line to straighten the line (2-3kg), 12-15mm dia rope, Buoy of similar size to that used for creating a shot (25lt capacity – used sofnalime tube size), brightly coloured, create a loop in the line to connect the drop bottle to, so that it will hang at a depth of 9m and can be pulled up to 6m, cylinder with suitably sized tank and mix of gas (e.g. 10lt with high percentage mix)

24. Safety: Deep water – watch depth. Stay on wall. If drift off, bag up. Exercise: Follow line down and don't pull on the line. Head SE to follow wall down to South East, sheer wall 20 to 30m, bottom about 40m broken shell, sand, gravel – expect good viz. Expect lots of life on wall as exposed to tide. Work way back up and bag off using DSMB.

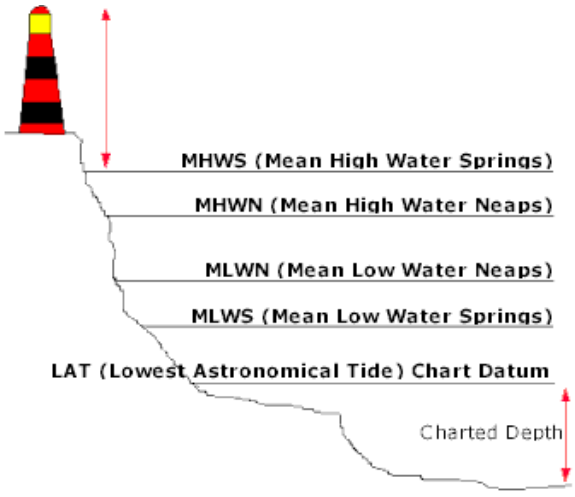
WEATHER AND SEAMANSHIP

25. a) Vessel > 50m (tow < 200m) b) Fishing Vessel c) Pilot boat

26. i) Upto to 12NM, ii) More than 12 hours iii) 1m iv) Yes.

27. Buoy in on the East i.e. Hazard is to the West, Horizontal coloured bands Black-Yellow-Black, Two arrows attached the top (one pointing up, one pointing down) making an egg shape, After dark flashing white light can be observed, three quick flashes

28:



29. A: Skeg, B: Water intake (given clarity of picture gearbox housing and oil plug acceptable), C: Primary Function Trim Tab/ Secondary Sacrificial anode, D: anti-ventilation plate

30. Weather, Tides, Navigation Information, Limitations of Vessel, Crew, Contingency, Information ashore
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