**The British Sub-Aqua Club**

# FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: October 2018

ANSWER GUIDELINES

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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".

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## MEDICAL

1a) Vinegar or methylated spirits
b) Painkillers or anaesthetic spray
c) Stop the remaining nematocysts from firing – use vinegar
d) Denature the protein that causes the inflammation – apply a heat pack.

2a) Hypocapnia is low levels of carbon dioxide.
b) Caused by hyperventilation or over breathing

3a) Hypovolaemic shock - caused by too little blood volume
b) Neurogenic shock – due to nervous system injury, severe pain, reaction to drugs
c) Cardiogenic shock - due to heart problems or mediastinal shift
d) Anaphylactic (Vasogenic) shock - caused by allergic reaction
e) Septic (Endotoxic) shock – caused by widespread infection
f) Low resistance shock – massive dilation of blood vessels

4a) Cardiogenic shock.
b) Movement of the heart in the chest cavity causing one or more blood vessels to become kinked or twisted which impairs blood flow to and from the heart (mediastinal shift).

5a) Raise the limb so that it is above the level of the casualty's heart
b) Apply indirect pressure to the brachial artery or place pads around the object and place pressure on these pads
c) 1-2 litres

6a) Send somebody to hold casualty so they don't float off.
b) Splint the arm then carefully remove the casualty's SCUBA equipment (the water should support the arm, splint it first as there will inevitably be some movement while removing equipment.)
c) Immobilise the splinted arm against the casualty's body.
d) Help the casualty to walk out of the water taking care to make sure nobody slips and falls on the way out.

## DECOMPRESSION

7a) 5min tissue would be half saturated 50% after 5min, then after half saturated again after another 5 mins 75%.
b) Total number of half times 6.

8a) Ox-stop tables indicate 2mins @ 9mtrs and 6mins @ 6mtrs
Due to gas loss refer to nitrox tables, dive out with nitrox tables
Nitrox tables indicate 2mins @ 9mtrs and 18mins @ 6mtrs
Ox-stop requires you to add 7mins to 6mtr stop
So 2mins @ 9mtrs and 18mins + 7mins = 25mins @ 6mtrs
b) Total Surfacing time 52 + 2 + 25 +1 = 80mins

9a) 1.20* 52mins = 24.960.65* 2 = 0.32 0.65* 26 = 3.2 + 0.8 + 0.16 = 4.16
24.96 + 0.32 + 4.16 = 29.44CNS

b) 1.20* 52mins = 68.64 0.65* 2 = 0.74 0.65* 26 = 7.4 + 1.85 + 0.37 = 9.62
68.64 + 0.74 + 9.62 = 79UPTD's
c) If you used 1.134, 0.513 & 0.432 or rounded these up it would still be ok

10a) ICD is where one inert gas enters the tissue faster than another can leave. This can lead to supersaturation and bubble formation.
b) The inner ear or skin lesions

11a) Gas is getting loaded into the tissues and blood, generally happens in the first part of the dive. Pressure increases, diffuse in to the tissues.
b) Blood
c) Brain
d) Spinal Cord
e) Major Organs
f) Active muscles

12a) PFO
b) Use an ultrasound scanner and inject him with an agitated saline solution and see if any bubbles transfer from the right atrium to the left.

## EQUIPMENT

13a) Nose block
b) The diver should push up the full face mask to block the nostrils, then proceed as normal with the rest of the normal process to clear the ears

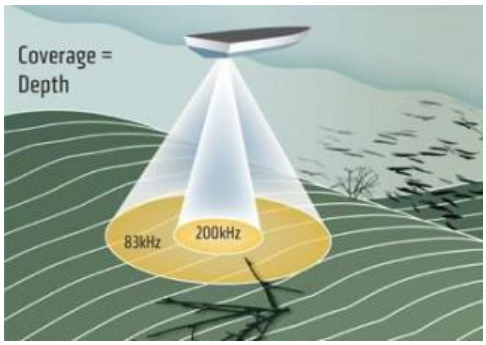
14a) Decrease in pressure
b) Gay-Lussac Law, or that with constant volume the pressure is proportional to the temperature

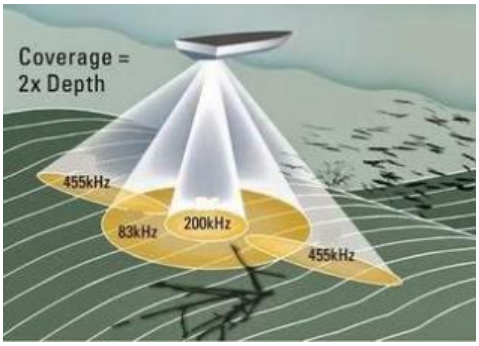
15a) Details about O2 carried (pressure, but also cylinder size)
b) Details about diluent carried (pressure, gas mix, MOD, cylinder size)
c) Details about scrubber duration at start of dive
d) Details about open circuit bailout (pressure, gas mix, MOD, cylinder size)
e) Battery life sufficient

16a) White shoulder
b) Cylinder body is black (not always true....)
c) Two pin index configuration on pillar valve
d) Pillar valve does not have 'o' ring etc, etc

17a) Increase the amount of torque (pulling power at lower speed)
b) Decrease the maximum speed of the rib

18a) 83Khz 50° b) 455Khz 7°
83Khz is a wider beam angle than a 200khz, works well for deeper objects.
83Khz gives a round beam less detail than 455Khz.
455Khz is more associated with structure scans and down scans.
455Khz gives much more detail than 83Khz at shallower depths



## DIVE PLANNING & TECHNIQUES

19a) **Advantages** You know the donated regulator is working.
b) More likely to have checked the octopus as it is for you.
c) Easy to see and always in the same place for everyone.
d) Being taught by other agencies worldwide.
e) **Disadvantages** Both divers remove mouthpieces during the incident.
f) If a problem with octopus both divers in trouble.
g) A panicky diver might snatch the regulator out of the donator's mouth surprising her.
h) Not the normal method taught to BSAC divers so less likely to be universal in a club.
i) Doesn't work with rebreathers.

20a) Weather
b) Tides
c) Suitable boats
d) Competent divers

21a) North
b) South
c) Drogue, Sea Anchor, Dragging something in the water.
d) Paddling into the wind.
e) Deflate the tubes and reduce windage. (not always the wisest move)

22a) Ferry Route
b) Underwater Submarine Cable
c) Marked Mile Distance
d) 4 Flashes repeats 15second

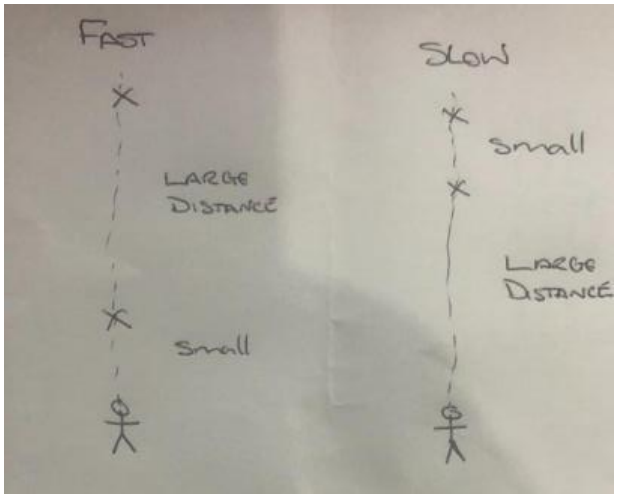
23a) Good boat cover, use shotline, check ferry times

24a) Approx **29.5** as 3pm BST is 1400 UTC. We do not work to UTC time usually when going diving. Only 5Hrs 20mins between LW & HW.
5.7 – 2 = 3.7/12 =0.3 * 3 = 0.9 26.4 + 2 + 0.9 = **29.3**

## WEATHER & SEAMANSHIP

25a) 6, 8
b) 9, 10
c) 13, 15, 17
d) 69, 72, 73 & 77

26a)




a) Fast Transit, distance between boat and first mark is less than the distance between the first mark and the second mark, goes out quite quickly with movement to either side.

b) Slow transit, distance between boat and the first mark is more than the distance between the first mark and the second mark, goes out slowly with movement to either side.

27a) Sector Light (Lateral lights were acceptable)

b) Red White Green in real view, Red Yellow Green on chart. Yellow/White is in the middle and is the line to travel.

28a) Advection, Radiation, Freezing & Valley Fog

**Radiation fog**

Radiation fog usually occurs in the winter, aided by clear skies and calm conditions. The cooling of land overnight by thermal radiation cools the air close to the surface. This reduces the ability of the air to hold moisture, allowing condensation and fog to occur. Radiation fogs usually dissipate soon after sunrise as the ground warms. An exception to this can be in high elevation areas where the sun has little influence in heating the surface

**Valley fog**

Valley fog forms where cold dense air settles into the lower parts of a valley condensing and forming fog. It is often the result of a temperature inversion with warmer air passing above the valley. Valley fog is confined by local topography and can last for several days in calm conditions during the winter.

**Advection fog**

Advection fog occurs when moist air passes over a cool surface and is cooled. A common example of this is when a warm front passes over an area with snow cover. It is also common at sea when moist tropical air moves over cooler waters. If the wind blows in the right direction then sea fog can become transported over coastal land areas.

29.

1. 

2. **Quasi-stationary front**
3. A stationary or slow-moving boundary between two air masses. Cloud and precipitation are usually associated.

30a) Westerlies
b) Strong Winds 5-6 gusting 7-8
c) Westerlies NW