The British Sub-Aqua Club

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: Sat 7th Mar 2015 10:30am

Name: _____

Memb No: _____

Please read the following instructions carefully before you begin answering the questions.

- **Answer all 30 questions.** Write your answers in the spaces on the question paper. Please remember to put your name on the paper.
- Brief answers are possible for most questions. Answer as concisely as possible. Use diagrams where these help your answer or where they are asked for.
- There are 2 marks for each question
- You are allowed 15 minutes to read the paper and plan how to answer it.
- You are allowed 60 minutes for writing your answers
- Write all answers in ink, as clearly as possible.
- You may use a calculator but please show all calculations.
- You will need your own copy of the complete BS-AC'88 Tables, levels 1-4 and BSAC Nitrox Tables and BSAC Ox-Stop Tables. No other reference material of any kind is allowed.
- You will need chartwork instruments (i.e. Breton plotter or parallel rules, pencil, compass).
- All questions assume sea water (density 1.025 kg/litre) and the prevailing conditions in the United Kingdom unless otherwise stated.
- Please check your work very carefully. A mistake at an early stage of some questions may result in a series of wrong answers and a loss of marks.

Please note that the mark awarded by the examiners for your performance on this paper is final and under no circumstances can the examiners enter into any correspondence or discussion with you regarding this paper.

MEDICAL

1. A diver has fallen against a boat trailer winch and badly cut his head. You are in a remote location and an ambulance would probably take 20minutes to arrive. He appears to be concussed and the local hospital is 5 miles away. You have transport available. What do you do?

_____

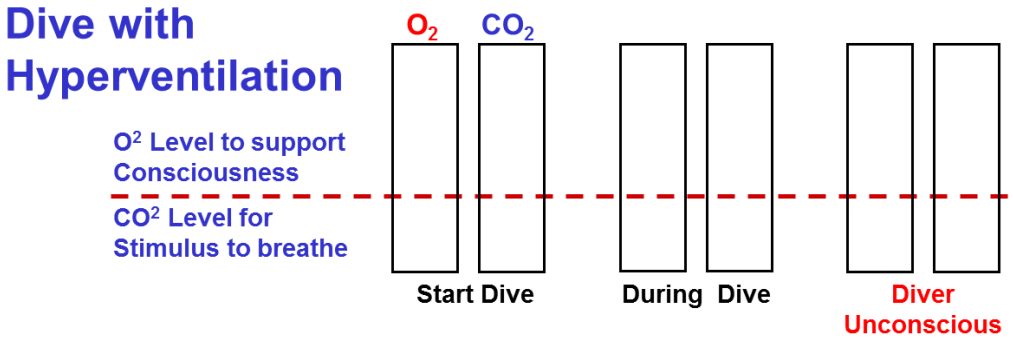
_____

_____

_____

_____

2. Complete the diagrams below to show what happens on a snorkelling dive with hyperventilation.



3. List air spaces in the body affected by diving

i) _____

ii)_____

iii) _____

iv) _____

v) _____

4. What are the proportions of Oxygen, Carbon Dioxide and Nitrogen in normal expired air at the surface?

Oxygen: _____ %

Carbon Dioxide: _____ %

Nitrogen: _____ %

5. One of your divers has skin rashes following a dive. A local non-diving doctor has been in attendance and thinks it may be just an allergic reaction and has prescribed anti-histamines. What you do?

_____

_____

_____

6. List 2 causes of de-hydration directly attributable to the act of going diving and/or snorkelling. (Note: Ignore pre-dive causes)

a)_____

b)_____

DECOMPRESSION

7. List two considerations when putting together a bailout plan when planning long decompression times.

a)_____

_____

b)_____

_____

8. When a problem occurs underwater:

a) What can the RMV reach initially? _____ litres per minute

b) For a dive to 50m with an ascent rate of 10m/min calculate what gas would be consumed (open circuit) if the first stop occurred at 20m?

RMV used for calculations _____ litres per minute

Gas used from 50 to 20m _____ litres

9. Decompression data is critical so individual divers may choose to back-up their main decompression plan in a number of ways. List two considerations to take into account if using either two computers (one backing up the other) or a slate and a computer.

(a)_____

_____

(b)_____

_____

10. A CCR diver begins a long decompression stop. Assuming he starts neutrally buoyant, what happens to his buoyancy throughout the decompression stop, why and what action must he take.

What:_____

Why:_____

Action:_____

11. What is isobaric counter diffusion and where might it occur in technical diving?

_____

_____

_____

_____

12. After leaving the water at 8.23am surface code G, divers want to start their second dive to 33m for 30 minutes at 12:30am. They have a 28% back gas and 80% deco gas.

a) What decompression stops will they require?

9m _____ 6m _____

b) If one of the pair suffers deco gas failure on the second dive what stops should be carried out?

9m _____ 6m _____

EQUIPMENT

13. List one advantage and one disadvantage of a Near Eye Remote Display.

a) _____

_____

b) _____

_____

14. List two advantages and two disadvantages of diving with twin independent cylinders, one with nitrox and the other with air.

Advantages:

a) _____

b) _____

Disadvantages:

c) _____

d) _____

15: What equipment would be most helpful to install and operate from your boat to help you conduct the following underwater searches where only approximate positions are known:

a) Hunt for a wooden wreck in shallow water off a long beach

_____

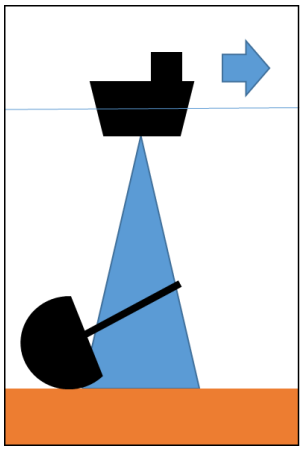
b) Creation of a precision 3D map of the seabed topography to identify new subsea pinnacles and cliffs

_____

c) Broken, part buried ferrous wreck in an area of shifting sand banks.

_____

16. Draw the echo sounder trace that you would expect to see on the vessel's echosounder as the vessel passes over the wreck using wide rather than narrow sonar beam.



17. List three factors that clubs and individuals must consider to enable them to tow their boats safely and legally on the highway.

a) _____

b) _____

c) _____

18. Describe briefly how the APD Rebreather Carbon Dioxide Sensor works?

_____

_____

_____

_____

_____

_____

DIVE PLANNING AND TECHNIQUES

19. You plan to dive at 15:30 hrs. Using the rule of twelfths calculate the height of the tide.

Sat 7 Mar			
LW	HW	LW	HW
04:49	11:24	17:09	23:52
1.0m	4.0m	0.8m	4.1m

_____

_____

_____

20. When might you need to complete a Dangerous Goods Note and how best should you go about the task to minimise disruption to your dive trip?

_____

_____

_____

_____

_____

_____

21. What is an MCZ? List one potential benefit for divers and one concern.

MCZ _____

Benefit _____

_____

Concern_____

_____

22. List 4 additional things specific to a deep technical dive plan that should be considered when planning the dive.

i)_____

ii)_____

iii)_____

iv)_____

23. In UK law, when are you deemed to be at work when diving and therefore subject to the Diving At Work Regulations 1997. How can you make sure that you do not break the law when diving for Sport?

_____

_____

_____

_____

24. You are organising a club training trip abroad. List 4 additional items of documentation that you may need to take compared to diving at home.

i) _____

ii) _____

iii)_____

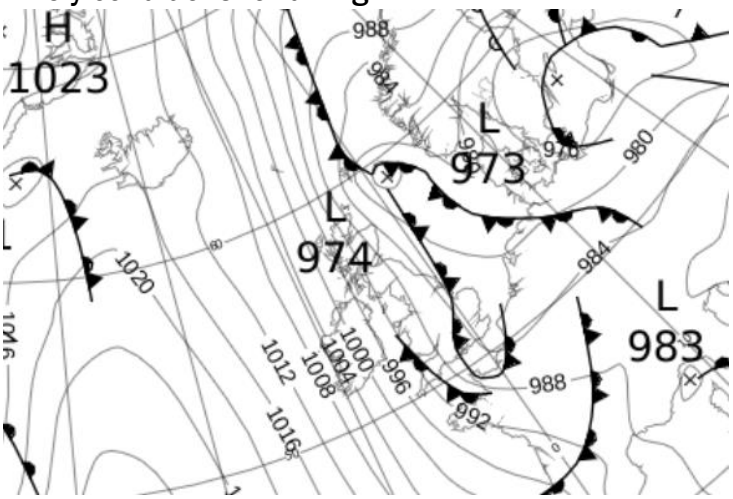
iv)_____

WEATHER AND SEAMANSHIP

25. You wish to maintain a course due north across a channel 1Nm wide. The boat is proceeding at 8knots and the current heading in an easterly direction at 4knots. What heading do you proceed on to maintain your course. Show your workings.

Heading _____ Time taken to cross channel _____

26. You are planning to dive off the South West coast of England and have the following synoptic chart for the weather. Describe the likely weather conditions. Would are the likely conditions for diving.



Expected conditions: Wind, Seastate, Weather:

_____

_____

Dive Conditions:

_____

_____

27. What is Buy Ballot's Law?

_____

_____

_____

_____

28. What types of seabed are the following anchors best suited for?

CQR: _____

Danforth: _____

Folding Grapnel: _____

Bruce: _____

29. The below diagram shows a RHIB towing another RHIB in a following sea. Draw and label four things you could to optimise the tow and ensure it goes smoothly.

30. With the aid of a diagram explain how a sea breeze is formed next to the coast?