

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: Sat 2nd March 2019 10:30am

Name: _____

Membership 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 chart work 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. Name the following four facial sinuses.

- a) _____
- b) _____
- c) _____
- d) _____

2. State four pieces of information you should obtain from a diabetic diver prior to them diving, when acting as the dive manager.

- a) _____

- b) _____

- c) _____

- d) _____

3. List four items from the contents of a small boat inshore waters first aid kit

- a) _____
- b) _____
- c) _____
- d) _____

4. A diver reports that after diving they often have difficulty moving their jaw and get a head ache. What are they likely to be suffering from and how could it be resolved.

a) _____

b) _____

5. What is carotid sinus syndrome and when may a diver suffer from it.

a) _____

b) _____

6. What is hyperoxic myopia and what type of diving would start to create symptoms.

a) _____

b) _____

DECOMPRESSION

7. List four conditions that may increase your susceptibility to DCI.

- a) _____
- b) _____
- c) _____
- d) _____

8. Diving on 2x12lt cylinders, you plan a dive to 45m for 30minutes dive time. Assume your breathing rate is 20lpm. What pressure of gas should you have left in your cylinders at the first decompression stop if you started with 230 bar. What pressure of gas should you have when surfacing after completing all decompression stops, briefly explain your answer and show all calculations.
(To simplify the gas calculation build in conservatism and assume that you are 'at depth' for the descent and ascent phases to the first stop.)

- a) _____

- b) _____

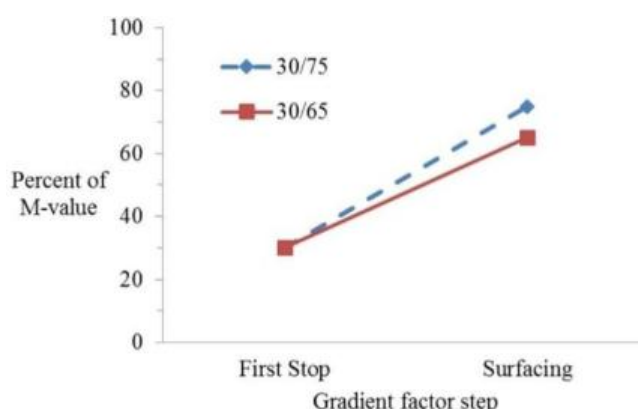
9. You are a team of ten divers conducting some dives on wrecks in 35 to 40m range and are using nitrox to accelerate your decompression. You are diving near a shipping lane and the dives require slack water. You all plan to dive at the same time. List two practical steps you could you take to manage your decompression as a team.

a) _____

b) _____

10. You have two divers both diving with the same computer on the same dive with different gradient factors. One diving 30/75 as represented by the blue line and the second diving 30/65 as represented by the red line. Which diver's computer will clear any decompression obligations first.

Explain your reason describing the difference how the gradient factors differ



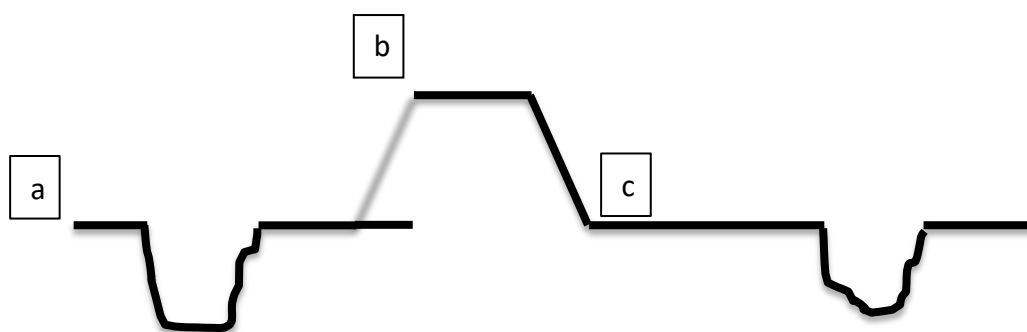
a) _____

11. For the purposes of this question, apart from when flying you should assume that you are at sea level at all times. You are planning a series of dives, which take place during an extended period (over 5hrs) of low atmospheric pressure (970millibars). This area of low pressure is large enough in size to cover the entire area of operations.

Your first dive is to commence at 09:00, with a depth of 27m and a dive time of 18 minutes. After a surface interval of 100 minutes, you are to take a flight in a pressurised aircraft. This flight is 55 minutes duration and your second dive is to commence 150 minutes after you land. This second dive has a depth of 23m and a dive time of 25 minutes.

On the sketch below state your CTC at the following three positions:

- a) at the start of dive 1
- b) at the start of the flight (having gained altitude)
- c) having landed at the end of the flight
- d) State the decompression requirements (if any) for dive 2



- a) _____
- b) _____
- c) _____
- d) _____

12. What is the current scientific recommended range for the maximum density for breathing gas. Calculate the density of 20/40 bottom gas at 60m. Individual gas density values are: Helium= 0.179 g/l, Oxygen = 1.428 g/l, Nitrogen = 1.251 g/l. Show your working.

- a) _____ g/l
- b) _____

EQUIPMENT

13. When inspecting your regulators you notice a small series of pin sized holes along the length of the high pressure hose. What is the purpose of the holes.
If whilst out diving, you see a small stream of bubbles coming from the holes, what does that mean?
- a) _____

- b) _____

14. Periodic examination and testing of diving cylinders used for air are conducted at what interval. What does the BS EN 12021 standard cover. List two reasons why a cylinder would require to be internally examined out with its test schedule when presented at a filling station.
- a) _____
- b) _____
- c) _____
- d) _____
15. With regards towing law, what do these two acronym's mean MAM and GVW mean.
- a) _____
- b) _____
16. You offer to tow the club boat on an expedition. The single engine boat has a gross weight of 1400 kg including the trailer. What is the maximum weight of the towing vehicle allowed to be, if you passed your test after January 1997.
List three checks you should carry out every time you tow a trailer, caravan or horsebox with a car, to make sure you're towing safely and legally.
- a) _____ kg
- b) _____
- c) _____
- d) _____

17. The club has bought a 7.5m RHIB with twin 150 hp outboards, which counter rotate. The engines cavitate on trial. List two things that the equipment officer can do to prevent the cavitation.

a) _____

b) _____

18. Describe the difference between Ideal and Real Gas laws.
If you were to fill two separate twinsets (2x 12ltr twinset) with Nitrox. Filling one to 230 bar and the other to 300 bar, how much gas would be available in each twinset. Show you calculations and workings.

a) _____

b) 230bar _____

300bar _____

DIVE PLANNING & TECHNIQUES

19. List four key elements of dive management

- a) _____
- b) _____
- c) _____
- d) _____

20. The MMO has issued a “best practice” guidance for divers in relations to ghost fishing. The title of the document has the mnemonic ALDFG, what does it mean. Marine Licensing guidance to recreational divers 2018 states “a marine licence is not required for markers (deployed and left unattended for longer than 24 hours but less than 28 days) in most case, what action is required to conform with the MMO guidance. What action is required if a marker is deployed for more than 28 days to conform with the MMO guidance. State one condition that would allow you to remove something from the seabed without a license.

- a) ALDFG _____
- b) _____

- c) _____

- d) _____

21. An A.P. Diving Inspiration rebreather diver states that they did two dives last week and is diving today on the same scrubber. He should have carried out a procedure with the scrubber canister in the week in between diving to help preserve the longevity of the scrubber life. Describe the procedure and the reason for doing it. What is the maximum dive time duration the manufacturer recommends for the scrubber in minutes.

- a) _____

- b) _____ minutes

22. On an accelerated decompression dive to 43m, your bottom gas is 21% and dive time is 28 minutes. Your tissue code at the start of the dive was A/1. You plan to decompress using 80% Nitrox. If the regulator fails on your decompression cylinder on this dive as you arrive at your first stop what decompression schedule would you follow for this dive.

Using BSAC Ox-Stop and Nitrox tables show your workings and calculations. Use the Ox-stop partial pressure table for calculations.

Your planned second dive is 1hour and 40 minutes after surfacing. Diving to 25m your bottom gas is 27% and dive time is 20 minutes conducting any decompression with a 50% nitrox mix. What is the total CNS at the end of the planned second dive.

a) _____

b) _____

23. You plan a weekend trip to the coast staying in accommodation for two nights. A 17 year old member of the club asks to come along to get more experience. List four factors to be considered to make this possible

a) _____
b) _____
c) _____
d) _____

24. When going out diving for the day or planning a week long expedition a Risk Assessment is required. Can you state four of the steps that are used when planning a risk assessment and briefly explain them.

- a) _____

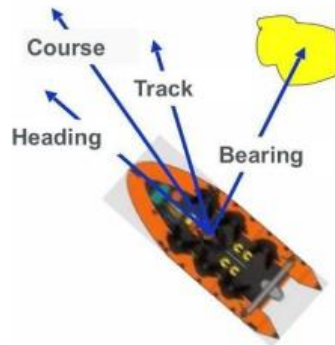
- b) _____

- c) _____

- d) _____

WEATHER & SEAMANSHIP

25. Define the four following terms, Course, Track, Bearing, and Heading.



- a) _____

- b) _____

- c) _____

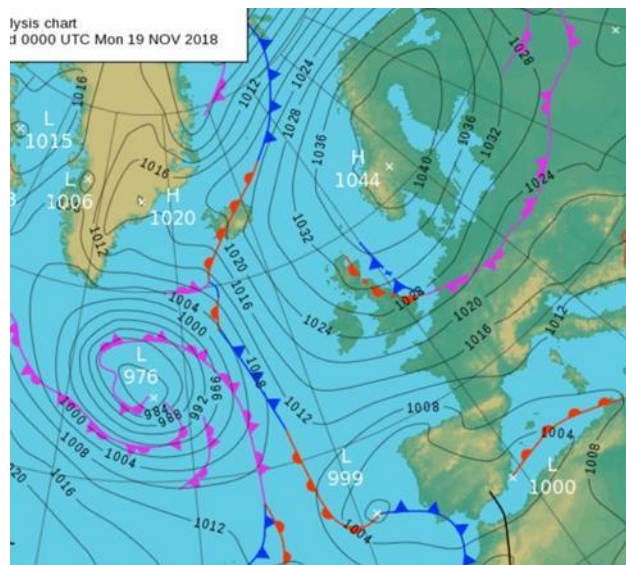
- d) _____

26. What is the name of the buoy in the photograph and what light sequence would it show if lit:



- a) _____
- b) _____

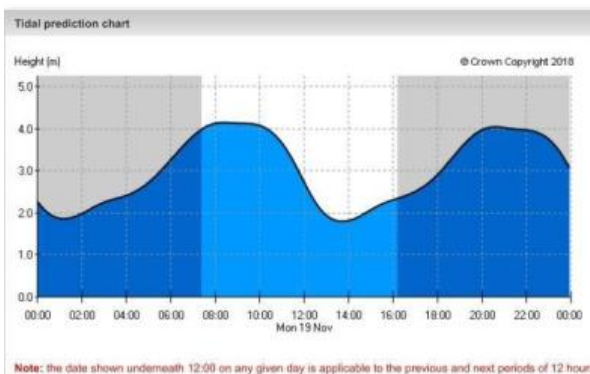
27. Study the Analysis chart for 19 November 2018.



What type of pressure system is dominant over the UK. What weather conditions can be expected during the day. What is the direction of the wind. Two fronts are present on the East coast of the UK, they both have a crosses in the middle of them what do the crosses mean

- a) _____
- b) _____
- c) _____
- d) _____

28. You intend to cross the drying height on your passage north of Cathead on Monday 19 November. Your RHIB has a draft of 1.8m. Between what times can you plan to follow the blue track on your plan safely. What times need to be avoided.



Mon 19 Nov					
LW	HW	HW	LW	HW	HW
01:10	07:28	10:23	13:42	19:50	22:45
1.9m	4.0m	4.0m	1.8m	3.9m	3.8m

- a) _____
- _____
- _____
- _____
- b) _____
- _____

29. Define the following four VHF prowords, Mayday, Securite, Seelonce Mayday, and Seelonce Feenee.

- a) _____
- b) _____
- c) _____
- d) _____

30. Below is the shipping forecast for Malin. Can you explain the following terms on the forecast Cyclonic. Can you explain the Sea state and describe what size the waves would be for Very rough, High and Very high.

Malin

Gale warning - issued: 03:43 on Fri 8 Feb 2019 UTC

Gale force 8 veering southwesterly and increasing storm force 10 imminent

Wind

Cyclonic, becoming northwesterly, gale 8 to storm 10.

Sea state

Very rough or high, occasionally very high.

Weather

Squally showers.

Visibility

Poor.

- a) Cyclonic _____
- b) Very Rough _____
- c) High _____
- d) Very High _____