

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: Sat 5th Mar 2016 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.

<p>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.</p>

MEDICAL

1. What is the latest BSAC recommended in-water rescue technique for an unconscious non-breathing diver?

2. List 4 signs of internal bleeding.

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

3. a) What is the first aid for near drowning? b) If they recover and what are you concerned about and what advice would you give them?

- a) _____

- b) _____

4. List two items a diabetic diver should carry in his/her dive kit to counter an episode of hypoglycaemia.

- a) _____
- b) _____

5. Briefly describe immersion pulmonary oedema. List 2 signs and symptoms. When it is likely to occur?

Description: _____

Sign/Symptom 1: _____

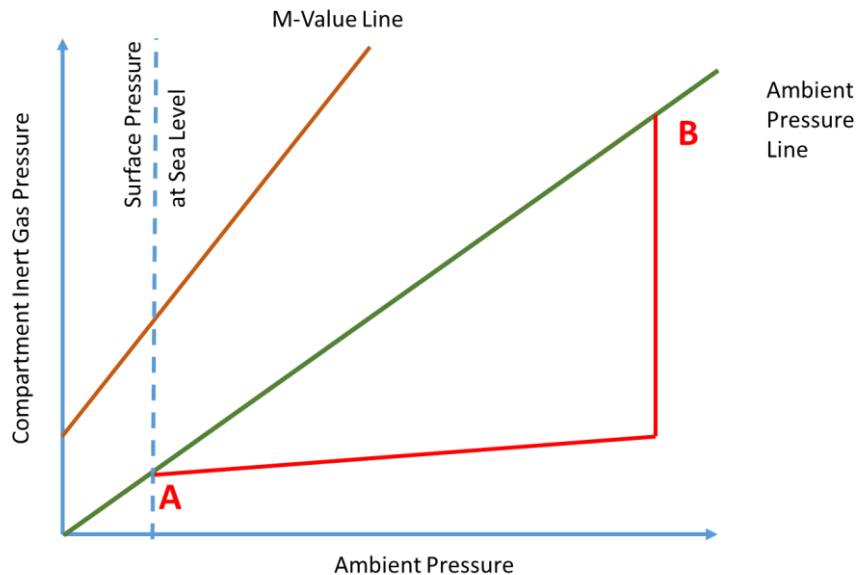
Sign/Symptom 2: _____

When: _____

6. Shortly after surfacing from a 35m dive, a Sports Diver, having just eaten some cake and had a cup of tea starts to feel unwell and doubles over with stomach cramps. He also reports tingling in his legs. What actions do you take? You are on hard boat, about 5 miles offshore.

DECOMPRESSION

7. The diagram below shows the M-Value line for a single Buhlmann compartment. Plot the 30/85 gradient factor line on the diagram below and show a safe ascent profile that from includes at least two stops from ambient pressure A to B.




8. What are the BSAC maximum recommended partial pressure of oxygen for open circuit decompression mixes? What is the maximum recommended depth they can be used at?

PP02 _____

Maximum Depth _____

9. Using BSAC Ox-Stop tables, complete the bail out run time slate below for a dive to 38m for 38 mins dive time. The back gas is NITROX 30 and the deco gas is NITROX 76. Assume Level 1 and 24 hrs surface interval.

		Depth (m)	Duration (mins)	Run Time (mins)	Gas (O ₂ %)
BAIL-OUT (Deco gas loss)		0			
	Deco Stops	6			
		9			
			Time to 1st stop		
	Max depth		Leave bottom		

Nov 2014

10. What is the maximum diving depth currently recognised by BSAC

Max depth _____ m

List two things you should to have to dive beyond that:

1) _____

2) _____

11. From the following table calculate the RMV and then complete the remainder of the table.

RMV = _____ lt/min	Pressure (bar)	Time (mins)	Litres air
6m to surface		1	26
6m stop	1.6	12	384
9m stop	1.9	2	76
Ascent 38m to 9m		2	
Bottom @ 38m	4.8	38	3648
TOTAL			

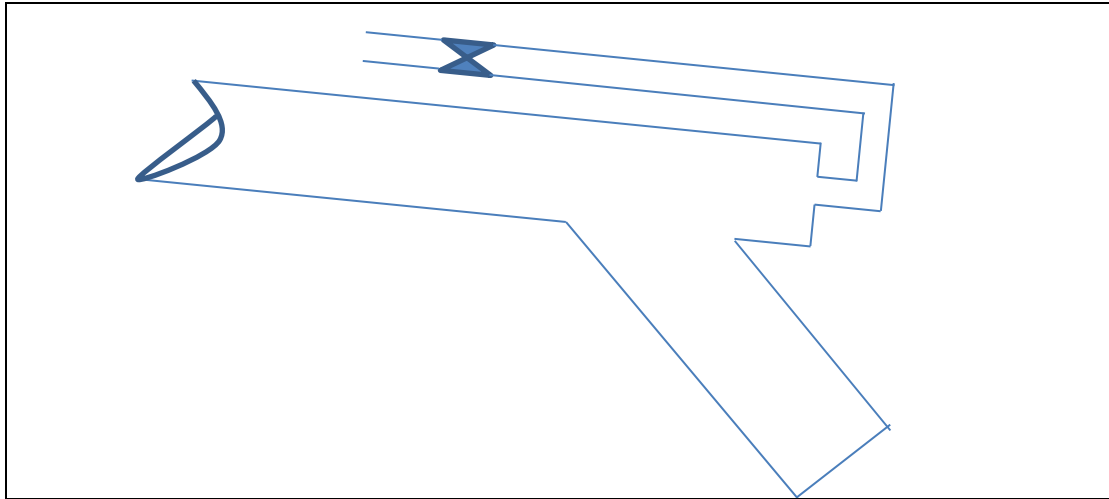
12. List 4 practical steps that you can implement to mitigate the risk of a diver switching to the wrong open circuit oxygen rich decompression gas.

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

EQUIPMENT

13. On the following diagram of a simple air dredge label the following.

- A) Debris in
- B) Throttle valve
- C) Debris out
- D) Compressed air supply in



14. List the steps in the start-up operation of a portable petrol drive compressor up to the point of connecting your first cylinder:

15. How can the non-return valves on a rebreather be tested by the user?

16: What are “cavitation” and “ventilation” with respect to boat propellers? List one negative impact of each

Ventilation: _____

Impact: _____

Cavitation: _____

Impact: _____

17. List two reasons that high moisture content in breathing air may cause divers or their equipment an issue.

a) _____

b) _____

18. What is the purpose of the following parts of a compressor filter

Felt Pads: _____

Molecular Sieve: _____

Activated Charcoal: _____

Activated Alumina: _____

DIVE PLANNING AND TECHNIQUES

19. Given a surface breathing rate of 15litres/minute. Approximately how much air is required to safely complete a dive with a bottom time of 35 minutes at 32 metres, including a suitable reserve? What size cylinders, charged to what pressure would be suitable?

Air Required:_____

Cylinder Size/Pressure_____

20. You are dive manager on a hardboat, looking after a group of 6 rebreather divers who want to explore wreck in 60m which lies in the shipping lanes. Visibility on the wreck is likely to be about 5 metres. List 4 safety precautions would you take?

a)_____

b)_____

c)_____

d)_____

21. You are planning to investigate an “unknown obstruction” in 30m of water, ten miles offshore. You are approaching neaps. You plan to meet at 9.30am.

Local Tide Information

What time do you put first pair divers in?

High Water is 08:15 BST

Hours Before High	Direction	Springs	Neaps
-6	321	1.2	0.7
-5	321	2.2	1.3
-4	323	2.7	1.5
-3	327	2.5	1.4
-2	323	1.5	0.8
-1	321	0.2	0.1
0	141	1.2	0.7
1	145	2.4	1.3
2	147	2.5	1.5
3	148	2.1	1.3
4	147	1.4	0.8
5	141	0.4	0.2
6	321	0.8	0.4

What is the maximum speed of tide and direction that you expect at that time

What is maximum speed and strength of tide that you expect the last divers to encounter at end of the dive?

22. For the dive in Question 21, produce an outline timetable. Assume that club RIB cruises comfortably at 18 knots with 6 divers and their kit.

9.30am	: Meet to prepare kit/launch boat
_____	: Depart slip
_____	: Arrive Site and locate with shot
_____	: Diving First Pair in
_____	: Dive Last Pair In
_____	: Recover shot and Depart Site
_____	: Recover Boat and Unload


23. You are planning to dive a site with charted depth of 30 metres. Low water height is 2.2m High water height is 9.5m. Slack water is approximately 4 hours after low water. What is the expected depth on site?

24. You have been given two possible positions for an unknown wreck. One is $52^{\circ}56.500' \text{ N } 001^{\circ}50.000' \text{ E}$, the other is $52^{\circ}59.250' \text{ N } 001^{\circ}50.001' \text{ E}$. How far are they apart are they? Show your workings.

WEATHER AND SEAMANSHIP

25. You wish to head due west. If variation is 5 degrees East and Deviation is 2 degrees West what would is your compass course?

26. You are using an online forecasting tool:

Forecast		2D	Map	Webcams	Wind reports	Accommodation	Schools/Rentals	Shops	Other...										
		Su 21.	Su 21.	Su 21.	Su 21.	Mo 22.	Mo 22.	Mo 22.	Mo 22.	Mo 22.	Mo 22.	Mo 22.	Tu 23.	Tu 23.	Tu 23.	Tu 23.	Tu 23.	Tu 23.	
		12h	15h	18h	21h	03h	06h	09h	12h	15h	18h	21h	03h	06h	09h	12h	15h	18h	21h
Wind speed (knots)		17	19	16	16	15	11	7	7	7	7	5	3	4	7	10	10	8	6
Wind gusts (knots)		27	33	31	30	28	20	12	11	12	11	9	4	6	12	13	13	12	10
Wind direction		↗	↗	↗	↗	↗	↘	↘	↘	↘	↘	↘	↘	↘	↓	↓	↓	↓	↙
*Temperature (°C)		12	12	11	11	11	11	9	9	9	7	6	5	5	6	8	8	6	4
*0° isotherm (m)		3.5k	3.5k	3.4k	3.3k	2.2k	2.1k	1.8k	1.4k	960	890	830	650	660	810	780	790	740	670
Cloud cover (%)		-	96	66	64	89	75		25	88	71	7	92	80	24	12			6
high / mid / low		-							11	28	24	70	99	99	100	51			
			81	56	87	100	100	100	100	96	75	40	98	98	68	36			
*Precip. (mm/3h)		-				0.4	0.6	0.4					1.4	1.5	0.7				

Describe the maximum wind speed according to the Beaufort scale on Sunday:

Force: _____

Description: _____

You plan to dive Tuesday in open sea. What wave height would you expect?

27. Your dive boat is "BSAC Diver". You are leaving harbour with 6 divers from Seahouses to dive the wreck of the Somali 1 mile off Beadnall Point, due back at 4.30pm. Write down the message you send over the radio to Humber Coastguard to advise them of your intentions.

28. What do the following nautical terms mean?

Abaft: _____

Astern: _____

Gun whale: _____

Abeam: _____

29. Draw a sea anchor and explain its purpose? List one way in which you could increase its effectiveness?

Purpose: _____

Increase effectiveness: _____

30. Weather forecast is: Low centred in Rockall, now falling. Expected Fair Isle later. Rockall and Fair Isle are areas to the left and right of St Kilda.



Describe the expected weather over next 24 hours

How could this affect the diving?
