The British Sub-Aqua Club

FIRST CLASS DIVER

DIVING KNOWLEDGE EXAM: Sat 7th October 2017 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. List four types of shock (2 marks)

i) _____

ii)_____

iii) _____

iv) _____

2. List four areas you can check during a five minute neurological examination (2 marks)

i) _____

ii)_____

iii) _____

iv) _____

3. List two symptoms of carbon monoxide poisoning that you as a diver would notice whilst diving underwater if you were suffering from it and two you may notice in a buddy suffering from it. (2 marks)

Yourself.

i)_____

ii)_____

Buddy

iii)_____

iv)_____

4. An elderly member of the club sits down with his kit on and clasps his chest after clambering out onto the rocks after a shore dive in the sea. He looks anxious and very grey. What actions to you take? (2 marks)

a)_____

b)_____

c) _____

d) _____

5. Name and describe two methods of clearing your ears (2 marks)

a) _____

_____

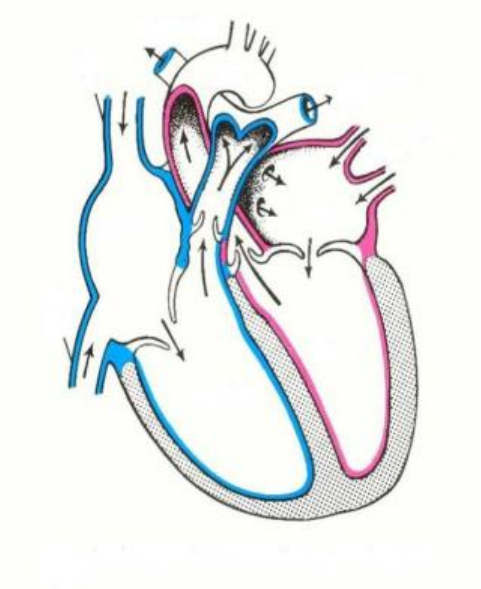
_____

b) _____

_____

_____

6. Label the following on the following diagram of the heart: Aorta, Pulmonary Artery (PA), Right Atrium (RA), Left Atrium (LA), Right Ventricle (RV), Left Ventricle (LV) and location of a Patent Foramen Ovale (PFO)



DECOMPRESSION

7. (a) Calculate the density of 20/30 bottom gas at 50m. Individual gas density values are: Helium= 0.179 g/l, Oxygen = 1.428 g/l, Nitrogen = 1.251 g/l. Show your working. (1 mark)

_____

_____

_____

(b) What is the current scientific recommendation for the maximum density for breathing gas (0.5 mark)

_____ g/l

(c) At what depth does this occur for air? (0.5 mark) _____m

8. From a decompression perspective what is the optimum body temperature profile on a dive to minimise gas update. (1 mark)

a) _____

_____

When using a heated vest in cold water, when theoretically is it best to activate this? (1 mark)

b) _____

_____

9. The following screen dumps are taken from multi deco software for the same depth and bottom time for an air dive. Figure a) uses gradient factors 30/90 and Figure b) uses gradient factors 50/90.

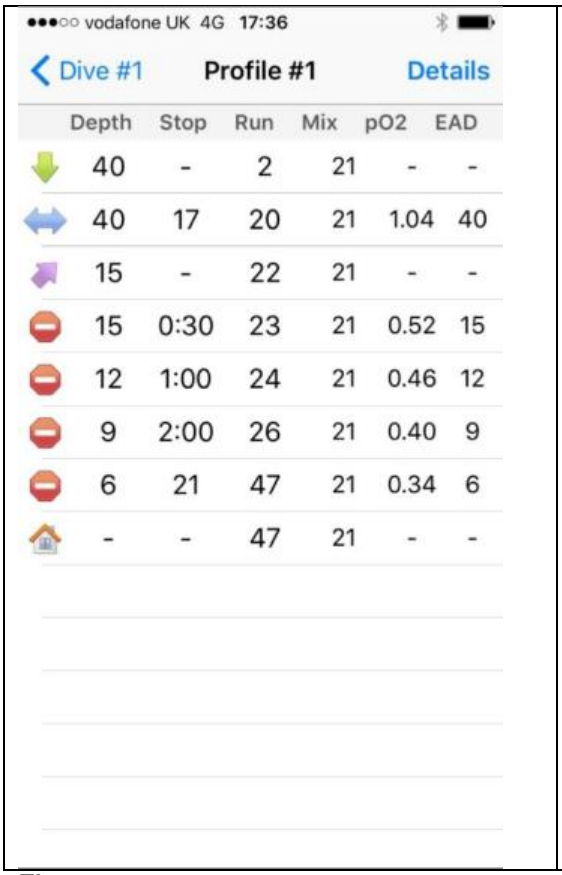


Fig a

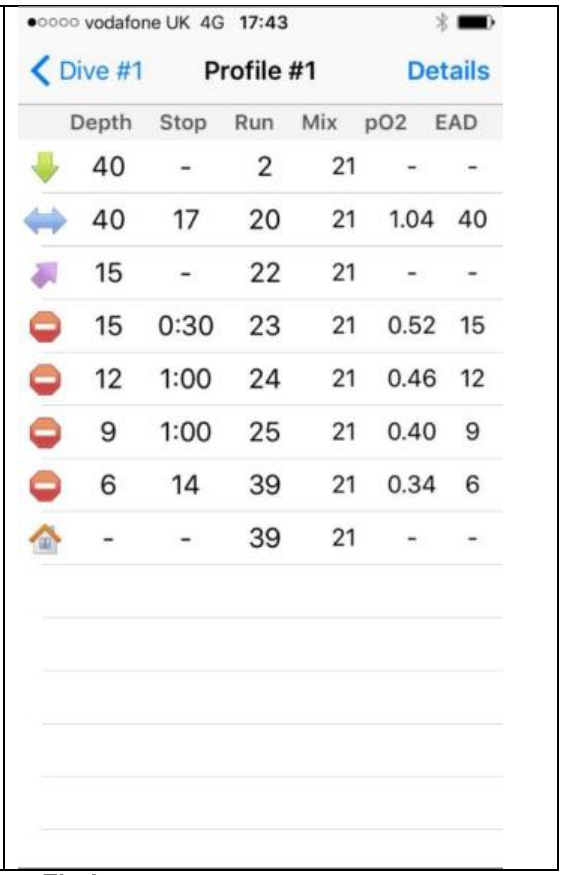


Fig b

Explain the difference (2 marks)

_____

_____

_____

_____

10. You are diving on BSAC tables. You surface a G/1 and a CNS of 50% and 5 hours later you dive to 35m on air with a stage cylinder of 50% decompression gas for a dive time of 25 minutes.

a) What stops will you need to do on 50% nitrox? (1 mark)

_____

_____

b) What will your CNS be at the start of the second dive? (1 mark)

_____

_____

11. A CCR diver has a set point PPO2 of 1.25bar with air as a diluent. You are using a nitrox computer as a backup and plan to dive to 36m. What is the maximum nitrox mix that you should set? Show your working.

_____

_____

12. List two things can a diver do to optimise off gassing during decompression stops other than breathing a higher nitrox mix?

i) _____

ii) _____

EQUIPMENT

13. What are the latest recommendations when it comes to selecting an Octopus type alternative air source, particularly for use in cold water. What is BSAC guidance if this is not met?

a) _____

_____

b) _____

_____

14. What is one advantage of using photogrammetry to survey a shipwreck and one disadvantage?

Advantage: _____

Disadvantage: _____

15. What is RAW format? List one advantage and one disadvantage. (2 marks)

RAW Format _____

_____

Advantage: _____

_____

Disadvantage: _____

_____

16. When draining gas quickly from a dive cylinder why does the pillar valve get very cold? What potential damage could be done to the cylinder and what potential injury to the operator? (2 marks)

Why:_____

_____

Potential Damage:_____

_____

Potential Injury: _____

_____

17 How do temperature sticks work in a rebreather scrubber to monitor duration? If the temperature stick failed during a dive would this be a critical failure leading to a need to abort? (2 marks)

_____

_____

_____

_____

18. You are recovering an outboard engine that has fallen of the club inflatable in 35m of water. Engine weighs 60kg in air. Calculate much air in litres will you need to lift it and what would the pressure drop be from the 12lt you are using to fill the lifting bag. (2 marks)

Air required (litres) _____

_____

Pressure drop (bar)_____

_____

DIVE PLANNING AND TECHNIQUES

19. Calculate chart datum on this site at 13:45 if your dive computer read 20m. Show your workings. (2 marks)

HW	LW	HW	LW
03:17	09:48	15:45	23:27
4.0m	1.0m	4.6m	1.7m

_____

_____

_____

20. Under UK law what is the difference between a Protected Wreck site and a Controlled Wreck Site? (2 marks)

_____

_____

_____

21. Draw a diagram to show how a tow fish side scan sonar works and how a transom mounted tow fish works. List one advantage for each. (2 marks)

Advantage Tow fish:

_____

Advantage Transom Mounted:

_____

22. You are taking a group of divers on their first coral reef dive ever with shore dive access through shallow sandy path cut through the reef specifically for divers. List four things you would cover in the brief to reduce risk of damage to the coral and associated eco-system. (2 marks)

i)_____

ii)_____

iii)_____

iv)_____

23. What is the current advice from the MMO regarding recovery of lost fishing equipment (Ghost Fishing)? What are BSAC doing about it? (2 marks)

_____

_____

_____

_____

24. List two things that the BSAC Third Party Liability Insurance covers you for (1 mark)

i) _____

ii _____

and two things that you are not (1 mark)

iii) _____

iv) _____

WEATHER AND SEAMANSHIP

25 What does SOLAS and IRPCS standard for? (1 mark each)

SOLAS : _____

IRPCS: _____

26. On a chart what do Oc, Fl and Iso mean in relation to lights. (2 marks)

Oc _____

_____

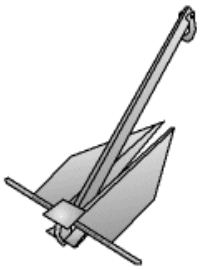
Fl _____

_____

Iso _____

_____

27. What type of anchor are the following and what bottom type do they hold best in (2 marks)

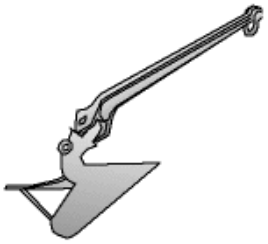


Anchor (a)

_____

Seabed

_____

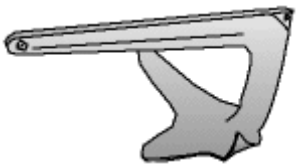


Anchor (b)

_____

Seabed

_____



Anchor (c)

_____

Seabed

_____

28. What flares would you use / not use (2 marks)

a) What would you use a white flare for?

_____

b) An inbound coastguard helicopter asks you to “make smoke”. Which type of flare you use?

_____

c) Which types of flare would you not use when a helicopter is hovering above?

_____

29. You plan to dive an unknown site in the entrance of a very tidal sea loch. Describe how you could practically determine the timing of slack and produce a very rough tidal diamond for the site using equipment available onboard: RHIB, GPS and compass over the course of a day. (2 marks)

_____

_____

_____

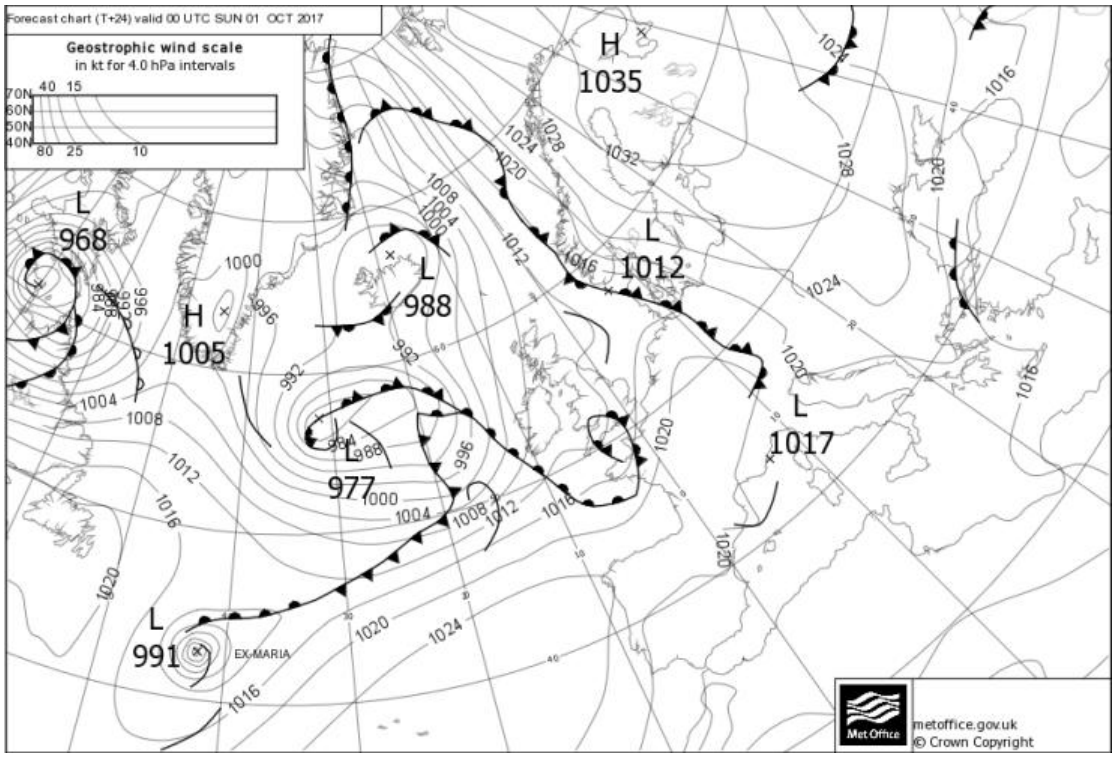
30. Studying the surface pressure charts below: what wind, sea state and weather and visibility would you expect along the South Coast of England on Sunday. Would you be able to go diving off the South Coast. (2 marks)

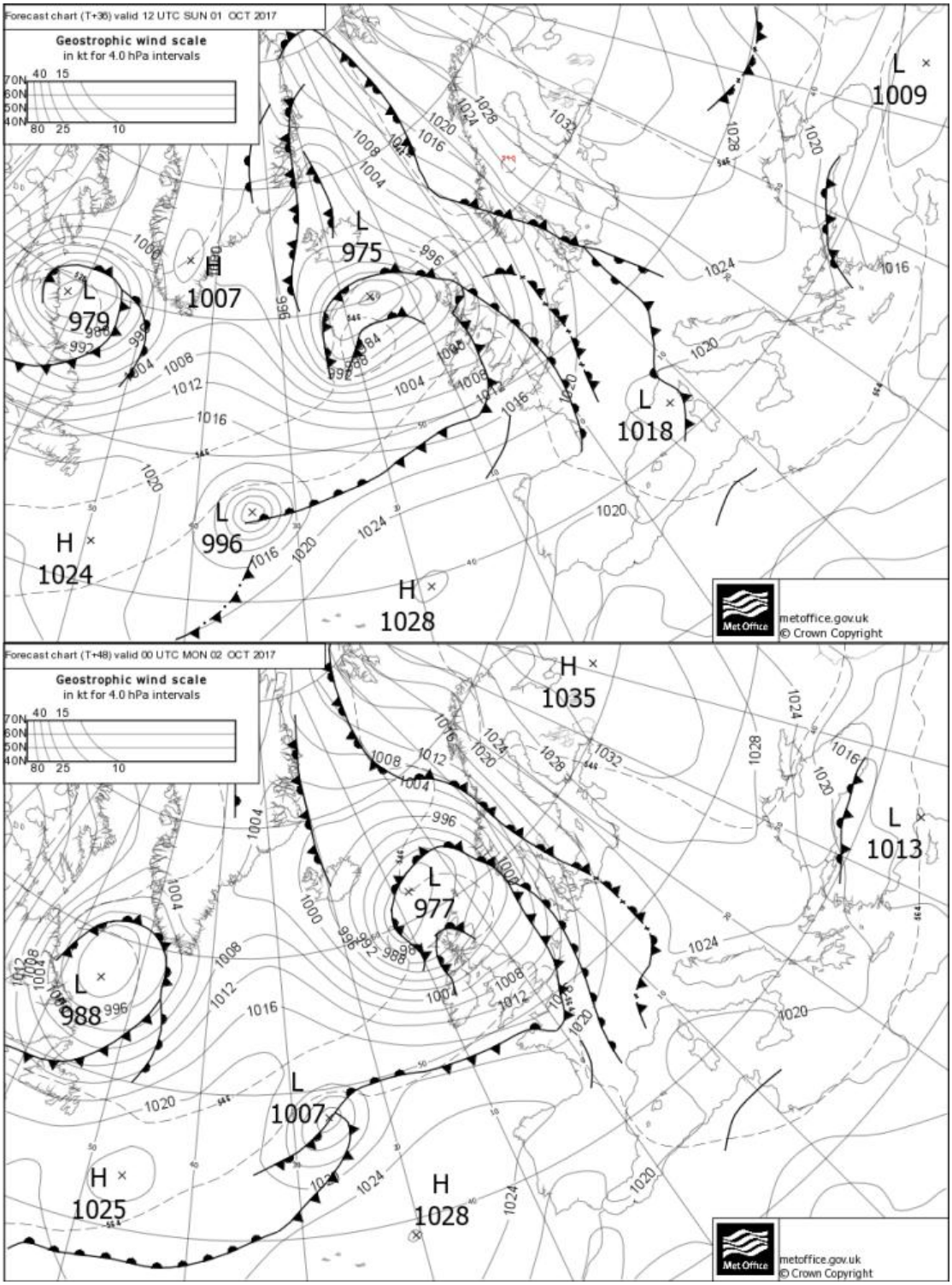
Wind: _____

Sea state: _____

Weather: _____

Visibility: _____




Forecast chart (T+36) valid 12 UTC SUN 01 OCT 2017
Geostrophic wind scale
in kt for 4.0 hPa intervals
40 15
70N
60N
50N
40N
80 25 10
L 1009
L 975
L 979
1007
L 1018
L 996
H 1024
H 1028
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Forecast chart (T+48) valid 00 UTC MON 02 OCT 2017
Geostrophic wind scale
in kt for 4.0 hPa intervals
40 15
70N
60N
50N
40N
80 25 10
H 1035
L 1013
L 977
L 988
L 1007
H 1025
H 1028
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