ANSWER

THEORY II: (PHYSICS) (QUESTIONS 1 - 6)

Question 1 Answer: ..... C. $t_b > t_i > 1$ s ..... (1 point)

Explanation: .....There is an air resistance ..... (0.5 point)

.....Air resistance on the feather greater than the iron .... (0.5 point)

Question 2 Answer: ...We use a concept of linear scaling by taking the distance 25 cm equivalent to 100 $^{\circ}$C . At the distance 25-8 = 17 cm above the icy level , the reading would be (25-8)/25*100 = 17*4 =68°C...

*****(1 point if students know the concept and 1 point for correct answer and unit. No unit deduce 0.5 point)

Question 3 Answer: ..... It would appear to be shallower (0.5 point).....

because : - the light coming from the fish will refract away from the line that is normal to water surface, or

- the incidence angle is less than the refraction angle, or

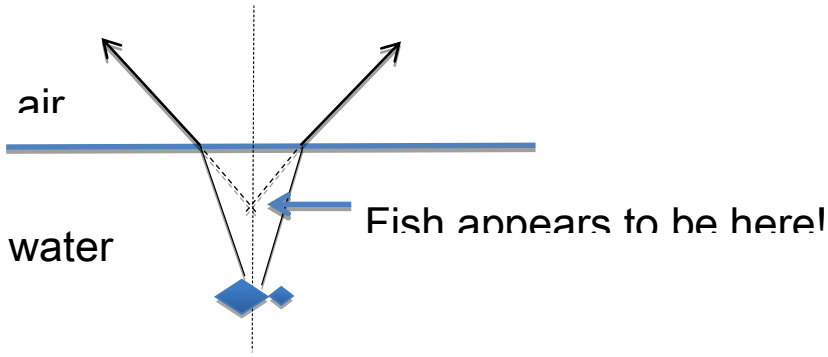
- the refractive index of the water is higher than that of the air.

(0.5 point)

***** (No point if writing just “law of refraction” or “Snell’s law”)

Draw paths of the light rays to identify the apparent position of the fish. (1 point)

Answer



*** (Student must draw 2 paths of ray that bend away from the normal line (0.5 point)

and extrapolate those lines backward to make intersection for the apparent position (0.5 point).**

Question 4 Answer:

(a) Just after the brief push, the velocity of 1 kg box is .....>..... that of 2 kg box. (0.5 point)

(b) Just after the brief push, the kinetic energy of 1 kg box is .....=..... that of 2 kg box. (0.5 point)

(c) The frictional force on 1 kg box is .....<..... that of 2 kg box. (0.5 point)

(d) The displacement of 1 kg box is .....>..... that of 2 kg box. (0.5 point)

Question 5

Answer: .....B..... (1 point)

Explanation: ....Batteries give the same voltage (0.5 point).....

....but can provide twice the current (0.5 point) of one battery...

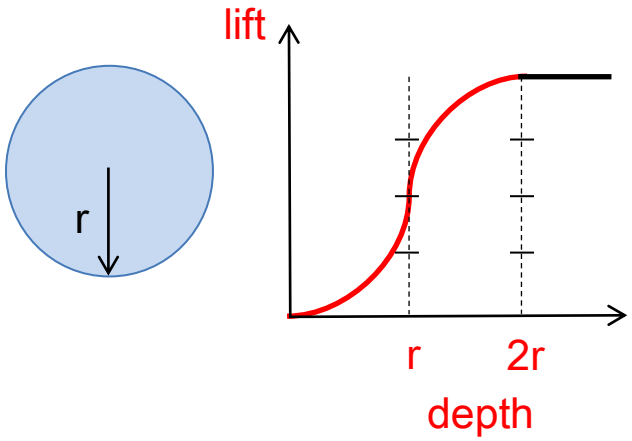
Question 6 Answer : (The lift force will increase at an increasing rate as its depth is reaching the center. Once, it's there and beyond, the lift force will increase with the decreasing rate. The lift force will look like an S-curve.)

******* - 2 points for the S-curve which is symmetric around its center (depth = r).**

- 1.5 points for correct S-curve that appear to be non-symmetric, i.e. does not make a turn at the middle position (r, half of maximum lift force).

-1 point only for half correct S-curve, i.e. the other part is straight line.

-0.5 point for any other curves that appears to be symmetric around its center (depth = r). *****



ANSWER

THEORY II: (BIOLOGY) (QUESTIONS 7 - 12)

Question 7 Answer: ..... A ..... (1 point)

Question 8 8.1 Answer: IV Red algae exposed to the white light directly without passing through prism and then added the aerobic bacteria (1 point)

8.2 Answer: II Red algae not exposed to the white light and then added the aerobic bacteria (1 point)

8.3 8.3.1 Answer: ..... ✗ ..... (0.5 point)

8.3.2 Answer: ..... ✗ ..... (0.5 point)

8.3.3 Answer: ..... ✗ ..... (0.5 point)

8.3.4 Answer: ..... ✓ ..... (0.5 point)

Question 9 9.1 Answer: ..... ✗ ..... (0.5 point)

9.2 Answer: ..... ✓ ..... (0.5 point)

9.3 Answer: ..... ✗ ..... (0.5 point)

9.4 Answer: ..... ✓ ..... (0.5 point)

Question 10 Answer: (acidic water lower the pH of the ocean, causing the decrease in carbonate ion (CO_3^{2-}), which essential to form the external structure of the corals, while increasing the level of bicarbonate ion (HCO_3^-). (1 point)

Question 11 11.1 Answer: ..... Circulatory system ..... (0.5 point)

11.2 Answer: ..... Respiratory system .... (0.5 point)

11.3 Answer: ..... Excretory system .... (0.5 point)

11.4 Answer: ..... Nervous system or Endocrine system..... (0.5 point)

Question 12 12.1 Answer: ..... ✗ ..... (0.5 point)

12.2 Answer: ..... ✗ .... (0.5 point)

12.3 Answer: ..... ✓ ..... (0.5 point)

12.4 Answer: ..... ✗ .... (0.5 point)

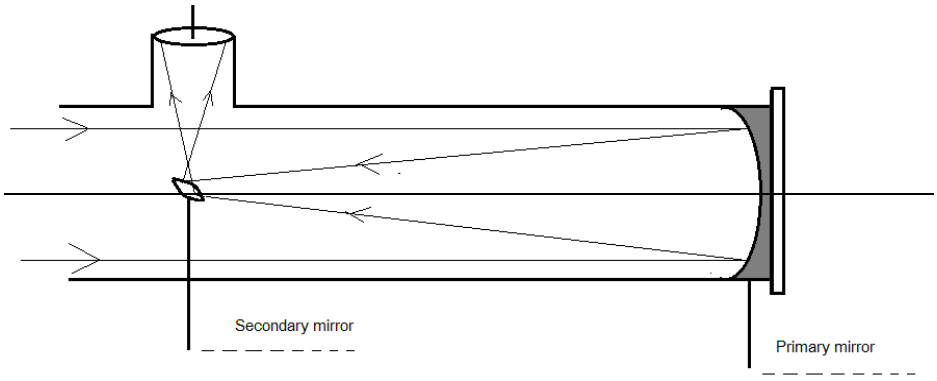
ANSWER

THEORY II: (EARTH SCIENCE) (QUESTIONS 13 - 19)

Question 13 (2 points)

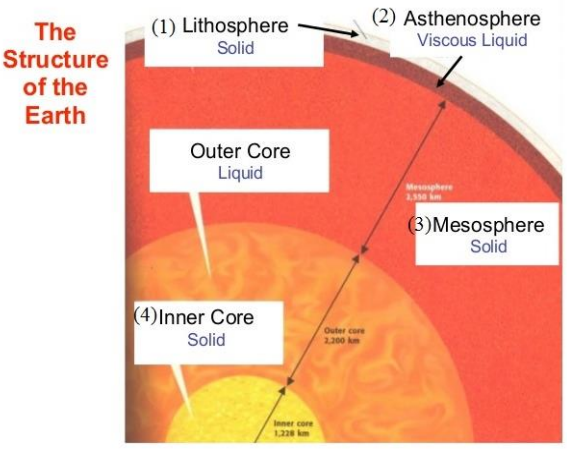
Question 14 Answer: (120^{o} - $115^{o}\,30'$ = $4^{o}\,30'$ = 4.5^{o} -> 4.5^{o} x 4 minutes (Earth takes 4 minutes for 1^{o} rotating) = 18 minutes -> 2pm - 18 minutes = 1:42pm (1 point) (1 point)

Question 15 (2 points)



Question 16 Answer: .....Solid..... (1 point)

Question 17 (2 points) **Answer:**



(Each correct choices = 0.5 point)

Question 18 Answer: ... a lot of water vapour… and suitable temperature

(1 point)

Question 19 Answer : ... (The density decrease / gravity of earth pull down the most of air molecules near the surface therefore the higher altitude has lower pressure.) ... (1 point)

ANSWER

THEORY II: (CHEMISTRY) (QUESTIONS 20 - 22)

Question 20 (2 points)

Answer: .. Full credit: 2 points

1 point for correct calculation

1 point for explanation

Calculation: $D = m/V$

$= 1920 \text{ g}/110 \text{ cm}^3$

$= 17.5 \text{ g/cm}^3$

The crown is not made of pure gold because the density of gold in the king's crown (17.5 g/cm^3) is less than the density of pure gold (19.3 g/cm^3).

Question 21 (2 points)

Step 1: ..... use a magnet.....

Step 2: ..... add water and remove the component that float.....

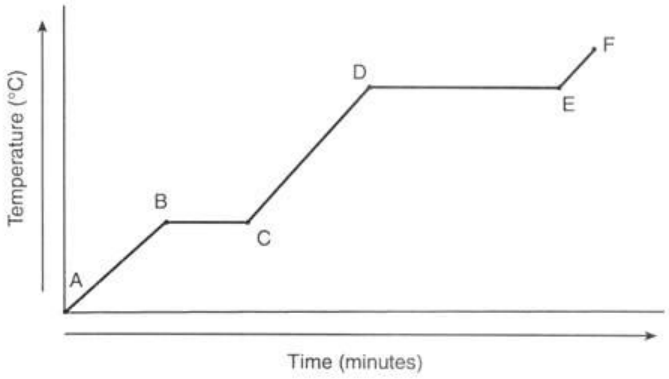
Step 3: ..... filter.....

Step 4: ..... evaporation of water.....

Scoring Full credit: 2 points

Partial credit: 0.5 points for each step

Question 22 (2 points)



Answer:

- The temperature of boiling (D-E) and melting (B-C) would be the same.
- Boiling point and melting point are size-independent physical properties of water.
- Each section of the graph will take longer time.
- Greater volume of water need more energy input during heating and phase transformation.

Scoring Full credit: 2 points

Partial credit: 0.5 point for correct drawing

0.5 point for correct answers about the changes on heating curve (what)

1.0 point for explanation (why)

- The temperature of boiling (D-E) and melting (B-C) would be the same <u>because boiling point and melting point are size-independent physical properties of water</u>.
- Each section of the graph will take longer time <u>because a greater volume of water needs more energy input during heating and phase transformation.</u>