UACE S101 General Paper section B: Logic Quiz 9

Study the information provided below and answer the questions that follow:

A navigable river runs from a lake at point A where there is a dam, following the northern direction. It pours into the sea at point Z. The distance between point A and Z is $\frac{x}{3}$ miles.

The boat racing club has decided to register sailors who can make it up to point Z successfully at an average speed of 84.3 miles/hr. However, there are some challenges the sailor will meet along the river. These include: illness, exhaustion, extreme heat, accidents and loss of direction. Loss of direction is likely to take place at point B which is ¾ of the distance between point A and Z. Here, the river branches into two directions, one part diverting to the North-West while the other, to the North-East. The one that goes North-West dries up in the desert due to extreme heat.

The part that branches to the North-East ends up in a big swamp several miles away. Each challenges met means that the involved race giants may drop out of the normal race to the sea.

At the dam (starting point), there are several boats which are to take part in a one day's race running day and night. The club releases 260 boats at a time. This release takes place after every two hours in one day. The first batch of the racing giants will have gone ten miles downstream, this is only 0.5 percentage of the distance downstream to the sea.

The table below summerises the challenges faced and the percentage rate of boat drop out.

Challenges	Drop out rate of boats (%)
Illness	2
Exhaustion	5
Extreme heat	6
Accidents	10
Loss of direction	23

Questions:

(a)(i) Calculate the length of the river from point A to point Z in kilometres given that 5miles = 8kilometres (04miles)

(ii) Find x in miles (02marks)

(b)(i) Calculate the number of boats that will drop out of the race due to each of the challenges given in the table. (show your working) (10marks)

   (ii) How many boats will successfully finish the race? (03marks)

   (iii) How much time does a successful boat travelling at the average speed take to reach point Z (03marks)

(c)   If a boat gets lost at point B, calculate the:

       (i) distance in kilometres that will have been covered. (03 marks)

       (ii) time that will have been taken if the boat was travelling at 135km/hr. (03marks)

(d)   Explain the challenges faced in utilising water resources in your community. (12 marks)

       Spellings, Punctuations, Gramatical Expressions (SPGE)   (10marks)

Suggested solution

(a)(i) Calculate the length of the river from point A to point Z in kilometres given that 5miles = 8kilometres (04miles)

       Let the distance between A and Z be Y; => $\frac{0.5}{100}Y = 10$

$$Y = \frac{100 \times 10}{0.5} = 2000\text{miles}$$

       Let distance in kilometres be Q

       ⇨   5miles = 8km
           2000miles = Q km
           Q = (2000 x 8)/5 = 3200km

   (ii) Find x in miles (02marks)

       $\frac{x}{3}$ = 2000miles

       x = 2000 x 3 = 6000miles

(b)(i) Calculate the number of boats that will drop out of the race due to each of the challenges given in the table. (show your working) (10marks)

       Total number of boats that participated = 260 x $\frac{24}{2}$ = 3120 boats

Number of boats that drop out due to illnes = $\frac{2}{100} x 3120$ = 62 boats

Number of boats that drop out due to exhaustion = $\frac{5}{100} x 3120$ = 156 boats

Number of boats that drop out due to extreme heat = $\frac{6}{100} x 3120$ = 187 boats

Number of boats that drop out due to accidents = $\frac{10}{100} x 3120$ = 312 boats

Number of boats that drop out due to loss of direction = $\frac{23}{100} x 3120$ = 718 boats

(ii) How many boats will successfully finish the race? (03marks)

Percentage of successful boats = 100 – (2 + 5 + 6 + 10 + 23) = 54%

Number of successful boats = $\frac{54}{100} x 3120$ = 1685 boats

Or

Number of successful boats = 3120 – (62 + 156 + 187 + 312 + 718) = 1685 boats

(iii) How much time does a successful boat travelling at the average speed take to reach point Z (03marks)

Time = distance / speed = 2000/84.4 = 23.725 hours

(c)   If a boat gets lost at point B, calculate the:

(i) distance in kilometres that will have been covered. (03 marks)

Distance in miles = $\frac{3}{4} x$ 2000 = 1500mile

Distance in km = $\frac{1500 \, x \, 8}{5}$ = 2400km

(ii) time that will have been taken if the boat was travelling at 135km/hr. (03marks)

Time = distance /speed

= 1500/135

= 11.111hours

(d)   Explain the challenges faced in utilising water resources in your community. (12 marks)

Water resources refers to bodies of water (such as rivers, streams, lakes, reservoirs, springs, and ground water) and rainwater that provide water to public drinking-water supplies and private wells.

Challenges faced in utilizing of water resources

- Contaminated portable water
- Rapids and falls hinder river navigation
- Water weeds hinder navigation
- Shallowness of water bodies hinder use of big ship
- Hard water wastes soap
- Water pollution with industrial and domestic wastes
- High cost expenses for water storage containers to harvest water resources.
- The dense swamp vegetation along the course of major Lakes like L. Victoria limits accessibility to the water bodies as well as development of landing sites. For example Lutembe, Gaba and Munyonyo swamps in Kampala limit access to Lake victoria.
- Presence of strong winds over the lakes e.g. L. Victoria lead to stong waves that may cause accidents
- Existence of outcrop rocks and stumps in Lake Victoria for example around Kalangala, Buvuma Islands and at Kasenyi cause accidents.
- Presence of large number of wild animals like Hippos and crocodiles on Kazing Channel are a threat to human life
- Water scarcity

Spellings, Punctuations, Gramatical Expressions (SPGE)   (10marks)

Please say something or send your additions/ comments/corrections/suggestions in the comment section. Note that digitaltechers.co.ug is an academic website that thrives on accuracy of information.

Thank you
Dr. Bbosa Science