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PRACTISE QUESTIONS AND MARK SCHEMES

Stage 7 Subject: Chemistry

Topic : Acids and Alkalis-Set-1

Note:
We have included explanations and complete answers to most questions in this pdf. The idea is to help you understand how to frame the answers.

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1 Ammonia, NH_3, is an alkaline gas.

What is the pH of an aqueous solution of ammonia?
Put a ring around the correct answer.

pH 1 **pH 3** **pH 5** **pH 7** **pH 9**

[1]

MARK SCHEME:

b) pH 9; [1]

Expert Solution:

Ammonia is a base/ hence it will have a pH above 7. Hence the answer is pH 9

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2 Sodium is a metal in Group I of the Periodic Table.

Aqueous sodium hydroxide is strongly alkaline.

(i) Which one of the following values is the pH of a strongly alkaline solution?

Put a ring around the correct answer.

pH 1 pH 2 pH 7 pH 13

[1]

(ii) Describe how you could use litmus to show that aqueous sodium hydroxide is alkaline.

.....

..... [2]

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MARK SCHEME:

(i) pH 13; [1]
(ii)
add (red) litmus to sodium hydroxide/dip (red) litmus into sodium hydroxide; [1]
turns blue; [1]

Expert Solution:

(i)

- Alkaline substances have a pH greater than 7
- Strongly alkaline means a pH closer to 14. The only choice we have here is pH 13. So the answer is pH 13.

(ii)Dip an indicator such as the red litmus into the sodium hydroxide solution. It will turn blue indicating it is alkaline.

Note: for q(ii):
Look at the mark distribution, it says tat mentioning the correct type of litmus paper will give you [1] mark and writing the colour change will give you another [1] mark.
This is how Cambridge does the marking. No fractional marks.

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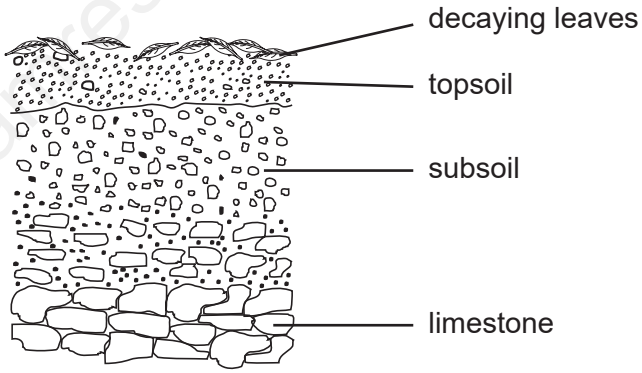
3 The diagram shows a cross section of a soil.



The topsoil had a pH of 6.
Which of the following gives the best description of this pH?
Tick **one** box.

strongly acidic ☐

weakly acidic ☐

neutral ☐

weakly alkaline ☐

[1]

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MARK SCHEME:

(ii) weakly acidic/2nd box down ticked [1]

Note:

- **A pH of 6 indicates that it is weakly acidic.**
- **This is a very basic question. You need to learn your concept well.**

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4 Alkalis are soluble bases.

(a) Which **one** of the following is alkaline?
Put a ring around the correct answer.

distilled water **hydrochloric acid**

sodium chloride solution **sodium hydroxide solution**

[1]

(b) Suggest a pH value for a solution which is alkaline.

..... [1]

(c) Describe how you would find the pH of a solution.

.....

.....

..... [2]

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MARK SCHEME:

(a) sodium hydroxide solution; [1]
(b) any pH above 7; [1]
(c) any two of: [2]
place indicator into solution;
universal indicator paper or solution / pH meter;
compare colour with pH colour chart / take reading on pH meter;

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Expert Solution:

Explanation:

(a) For part a, sodium chloride and pure distilled water will have a pH of 7. Hydrochloric acid will have a pH less than 7. Sodium hydroxide is alkaline

(b) Hence Sodium hydroxide will have a pH greater than 7. [The mark scheme expects you to state any number for the pH , but it should be above 7.

Expert Answer:

(c)

For finding the pH of a solution, place the indicator i, example universal indicator into the solution. The indicator will change colour. Compare the colour with the pH colour chart to find the exact pH of the solution.

or

Dip the pH meter into the solution . Then note the vale shown by the pH meter. This will be the required pH.

Note:

wherever a slash [/] is present, it tells you that it is 'either' ;or'. It does not mean that you need to include both in your answer.

5 (i) Hydrogen chloride dissolves in water to form an acidic solution (hydrochloric acid). Describe how you would use litmus paper to show that this solution is acidic.

.....

..... [2]

(ii) Which one of the following values is most likely to represent the pH of a dilute solution of hydrochloric acid?

Put a ring around the correct answer.

pH 2 **pH7** **pH10** **pH14** [1]

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MARK SCHEME:

(i)blue litmus; [1]
(litmus) turns red [1]
(ii) pH2 [1]

Expert Solution:

(i). Dip blue litmus paper into the solution. It will turn red, indicating that the solution is acidic.

(ii) While answering such questions, you must have realised, that all you need to remember is the pH range /values for acidic /Basic/Neutral substances and also a general knowledge os the common acidic and basic chemicals. [Once again [1] marks for mentioning blu and another [1] mark for mentioning the colour change.

All the other stated pH do not indicate acidic substances. The only choice then remains is 'pH 2'

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6 Carbon dioxide dissolves in water to form a mixture which contains hydrogencarbonate ions and hydrogen ions.

$$CO_2(g) + H_2O(l) \rightleftharpoons HCO_3^-(aq) + H^+(aq)$$

The solution formed is slightly acidic.

Describe how you would use Universal Indicator paper to determine the pH of this solution.

.....

..... [2]

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MARK SCHEME:

dip (indicator) paper in solution /put (indicator paper) in solution [1]
compare the colour with the (colour) chart /different colours represent different pH values [1]

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7 Ammonia is a weak base.

Describe how you would measure the pH of an aqueous solution of a weak base using Universal Indicator.

.....

..... [2]

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MARK SCHEME:

add Universal Indicator to the solution/ observe colour;
compare with colour chart;

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8 The pH of the mineral water is 7.8.

Which one of the following best describes this pH?
Tick one box.

slightly acidic ☐

slightly alkaline ☐

neutral ☐

very acidic ☐

very alkaline ☐ [1]

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MARK SCHEME:

2nd box down ticked [1]

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