ICSE CLASS 10 EXAMINATION

PRACTICE QUESTION PAPER

CHEMISTRY (SCIENCE PAPER – 2)

Chapter 10: Study of Compounds – Nitric Acid

Maximum Marks: 40 ***Time allowed: One hour***

1. Answers to this Paper must be written on the paper provided separately.
*2. You will not be allowed to write during the first **10** minutes. This time is to be spent in reading the question paper.*
*3. **The time given at the head of this Paper is the time allowed for writing the answers.***
*4. **Section A** is compulsory. Attempt **any two** questions from **Section B**.*
5. The intended marks for questions or parts of questions are given in brackets [ ].

SECTION A (20 Marks)

*(Attempt **all** questions from this Section.)*

Question 1

Choose the correct answers to the questions from the given options. [8]
(Do not copy the question, write the correct answers only.)

(i) Nitric acid is prepared in the laboratory by heating potassium nitrate with:
- (a) Concentrated hydrochloric acid
- (b) Concentrated sulphuric acid
- (c) Dilute sulphuric acid
- (d) Sodium hydroxide solution

(ii) The yellow colour of nitric acid kept in the laboratory is due to dissolved:
- (a) Nitric oxide
- (b) Nitrous oxide
- (c) Nitrogen dioxide
- (d) Chlorine

(iii) Which of the following metals becomes passive on treatment with concentrated nitric acid?
- (a) Copper
- (b) Zinc
- (c) Aluminium
- (d) Lead

(iv) Which gas is evolved when copper reacts with **dilute** nitric acid?
- (a) Hydrogen
- (b) Nitrogen dioxide
- (c) Nitric oxide
- (d) Ammonia

(v) Which of the following nitrates gives only oxygen (and no nitrogen dioxide) on heating?

(a) Copper(II) nitrate

(b) Lead(II) nitrate

(c) Zinc nitrate

(d) Sodium nitrate

(vi) **Assertion (A):** Freshly prepared ferrous sulphate solution is used in the brown ring test.
Reason (R): On exposure to air, ferrous sulphate is oxidised to ferric sulphate, which does not give the brown ring.

(a) (A) is true but (R) is false.

(b) (A) is false but (R) is true.

(c) Both (A) and (R) are true, and (R) is the correct explanation of (A).

(d) Both (A) and (R) are true, but (R) is not the correct explanation of (A).

(vii) Aqua regia is capable of dissolving:

(a) Gold

(b) Sulphur

(c) Carbon

(d) Glass

(viii) The gases formed on heating ammonium nitrate are:

(a) Nitrogen dioxide and oxygen

(b) Nitrous oxide and steam

(c) Nitrogen and hydrogen

(d) Ammonia and nitric oxide

Question 2

(i) Complete the following sentences by choosing the correct option from the brackets: [3]

(a) In the laboratory preparation of nitric acid, the apparatus used is made entirely of _____ because nitric acid vapours attack cork and rubber. (glass / rubber)

(b) Nitric acid is stored in _____ bottles to prevent its decomposition by sunlight. (coloured / colourless)

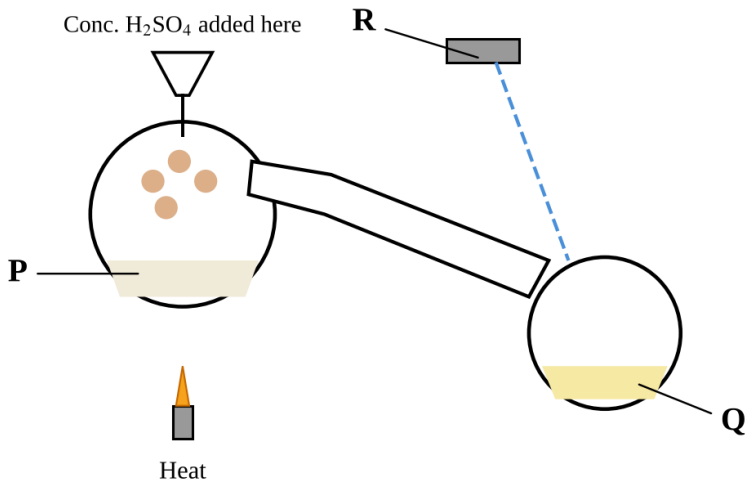
(c) Heating concentrated nitric acid gives reddish brown fumes of _____. (nitrogen dioxide / nitric oxide)

(ii) Match Column A with Column B. (Write the answers as (a)–(number), and so on.) [3]

Column A	**Column B**
(a) Residue left on heating silver nitrate	1. Grey silver metal
(b) Residue left on heating copper(II) nitrate	2. Black copper(II) oxide
(c) Residue left on heating ammonium nitrate	3. No residue
	4. Yellow solid that turns white on cooling

Question 3

(i) The diagram below shows the laboratory preparation of nitric acid. [3]



(a) Name the substances heated in the retort P. Write the equation for the reaction.

(b) What is the purpose of the running water R over the receiver Q?

(c) The acid collected in Q is slightly yellow. Give the reason and state how the colour can be removed.

(ii) Give reasons for the following: [3]

(a) Concentrated hydrochloric acid is not used in place of concentrated sulphuric acid for this preparation.

(b) The temperature of the mixture should not be allowed to exceed 200 °C.

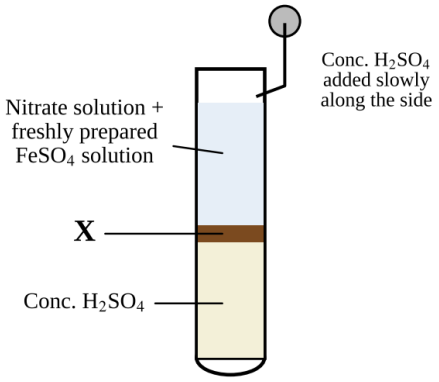
(c) Iron and aluminium vessels can be used to carry concentrated nitric acid.

SECTION B (20 Marks)

*(Attempt **any two** questions from this Section.)*

Question 4

The diagram below shows the test tube obtained when a test for nitrates is performed.



(i) Answer the following questions based on the diagram: [4]

(a) Name the test. Name the substance X and give its colour.

(b) Why is freshly prepared ferrous sulphate solution used?

(c) Why is concentrated sulphuric acid added slowly along the side of the test tube?

(d) Write the formula of the compound X.

(ii) Nitric acid acts as an oxidising agent. Write balanced equations for the reaction of concentrated nitric acid with: [3]

(a) carbon.

(b) sulphur.

(c) copper.

(iii) Concentrated nitric acid and concentrated hydrochloric acid are mixed. [3]

(a) In what ratio are the acids mixed? Name the mixture.

(b) Write the equation for the reaction between them.

(c) Name one metal that dissolves in this mixture and give the reason.

Question 5

The table below gives the action of nitric acid of different concentrations on some metals.

	Reactants	Gas evolved
1	Copper and dilute nitric acid	(a) .....
2	Copper and concentrated nitric acid	(b) .....
3	Iron and cold concentrated nitric acid	(c) .....
4	Magnesium and very dilute (about 1%) nitric acid	(d) .....

(i) Complete the table by naming the gases (a), (b), (c) and (d) (write 'no reaction' if no gas is evolved): [4]

(ii) Write balanced equations for the reactions of dilute nitric acid with: [3]

(a) copper(II) oxide.

(b) sodium hydrogencarbonate.

(c) copper (to give nitric oxide).

(iii) Nitric acid is formed in nature during a thunderstorm. [3]

(a) Write the equation for the reaction between nitrogen and oxygen during lightning.

(b) Write the equation for the formation of nitric acid from nitrogen dioxide, oxygen and water.

(c) What is meant by the fixation of atmospheric nitrogen?

Question 6

The table below gives the effect of heat on some nitrates.

	Nitrate heated	Residue	Gas(es) evolved
1	Sodium nitrate	(a)	Oxygen
2	Zinc nitrate	Zinc oxide	(b) .....
3	Silver nitrate	(c)	Nitrogen dioxide and oxygen
4	Ammonium nitrate	None	(d) .....

(i) Complete the table by writing the answers (a), (b), (c) and (d): [4]

(ii) Write balanced equations for the effect of heat on: [3]

(a) lead(II) nitrate.

(b) copper(II) nitrate.

(c) potassium nitrate.

(iii) Answer the following questions: [3]

(a) A nitrate on heating gives a reddish brown gas and a gas that relights a glowing splinter. Name the two gases.

(b) Why is nitric acid used to etch designs on copper and brass?

(c) State two industrial uses of nitric acid.

****** END OF PAPER ******