My Revision Deck

Term Examination — Answer Key

2026 – 2027

Grade: 8 **Subject:** Chemistry

Time: 2½ hours **Maximum Marks:** 80

Section A

1. **Select the correct answers to the questions from the given options. (Do not copy the questions, write the correct answer only).**

(i) Which of the following pairs lists two efflorescent substances? [1]

(a) Calcium chloride and ferric chloride

(b) Silica gel and quicklime

(c) Washing soda and Glauber's salt

(d) Epsom salt and sodium hydroxide

Explanation: *Examples of efflorescent crystals include washing soda (sodium carbonate decahydrate), Glauber's salt (sodium sulphate decahydrate), blue vitriol and Epsom salt.*

(ii) Carbon monoxide is used as an industrial fuel in which of the following gas mixtures? [1]

(a) Petroleum gas

(b) Marsh gas

(c) Producer gas

(d) Natural gas

Explanation: *Carbon monoxide is used as an industrial fuel in the form of producer gas ($CO + N_2$) and water gas ($CO + H_2$). CO can be used as fuel because it can be oxidised — its oxidation to CO_2 is exothermic and so much heat is produced.*

(iii) Who first observed in the 16th century that a highly inflammable gas was produced when iron was added to sulphuric acid? [1]

(a) Paracelsus

(b) Antoine Lavoisier

(c) Henry Cavendish

(d) Robert Boyle

Explanation: *In the beginning of the 16th century, Paracelsus, a Swiss physician, observed that a highly inflammable gas was produced when iron was added to sulphuric acid.*

(iv) Riya heats some sugar in a pan. First it melts into a clear syrup, then it turns brown and gives off a burnt smell. On cooling, the brown mass becomes hard. Which of these shows that a chemical change has taken place? [1]

(a) The sugar melting into a clear, thick syrup

(b) The syrup turning brown with a burnt smell

(c) The pan getting very hot while it is heated

(d) The brown mass becoming hard on cooling

Explanation: *Melting and hardening on cooling change only the physical state of the sugar, and the pan getting hot is only the effect of heating. The change in colour and the new smell show that new substances have been formed, so this is a chemical change.*

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(v) What property do basic oxides show when they react with acids? [1]

(a) They form an alkali and a gas as products of the reaction with the acid in a chemical reaction

(b) They form a salt and water as products of the reaction with the acid in this chemical reaction

(c) They form an oxide and water as products of the reaction with the acid in a chemical reaction

(d) They form a precipitate and a gas as products of the reaction with the acid in a chemical reaction

Explanation: *Basic oxides react with acids to form salt and water. For example, $CaO + 2HCl \rightarrow CaCl_2 + H_2O$.*

(vi) In the molecule of methane (CH_4), what is the valency of carbon? [1]

(a) 1, because carbon joins only one other element to form one whole molecule of methane gas

(b) 4, equal to the four hydrogen atoms that combine with one atom of carbon in methane

(c) 3, the same valency that nitrogen takes in ammonia with three hydrogen atoms

(d) 2, twice the number of carbon atoms that are present in one single molecule of methane

Explanation: *In CH_4, four hydrogen atoms combine with one atom of carbon. By the hydrogen-rule, the valency of carbon is 4.*

(vii) When drawing the atomic diagram of an element, what must the innermost circle represent? [1]

(a) The nucleus of the atom that contains the protons and the neutrons of the element

(b) The first shell of electrons of the atom labelled K and containing two valence electrons

(c) The outermost orbit of the atom that holds the valence electrons of that element

(d) The total number of protons in the atom written numerically inside the central circle

Explanation: *In the steps to draw an atom, the innermost circle represents the nucleus, inside which we write the number of protons and neutrons. Electrons are placed as dots on the circles around it.*

(viii) The smallest particle which can exist freely in nature and can retain the properties of that substance is a(n): [1]

(a) Molecule

(b) Atom

(c) Element

(d) Ion

Explanation: *A molecule is the smallest particle which can exist free in nature and which can retain the properties of that substance. A molecule is composed of one or more atoms of the same or different elements.*

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(ix) Which property best distinguishes a suspension from a colloid? [1]

(a) The suspended particles in a suspension settle down at the bottom while in a colloid they stay dispersed

(b) A suspension exhibits the Tyndall effect strongly while a colloid does not show any scattering of light

(c) A suspension is a homogeneous mixture while a colloid is a heterogeneous mixture in every case

(d) The particles in a suspension are smaller than 10^{-7} cm while particles in a colloid are larger than this

Explanation: *Suspended particles in a suspension settle at the bottom of the container if left undisturbed because they are sufficiently large for sedimentation. Colloidal particles do not settle on standing.*

(x) Which combination of reactants is used in the laboratory preparation of carbon dioxide? [1]

(a) Calcium carbonate marble chips and dilute hydrochloric acid are the reactants used

(b) Calcium carbonate marble chips and concentrated sulphuric acid are the reactants used

(c) Heated charcoal and a stream of carbon dioxide gas are the reactants used

(d) White hot coke and steam heated together to about 1000°C are the reactants used

Explanation: *In the laboratory, carbon dioxide is prepared by the action of dilute acid on a carbonate. Marble chips (calcium carbonate) are placed in a flask and dilute hydrochloric acid is added: $CaCO_3 + 2HCl \rightarrow CaCl_2 + H_2O + CO_2$.*

(xi) Assertion (A): Pure water is not used directly in the electrolysis to produce hydrogen and oxygen. [1]
Reason (R): Pure water is a poor conductor of electricity.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not the correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

Explanation: *Pure water is not used directly in the electrolysis (A is true). Pure water is indeed a poor conductor of electricity (R is true), which is why dilute sulphuric acid must be added to make 'acidulated water' that conducts electricity well. R correctly explains A.*

(xii) Assertion (A): A piece of ice pushed below the surface of a lake and then released rises back to the top. [1]
Reason (R): Ice has a lower density than liquid water.

(a) Both A and R are true and R is the correct explanation of A

(b) Both A and R are true but R is not the correct explanation of A

(c) A is true but R is false

(d) A is false but R is true

Explanation: *Ice is less dense than liquid water, so it floats. A freely released piece of submerged ice rises to the surface. Both statements are true and R explains A.*

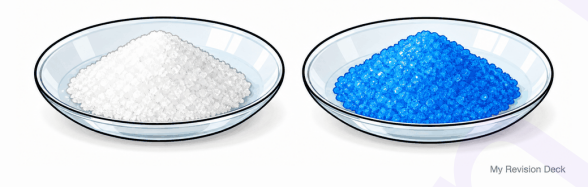
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(xiii) Assertion (A): Carbon monoxide gas bubbled through water turns moist blue litmus red. [1]
Reason (R): Carbon monoxide is an oxide of a non-metal.

(a) Both A and R are true and R is the correct explanation of A
(b) Both A and R are true but R is not the correct explanation of A
(c) A is true but R is false
(d) A is false but R is true

Explanation: *Carbon monoxide is indeed an oxide of a non-metal (carbon), so R is true. But it is a neutral oxide: it is insoluble in water, has no effect on moist litmus and does not react with acids or bases. So A is false. Not every non-metal oxide is acidic.*

(xiv) Observe the image showing two samples of copper sulphate side by side — one is white and the other is blue. Which of the given options best identifies the two samples? [1]



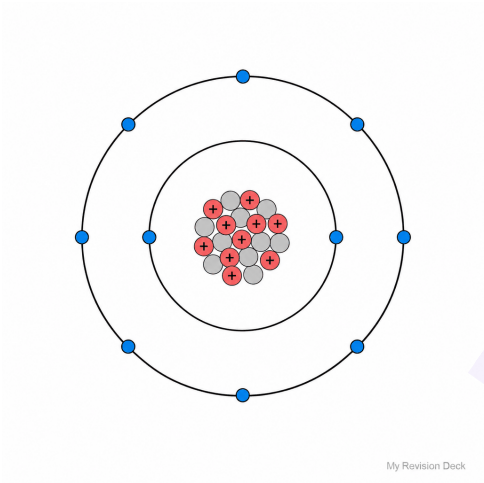
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(a) The white sample is anhydrous copper sulphate and the blue sample is hydrated copper sulphate ($CuSO_4 \cdot 5H_2O$)
(b) The white sample is hydrated copper sulphate and the blue sample is anhydrous copper sulphate of the same compound
(c) Both samples are hydrated copper sulphate but at different temperatures during crystallisation in the solution
(d) Both samples are anhydrous copper sulphate but the blue colour is due to impurities in the sample of the salt

Explanation: *Hydrated copper sulphate ($CuSO_4 \cdot 5H_2O$) is blue. When heated, it loses its water of crystallisation and becomes white anhydrous copper sulphate. Adding water to the white powder turns it blue once again.*

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(xv) Observe the diagram. Which of the given options best describes the atomic model shown? [1]



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(a) It is Bohr's model with the nucleus at the centre and electrons in fixed orbits around it

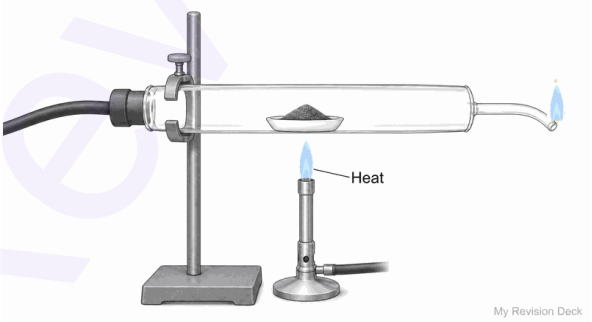
(b) It is the plum pudding model with electrons embedded in a positive solid ball of matter

(c) It is Dalton's model showing atoms as solid indivisible spheres without any inner structure

(d) It is Democritus' model showing the atom as a single particle that cannot ever be divided

Explanation: *The diagram shows Bohr's atomic model — the atom is mostly empty space, with the nucleus at the centre (containing protons and neutrons) and the electrons revolving around it in fixed orbits, like planets around the Sun.*

2. (i) Study the laboratory setup in which a dry gas is passed over heated copper(II) oxide and answer the questions that follow.



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(a) Name the dry gas being passed over the heated metal oxide. [1]
Model answer: Dry hydrogen gas is passed over the heated metal oxide.

(b) State the change in the valency of copper during this reaction. [1]
Model answer: The valency of copper decreases from +2 to 0 as copper(II) oxide is reduced to copper.

(c) Write the balanced equation for the reaction. [1]
Model answer: The balanced equation is: $CuO + H_2 \rightarrow Cu + H_2O$.

(d) State the change in the valency of this gas during the reaction. [1]
Model answer: The valency of hydrogen increases from 0 to +1 during this reaction.

(e) How is this gas, as a reducing agent, used industrially? [1]
Model answer: Hydrogen is used in metallurgy to extract pure metals from their metal oxides.

(ii) Match Column A with Column B: [5]

Column A	Column B
(a) Reduction	(i) Recovers both solid and liquid of a homogeneous mixture
(b) Decantation	(ii) Separates gases like CO_2, SO_2 and NH_3 from other gases
(c) Chromatography	(iii) Pouring off the clear liquid from above the settled solid
(d) Preferential liquefaction	(iv) Getting iron back from iron oxide by heating with charcoal
(e) Distillation	(v) Separates mixtures like ink, blood and chlorophyll

(a) → (iv)
(b) → (iii)
(c) → (v)
(d) → (ii)
(e) → (i)

(iii) Complete the following sentences by choosing the correct word(s) from the brackets:

(a) The reaction of _____ with cold water is more vigorous than that of sodium with cold water. [Calcium / Potassium] [1]
Potassium

(b) The action of heat on a sample of ammonium chloride is a _____ change. [reversible / permanent] [1]
reversible

(c) The acid found in lemon juice is _____ acid. [Citric / Acetic] [1]
Citric

(d) The chemical symbol Au for gold is derived from its _____ name aurum. [Latin / Greek] [1]
Latin

(e) The intermolecular forces of attraction are strongest in _____. [solids / gases] [1]
solids

(iv) State the terms for the following:

(a) A chemical reaction in which light energy is absorbed to bring about the change. [1]
Photochemical reaction

(b) A soluble acidic oxide that gives an acid on reaction with water. [1]
Acid anhydride

(c) A substance that alters the speed of a chemical reaction without itself being consumed. [1]
Catalyst

(d) The scientific principle stating that in a chemical reaction, mass is neither created nor destroyed but can be transformed from one form to another. [1]
Law of Conservation of Mass

(e) The scientist who proposed in 1897 that the atom could be split up into smaller particles. [1]
JJ Thomson

(v) Write whether the statements are true or false. If false, change the statement to a true statement by changing the underlined word only.

(a) The specific gravity of diamond is 3.52. [1]
True
Explanation: *The specific gravity of diamond is 3.52. This high value reflects the compact arrangement of carbon atoms in the tetrahedron structure.*

(b) When liquid water undergoes the change of state called evaporation, heat is given out to the surroundings and the environment is warmed. [1]
False — correct word: freezing
Explanation: *It is the freezing of water that gives out heat to the surroundings and warms the environment. Evaporation, by contrast, takes up heat from the surroundings and cools the environment.*

(c) Phenolphthalein turns from colourless to yellow in the presence of a base. [1]
False — correct word: pink
Explanation: *Phenolphthalein turns from colourless to pink (not yellow) in the presence of a base. Methyl orange turns from orange to yellow in the presence of a base.*

(vi) (a) Define the term 'Chemical Formula'. [1]
Model answer: A chemical formula is a symbolic representation of a molecule of a compound.

(b) Define the term 'Atomic Number'. [1]
Model answer: Atomic number is the number of protons present in the nucleus of an atom.

Section B

(Attempt all questions from this Section.)

3. (i) The activity series of metals is a foundational concept in displacement reactions.

(a) What metal is at the top of the activity series of metals? [1]
Model answer: Potassium is at the top of the activity series of metals.

(b) Why does gold not displace hydrogen from acids? [1]
Model answer: Gold does not displace hydrogen from acids because it is placed below hydrogen in the activity series, and an element can displace only an element placed below it.

(ii) Solubility of a substance in a solvent is a quantitative property defined under specific conditions.

(a) How is the solubility of a substance defined at a particular temperature? [1]
Model answer: Solubility at a particular temperature is the maximum mass of solute in grams that can be dissolved in 100 grams of the solvent at one atmosphere pressure to make a saturated solution.

(b) State any two factors that affect the solubility of a substance in a solvent. [1]
Model answer: The solubility of a substance is affected by the nature of the solute and the nature of the solvent.

Additional points a student may include: temperature also affects solubility; pressure affects the solubility of gases — the solubility of a gas in water increases with an increase in pressure.

(iii) An atom and the ion derived from it differ in size, charge, and electronic configuration.

(a) How does the size of a cation compare with the size of its parent atom? [1]
Model answer: A cation is smaller in size than its parent atom because it has one shell less.

(b) How does the number of shells in an anion compare with that of its parent atom? [1]
Model answer: An anion has the same number of shells as its parent atom but more electrons.

(c) What is the anion of sulphur called? [1]
Model answer: The anion of sulphur is called the sulphide ion.

(iv) Various metals react differently with water, steam, and acids to liberate hydrogen.

(a) Name any two metals that react with cold water to liberate hydrogen. [1]
Model answer: Potassium and sodium react with cold water to liberate hydrogen.

Additional points a student may include: calcium also reacts with cold water to liberate hydrogen.

(b) Name any two metals that react with steam to liberate hydrogen. [1]
Model answer: Magnesium and aluminium react with steam to liberate hydrogen.

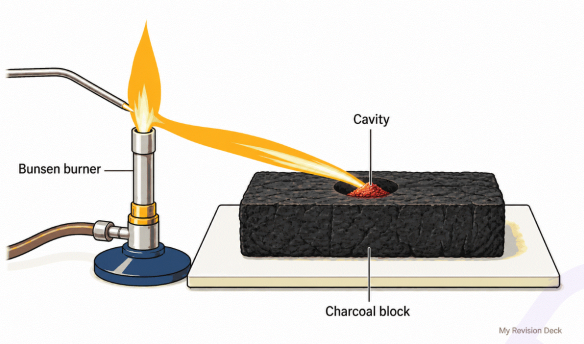
Additional points a student may include: zinc also reacts with steam to liberate hydrogen, and iron reacts with steam reversibly to liberate hydrogen.

(c) Name any two amphoteric metals that react with hot concentrated alkalis to release hydrogen. [1]
Model answer: Zinc and lead are amphoteric metals that react with hot concentrated alkalis to release hydrogen.

Additional points a student may include: aluminium is also an amphoteric metal that releases hydrogen with hot concentrated alkalis.

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4. (i) Study the laboratory experiment shown and answer the questions that follow. A pinch of red mercury(II) oxide has been placed in the cavity and moistened with water.

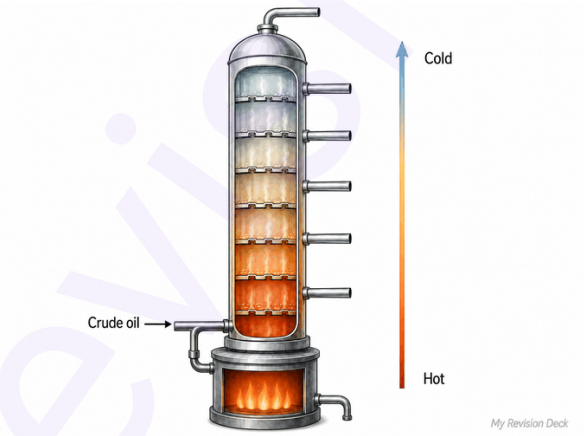


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(a) What property of charcoal is being demonstrated in the experiment shown? [1]
Model answer: The experiment demonstrates the reducing action of charcoal.

(b) What is observed in the cavity after the substance in it has been heated for a while? [1]
Model answer: A silvery globule of metallic mercury is seen in the cavity, indicating that the mercury(II) oxide has been reduced to mercury.

(ii) Study the fractional distillation setup shown, used in an oil refinery to separate crude oil into its useful fractions, and answer the questions that follow.



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(a) State the approximate temperatures at the top and at the bottom of the fractionating column. [1]
Model answer: The top of the column is at about 25°C and the bottom is at about 350°C.

(b) Name the fraction collected near the top of the column and the residue that remains at the bottom. [1]
Model answer: The fraction collected at the top of the column is refinery gas, and the residue that remains at the bottom is bitumen.

Additional points a student may include: Petrol, which is collected just below the refinery gases, may also be accepted as the fraction near the top of the column.

(iii) State any three differences between a liquid and a gas with reference to the kinetic molecular theory. [3]

Model answer: The intermolecular space between the particles of a liquid is small, whereas in a gas the intermolecular space is very large. The intermolecular forces of attraction in a liquid are moderate — strong enough to hold the particles in contact but weak enough to allow them to slide past one another — while in a gas the forces are very weak, so the particles move freely in all directions. A liquid has a definite volume but no definite shape, while a gas has neither a definite volume nor a definite shape.

Additional points a student may include: Liquids are almost incompressible, whereas gases are highly compressible. A liquid has a free surface, while a gas has no free surface. Liquids diffuse slowly, while gases diffuse rapidly.

(iv) Describe the different valencies of positive ions, with at least two examples for each (monovalent, divalent, trivalent and tetravalent). [3]

Model answer: Positive ions can be classified by their valency. Monovalent ions have a +1 charge — examples include K^+ (potassium) and Na^+ (sodium). Divalent ions have a +2 charge — examples include Ca^{2+} (calcium) and Mg^{2+} (magnesium). Trivalent ions have a +3 charge — examples include Al^{3+} (aluminium) and Fe^{3+} (ferric). Tetravalent ions have a +4 charge — examples include Pb^{4+} (plumbic) and Sn^{4+} (stannic).

Additional points a student may include: Other monovalent positive ions include H^+, Ag^+ and NH_4^+. Other divalent positive ions include Zn^{2+}, Cu^{2+} and Fe^{2+} (ferrous).

5. (i) Why is the dissolving of salt in water considered a physical change? State any four reasons. [2]

Model answer: Dissolving salt in water is a physical change because no new chemical substance is formed. The salt can be recovered from the solution by the simple technique of evaporation, which shows that the change is reversible. The composition of the salt remains unaltered during dissolving. The salt dissolves in the water without losing its characteristics.

(ii) Why is rainwater considered the purest form of natural water? How does it become hard as it seeps through the soil? [2]

Model answer: Rainwater is the purest form of natural water because it is a product of natural distillation. As it passes through the atmosphere, it absorbs carbon dioxide and becomes slightly acidic due to the formation of carbonic acid. On reaching the ground, it reacts with the insoluble carbonates of calcium and magnesium in the Earth's crust to form soluble bicarbonates. As it seeps through the soil, it also dissolves chlorides and sulphates of calcium and magnesium. These dissolved salts lend hardness to the water.

(iii) Chemical reactions involve energy changes.

(a) What is an exothermic reaction? [1]

Model answer: An exothermic reaction is one that proceeds with the liberation of heat energy and produces a temperature rise.

(b) What is an endothermic reaction? [1]

Model answer: An endothermic reaction is one that proceeds with the absorption of heat energy and produces a fall in temperature.

(c) What is activation energy? [1]

Model answer: Activation energy is the minimum energy with which reacting particles must collide for a chemical reaction to occur.

(iv) The type of mixture also depends on the physical states of the components being combined.

(a) Give one example of a solid-solid mixture and state whether it is homogeneous or heterogeneous. [1]
Model answer: Brass (copper and zinc) is a homogeneous solid-solid mixture.

Additional points a student may include: Gunpowder (nitre + charcoal + sulphur) is a heterogeneous solid-solid mixture.

(b) Give one example of a solid-liquid mixture and state whether it is homogeneous or heterogeneous. [1]
Model answer: Salt dissolved in water is a homogeneous solid-liquid mixture.

Additional points a student may include: Mud in water is a heterogeneous solid-liquid mixture.

(c) Give one example of a liquid-liquid mixture and state whether it is homogeneous or heterogeneous. [1]
Model answer: Alcohol in water is a homogeneous liquid-liquid mixture.

Additional points a student may include: Oil and water is a heterogeneous liquid-liquid mixture.

6. (i) Carbon is unique because it has both crystalline and amorphous allotropic forms.

(a) Name the crystalline allotropes of carbon. [1]
Model answer: The crystalline allotropes of carbon are diamond, graphite and fullerene.

(b) Name the amorphous allotropes of carbon. [1]
Model answer: The amorphous allotropes of carbon are coal, coke and lampblack (soot).

(ii) A student adds a few drops of lime juice to a glass of milk. Within a short time, the milk begins to thicken and solid chunks appear in the liquid.

(a) Name the change that has occurred to the milk. [1]
Model answer: The change that has occurred is curdling.

(b) State whether this is a reversible or an irreversible change. [1]
Model answer: This is an irreversible change.

(iii) Hot rice is packed in a steel tiffin box and the lid is closed. When the box is opened at lunch time, drops of water are seen on the underside of the lid. Name the two changes of state that have taken place and explain each of them in terms of the particles of water. [3]
Model answer: The two changes are evaporation and condensation. First, water evaporates from the hot rice: some of the water particles at the surface move fast enough to overcome the attraction of the neighbouring particles and escape as water vapour into the closed box. Then condensation takes place at the lid, which cools faster than the rice: when the vapour touches the cooler lid, it loses heat, its particles lose energy and slow down, and they come close together again to form drops of liquid water on the underside of the lid.

(iv) Define a chemical equation and explain what information a balanced chemical equation conveys. [3]

Model answer: A chemical equation is a representation of the changes that take place during a chemical reaction, shown using symbols and formulas. A balanced equation conveys: the chemical formulas of all reactants and products; the relative numbers of molecules of each substance; the total number of atoms of each element on both sides (which must be equal); and the masses in which the substances combine. By implication it shows that the reaction obeys the law of conservation of mass.

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