CHEMISTRY

BOOKS - HT Olympiad Previous Year Paper

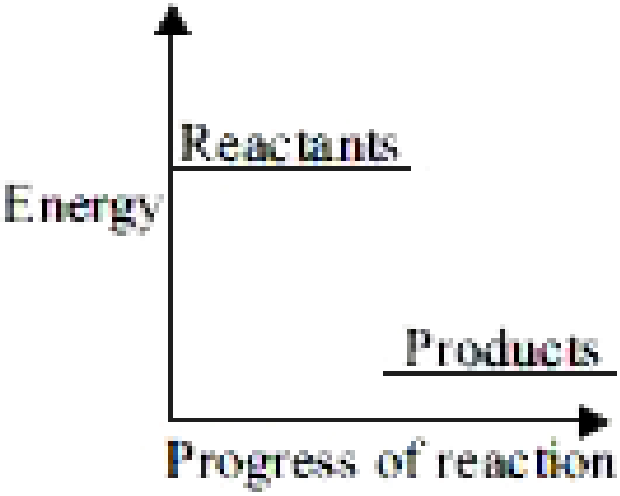
NSO QUESTION PAPER 2016 SET A

Science

1. The given diagram shows the energy levels of the reactants and products for a particular

reaction :

Which of the following processes can be related to the given diagram ?



A. Ethyne gas burns in oxygen to form carbon dioxide and water along with evolution of heat.

B. When solid mercury (II) oxide is heated liquid mercury and oxygen gas are produced.

C. Hydrogen gas combines with chlorine gas in the presence of light to form hydrogen chloride gas.

D. Potassium chlorate decomposes in presence of heat to form potassium chloride and oxygen.

Answer: A

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2. Which of the following statements are correct?

I. Solubility of solids in liquids usually decreases with decrease in temperature and the extra amount of solute crystallises out.

II. The solubility of gases in liquids increases on increasing the temperature.

III. Solubility of gases in liquids increases on increasing the pressure.

IV. While expressing the solubility of a substance temperature is not specified.

A. I and III only

B. II and III only

C. I, II and IV only

D. III and IV only

Answer: A

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3. The given table shows a part of the periodic table

Groups → Periods ↓	1	2	3 to 12	13	14	15	16	17	18
2							*Q*		*R*
3		*P*				*T*			*U*

P, Q, R, T and U are respectively

A. Mg, S, Ar, Al, and Ne

B. O, Mg, Ar, P and Ne

C. Mg, O, Ne, P and Ar

D. O, Mg, Ne, P and Ar

Answer: C

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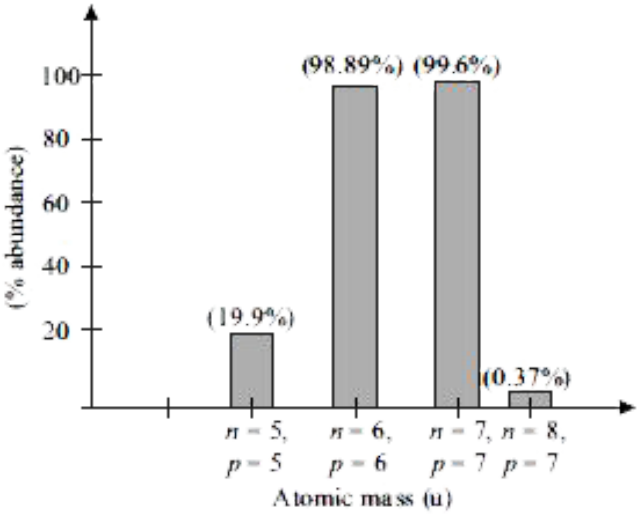
4. Observe the given graph carefully and find the relative atomic mass of the isotopes.



A. 27.86 u

B. 13.99 u

C. 14.86 u

D. 15.98 u

Answer: B

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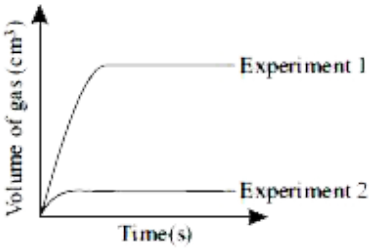
5. Daivik, a class 10 student studied the reaction between a carbonate and an acid in the lab. His results are shown in the given

graph:



Which of the following experimental conditions did he use?

		Experiment 1	Experiment 2
A.	(i)	Excess acid, 5 g carbonate, 20°C	Excess acid, 5 g carbonate, 40°C
B.	(ii)	Excess acid, 4 g carbonate	Excess acid, 1 g carbonate
C.	(iii)	200 cm^3 of 0.5 mol/dm^3 acid, excess carbonate	100 cm^3 of 1 mol/dm^3 acid, excess carbonate
D.	(iv)	150 cm^3 of 0.1 mol/dm^3 acid, excess carbonate	50 cm^3 of 0.5 mol/dm^3 acid, excess carbonate

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6. 8 g of E_2O_3 contains 5.6 g of 'E'. How many moles of E does 16.8 g of the element 'E'

contain?

A. 0.1

B. 0.2

C. 0.3

D. 0.75

Answer: C

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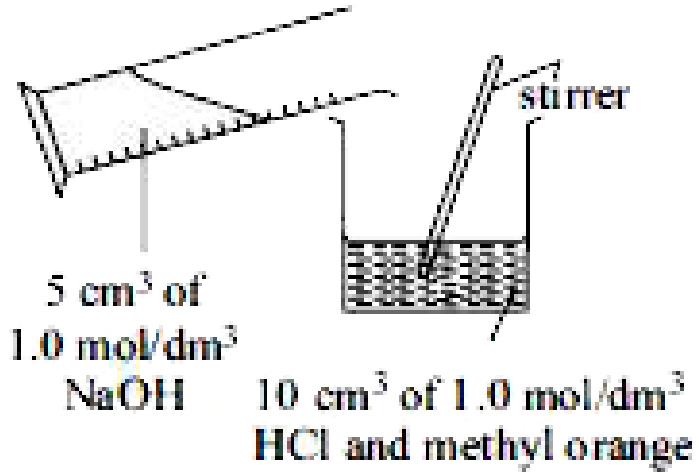
7. In an experiment, 5 cm^3 of 1.0 $\mathrm{mol/dm^3}$ NaOH solution is gradually added to 10 $\mathrm{cm^3}$ of 1.0 $\mathrm{mol/dm^3}$ HCl solution containing methyl orange indicator .

Which of the following changes will occur in the mixture ?



A. pH of the resultant solution increases.

B. The methyl orange indicator changes colour from red to yellow.

C. Number of moles of water decreases and beaker gets warmed up.

D. A precipitate is formed.

Answer: A

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8. The electronic configuration of an ion Z^{2-} is 2, 8. If the number of neutrons present in the parent atom Z is 11 then the nucleon no. of 'Z' is

A. 16

B. 19

C. 20

D. 21

Answer: B

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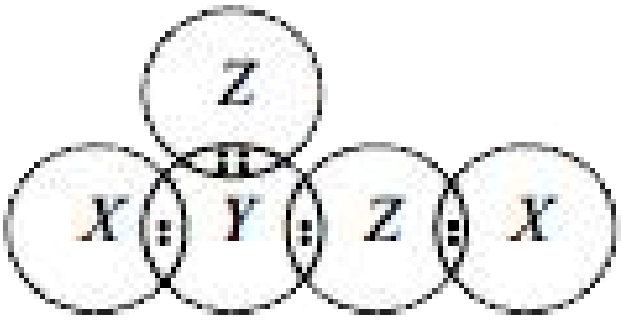
9. The given diagram shows the arrangement of valence electrons in organic compound Q, having molecular formula X_2YZ_2

What could be the compound Q?



A. Methanol

B. Ethanol

C. Methanoic acid

D. Ethanoic acid

Answer: C

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10. Some properties of substances P, Q, R and S are given in the table :

Sub-stance	M. pt. (°C)	B.pt. (°C)	Electrical conductivity
P	44	280	Good
Q	–7.2	59	Poor
R	–101	–35	Poor
S	–39	357	Good

Which of the given substances represents a gaseous non-metal at room temperature?

A. P

B. R

C. Q

D. S

Answer: B

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11. Match column I with column II and select the correct option using the given codes.

	Column I		Column II
P.	A metal that forms two types of oxides	(i)	Cu
Q.	A metal used in hot water apparatus	(ii)	Ag
R.	A metal which can displace hydrogen from steam only	(iii)	Fe
S.	A metal that does not react with air even at high temperature	(iv)	Zn

A. P-(ii), Q-(i), R-(iii), S-(iv)

B. P-(iii), Q-(i), R-(iii), (iv), S-(ii)

C. P-(iv), Q-(ii), R-(iii), S-(i)

D. P-(iii), Q-(ii), R-(i), S-(iv), (ii)

Answer: B

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12. Ms. Neelam, a class 10 teacher took Cu, Al, Pb and Zn strips respectively in four test tubes labelled as, I, II, III and IV and added 10 mL of freshly prepared ferrous sulphate solution to each test tube as shown in the figure :

Black residue would be obtained in test tubes

A. I and II only

B. I and III only

C. II and III only

D. II and IV only.

Answer: D

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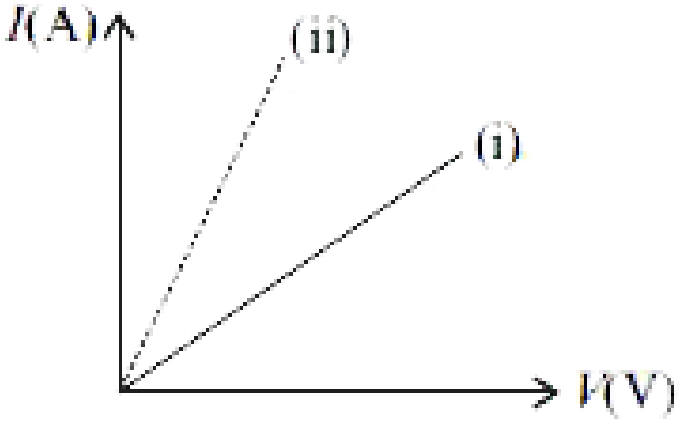
Achievers Section

1. The given figure shows the I-V curve (i) for a nichrome wire of fixed length and cross-section



Which of the following will yield the curve (ii) ?

A. Increase the length of nichrome wire

B. Decrease the thickness of nichrome wire

C. Replace the nichrome wire with a similar copper wire

D. None of these

Answer: C

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2. An organic compound 'A' on heating with concentrated H_2SO_4 forms a compound 'B' which on addition of one mole of hydrogen in presence of Ni forms a compound 'C'. One mole of compound 'C' on combustion forms two moles of CO_2 and three moles of H_2O. Which of the following represents the compound 'C' ?

A. C_2H_6 a saturated hydrocarbon

B. C_2H_4 an unsaturated hydrocarbon

C. $HCOOH$, an unsaturated acid

D. C_2H_5OH , a saturated alcohol

Answer: A

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3. An organic compound 'A' on heating with concentrated H_2SO_4 forms a compound 'B' which on addition of one mole of hydrogen in presence of Ni forms a compound 'C'. One mole of compound 'C' on combustion forms two moles of CO_2 and three moles of H_2O

When 'B' and 'C' are added separately to the test tubes containing orange-brown liquid X', the colour disappears in case of 'B' but remains same in case of 'C'. The name of the liquid X and the substance responsible for colour change are respectively

A. Alkaline $KMnO_4$ solution and ethanoic acid

B. Alkaline $KMnO_4$ and ethanol

C. Bromine water and 1, 2-dibromoethane

D. Bromine water and 1, 1, 2, 2-tetrabromoethane.

Answer: C

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