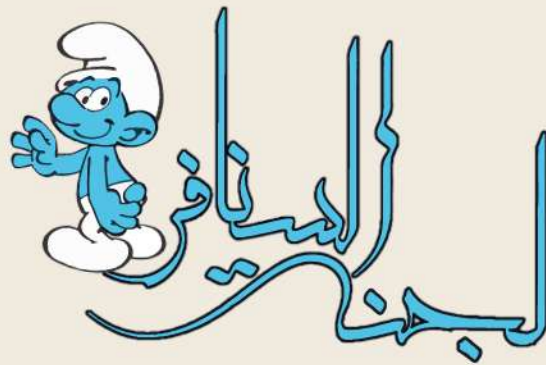


خدمتكم طريق خضناه لرضى الله

2021

# أسئلة سنوات فاينال كيمياء عامة



سنا البولي تكنك f

# بسم الله الرحمن الرحيم

نقدم لكم نحن أسرة فريق  
(لجنة السنافر)

مجموعة أسئلة اختبارات إلكترونية تم تجميعها خلال الفصول الماضية  
سائلين المولى أن يوفقنا وإياكم لكل خير

تنويه

يوجد بعض الأسئلة عليها إجابات قد تحتل الصواب وقد تحتل الخطأ  
فإن أصبنا فما هو إلا توفيق من الله  
وإن أخطأنا فمن أنفسنا

#خدمتكم\_طريق\_خضناه\_لرضى\_الله

#الإتجاه\_الاسلامي

#بسواعدنا\_نبنيتها

#لجنة\_السنافر

#هي\_الله

The boiling point of a substance X = 350 K

If enthalpy of vaporization ( $\Delta H_{\text{vap}}$ ) = 55kJ/mol

Find the entropy of vaporization ( $\Delta S_{\text{vap}}$ ) in J/mol.K

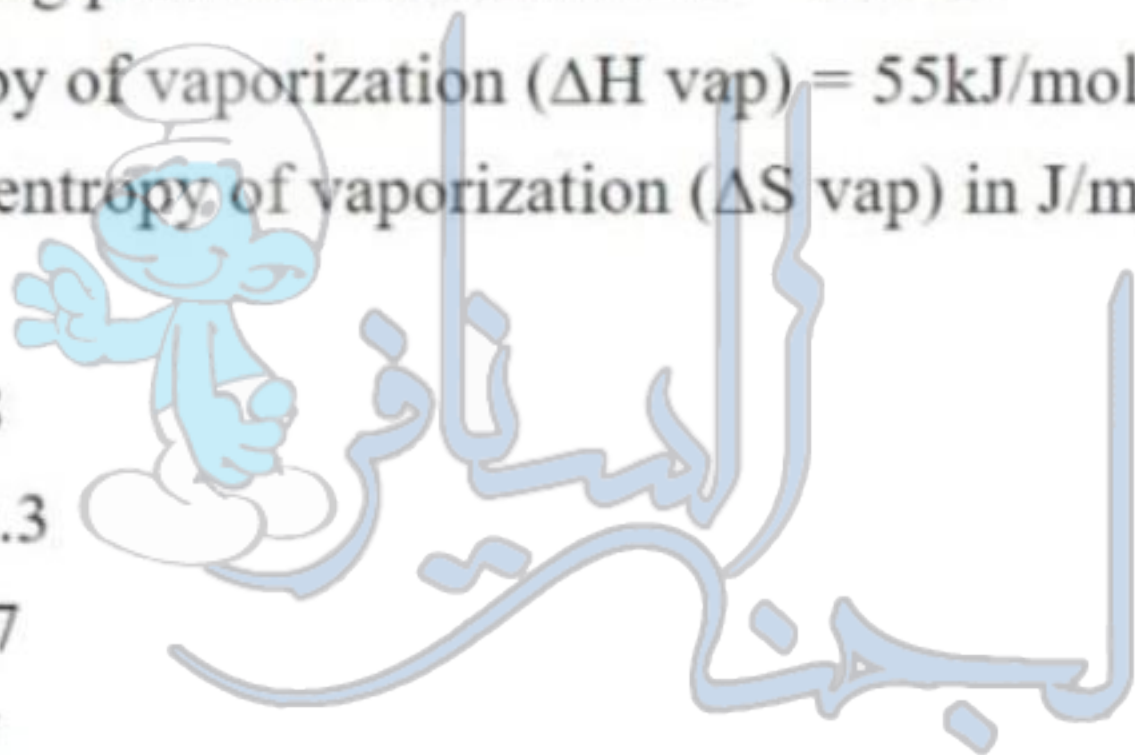
A. 298

B. 636.3

C. -157

D. 157

E. -636.3



Which of the following is correct regarding bomb calorimetry and coffee-cup calorimetry

Select one:

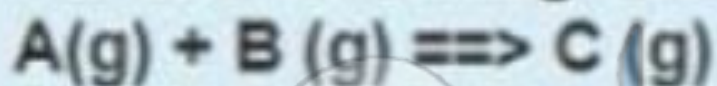
- ☐ In bomb calorimetry the volume remains constant
- ☐ in bomb calorimetry work is zero
- ☐ Coffee cup calorimeter is mostly used for solution reactions
- ☐ In both techniques, heat flow is measured through temperature changes
- ☐ All are correct

If piece of metal at  $120^{\circ}\text{C}$  is placed in  $106\text{ g}$  of  $\text{H}_2\text{O}$  at  $20^{\circ}\text{C}$ .  
The final temperature of both water and metal piece was  $25^{\circ}\text{C}$ .  
Calculate heat lost by metal in J  
(Specific heat for  $\text{H}_2\text{O} = 4.184\text{ J.g}^{-1}.\text{C}^{-1}$ )

Select one:

- ☐ 2217.5
- ☐ -1774
- ☐ 3322.4
- ☐ 1774
- ☐ -2217.5

For the following exothermic reaction



This reaction is :

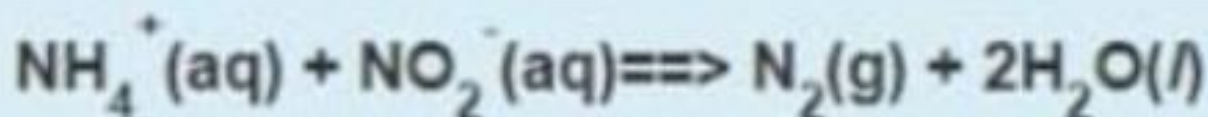


Select one:

- ☐ spontaneous at all temperatures
- ☐ non-spontaneous at all temperatures
- ☐ spontaneous only at low temperatures.
- ☐ spontaneous only at high temperatures.



Given the following data for this reaction:



EXP	$[\text{NH}_4^+]$	$[\text{NO}_2^-]$	RATE
1	0.010 M	0.020 M	0.020 M/s
2	0.015 M	0.020 M	0.030 M/s
3	0.010 M	0.010 M	0.005 M/s

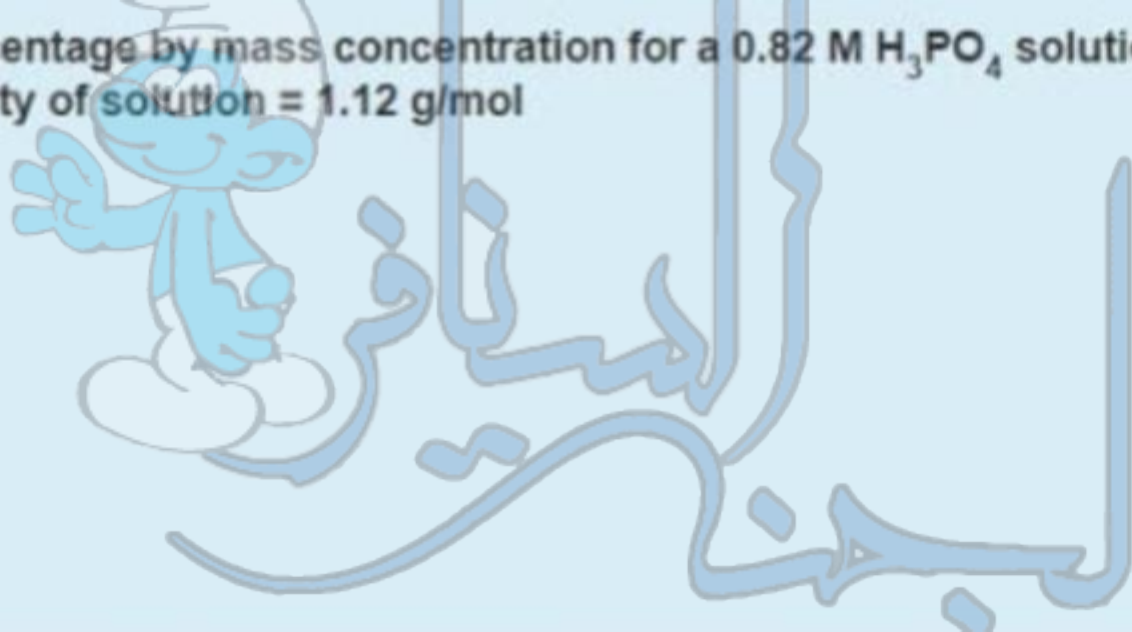
Select one:

- ☐ Rate =  $k[\text{NH}_4^+][\text{NO}_2^-]$
- ☐ Rate =  $k[\text{NH}_4^+]^2[\text{NO}_2^-]^2$
- ☐ Rate =  $k[\text{NH}_4^+]^2[\text{NO}_2^-]$
- ☐ Rate =  $k[\text{NH}_4^+][\text{NO}_2^-]^2$
- ☐ none

Calculate percentage by mass concentration for a 0.82 M  $\text{H}_3\text{PO}_4$  solution (molar mass = 98 g/mol) if density of solution = 1.12 g/mol

Select one:

- ☐ 7.2 %
- ☐ 12.4%
- ☐ 6.3 %
- ☐ 10.2%
- ☐ 8.05%





The equation for the standard enthalpy of formation of calcium carbonate ( $\text{CaCO}_3$ ) is:

- A.  $\text{Ca(s)} + \text{C(s)} + 3/2 \text{O}_2(\text{l}) \rightarrow \text{CaCO}_3(\text{s})$
- B.  $\text{Ca(s)} + 2\text{C(s)} + 3/2 \text{O}_2(\text{g}) \rightarrow \text{CaCO}_3(\text{s})$
- C.  $\text{Ca(s)} + \text{C(s)} + 3/2 \text{O}_2(\text{g}) \rightarrow \text{CaCO}_3(\text{s})$
- D.  $\text{Ca(s)} + \text{C(s)} + 3\text{O}(\text{g}) \rightarrow \text{CaCO}_3(\text{s})$

Select one:

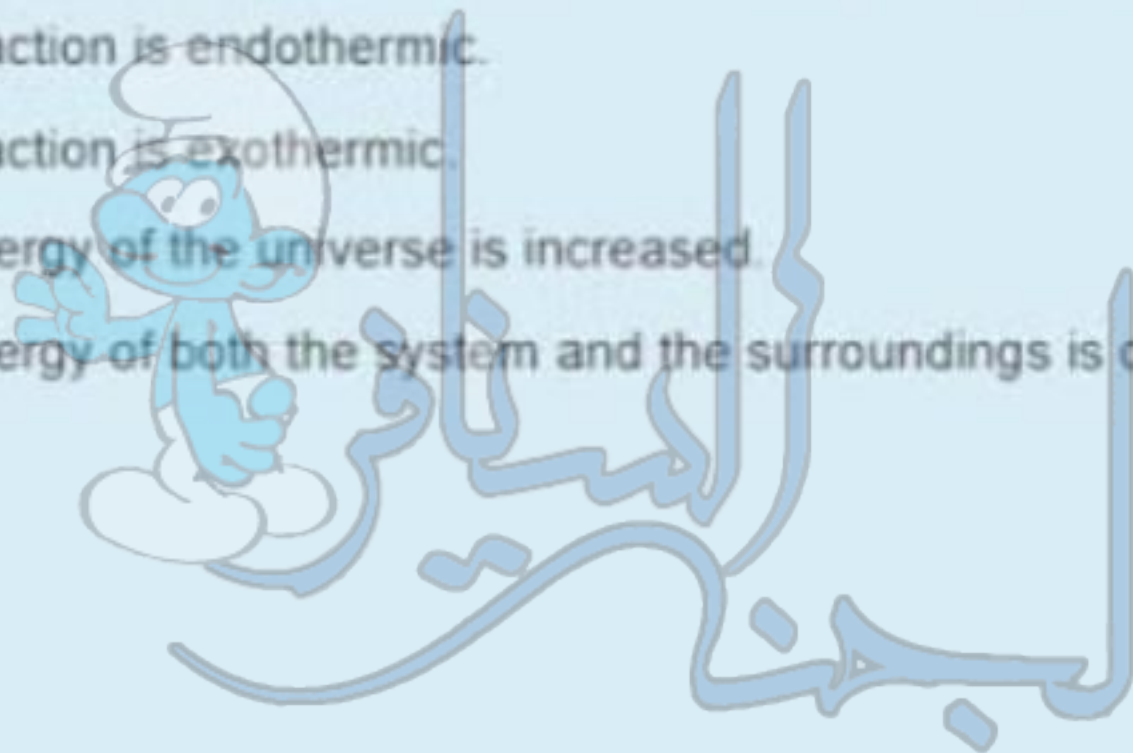
- ☐ A
- ☐ B
- ☐ C
- ☐ D

When two solutions react the container "feels cold" That means that:

- A) the reaction is endothermic.
- B) the reaction is exothermic.
- C) the energy of the universe is increased.
- D) the energy of both the system and the surroundings is decreased.

Select one:

- ☐ A
- ☐ B
- ☐ C
- ☐ D



For the given reaction :



If 4 mol (C) absorbs 400 kJ of heat (q)

Calculate  $\Delta H$  for the above reaction (in kJ)

- a. +25
- b. +50
- c. -25
- d. -50

Select one:

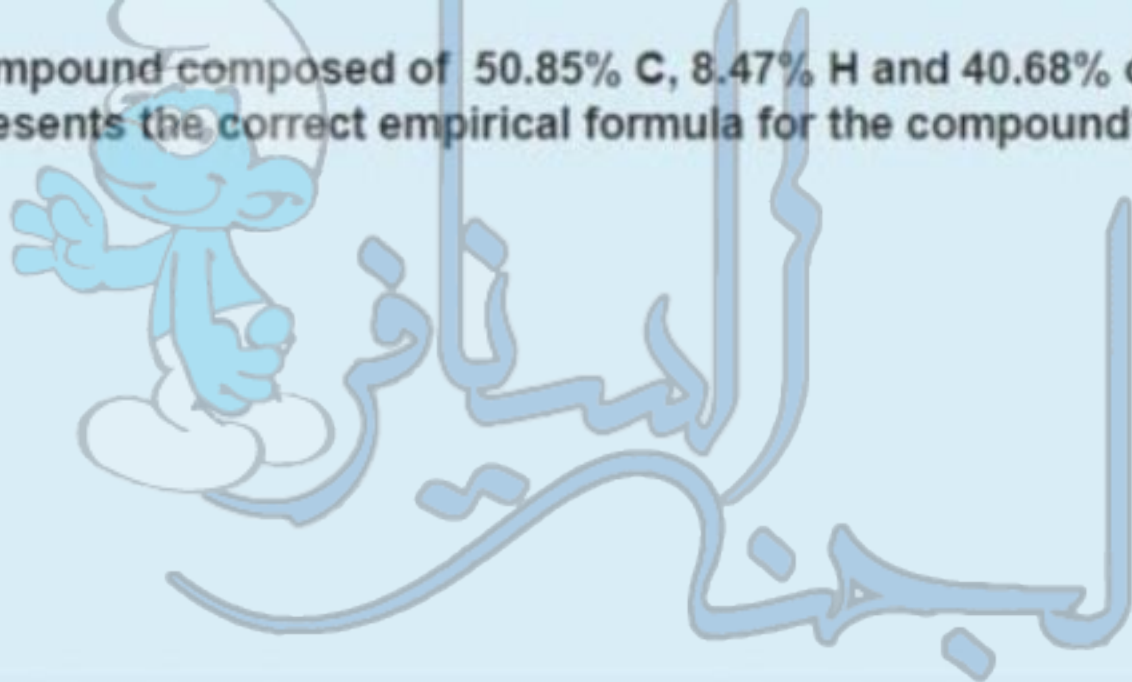
- ☐ a
- ☐ b
- ☐ c
- ☐ d



An organic compound composed of 50.85% C, 8.47% H and 40.68% oxygen. Which of the following represents the correct empirical formula for the compound?

Select one:

- ☐  $C_5H_{10}O_3$
- ☐  $C_3H_6O_2$
- ☐  $CH_2O$
- ☐  $C_2H_4O$
- ☐  $C_4H_8O_3$



You can find 2 moles of oxygen atoms in:

- (a) 0.5 mole of  $\text{K}_2\text{SO}_4$
  - (b) 4 moles of  $\text{Na}_2\text{O}$
  - (c) 1 molecule of  $\text{Na}_3\text{PO}_4$
  - (d) 4 molecules of  $\text{H}_2\text{O}$
  - (e) 2 grams of  $\text{Ca(OH)}_2$  (76g/mol)
- (Avog.no  $\approx 6.022 \times 10^{23}$ )

Select one:

- ☐ a
- ☐ b
- ☐ c
- ☐ d
- ☐ e

Which of the following thermodynamic quantities are not state functions?

Heat ( $q$ )

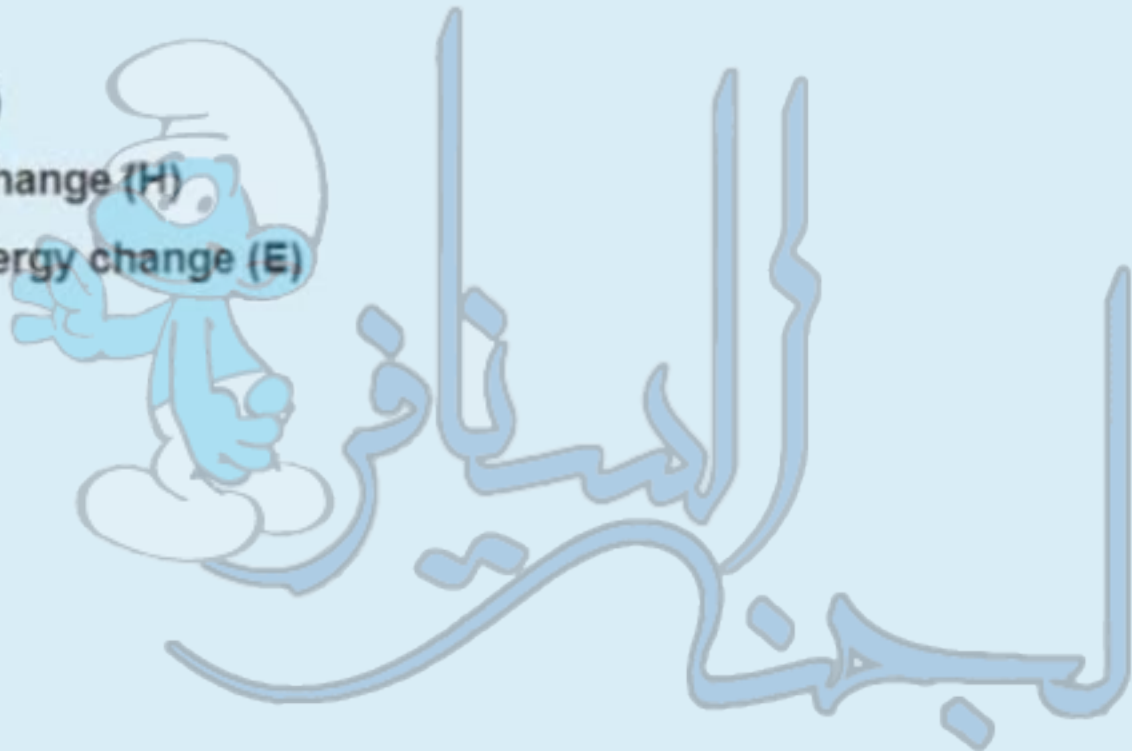
Entropy ( $S$ )

Enthalpy change ( $H$ )

Internal energy change ( $E$ )

Select one:

- ☐  $q$  only
- ☐  $E$  and  $S$
- ☐  $H$  and  $E$
- ☐  $q$  and  $E$
- ☐  $H$  and  $q$

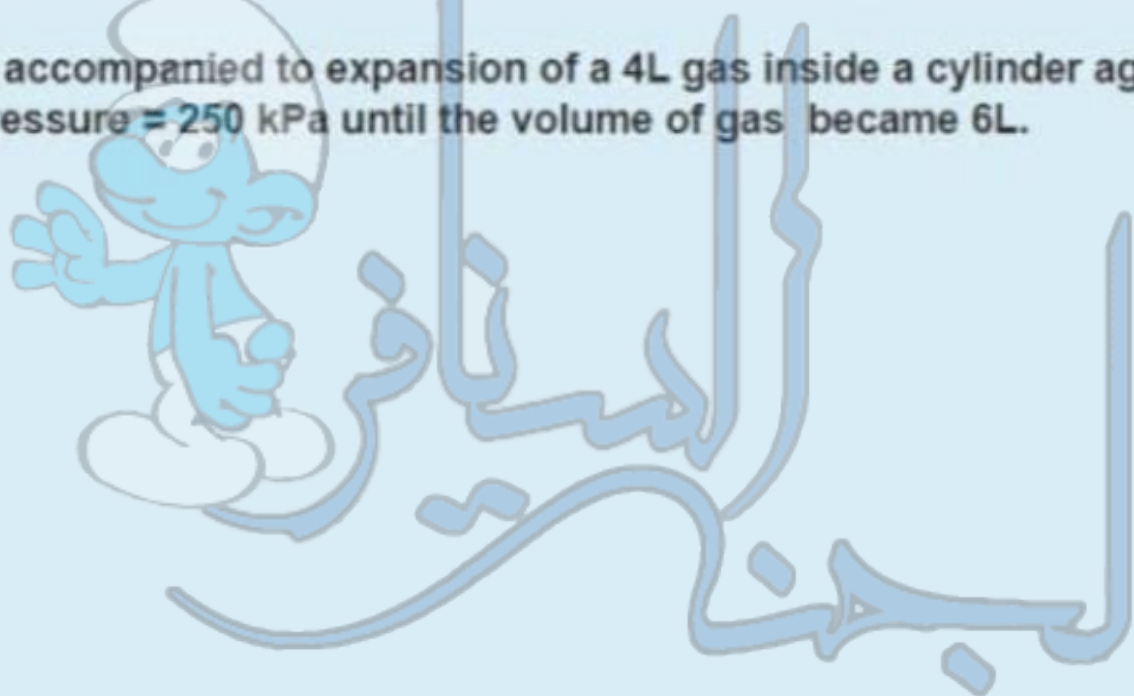




Calculate work accompanied to expansion of a 4L gas inside a cylinder against external atmospheric pressure = 250 kPa until the volume of gas became 6L.

Select one:

- ☐ -1000 J
- ☐ +500 J
- ☐ -500 J
- ☐ +1000 J
- ☐ -1500 J



Calculate  $\Delta G^\circ$  rxn :  $\text{C}_3\text{H}_6\text{O} (\text{l}) + 4\text{O}_2 (\text{g}) \rightarrow 3\text{H}_2\text{O} (\text{l}) + 3\text{CO}_2 (\text{g})$

given that:

$\Delta G_f^\circ \text{CO}_2 (\text{g}) = -394.6 \text{ kJ/mol}$ ,

$\Delta G_f^\circ \text{H}_2\text{O} (\text{l}) = -237.2 \text{ kJ/mol}$  and

$\Delta G_f^\circ \text{C}_3\text{H}_6\text{O} (\text{l}) = -154.5 \text{ kJ/mol}$ ,

Select one:

- ☐ +1740.9 kJ
- ☐ -1740.9 KJ
- ☐ -3481.8 KJ
- ☐ +3481.8 KJ
- ☐ -3697.8 KJ

The half-life for a first-order reaction is 70 s.

What was the original concentration if, after 2.0 minutes, the reactant concentration remained is 0.062 M?

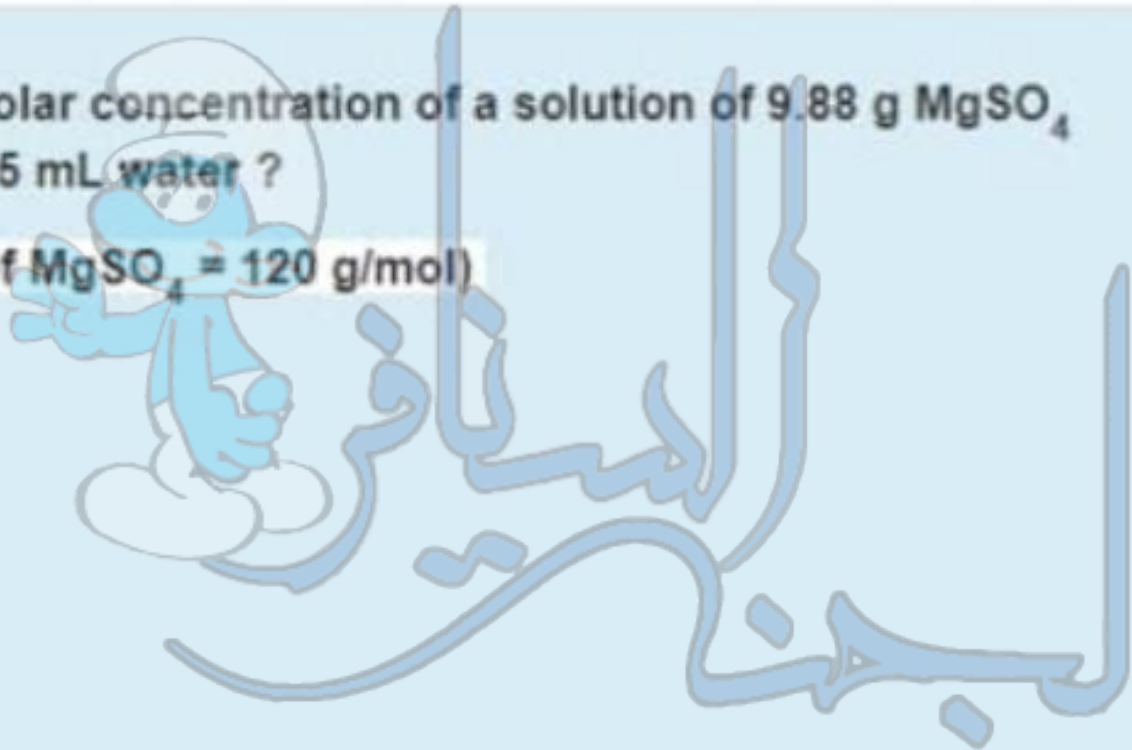
Select one:

- ☐ 0.421M
- ☐ 0.204 M
- ☐ 0.368 M
- ☐ 0.0189 M
- ☐ 0.668 M

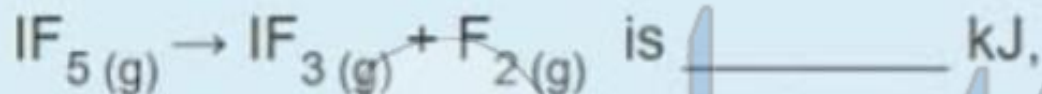
What is the molar concentration of a solution of 9.88 g  $\text{MgSO}_4$  dissolved in 75 mL water ?

(Molar mass of  $\text{MgSO}_4 = 120 \text{ g/mol}$ )

- a. 0.011 M
- b. 11 M
- c. 1.1 M
- d. 0.11 M



Calculate  $\Delta H$  for the reaction



given the data below.



$\Delta H = -390 \text{ kJ}$



$\Delta H = -372.5 \text{ kJ}$

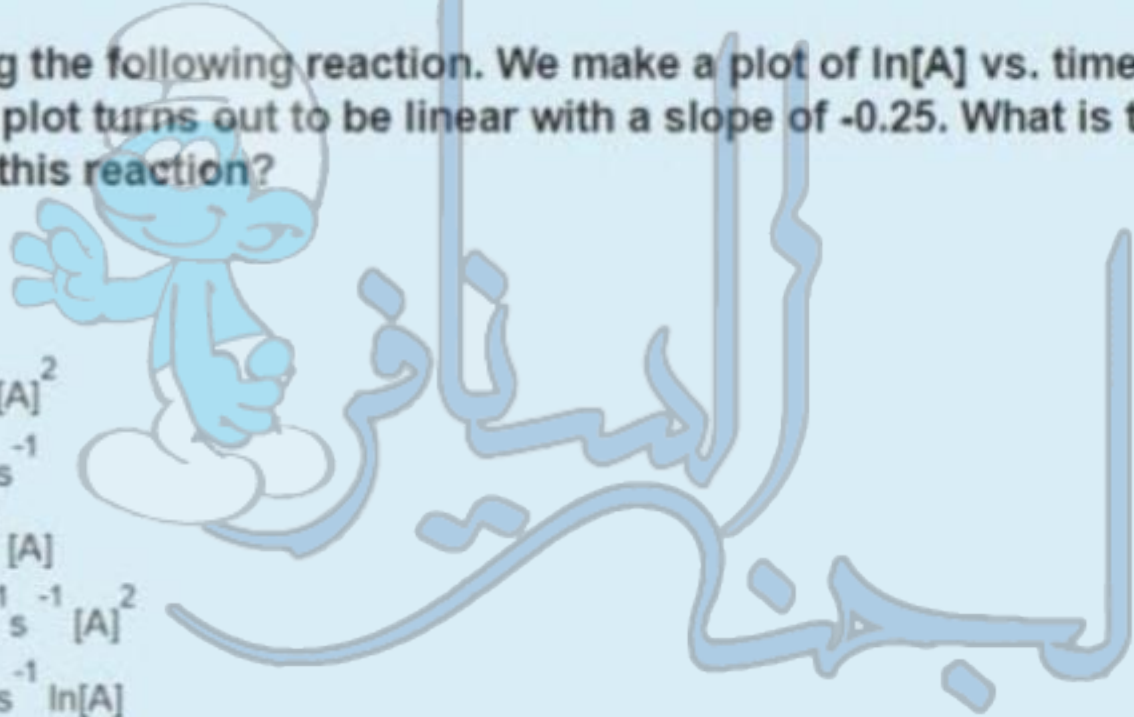
- A) -1135
- B) +35
- C) +1135
- D) -35
- E) +355

We are studying the following reaction. We make a plot of  $\ln[A]$  vs. time as the reaction proceeds. This plot turns out to be linear with a slope of  $-0.25$ . What is the rate law expression for this reaction?



Select one:

- ☐ rate =  $0.25 \text{ s}^{-1} [A]^2$
- ☐ rate =  $0.25 \text{ M.s}^{-1}$
- ☐ rate =  $0.25 \text{ s}^{-1} [A]$
- ☐ rate =  $0.25 \text{ M}^{-1} \text{ s}^{-1} [A]^2$
- ☐ rate =  $0.25 \text{ M.s}^{-1} \ln[A]$

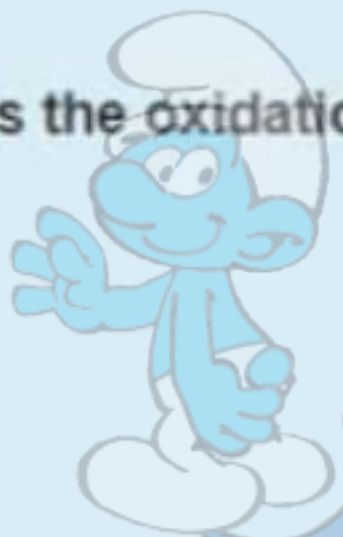




What is the oxidation number of (N) in  $\text{NH}_3$

Select one:

- ☐ -3
- ☐ +4
- ☐ +3
- ☐ -4
- ☐ +5

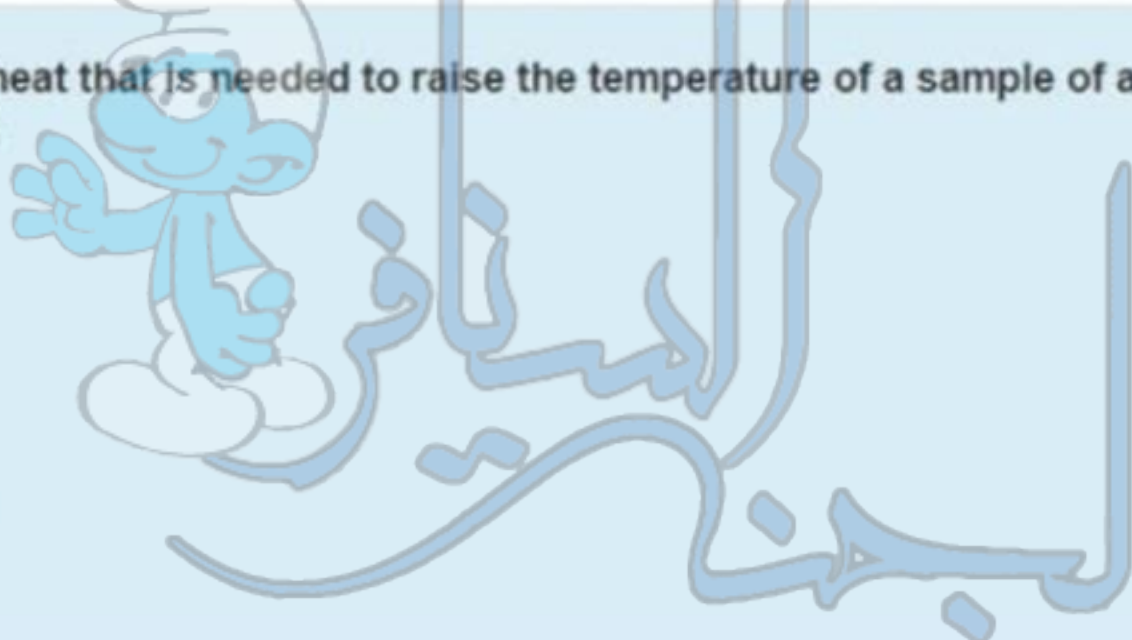


لجنة الامتحان

The quantity of heat that is needed to raise the temperature of a sample of a substance 1.00 degree is called:

Select one:

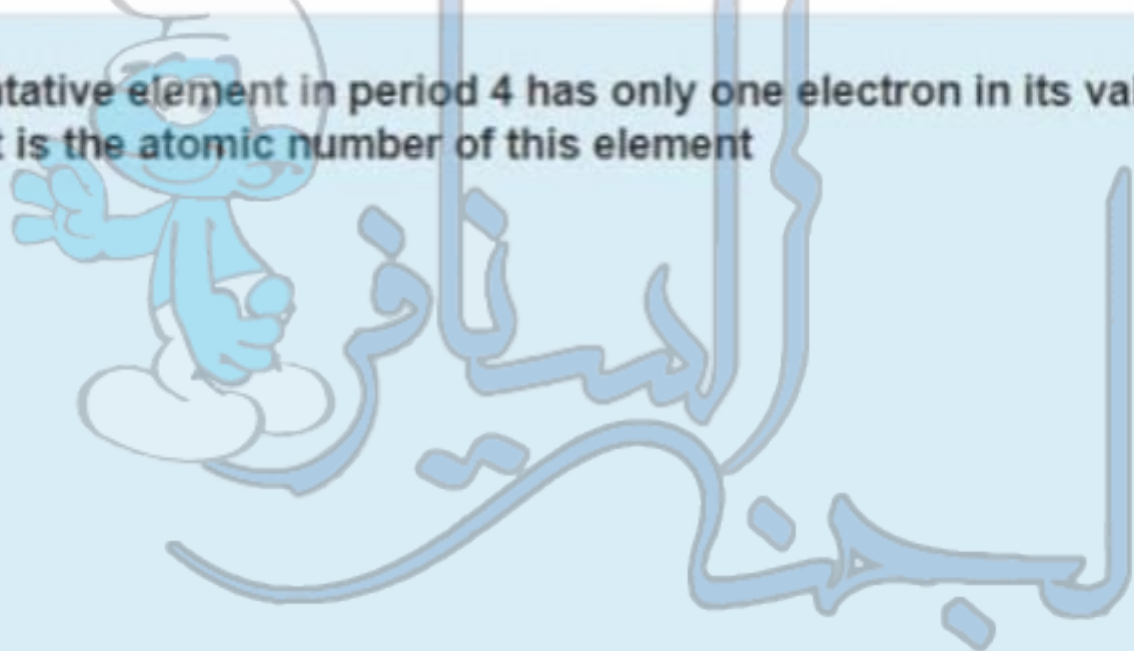
- ☐ Heat capacity
- ☒ Specific heat
- ☐ Kinetic energy
- ☐ Enthalpy



A representative element in period 4 has only one electron in its valence shell (outer shell) what is the atomic number of this element

Select one:

- ☐ 21
- ☐ 13
- ☐ 12
- ☐ 20
- ☐ 19



Rate constants for the first-order reaction:

rate constant  $k = 4.75 \times 10^{-4} \text{ s}^{-1}$  at 293 K

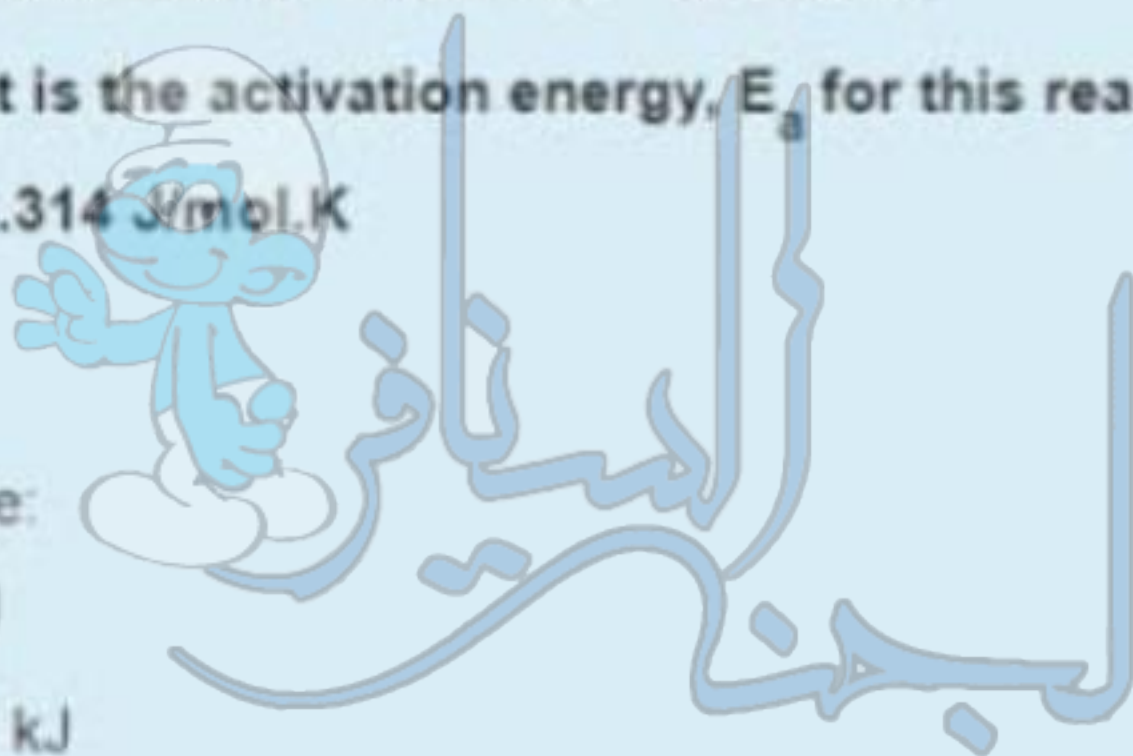
rate constant  $k = 1.63 \times 10^{-3}$  at 310 K.

What is the activation energy,  $E_a$ , for this reaction?

$R = 8.314 \text{ J/mol.K}$

Select one:

- ☐ 91 kJ
- ☐ -91.1 kJ
- ☐ 35.6 kJ
- ☐ 54.8 kJ
- ☐ 44.7 kJ



For the reaction:



Calculate mass of  $\text{Ca}_3(\text{PO}_4)_2$  (molar mass = 310 g/mol) precipitated when 6 mole of  $\text{H}_3(\text{PO}_4)_2$  are allowed to react with 12 mole of  $\text{Ca}(\text{OH})_2$ .

Select one:

- ☐ 1550 g
- ☐ 1240 g
- ☐ 310 g
- ☐ 930 g
- ☐ 620 g

Which of the following represents an decrease in entropy?

Select one:

- ☐ freezing of water
- ☐ boiling of water
- ☐ the reaction  $\text{N}_2\text{O}_2(\text{g}) \rightleftharpoons 2\text{NO}(\text{g})$
- ☐ The reaction :  $2\text{H}_2\text{O}(\text{g}) \rightleftharpoons 2\text{H}_2(\text{g}) + \text{O}_2(\text{g})$
- ☐ none



When the following equation is balanced with the smallest possible set of integers (in the acidic medium)



The coefficient of  $\text{Fe}^{3+}$  in the balanced equation is :

Select one:

- ☐ 5
- ☐ 2
- ☐ 8
- ☐ 1
- ☐ 4

?Which has the highest first ionization energy



11A

12B

13C

الاجابة

اختر احد الخيارات

☒ C

☐ A

☐ B

Which of the following represents an increase in entropy?

Select one:

- ☐ freezing of water
- ☒ boiling of water
- ☐ the reaction  $2\text{NO}(\text{g}) \rightleftharpoons \text{N}_2\text{O}_2(\text{g})$
- ☐  $2\text{H}_2(\text{g}) + \text{O}_2(\text{g}) \rightleftharpoons 2\text{H}_2\text{O}(\text{g})$
- ☐ none

An organic compound composed of 48.65 % C, 8.11% H and 43.24 % oxygen. Which of the following represents the correct empirical formula for the compound?

Select one:

