CHEMISTRY

JEE MAIN AND ADVANCED

MOCK TEST 10

Example

1. A well stoppered thermos flask contains hot water .This is an example of

A. closed system

B. open system

C. isolated system

D. non thermodynamic system

Answer: C

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2. Incorrect relation is

A. for isothermal reversible change

$$W = -P_{ext}(V_f - V_i)$$

B. for isothermal reversible change

$$Q = 2.303nRt\frac{\log V_f}{V_i}$$

C. for isothermal reversible change

$$W = -2.303nRT\frac{\log P_f}{P_i}$$

D. for adiabatic change $\Delta U = W$

Answer: C

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3. Which of the following is zero for an isochoric process?

A. ΔP

B. ΔV

C. ΔT

D. ΔE

Answer: B

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4. Identify an intensive property among the following

A. Gibbs free energy

B. volume

C. internal energy

D. temperature

Answer: D

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5. An adiabatic process occurs in

A. open system

B. closed system

C. isolated system

D. all of the three systems

Answer: C

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6. Which of the following is not a state function?

A. internal energy

B. temperature

C. work

D. enthalpy

Answer: C

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7. Which of the following is a feature of adiabatic expansion?

A. $\Delta V < 0$

B. $\Delta U < 0$

C. $\Delta U > 0$

D. $\Delta T = 0$

Answer: B

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8. Find out the correct match. a.First law of thermodynamics b.isothermal change c.state function d.adiabatic change i.$\Delta U = W$ ii.q=-W iii.q+W. iv.$\Delta U = q + W$

A. a(iv),b(ii),c(iii),d(iv)

B. a(ii),b(iii),c(iv),d(i)

C. a(iv),b(i),c(ii),d(iii)

D. a(I),b(iv),c(ii),d(iii)

Answer: A

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9. In an isothermal process

A. $q = 0$ and $\Delta U = 0$

B. $q \neq 0$ and $\Delta U = 0$

C. $q = 0$ and $\Delta U \neq 0$

D. $q \neq 0$ and $\Delta U \neq 0$

Answer: B

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10. The work done by a system is 8 Joule, when 40 joule heat is supplied to it .What is the increase in internal energy of the system?

A. 25J

B. 30J

C. 32J

D. 28J

Answer: C

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11. Work done during isothermal expansion of one mole of an ideal gas from 10 atm to 1atm at 300 k is

A. -4938.8J

B. 4138.8J

C. -5744.1J

D. 6257.2J

Answer: C

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12. Out of the following, choose the one which is not a part of internal energy?

A. kinetic energy

B. potential energy

C. chemical bond energy

D. gravitational energy

Answer: D

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13. Pressure volume (PV) work done by an ideal gas system at constant volume is

A. $-\frac{\Delta P}{P}$

B. Zero

C. $-\frac{V}{\Delta P}$

D. $-\Delta V$

Answer: B

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14. 6mole of an ideal gas expand isothermally and reversibly from a volume of 1 litre to a volume of 10 litre at 27^{o} C .The maximum work is done

A. 47kJ

B. 100kJ

C. 0

D. 34.46kJ

Answer: D

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15. An ideal gas expands against a constant external pressure of 2 atmosphere from 20 litre to 40 litre and absorbs 10 kJ of heat from surrounding .What is the change in internal energy of the system?

A. 4053J

B. 5948J

C. 14052J

D. 9940J

Answer: B

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16. The equation $\frac{1}{2}H_2(g) + \frac{1}{2}Cl_2 \rightarrow HCl, \Delta H^\circ =$ -24080 calorie per mole means

A. the heat absorbed when one gram molecule of HCL is formed from its element at 25°C is 24080 kcal

B. the heat given out when one gram molecule of HCL is formed from its element at 298K is 24 080 kcal

C. the heat observed when one atom of hydrogen reacts with one atom of chlorine to form one molecule of at 25°C and atmospheric pressure is 24.0 80 kcal

D. the intrinsic heat of one molecule of HCL is 24.080kcal more than the intrinsic heat of one atom of hydrogen and one atom of chlorine

Answer: B

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17. when $50cm^3$ of 0.2 N $H_3SO_4 is mixed with 50$ cm^3 $of 1n KOH, the heat liberete dis (Given$H^+(aq)+OH^-(aq)rarrH_2O(l)Delta_neulH=-57.3kJ`)

A. 11.46kJ

B. 57.3kJ

C. 0.563kJ

D. 0.573kJ

Answer: D

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18. molar heat capacity of Aluminium is $25JK^{-1}mol^{-1}$the heat necessary to raise the temperature of 54 gram of aluminium (atomic mass $27gmol^{-1}$)from 30°C to 50°C is

A. 1.5kJ

B. 0.5kJ

C. 1.0kJ

D. 2.5kJ

Answer: C

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19. What will be the heat of formation of ethane, in the heat of combustion of carbon is $-xkJ$,heat of formation of water is $-ykJ$, and heat liberated during complete combustion of ethane is zkJ

A. $(-2x-2y+z)kJ$

B. $(-2x-3y+z)kJ$

C. $(-2x+3y+z)kJ$

D. $(-2x-3y-z)kJ$

Answer: B

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20. If for H_2 gas,$C_p - C_v = a$ and for O_2 gas, $C_p - C_v = b$,where C_p and C_v is heat capacity in cal/$g - k$,then select the correct relation

A. b=8a

B. a=b

C. a=16b

D. a=4b

Answer: C

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21. In a constant volume calorimeter 5g of a gas with molecular weight 40 was burnt in excess of oxygen at 298 K.the temperature of the calorimeter was found to increase from 298 K to 298.75 K due to combustion process.Given that the heat capacity of the calorimeter is 2.5 kJK^{-1} ,a numerical value for the ΔU of combustion of the gas in $kJmol^{-1}$ is

A. 15

B. 12

C. 90

D. 8

Answer: A

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22. When 1 mole of oxalic acid is treated with excess of NaOH in dilute aqueous solution 108kJ of heat is liberated ,then the enthalpy of ionization of the oxalic acid is(Given $H^+(aq) + OH^{-(aq)} \rightarrow H_2O(l) \Delta_{\neq} \underline{H} = -57.3kJ$)

A. $4.6kJmol^{-1}$

B. $-4.6kJmol^{-1}$

C. $-6.6kJmol^{-1}$

D. $6.6kJmol^{-1}$

Answer: D

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23. If the bond dissociation energies of XY,X_2 and Y_2(all diatomic molecules)are in the ratio of $1:1:0.5$ and $\Delta_f H$ for the formation of XY is $-200kJ\ mol^{-1}$.The bond dissociation energy of X_2 will be

A. 100kJ mol^{-1}

B. 800kJ mol^{-1}

C. $300kJ\ mol^{-1}$

D. $400kJ\ mol^{-1}$

Answer: B

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24. The species which by definition has non zero standard molar enthalpy of formation at 298 K is

A. $Br_2(l)$

B. $Cl_2(g)$

C. $Hg(l)$

D. $I_2(g)$

Answer: D

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25. One mole of anhydrous salt AB dissolves in water and liberates $15Jmol^{-1}$ of heat .The value of $\Delta H^{\circ}_{hydration}$ of AB is $-20.05J\ mol^{-1}$ .Hence the enthalpy of dissolution of hydrated salt $AB.3H_2O(s)$ is

A. $-5.5J\ mol^{-1}$

B. $5.5J\ mol^{-1}$

C. $35.5J\ mol^{-1}$

D. $-35.5J\ mol^{-1}$

Answer: B

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26. choose the reaction in which ΔH is not equal to ΔU

A. $C_{gra\phi te} + O_{2(g)} \rightarrow CO_{2(g)}$

B. $C_2H_{4(g)} + H_{2(g)} \rightarrow C_2H_{6(g)}$

C. $N_{2(g)} + O_{2(g)} \rightarrow 2NO_g$

D. $H_{2(g)} + I_{2(g)} \rightarrow 2HI_g$

Answer: B

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27. Hess's law is applicable for the determination of heat of

A. reaction

B. formation

C. transition

D. All of these

Answer: D

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28. Enthalpy (H) is equal to

A. Internal energy (E)

B. Product of pressure (P) and volume (V) of gas

C. Internal energy (E)+PV(work)

D. work (W) done by a system

Answer: C

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29. If $\Delta_f H^\circ(C_2H_4)$and $\Delta_f H^\circ(C_2H_6)|$ are in $x_1|$ and x_2$kcal$mol ^(-1), $thenheatofhydro \geq nationof$C_2H_4` will be

A. $x_1 + x_2$

B. $x_1 - x_2$

C. $x_2 - x_1$

D. $x_1 + 2x_2$

Answer: C

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30. heat of combustion of gaseous compounds A(molar mass =16) B(molar mass=28) C(molar mass=30) and D(molar mass=40) are -890 ,-1411, -1560 and-1900 kJ/mole respectively.Which has the highest calorific fuel(J/g)?

A. A

B. B

C. C

D. D

Answer: A

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