



**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.  $\Delta P$

B.  $\Delta V$

C.  $\Delta T$

D.  $\Delta E$

**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  $27^{\circ}\text{C}$  .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  $25^{\circ}\text{C}$  and atmospheric pressure is 24.080 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  $50\text{cm}^3$  of  $0.2\text{ N H}_3\text{SO}_4$  is mixed with  $50\text{cm}^3$  of  $1\text{N KOH}$ , the heat liberated is (Given  $\text{H}^+(\text{aq}) + \text{OH}^-(\text{aq}) \rightarrow \text{H}_2\text{O}(\text{l})$   $\Delta_{\text{neut}}H = -57.3\text{kJ}$ )

A.  $11.46\text{kJ}$

B.  $57.3\text{kJ}$

C.  $0.563\text{kJ}$

D.  $0.573\text{kJ}$

**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  $30^{\circ}C$  to  $50^{\circ}C$  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**



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  $2.5 \text{ kJK}^{-1}$ , a numerical value for the  $\Delta U$  of combustion of the gas in  $\text{kJmol}^{-1}$  is

A. 15

B. 12

C. 90

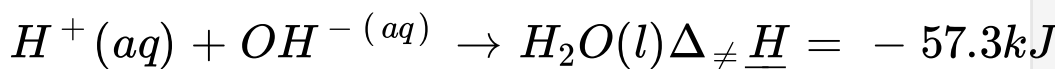
D. 8

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



)

A.  $4.6kJmol^{-1}$

B.  $-4.6 \text{ kJ mol}^{-1}$

C.  $-6.6 \text{ kJ mol}^{-1}$

D.  $6.6 \text{ kJ mol}^{-1}$

**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  $-200 \text{ kJ mol}^{-1}$ . The bond dissociation energy of  $X_2$  will be



A.  $100\text{kJ mol}^{-1}$

B.  $800\text{kJ mol}^{-1}$

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

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

**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.  $\text{Br}_2(l)$

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  $\Delta H_{hydration}^{\circ}$  of  $AB$  is  $-20.05J mol^{-1}$  .Hence the enthalpy of dissolution of hydrated salt  $AB.3H_2O(s)$  is

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

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

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

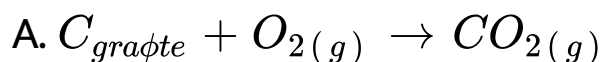
D.  $-35.5J \text{ mol}^{-1}$

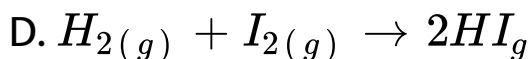
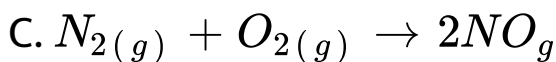
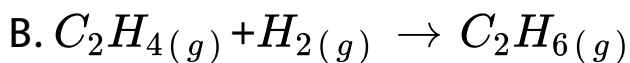
**Answer: B**



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**26.** choose the reaction in which  $\Delta H$  is not equal to  $\Delta U$





**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  $x_2 \text{ kcal mol}^{-1}$

), then heat of hydro  $\geq$  nation of  $C_2H_4$  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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