DPP–4 [Enthalpy of Combustion]

The expert in anything was once a beginner.

Q1. **The heat of combustion of a substance is –**

(A) Always positive
(B) Always negative
(C) Numerically equal to the heat of formation
(D) 1 and 3 both

Q2. **Correct expression of enthalpy of combustion [NCERT Pg.176]**

(A) $C_2H_6(g) + 5/2\ O_2(g) \rightarrow 2CO(g) + 3H_2O(l)$
(B) $C(s)$ (diamond) $+ 1/2\ O_2(g) \rightarrow CO(g)$
(C) $C(s) + 1/2\ O_2(g) \rightarrow CO_2(g)$
(D) $S(s)^{\circ}_{rhombic} + O_2(g) \rightarrow SO_2(g)$

Q3. **Which of the following equations corresponds to the enthalpy of combustion at 298 K –**

(A) $C_2H_4(g) + 7/2\ O_2(g) \rightarrow 2CO_2(g) + 3H_2O(g)$
(B) $2C_2H_2(g) + 7\ O_2(g) \rightarrow 4CO_2(g) + 6H_2O(g)$
(C) $C_2H_6(g) + 7/2\ O_2(g) \rightarrow 2CO_2(g) + 3H_2O(l)$
(D) $2C_2H_6(g) + 7O_2(g) \rightarrow 4CO_2(g) + 6H_2O(l)$

Q4. **In the combustion of 0.4 g of CH_4, 0.25 kCal of heat is liberated. The heat of combustion of CH_4 is:**

(A) 20 kCal
(B) 10 kCal
(C) 2.5 kCal
(D) 5 kCal

Q5. **According to equation, $C_6H_6(l) + 15/2\ O_2(g) \rightarrow 6CO_2(g) + 3H_2O(l)$, $\Delta H = -3264.40$ kJ mol^{-1} the energy evolved when 7.8 g benzene is burnt in air will be –**

(A) 163.22 kJ
(B) 32.64 kJ
(C) 3.264 kJ
(D) 326.4 kJ

Q6. **X g of ethanol was subjected to combustion in a bomb calorimeter and the heat produced is Y joules. Then –**

(A) $\Delta E_{\text{combustion}} = -X J$
(B) $\Delta E_{\text{combustion}} = -Y J$
(C) $\Delta E_{\text{combustion}} = -\dfrac{44Y}{X}$ J mol^{-1}
(D) $\Delta E_{\text{combustion}} = \dfrac{44Y}{X}$ J mol^{-1}

Q7. **An athlete takes 100 gm of glucose of energy equivalent to 1560 kJ. How much amount of energy is uptaken by 1 gm of glucose?**

(A) 15.6 kJ
(B) 1560 kJ
(C) 2808 kJ
(D) 28.08 kJ

Q8. **When 1 g of anhydrous oxalic acid is burnt at 25°C, the amount of heat liberated is 2.835 kJ. $\Delta H_{combustion}$ is:**

(A) 255.15 kJ
(B) 445.65 kJ
(C) 295.24 kJ
(D) 155.16 kJ

Q9. **Heat of formation of CO_2 is –94.0 kCal. What would be the quantity of heat liberated, when 3 g of graphite is burnt in excess of oxygen –**

(A) 23.5 kCal
(B) 22.35 kCal
(C) 94.0 kCal
(D) 31.3 kCal

Q10. **The heat of combustion of carbon to CO_2 is –393.5 kJ mol^{-1}. The heat released upon formation of 35.2 g of CO_2 from carbon and oxygen gas is:**

(A) –630 kJ
(B) –21.5 kJ
(C) –315 kJ
(D) +315 kJ

Q11. **A person requires 2870 kCal of energy to lead normal daily life. If heat of combustion of cane sugar is –1349 kCal, then his daily consumption of sugar is :**

(A) 728 g
(B) 0.728 g
(C) 342 g
(D) 0.342 g

Q12. **If $C_6H_{12}O_6(s) + 9O_2(g) \rightarrow 6CO_2(g) + 6H_2O(g)$; $\Delta H = -680$ kCal. The weight of CO_2 produced when 170 kCal of heat is evolved in the combustion of glucose is:**

(A) 25 g
(B) 11 g
(C) 66 g
(D) 64 g

Q13. **The enthalpy of formation for $C_2H_2(g)$, $CO_2(g)$ and $H_2O(l)$ at 25°C and 1 atm. pressure are 52, –394 and –286 kJ mol^{-1} respectively. The enthalpy of combustion of C_2H_2 will be:**

(A) +1412 kJ mol^{-1}
(B) –1412 kJ mol^{-1}
(C) +142.2 kJ mol^{-1}
(D) –141.2 kJ mol^{-1}

Q14. **Given standard enthalpy of formation of CO (–110 kJ mol^{-1}) and CO_2 (–394 kJ mol^{-1}). The heat of combustion when one mole of graphite burns is –**

(A) –110 kJ
(B) –284 kJ
(C) –394 kJ
(D) –504 kJ

Q15. **Heat of combustion for C(s), $H_2(g)$ and $CH_4(g)$ are –94, –68 and –213 kcal/mol, then ΔH for $C(s) + 2H_2(g) \rightarrow CH_4(g)$ is –**

(A) –17 kcal
(B) –111 kcal
(C) –170 kcal
(D) –85 kcal

Q16. **The heat of combustion of carbon and carbon monoxide are –394 and –285 kJ mol^{-1} respectively. The heat of formation of CO in kJ mol^{-1} is:**

(A) +109
(B) –109
(C) +218
(D) –218

Q17. **On complete combustion of 2 g methane 26575 Cal heat is generated. The heat of formation of methane will be (given heat of formation of CO_2 and H_2O are –97000 and –68000 Cal respectively) :**

(A) +20400 Cal
(B) +20600 Cal
(C) –20400 Cal
(D) –2000 Cal

Q18. **Under the same condition heats of formation of water & CO_2 are –285 and –394 kJ mol^{-1} respectively. The heat of combustion of methane is -890 kJ mol^{-1}. The heat of formation of methane(in kJ mol^{-1}) is:**

(A) –964
(B) –890
(C) –222
(D) –74

Q19. **The following are the heats of reactions –**

(i) ΔH_f° of $H_2O(l) = -68.3$ kCal mol^{-1}

(ii) ΔH_c° of $C_2H_2 = -337.2$ kCal mol^{-1}

(iii) ΔH_c° of $C_2H_4 = -363.7$ kCal mol^{-1}.

Then heat change for the reaction $C_2H_2 + H_2 \rightarrow C_2H_4$ is –

(A) –716.1 kCal
(B) +337.2 kCal
(C) –41.8 kCal
(D) –579.5 kCal

Q20. **If calorific fuel value of C_2H_6 is x kJ/kg then the heat of combustion of C_2H_6 is – [NCERT Pg.176]**

(A) x
(B) 30 x
(C) x/30
(D) 30/x

Q21. **Enthalpies of combustion of propane, butane and pentane are –2220, –2878, –3537 kJ/mol respectively. Order of calorific value (per gram) of fuel is:**

(A) Propane > Butane > Pentane
(B) Butane > Pentane > Propane
(C) Propane > Pentane > Butane
(D) Pentane > Butane > Propane

Q22. **Heat of combustion of CH_4, C_2H_6, C_2H_4 and C_2H_2 gases are –212.8, –373.0, –337.0 and –310.5 kCal respectively at the same temperature. The best fuel among these gases is :**

(A) CH_4
(B) C_2H_6
(C) C_2H_4
(D) C_2H_2

Q23. **Heat of combustion of CH_4, C_2H_4 and C_2H_6 are –890, –1411 and –1560 kJ/mol respectively. Which has the lowest calorific fuel value in kJ/g?**

(A) CH_4 (C) C_2H_4
(B) C_2H_6 (D) All of these

Q24. **If heat of combustion of ethylene is 1411 kJ when a certain amount of ethylene was burnt 6226 kJ heat was evolved. Then the volume of O_2 at NTP that entered into the reaction is –**

(A) 296.5 ml (C) 6226 × 22.4 L
(B) 296.5 L (D) 22.4 L

Q25. **The heat evolved during the combustion of 112 litre of water gas at STP (mixture of equal volume of H_2 and CO) is :**

Given $H_2(g) + 1/2\ O_2(g) \rightarrow H_2O(g)$;$\Delta H = –241.8$ kJ;

$CO(g) + 1/2\ O_2(g) \rightarrow CO_2(g)$; $\Delta H = –283$ kJ.

(A) 241.8 kJ (C) 1312 kJ
(B) 283 kJ (D) 1586 kJ

Q26. **When 5 litres of a gas mixture of methane and propane is perfectly combusted at 0°C and 1 atmosphere, 16 litre of oxygen at the same temperature and pressure is consumed. The amount of heat released from this combustion in kJ (ΔH_{comb} (CH_4) = 890 kJ mol^{-1}, ΔH_{comb} (C_3H_8) = 2220 kJ mol^{-1}) is:**

(A) 32 (C) 317
(B) 38 (D) 477

Q27. **Enthalpy of $CH_4 + 1/2\ O_2 \rightarrow CH_3OH$ is negative. If enthalpy of combustion of CH_4 and CH_3OH are x and y respectively. Then which relation is correct?**

(A) $x > y$ (C) $x = y$
(B) $x < y$ (D) $x \geq y$

Q28. **The heat liberated on complete combustion of 1 mole of CH_4 gas to CO_2 and $H_2O(l)$ is 890 kJ. Calculate the heat evolved by 2.4 L at STP of CH_4 on complete combustion.**

(A) 95.3 kJ (C) 890 kJ
(B) 8900 kJ (D) 89.0 kJ

Q29. **The value of ΔH for the combustion of C(s) is –94.4 kCal. The heat of formation of CO(g) is :**

(A) –49.5 kCal (C) –188.0 kCal
(B) –94.4 kCal (D) More data required