Date: Sunday 16/08/1440 H	الاسم : .....
Time: 8:00 - 11:00 AM	الرقم الجامعي : .....
Time allowed: 180 minutes	رقم الشعبة : .....

Write your answer in the table below

Q1: D	*Q8:* C	*Q15:* B	*Q22:* D	*Q29:* B	*Q36:* A
Q2: B	*Q9:* B	*Q16:* D	*Q23:* B	*Q30:* C	*Q37:* B
Q3: A	*Q10:* D	*Q17:* A	*Q24:* A	*Q31:* A	*Q38:* A
Q4: C	*Q11:* A	*Q18:* B	*Q25:* C	*Q32:* D	*Q39:* C
Q5: B	*Q12:* B	*Q19:* C	*Q26:* D	*Q33:* B	*Q40:* A
Q6: A	*Q13:* A	*Q20:* D	*Q27:* C	*Q34:* D	
Q7: D	*Q14:* C	*Q21:* C	*Q28:* D	*Q35:* C	

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1 H 1.008	2 IIA											13 IIIA	14 IVA	15 VA	16 VIA	17 VIIA	2 He 4.003
3 Li 6.94	4 Be 9.01											5 B 10.811	6 C 12.01	7 N 14.01	8 O 16.00	9 F 19.00	10 Ne 20.18
11 Na 23.00	12 Mg 24.31	3 IIIB	4 IVB	5 VB	6 VIB	7 VIIB	8	9 VIIIB	10	11 IB	12 IIB	13 Al 26.98	14 Si 28.09	15 P 30.97	16 S 32.07	17 Cl 35.45	18 Ar 39.98
19 K 39.09	20 Ca 40.08	21 Sc 44.96	22 Ti 47.87	23 V 50.94	24 Cr 52.00	25 Mn 54.94	26 Fe 55.85	27 Co 58.93	28 Ni 58.69	29 Cu 63.546	30 Zn 65.41	31 Ga 69.72	32 Ge 72.64	33 As 74.9216	34 Se 78.96	35 Br 79.90	36 Kr 83.80
37 Rb 85.47	38 Sr 87.62	39 Y 88.91	40 Zr 91.23	41 Nb 92.91	42 Mo 95.94	43 Tc [98]	44 Ru 101.07	45 Rh 102.91	46 Pd 106.42	47 Ag 107.87	48 Cd 112.41	49 In 114.82	50 Sn 118.71	51 Sb 121.760	52 Te 127.60	53 I 126.90	54 Xe 131.29
55 Cs 132.91	56 Ba 137.33	71 Lu 174.97	72 Hf 178.49	73 Ta 180.95	74 W 183.84	75 Re 186.21	76 Os 190.23	77 Ir 192.22	78 Pt 195.08	79 Au 196.97	80 Hg 200.59	81 Tl 204.38	82 Pb 207.2	83 Bi 208.980	84 Po [209]	85 At [210]	86 Rn [222]
87 Fr [223]	88 Ra [226]	103 Lr [262]	104 Rf [261]	105 Db [262]	106 Sg [266]	107 Bh [264]	108 Hs [269]	109 Mt [268]	110 Ds [271]	111 Rg [272]	112 Uub [285]	113 Uut [286]					

Constants:

1 atm = 760 torr = 101.325 kPa

$R = 0.0821$ atm L mol^{-1} K^{-1} = 8.314 J mol^{-1} K^{-1}

N_A (*Avogadro's Number*) = 6.022×10^{23}

1 atm.L = 101.325 J

Q1: The SI unit for mass is:

A) Pound (lb) B) Gram (g)

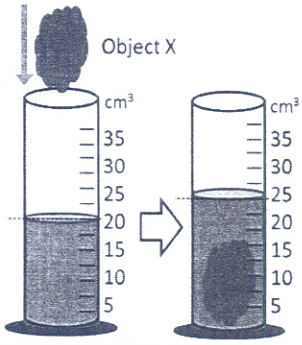
C) Ounce (oz) D) Kilogram (kg)

Q2: Express 0.00002530 in scientific notation?

A) 2.53×10^{-5} B) 2.530×10^{-5}

C) 2.5×10^{-5} D) 25.30×10^{-4}

Q3: If the mass of object X is 11.8 g, its density in "g/cm^3" is:



A) 2.36

B) 0.47

C) 5.90

D) 0.60

Q4: What is the results of the following calculation, reported the correct number of significant figures.

$$(2.14 \times 10^4) + (1.11 \times 10^2)$$

A) 2.1×10^4 B) 2.151×10^4

C) 2.15×10^4 D) 2.1511×10^4

Q5: The gold ion " Au^{3+} " has

A) 82 electrons and 179 protons

B) 76 electrons and 79 protons

C) 179 electrons and 79 protons

D) 79 electrons and 79 protons

Q6: Which of the following is a molecular compound?

A) PCl_3 B) KCl

C) CsCl D) VCl_3

Q7: The correct name of "CaH_2" is:

A) calcium dihydride B) calcium hydroxide

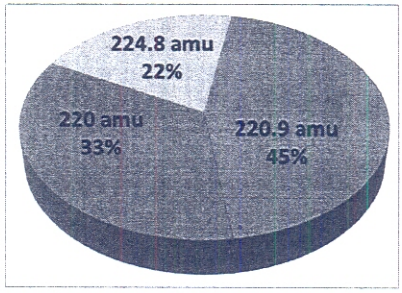
C) calcium dihydroxide D) calcium hydride

Q8: What is the name of " BrO^{2-} " anion?

A) Perbromate B) Hypobromate

C) Hypobromite D) Bromate

Q9: The atomic mass of isotopes of an element "X" is given below:



The average atomic mass of this element is:

A) 222.96 B) 221.46

C) 223.93 D) 222.25

Q10: The balanced equation for the decomposition of sodium azide "NaN_3" is:

A) $2NaN_3\ (s) \rightarrow 2Na\ (s) + 2N_2\ (g)$

B) $NaN_3\ (s) \rightarrow Na\ (s) + N_2\ (g)$

C) $NaN_3\ (s) \rightarrow Na\ (s) + N_2\ (g) + N\ (g)$

D) $2NaN_3\ (s) \rightarrow 2Na\ (s) + 3N_2\ (g)$

Q11: How many molecules of "CO_2" are present in 13.4 g of "CO_2"?

A) 1.83×10^{23} B) 9.79×10^{24}

C) 3.55×10^{26} D) 5.06×10^{23}

Q12: How many moles of aluminum "Al" are needed to react completely with 1.2 mol of Fe_2O_3?

$$2Al(s) + 3Fe_2O_3(s) \rightarrow 3Fe(s) + Al_2O_3\ (s)$$

A) 1.2 B) 0.8

C) 2.4 D) 1.6

Q13: The empirical formula of a compound that contains 57.14% C, 6.16% H, 9.52% N and 27.18% O by mass, is:

A) $C_{14}H_{18}N_2O_5$ B) $C_7H_9N_2O_3$

C) $C_{14}H_{18}N_5O_2$ D) $C_7H_9NO_2$

Q14: If the density of "Kr" is 1.7 g/L at –25°C, what is the pressure in **atm**?

A) 0.758 B) 0.495

C) 0.413 D) 0.349

Q15: The volume of a gas is 400 mL at 750 torr and 273 K. If the gas is allowed to expand to 600 mL at 550 torr, what is the final temperature in "**K**"?

A) 315.2 B) 300.3

C) 311.6 D) 295.8

Q16: At constant temperature and pressure, gas volume is directly proportional to the

A) molar mass of the gas

B) density of the gas at STP

C) rate of diffusion.

D) number of moles of gas

Q17: A gaseous mixture contains 5.0 moles of N_2 and 10.0 moles of He. The total pressure in the container is 3 atm. What is the partial pressure of N_2 in **atm**?

A) 1.0 B) 3.0

C) 2.0 D) 0.5

Q18: When 11.5 L of "O_2" react with enough amount of "C_2H_6", the volume in "***L***" of "H_2O (g)" at constant temperature and pressure, is:

$$2C_2H_6\ (l) + 7O_2\ (g) \rightarrow 4CO_2\ (g) + 6H_2O\ (g)$$

A) 3.28 B) 9.86

C) 19.6 D) 6.12

Q19: The specific heat of silver is 0.24 J/g°C. How many joules of energy are needed to warm 4.37 g of silver from 25.0°C to 27.5°C?

A) 0.14 B) 45.50

C) 2.62 D) 0.02

Q20: The amount of heat involved in the synthesis of 1 mole of a compound from its elements, with all substances in their standard states at 25°C, is called ____.

A) Enthalpy B) Specific heat.

C) Heat of reaction D) Standard heat of formation

Q21: 850 g of a metal has heat capacity of 391 J/°C. The specific heat of this metal in " ***J/g.°C***" is:

A) 0.39 B) 0.75

C) 0.46 D) 0.54

Q22: When a system _____. ΔE is always negative.

A) absorbs heat and does work.
B) absorbs heat and has work done on it
C) is always negative
D) gives off heat and does work.

Q23: Which of the following reaction has ΔH = ΔE?

A) $2C(s) + O_2(g) \rightarrow 2CO(g)$
B) $H_2(g) + I_2(g) \rightarrow 2HI(g)$
C) $N_2(g) + 3H_2(g) \rightarrow 2NH_3(g)$
D) $N_2H_4(g) + O_2(g) \rightarrow N_2(g) + 2H_2O(l)$

Q24: A ball having a mass of 30.0 g at 180°C is placed in 120 g of water at 20°C. If the specific heat of the ball is 0.474 J/g.°C and that of water is 4.184 J/g.°C. Calculate the final temperature of water in "***°C***"?

A) 24.4 B) 26.2
C) 23.6 D) 27.5

Q25: Which of the following has an enthalpy of formation of **0 kJ/mol**?

A) Hg (s) B) N_2 (s)
C) N_2 (g) D) N_2 (l)

Q26: Given the following reactions

$Fe_2O_3(s) + 3CO(g) \rightarrow 2Fe(s) + 3CO_2(g)$ $\Delta H = -28.0$ kJ

$3Fe(s) + 4CO_2(g) \rightarrow 4CO(g) + Fe_3O_4(s)$ $\Delta H = +12.5$ kJ

the enthalpy of the following reaction in (kJ) is:

$3Fe_2O_3(s) + CO(g) \rightarrow CO_2(g) + 2Fe_3O_4(s)$

A) +59 B) +109
C) – 109 D) – 59

Q27: The value of ΔE for a system that performs 23 kJ of work on its surroundings and loses 79 kJ of heat is _____kJ

A) – 102 B) +102
C) – 79 D) +23

Q28: A gas is compressed in a cylinder from a volume of 20.0 L to 2.0 L by a constant pressure of 10.0 atm. Calculate the amount of work done in "***J***"?

A) -1.82×10^4 B) 1.82×10^4
C) -1.01×10^4 D) 1.01×10^4

Q29: Given the data in the table below:

Substance	$\Delta H°_{rxn}$ (kJ/mol)
$Ca(OH)_2$	-986.6
H_3AsO_4	-450.2
$Ca(H_2AsO_4)_2$	-2346.0
H_2O	-285.9

$\Delta H°_{rxn}$ for the following reaction in "**kJ**" is:

$Ca(OH)_2 + 2H_3AsO_4 \rightarrow Ca(H_2AsO_4)_2 + 2H_2O$

A) – 4219 B) – 1030.8
C) – 744.9 D) – 4519

Q30: What is the molality (**m**) of an aqueous solution labeled "8.6% glucose ($C_6H_{12}O_6$) by mass?

A) 0.34 B) 0.44
C) 0.52 D) 0.26

Q31: The mass of urea (M_{Wt} = 60 g/mol) in "**g**" needed to prepare 6.8 m (molal) of urea in 39 g of water is:

A) 15.9 B) 8.5
C) 24.3 D) 12.1

Q32: A sulfuric acid solution containing 571.4 g of H_2SO_4 **per liter** of solution has a density of 1.329 g/mL. Calculate the molality "**m**" of H_2SO_4 in this solution?

A) 5.83 B) 4.38

C) 10.19 D) 7.69

Q33: The molal freezing point depression constant (K_f) and the molal boiling point elevation constant (K_b) depend on the

A) amount of solvent B) nature of solvent

C) nature of solute D) amount of solute

Q34: The vapor pressure of a solution prepared by dissolving 18.0 g of glucose (a nonelectrolyte, M_{Wt} = 180.0 g/mol) in 95.0 g of water is 23.4 torr at 25 °C. What is the vapor pressure in "***torr***" of pure water at the same temperature?

A) 22.96 B) 0.44

C) 0.56 D) 23.87

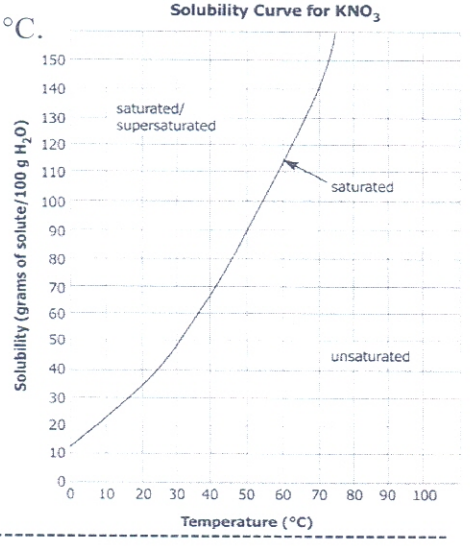
Q35: Estimate the approximate solubility of KNO_3 in (g/kg H_2O) at 30 °C.

A) 33

B) 3.3×10^2

C) 4.8×10^2

D) 48



Q36: The boiling point of a solution made by dissolving 38 g of urea (M_{Wt}= 60 g/mol) in 800 g of ethanol, is:

(For ethanol: K_b = 1.22°C/m and boiling point = 78°C)

A) 79 B) 87

C) 81 D) 83

Q37: What is the mass in "**g**" of a compound (nonelectrolyte, M_{Wt} = 29.2 g/mol) dissolved in 750 g of water, if the freezing point of this solution is –2.86 °C?

(K_f of water = 1.86 °C/m)

A) 88.5 B) 33.7

C) 42.6 D) 68.8

Q38: If the partial pressure of oxygen is 0.46 atm at 25 °C, the concentration of dissolved oxygen in (mol/L) at the same temperature, is: (Henry's law constant of oxygen is $1.3\text{x}10^{-3}$ mol/atm.L)

A) 5.98×10^{-4} B) 0.598×10^{-4}

C) 5.98×10^{-2} D) 5.89×10^{-3}

Q39: The osmotic pressure of protein solution is 0.20 torr at 25°C, The molarity of this solution is:

A) 8.2×10^{-5} B) 1.1×10^{-4}

C) 1.1×10^{-5} D) 8.2×10^{-4}

Q40: If 1×10^{-2} g of a substance (a nonelectrolyte) dissolved in 1 mL of solution generates an osmotic pressure of 9.9×10^{-3} atm at 300 K, what is the molar mass in "***g/mol***" of the substance?

A) 2.5×10^4 B) 2.5×10^5

C) 2.5×10^3 D) 2.5×10^2
