THIRUNELVELI   Standard XI   Reg: ☐☐☐☐☐☐☐

DISTRICT   CHEMISTRY

Time: 1.15 hours   Part – I   Marks:35

I Choose the correct answer: 10x1=10

1. An element X has the following isotopic composition $^{200}X=90\%$, $^{199}X=8\%$ and $^{202}X=2\%$. The weighted average atomic mass of the element X is closest to

   a) 201 u   b) 202 u   c) 199 u   d) 200 u

2. Which one of the following represents 180g of water?

   a) 5 Moles of water   b) 90 moles of water

   c) $\dfrac{6.022 \times 10^{23}}{180}$ molecules of water   d) 6.022×10^{24} molecules of water

3. Match the Column I with Column II

Column -1		Column -II	
i)	combination reaction	A)	$2H_2O_2 \rightarrow 2H_2O + O_2$
ii)	Decomposition reaction	B)	$C + O_2 \rightarrow CO_2$
iii)	Displacement reaction	C)	$Zn + HCl \rightarrow Zncl_2 + H_2$
iv)	Disproportionation	D)	$CaCO_3 \rightarrow CaO + CO_2$

	i	ii	iii	iv
a	C	D	A	B
b	A	C	B	D
c	D	A	C	B
d	B	D	C	A

4. The energy of an electron in the 3rd orbit of hydrogen atom is $-E$. The energy of an electron in the first orbit will be

   a) -3E   b) $\dfrac{-E}{3}$ c) $\dfrac{-E}{9}$ d) -9E

5. How many orbitals are possible in the 3rd energy level?

   a) 16   b) 9   c) 5   d) 3

6. Equal weights of methane and oxygen are mixed in an empty container at 298 K. The fraction of total pressure exerted by oxygen is

   a) $1/3$ b) $1/2$ c) $2/3$ d) $1/3 \times 273 \times 298$

7. Assertion: Critical temperature of CO_2 is 304K, it can be liquefied above 304K.

Reason: For a given mass of gas volume is to directly proportional to pressure at constant temperature.

a) Both assertion and reason are true and reason is the correct explanation of assertion.

b) Both assertion and reason are true but reason is not the correct explanation of assertion

c) Assertion is true but reason is false

d) both assertion & reason are false

8. Find the x and y co-ordinates of the following graph which stands for Boyle's law?

a) P Vs V

b) P Vs $1/v$

c) P Vs T

d) P Vs $1/T$

9. In an adiabatic expansion of an ideal gas

a) $W = -\Delta u$

b) $W = -\Delta u + \Delta H$

c) $\Delta u = 0$

d) $w = 0$

10. Which is/are path function

i) Heat

ii) work

iii) Pressure

iv) volume

a) i only

b) ii & iii

c) ii & iv

d) i & ii

Part - II

II Answer any 3 questions: (Ques. No.15 is compulsory)   3x2=6

11. Distinguish between oxidation and reduction

12. Write the electronic configuration of Cr & Ne.

13. What is the de Broglie wavelength (in cm) of a 160g cricket ball travelling at 140 Km hr^{-1}.

14. State Grahm's law of diffusion

15. Calculate the entropy change during the melting of one mole of ice into water at 0° C and 1 atm pressure. Enthalphy of fusion of ice is 6008 J mol^{-1}.

Part - III

III Answer any 3 questions: (Ques. No.20 is compulsory)   3x3=9

16. Calculate the empirical and molecular formula of a compound containing 76.6% carbon, 6.38 % hydrogen and rest oxygen its vapour density is 47.

17. Give Kelvin statement of second law of thermodynamics.

18. List the characteristics of Gibbs free energy.

19. A sample of gas at 15°C at 1 atm has a volume of 2.58dm3. When the temperature is raised to 38°C at 1 atm does the volume of the gas increase? If so, calculate the final volume.

20. How many radial nodes for 2s, 4p, 5d and 4f orbitals exhibit? How many angular nodes?

Part - IV

IV Answer all the questions: 2x5=10

21. a) Define grame equivalent mass (2)

b) The balanced equation for a reaction is given below $2x+3y \rightarrow 4l+m$ when 8 moles of x react with 15 moles of y, then

i) which is the limiting reagent? ii) Calculate the amount of products formed. iii) Calculate the amount of excess reactant left at the end of the reaction. (3)   or

a) Identify the missing quantum numbers and the sub energy level (3)

S. No	n	l	m	sub energy
i	?	2	0	4d
ii	3	1	0	?
iii	?	1	?	5p
iv	?	?	-2	3d

b) State Heisenberg's uncertainty principle.(2)

22. Derive the values of critical constants in terms of Van Der Waals constants.(5)

Or

a) Write down the Born-Haber cycle for the formation of $CaCl_2$ (3)

b) Define enthalpy of combustion (2)

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