

Model Question of HSC Examination 2020

Chemistry First Paper

Subject Code

1	7	6
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Time — 2 hours 35 minutes

Creative Essay Type

Full marks — 50

[N.B. -The figures in the right margin indicate full marks. Read the stems carefully and answer the associated questions. Answer any five questions.]

1. ► X & Y two elements of second period which are located in group 13 & 15.

- a. What is indicator? 1
- b. Which one is more covalent in between $MgCl_2$ & $AlCl_3$ and why? 2
- c. What kind of bond can enclose XH_3 & YH_3 ? Explain. 3
- d. Shape of XH_3 & YH_3 is different analyze on the basis of hybridization. 4

2. ★ Observe the following information.

Solution-A :	80 mL 0.1 M $Cr_2(SO_4)_3$
Solution-B :	120 mL 0.1 M NaOH

Solubility product of $Cr(OH)_3$ at $25^\circ C$ is 4.5×10^{-15}

- a. What is flame test? 1
- b. Why concentrated HCl is used during crystallization of edible salt? 2
- c. Determine solubility product of compound of solution-A. 3

d. What will happen if two solutions are mixed? Analyze mathematically.

4

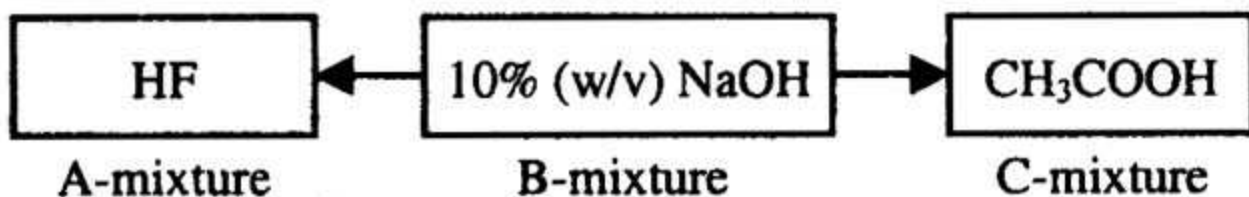
3. ► A & B are two consecutive 3d-block elements, values of four quantum number of for the valence shell electron of A & B are–

A	$n = 4$	$l = 0$	$m = 0$	$s = +\frac{1}{2}$
B	$n = 4$	$l = 0$	$m = 0$	$s = \pm\frac{1}{2}$

(A is transition not B)

- Write Hund's law. 1
- Write the differences between orbit and orbital. 2
- Identify-A through confirmation test. 3
- Which one in between A & B will form color compound? Analyze with specific reason. 4

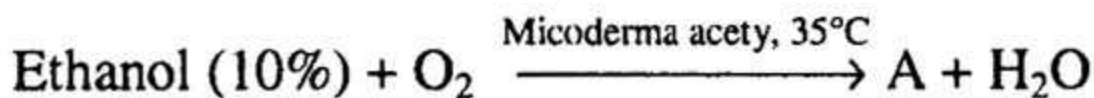
4. ★



- Write Hess law. 1
- Sc is not transition-explain. 2
- Calculate pH of alkaline solution. 3

- d. Which one in between AB & BC mixture has high neutralization energy? Analyze it. 4
5. ► X, Y, Z are three consecutive non-metallic elements of second period, containing 3, 2, 1 unpaired electrons in their valence shell.
- a. What is isotope? 1
- b. Explain H-bond. 2
- c. Explain Pauli's exclusion principle by using unpaired electrons of element X. 3
- d. Analyze the order of ionization energy of the mentioned elements. 4
6. ► Observe the following reaction:
- $$2C \rightleftharpoons A + B \quad [\text{Mole number and degree of dissociation of "C" are 10 \& 20\%}]$$
- a. What is catalyst poison? 1
- b. How can activation energy control rate of reaction? Explain. 2
- c. Calculate K_C for the mentioned reaction. 3
- d. Prove that, mentioned reaction has no effect of pressure by calculating K_P using a as degree of dissociation. 4

7. ★ Observe the following reaction.



- What is polarity? 1
- What are the differences between glass cleaner & toilet cleaner? 2
- How can you prepare "A" from natural source?- Explain. 3
- Analyze the mechanism of food preservation technique of "A". 4

8. ► Observe the following table :

Chemicals used in laboratory	System used in developed country	System used in Bangladesh
H ₂ S, NaOH, CHCl ₃	Micro Analytical Method	Macro Analytical Method

- What is pi-bond? 1
- How can you detect fake currency note? 2
- Explain the negative impact of the mentioned chemicals. 3
- Analyze the comparative feature of the system used in Bangladesh & developed country. 4

Time — 25 minutes

Creative Multiple Choice Questions

Full marks — 25

[N.B. Choose the best answer among the options. Fill the circle in the answer sheet with ball point pen. Each question has value 1.]

1. Which organic acid is used for canning of jackfruits—

- (a) Acetic (b) Formic
(c) Lactic (d) Citric

2. How much oxygen mole is required to burn 2 mole of acetylene —

- (a) 1 mole (b) 3 mole
(c) 5 mole (d) 7 mole

3. How many period are there in Mendeleev periodic table—

- (a) 7 (b) 8
(c) 12 (d) 14

4. Which one is the main ingredient of glass cleaner?

- (a) NH_3 sol
(b) NaOH
(c) Detergent
(d) Soap

5. In titration which is used to measure liquid volume accurately & consecutively—

- (a) Pipette & Conical flask
(b) Burette & Pipette
(c) Burette & Measuring cylinder
(d) Measuring cylinder & Conical flask

6. **★** A, B are two organic compound, they are burn and some data is given below :

General formula	a = number of carbon atom	compound	Value (Kj/mol) of heat of combustion
$\text{C}_n\text{H}_{2n+2}$	1	A	1758.6
	2	B	1362.35

- i. B is more suitable fuel than A
ii. A, is more suitable fuel than B
iii. A & B can produce carbon dioxide & water.

Which one is correct?

- (a) i & ii (b) ii & iii

- (c) iii & i (d) i, ii & iii

7. **★** Total Heat combustion of A & B is

- (a) 90.82 kJ/mol
(b) 90.41 kJ/mol
(c) 91.41 kJ/mol
(d) 92.82 kJ/mol

8. Which one is corrosive and poisonous?

- (a) Methanol
(b) Potassium hydroxide
(c) Arsenic oxide
(d) Ethanol

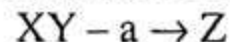
9. How many phases are in chromatography—

- (a) 1 (b) 2
(c) 3 (d) 4

10. Which one is correct ionization energy between two elements?

- (a) $\text{N} > \text{O}$ (b) $\text{B} > \text{C}$
(c) $\text{Al} > \text{Si}$ (d) $\text{Na} > \text{Mg}$

Read the passages and answer the Following questions No. 11: 12:



11. The properties of compound can be formed between chlorine with Z—

- (a) Higher MP
(b) Lower MP
(c) Forms H-bonding
(d) Vander waals

12. **★** The set of Possible quantum numbers of the last shell electron in Z element are

- i. $\frac{n}{3} \frac{l}{2} \frac{m}{+1} \frac{s}{+1/2}$
ii. $4 \ 0 \ 0 \ +1/2$
iii. $4 \ 0 \ 0 \ -1/2$

Which one is correct?

- (a) i, ii & iii (b) i & ii
(c) ii & iii (d) i, ii & iii

13. The method is used for identification of specific disease?

- i. UV
- ii. MRI
- iii. IR

Which one is correct?

- (a) i & ii
- (b) ii & iii
- (c) iii & i
- (d) i, ii & iii

14. Which solution has highest pH value—

- (a) 0.1M NH_3
- (b) 0.1M NaOH
- (c) 0.1M NH_4Cl
- (d) 0.1M CH_3COONa

Read the following equation and give answer (Ques. no. 15 and 16):

$\text{PCl}_5 = \text{PCl}_3 + \text{Cl}_2$, this reaction, is happen at 25th and K_p is 0.14 atm.

15. The value of K_c is—

- (a) $5.729 \times 10^{-3} \text{ molL}^{-1}$
- (b) $7.86 \times 10^{-3} \text{ molL}^{-1}$
- (c) $9.51 \times 10^{-3} \text{ molL}^{-1}$
- (d) $11.86 \times 10^{-3} \text{ molL}^{-1}$

16. If PCl_3 is added in products then the reaction will move—

- i. Left to right
- ii. Right to left
- iii. K_c remain unchanged

Which one is correct?

- (a) i & ii
- (b) ii & iii
- (c) iii & i
- (d) i, ii & iii

17. Milk of which animal contains more Caloric—

- (a) Cow
- (b) Sheep
- (c) Buffalo
- (d) Goat

18. Hybrid orbital of SF_4 & C_2H_4 compounds—

- (a) $sp-sp^2$
- (b) $sp-sp^3$
- (c) sp^3-sp^2
- (d) sp^3d-sp^2

19. Main difference in mm between two consecutives marks in Burette

- (a) 1.0
- (b) 0.1
- (c) 0.01
- (d) 0.001

20. Nature H-bonding?

- i. Longer than covalent bond
- ii. Shorter than covalent bond
- iii. Stronger than Vander waal's force.

Which one is correct?

- (a) i & ii
- (b) ii & iii
- (c) i & iii
- (d) i, ii & iii

21. Solubility of CaF_2 is $0.0002 \text{ mol/L}^{-1}$, the solubility product of the salt—

- (a) 2.3×10^{-11}
- (b) 3.2×10^{-11}
- (c) 4.3×10^{-11}
- (d) 2.3×10^{-10}

22. Which one is the main ingredient for Lipstick?

- (a) Wax
- (b) Mineral oil
- (c) Pigment
- (d) Vaseline

23. The value of electronegativity of M and X is 2.1 and 3.0, formed compound will be—

- i. Ionic
- ii. Covalent
- iii. Soluble

Which one is correct?

- (a) i & ii
- (b) ii & iii
- (c) iii & i
- (d) i, ii & iii

24. ★ Chemical used in vinegar preparation to grow bacteria—

- i. Ammonium carbonate
- ii. Ammonium sulphate
- iii. Ammonium phosphate

Which one is correct?

- (a) i & ii
- (b) ii & iii
- (c) iii & i
- (d) i, ii & iii

25. Difference between micro and macro— according to their mass?

- (a) 10–20 time
- (b) 50–100 times
- (c) 100–200 times
- (d) 200–300 times

Ans.	1	(d)	2	(c)	3	(a)	4	(a)	5	(b)	6	(b)	7	*	8	(c)	9	(b)	10	(a)	11	(a)	12	(c)	13	(b)
	14	(b)	15	(a)	16	(b)	17	(c)	18	(d)	19	(b)	20	(c)	21	(b)	22	(a)	23	(b)	24	(b)	25	*		

7. This question is incomplete; ; 25. N.B. The correct answer is 10-100 times