CHEMISTRY

BOOKS - SURA CHEMISTRY (TAMIL ENGLISH)

SURAS MODEL QUSETION PAPER - I

Part A

1. In the third period the first ionization potential is of the order.

A. $Na > Al > Mg > Si > P$

B. $Na < Al < Mg < Si < P$

C. $Mg > Na > Si > P > Al$

D. $Na < Al < Mg < Si < P$

Answer: B

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2. The unit of pressure is_____

A. Pascal

B. Torr

C. Bar

D. all the above

Answer: D

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3. Which one of the following binary liquid mixtures exhibits positive deviation from Raoults law?

A. Acetone + chloroform

B. Water + nitric acid

C. HCl + water

D. Ethanol + water

Answer: D

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4. Match the list I with List II and select the correct answer using. The code given below the lists.

	List I		List II
A	Diamond	1	Heterogeneous mixture
B	Aerated drinks	2	Element
C	Distilled water	3	Homogeneous mixture
D	Sand	4	Compound

A. A B C D
2 3 4 1

B. A B C D
4 3 1 2

C. A B C D
3 1 4 2

D. A B C D
2 1 4 3

Answer: A

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5. Compounds having boiling points widely apart 40k and above can be purified by_____.

A. Crystallisation

B. Sublimating

C. Fractional distillation

D. Simple distillation

Answer: D

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6. Assertion : Generally alkali and alkaline earth metals form superoxides

Reason : There is a single bond between O and O in superoxides.

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 and reason are false

Answer: D

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7. In a chemical equilibrium, the rate constant for the forward reaction is 2.5×10^2 and the equilibrium constant, is 50. The rate constant for the reverse reaction is

A. 11.5

B. 5

C. 2×10^2

D. 2×10^{-3}

Answer: B

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8. Zeolite used to soften hardness of water is, hydrated

A. Sodium aluminium silicate

B. Calcium aluminium silicate

C. Zinc aluminium borate

D. Lithium aluminium hydride

Answer: A

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9. Statement : Chloro acetic acid is more acidic than acetic acid

Reason : Chloro group has $+1$ effect

A. Both Assertion, Reason are correct

B. Assertion is false, Reason is correct

C. Assertion is correct, Reason is false

D. Both Assertion and Reason are false

Answer: C

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10. The temperature of the system, decreases in an_____.

A. Isothermal expansion

B. Isothermal Compression

C. adiabatic expansion

D. adiabatic compression

Answer: C

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11. Assertion : The spectrum of He^+ is expected to be similar to that of hydrogen

Reason : He^+ is also one electron system.

A. If both assertion and reason are true and reason is the correct explanation of assertion

B. If both assertion and reason are true but reason is not the correct explanation of assertion

C. If assertion is true but reason is false

D. If both assertion and reason are false

Answer: A

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12. The sharing of valence electrons between the atoms will lead to the formation of_____

A. Ionic Bond

B. Covalent Bond

C. Co-ordinate Bond

D. None of these

Answer: B

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13. Consider the following statements

(i) Matter possesses mass

(ii) 22 carat gold is a mixture

(iii) Dry ice is a compound.

Which of the following statement(s) given above is/are correct?

A. $1\&3$

B. only 1

C. $1\&2$

D. $1, 2\&3$

Answer: D

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14. Consider the following statements

1. $\lambda = h/mv$ is valid only when the particle travels at speed much less than the speed of light.

2. Einstein's mass-energy relationship is $E = mc^2$

3. The angular momentum (mvr) of the electron must be equal to an integral multiple of $h/4\pi$.

Which of the following statement(s) given above is/are correct?

A. $1\&3$

B. only 1

C. $1\&2$

D. $1, 2\&3$

Answer: C

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15. Match the compounds given in Column I with suitable items given in Column II

	Column I (Compound)		Column II (Uses)
A	Iodoform	1	Fire extinguisher
B	Carbon tetra chloride	2	Insecticide
C	CFC	3	Antiseptic
D	DDT	4	Refrigerants

A. $A \rightarrow 2B \rightarrow 4C \rightarrow 1D \rightarrow 3$

B. $A \rightarrow 3B \rightarrow 2C \rightarrow 4D \rightarrow 1$

C. $A \rightarrow 1B \rightarrow 2C \rightarrow 3D \rightarrow 4$

D. $A \rightarrow 3B \rightarrow 1C \rightarrow 4D \rightarrow 2$

Answer: D

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Part B

1. What is working standard?

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2. Explain why HCl is a gas HF is a liquid?

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3. How many sigma and pi bonds are present in

$CH_3 - C \equiv N$

A. 4 sigma bonds and 3 pi bonds

B. 3 sigma bonds and 4 pi bonds

C. 5 sigma bonds and 2 pi bonds

D. 6 sigma bonds and 1 pi bonds

Answer: c

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4. How many sigma and pi bonds are present in

$CH_2 = C = O$

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5. Define equivalent mass.

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6. Write the chemical equations for combustion of propane.

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7. Explain intensive properties with two examples

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8. If there is no change in concentration, why is the equilibrium state considered dynamic?

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9. Comment on the statement - A sample of an ideal gas escapes into an evacuated container without any changes in its kinetic energy.

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10. How many electrons can have $s + 1/2$ in a d-sub-shell?

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Part C

1. On what basis do you classify gases into permanent and temporary gases? Explain these types with example.

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2. Describe the conformers of n - butane.

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3. How would you explain the following observation? BeO is almost insoluble but $BeSO_4$ is soluble in water.

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4. Give reason for the higher melting point value of AlF_3 (solid) than SiF_4 (gas).

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5. The size of $Cl^- = 1.81\text{Å}$ and $Cl = 0.99\text{Å}$. Explain

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6. Write a short note on β-elimination reaction.

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7. Which of the following orbitals are possible?

A. 1p

B. 2s

C. 2d

D. 3f

Answer:

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8. Show the heterolysis of covalent bond by using curved arrow notation and complete the following equations. Identify the nucleophile is each case.

$CH_3 - Br + KOH \rightarrow$

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9. Show the heterolysis of covalent bond by using curved arrow notation and complete the following equations. Identify the nucleophile is each case.

$CH_3 - OCH_3 + HI \rightarrow$

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10. Does propene exhibit geometrical isomers? Give reason.

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Part D

1. What are the factors influencing ionization enthalpy.

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2. Draw the Lewis structure of N, C, O and He.

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3. Define co-ordinate covalent bond.

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4. KCl in water deviates from ideal behaviour - why?

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5. Define solution. Explain with an example.

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6. 'The electronic configuration of Cr and Cu are written as $3d^5 4s^1$ and $3d^{10} 4s^1$ instead of $3d^5 4s^1$ and $3d^{10} 4s^1$ Justify the statement.

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7. 1 mole of an ideal gas, maintained at 4.1 atm and at a certain temperature, absorbs heat 3710 J and expands to 2 litres. Calculate the entropy change in expansion process.

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8. What is the type of hybridisation of each carbon in the following compounds?

$CH_3 - CH_3$

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9. What is the type of hybridisation of each carbon in the following compounds?

$(CH_3)_2CO$

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10. Write a short note on homologous series.

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11. Explain the following reactions.

Dow's process

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12. Explain the following reactions.

Wurtz Fitting reaction

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13. Explain the following reactions.

Fitting Reaction

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14. How does the haloalkanes react with metals?

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15. Balance the following equations by oxidation number method

$$K_2Cr_2O_7 + KI + H_2SO_4 \rightarrow K_2SO_4 + Cr_2(SO_4)_3 + I_2 + H_2O$$

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16. Balance the following equations by oxidation number method

$$KMnO_4 + Na_2SO_3 \rightarrow MnO_2 + Na_2SO_4 + KOH$$

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17. Balance the following equations by oxidation number method

$Cu + HNO_3 \rightarrow Cu(NO_3)_2 + NO_2 + H_2O$

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18. Balance the following equations by oxidation number method

$KMnO_4 + H_2C_2O_4 + H_2SO_4 \rightarrow K_2SO_4 + MnSO_4 + CO_2 + H_2O$

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19. Explain the pressure - volume isotherms of Carbon dioxide Andrew's isotherm.

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20. State law of mass action.

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21. Consider the following reactions,

$H_2(g) + I_2(g) \Leftrightarrow 2HI$

In each of the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

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22. Consider the following reactions,

$CaCO_3(s) \Leftrightarrow CaO(s) + CO_2(g)$

In each of the above reaction find out whether you have to

increase (or) decrease the volume to increase the yield of the product.

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23. Consider the following reactions,

$S(s) + 3F_2(g) \Leftrightarrow SF_6(g)$

In each of the above reaction find out whether you have to increase (or) decrease the volume to increase the yield of the product.

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