CHEMISTRY

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NAVA NALANDA QUESTION PAPER

Exercise

1. The radius of the first Bohr orbit of hydrogen is a_0. The radius of the third orbit would be :
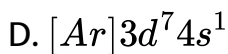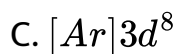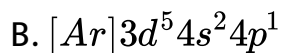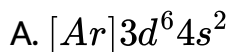
A. $3a_0$

B. $6a_0$

C. $9a_0$

D. $27a_0$

Answer:

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2. The electronic configuration of Cu^{3+} is :

A. $[Ar]3d^6 4s^2$

B. $[Ar]3d^5 4s^2 4p^1$

C. $[Ar]3d^8$

D. $[Ar]3d^7 4s^1$

Answer:

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3. Which of the following is least thermally, stable :

A. CI_4

B. $SiCI_4$

C. $GeCI_4$

D. $PbCI_4$
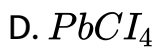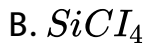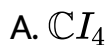
Answer:

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4. Which of the following is not state function:

A. $(q + w)$

B. W

C. H

D. G

Answer:

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5. The nomality of 30 volume of H_2O_2 is :

A. 2.687

B. 5.357

C. 8.034

D. 6.685

Answer:

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6. The vapour density of a mixture of NO_2 and N_2O_2 is 27.4. The mole fraction of NO_2 in the mixture is:

A. 1.6

B. 0.8

C. 2.4

D. 0.6

Answer:

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7. The shape of ICI_4^- is:
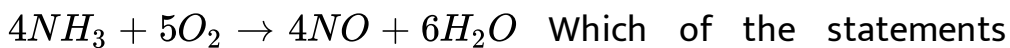
A. tetrahedral

B. octahedral

C. squareplanar

D. distorted tetrahedral

Answer:

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8. 1.0 mol each of ammonia and oxygen ore made to react according to the following equation: $4NH_3 + 5O_2 \rightarrow 4NO + 6H_2O$ Which of the statements below is/are correct:

A. 1.0 mol of H_2O produced

B. 10 mol of NO is formed

C. All the ammonia is cosumed

D. all the oxygen is consumed

Answer:

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9. Which of the following sets of quantum numbers represents the highest energy of an atom :

A. $n = 3, l = 0, m_l = 0, s = +\dfrac{1}{2}$

B. $n = 3, l = 1, m_l = +1, s = +\dfrac{1}{2}$

C. $n = 3, l = 2, m_l + 1, s = +\dfrac{1}{2}$

D. $n = 4, l = 0, m_l = 0, s = +\dfrac{1}{2}.$

Answer:

10. The temperature above which a gas remains ideal over a wide range of pressure is called:

A. boiling point

B. Boyle's temperature

C. critical temperature

D. ideal temperature

Answer:

11. The rate of diffusion of methane is twice that of x. The molecular mass of x is:

A. 16

B. 32

C. 64

D. 80

Answer:

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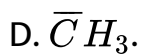
12. The correct IUPAC name of the following compund is:

A. 1, l-Diethyl-2, 2-dimethylpentane

B. 4,4-Dimethyl-5, 5-diethylpentane

C. 5, 5-Diethyl -4, 4-dimethylpentane

D. 3-Ethyl-4, 4-dimethylheptane

Answer:

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13. The most stable carbonion is :

A. $(CH_3)_3\overline{C}$

B. $(CH_3)_2\overline{C}H$

C. $CH_3{-}\overline{C}H_2$

D. $\overline{C}H_3$.
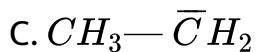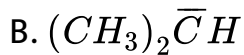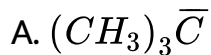
Answer:

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14. Which of the following components cannot show tautomerism:

A.

$$CH_3\!-\!\overset{\displaystyle O}{\overset{\|}{C}}\!-\!CH_3$$

B.

$$CH_2\!=\!CH\!-\!OH$$

C.

D.

Answer:

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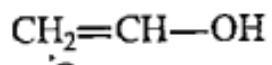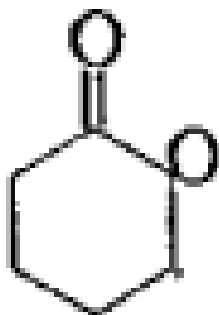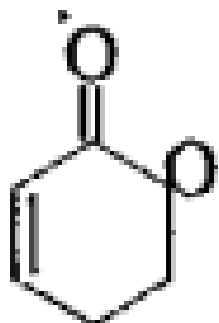
15. The number of metamers will be possible with $C_4H_{10}O$ is :

A. 1

B. 2

C. 3

D. 7

Answer:

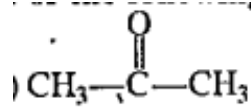**16.** Write the electronic configuration of Cr (24) and assign its position in the long form of Periodic table.

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17. Write two limitations of Rutherford's nuclear model.

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18. How does hydrolith react with water?

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19. A system is changed from a initial state toa final state by a manner such that $\Delta H = q$. If the change from the initial state

to the final state were made by a different.path,' would ΔH be the same as that for the first path? Would q? Give reason.

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20. Write the electron dot structure of CO_3^{2-}.

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21. Between H_3C and F_3C- which can give more +I effect and why?

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22. What would be the S.I. unit for the quantity $\dfrac{PV^2T^2}{n}$?

23. Predict the state of hybridisation of central iodine in linear ion I_3^- .

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24. What is- the molality of sulphuric acid'solution in which the mole fraction of water is 0.8?

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25. In a reaction 1.0 mol of $MnSO_4$ was completely converted to 1.0 mol of MnO_4^- Calculate the equivalent mass of MnO_4^- [Mn = 54.94]

26. State and explain with a -suitable example the Hund's rule of maximum spin multiplicity.

27. Calculate the wave length in.angsfrom of the photon emitted when an electron returns to 2nd orbit from third orbit in the hydrogen atom. Given ionisation energy of hydrogen = 2.17×10^{-11} erg /atom, h = 6.62 xx 10^(-27)` erg sec.

28. Write IUPAC name of $OHC—CH_2—CH_2—CH_2—CHO$

.

29. Count the number of tn and m bonds in 1, 3-pentadiene.

Calculate, the compressibility factor for 1.0 mol sample of NH_3

present in a 500 ml vessel-at a pressure of 30.0 atm. the

temperature being $10.0°C$. What would be the ideal pressure

for 1.0. mol of NH_3 at -10.0^@C` in a 500 ml vessel.?

30. Find out the number of unpaired electrons in Ni^{2+}.

[Atomic no. of Ni = 28]

31. CCl_4 does not give white precipitate while NaCI solution

does with $AgNO_3$ solution— Explain why.

32. Establish that an orbital can accomodate at most two

electrons with their spin anti-parallel.

33. Show that the product of pressure times volume, PV, has

the dimension of energy.

34. Write de Broglie equation mentioning all the terms there in.

35. Calculate the wave length of wave associated -with an electron moving with the velocity $1.55 \times 10^6 ms^{-1} [h = 6.63 \times 10^{-34} J. S, m_e = 9.109 \times 10^{-31} kg]$

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36. What is oxidation number?' Balance the equation by oxidation number method:

$$AI + NaOH + H_2O \rightarrow NaAlO_2 + H_2.$$
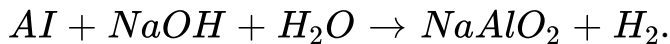
37. Calculate volume of $0.1 M K_2 Cr_2 O_7$ solution required to react completely with 30 ml of $0.2 M FeSO_4$ solution in dil H_2SO_4 medium.

38. Give an example of disproportionation reaction.

39. Give an experimental evidence to prove that an half-filled plevel is more stable than any other alternative arrangements.

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40. Write general electronic configuration of d-block elements and f-blockelements.

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41. PCI_5 is known but PH_5 is not known— explain why.

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42. Arrange the following ions in ascending order of their ionic radic Na^+, F^-, O^{2-}, Mg^{2+}.

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43. Calculate the average kinetic energy in joules of the molecules in 8.0 g of methane at $27°C$.

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44. Write the units of Vander Waals constants a and b.

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45. An organic compound contains C, H and oxygen. 0.30 g of this compound on combustion yielded 0.44 g of CO_2 and 0.18 g of H_2O.If the weight of 1 mole of the compounds is 60, what is the molecular formula of the organic compound.?

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46. Write the IUPAC name of CH_3— CO— $NH2$.

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47. What is inductive effect? arrange the following groups in ascending order of -I effect : $-CN$, $-NO_2$, $-CI$, $-F$, $-SO_3H$ Formic acid is stronger than acetic acid— explain why.

48. What are the species formed by homolytic cleayageof C— C bond of ethane molecule? Write- the order of stability of the following and give reason :-$\overset{+}{C}H_2$, $(H_3C)_2(\overset{+}{C})H_3$, $_3\overset{+}{C}$.

49. CO_2 is a gas but SiO_2 is a high melting solid— explain why.

50. In a certain process. 678 J of heat is absorbed by a system, while 294 J of work is done on the system. What is the change

in the internal energy for the process?

51. What happens when H_2O_2 solution is added to KI solution containing dilute H_2SO_4?

52. Write down the Vaiider Waal's equation for n moles of a gas mentioning the terms there in. Mention the significance of Vander Waal's constant. What is Boyle, temperature?

53. Write the mathematical expression of the first law of thermodynamics explaining all the terms present in the expression.

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54. What is the demineralised water? Will it be suitable for solvent for medicinal purpose? Will distilled water be suitable for drinking purpose?

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55. Write short notes on :the hyper conjugative effect.

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56. Write short notes on :Electrometric effect.

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57. Write down the chain structural isomers of hydrocarbon having molecular formula C_5H_8

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58. Analysis of a compound of phosphorous shows that 1.0 litre of it at STP never contains less than 1.384 g of the' element,Again 1.0 litre phosphorous vapour at STP weighs 5.536 g. Calculate approximate atomic mass, molecular mass and atomicity.

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59. Acidiccharacter of 4-nitrophenol is greater than 3-nitrophenol Explain why? Compare basic character of aromatic and aliphatic amines.

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