JEE Main 27 January 2024 Shift 1 Question Paper

Chemistry

1. A solution of two volatile components showing negative deviation from Raoult's law shows:
   i. A Decrease in vapour pressure, boiling point increases
   ii. Increase in vapour pressure, boiling point decreases
   iii. Decrease in vapour pressure, boiling point decreases
   iv. Increase in vapour pressure, boiling point increases

2. Among the following, the number of meta-directing groups is:
   -CN, $-NO_2$, -COOH, CH_3, $-SO_3H$, $NH3^+$, -F

3. Arrange the following compounds in order of their basic strength.

4. Arrange the given compounds in order of their basic strength.

5. Assertion: All s-block Elements are found in Nature
   Reason: 4f and 5f Series Periodic table are kept below
   i. Assertion and Reason, both are true and Reason is correct explanation of Assertion
   ii. Assertion and Reason, both are true and Reason is not correct explanation of Assertion.
   iii. Assertion is True, but Reason is False.
   iv. Assertion is False but Reason is True

6. ASSERTION: Boron is a Hard Element.
   REASON: Boron has an unusually high melting point due to its crystalline structure.
   i. Both Assertion and Reason are true and Reason is the correct explanation of Assertion
   ii. Both Assertion and Reason are true but Reason is not the correct explanation of Assertion
   iii. A is true, R is not
   iv. R is true, A is not

7. Calculate the mass of CH_4 consumed for the formation of 22g CO_2.

8. Calculate the number of electrons for which n = 4 and s = +1/2.

9. Calculate the temperature (in K) at which the kinetic energy of monoatomic gaseous molecule is equal to 0.414 eV.

10. Ethanol shows turbidity with Lucas reagent after going through which process?

11. Find out the number of stereoisomers obtained when 3-methylhex-2-ene reacts with HBr in the presence of peroxide.

12. Find out the sum of bond orders of CO & NO^+.

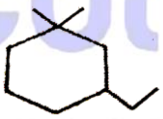
13. If SN^1 is a racemisation reaction, then which of the following will be the correct reaction for SN^2?

14. In which of the following compounds, which central atom has +4 oxidation state?
    i. SO_3
    ii. H_2SO_3
    iii. $H_2S_2O_7$
    iv. $BaSO_4$

15. PbCrO4 reacts in the presence of NaOH to give which complex?
    i. Dianionic with CN = 6
    ii. Dianionic with CN = 4
    iii. Neutral with CN = 4
    iv. Trianionic with CN = 6

16. The compound $(CH_2)_4C_2H_2$ is:
    i. Alicyclic
    ii. Aromatic
    iii. Antiaromatic
    iv. Acyclic

17. What is the correct IUPAC name of the following compound?



    i. 1 - ethyl - 3,3-dimethyl cyclohexane
    ii. 3 - ethyl -1,1-dimethyl cyclohexane
    iii. 1 - ethyl - 3,3-dimethyl cyclohexene
    iv. 3 - ethyl - 1,1-dimethyl cyclohexene

18. What is the electronic configuration of Neodymium (60) Nd?

19. Which of the following compounds are polar?
    i. CCl_4
    ii. $CH_2 = CH2$
    iii. CO_2
    iv. CH_3Cl

20. Which of the following configurations has the strongest metallic bonding?
    i. $[Ar]3d^74s^2$
    ii. $[Ar]3d^54s^1$
    iii. $[Ar]3d^64s^2$
    iv. $[Ar]3d^34s^2$

21. Which of the following does not show a variable oxidation state?
    i. Fluorine
    ii. Chlorine
    iii. Bromine
    iv. Iodine

22. Which of the following has the highest enol content?

23. Which of the following is a complex with maximum spin angular momentum?
    i. $[FeF_6]^{3-}$
    ii. $[Fe(CN)_6]^{3-}$
    iii. $[Fe(H_2O)_6]^{2+}$
    iv. $[V(H_2O)_6]^{2+}$

24. Which type of linkage is present in nucleotide between base and sugar?