

CHEMISTRY

BOOKS - UNITED BOOK HOUSE

2015 QUESTION PAPER

Exercise

1. How many Faraday of electricity are required to produce 18 g of Al (atomic mass=27) from molten Al_2O_3 by electrolysis?

A. $\frac{3}{2}$

B. $\frac{2}{3}$

C. 2

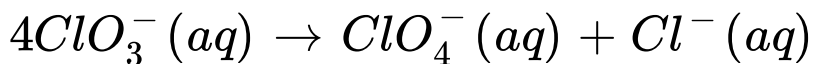
D. $\frac{3}{17}$

Answer:



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2. Indicate the type to which the following reaction belongs:



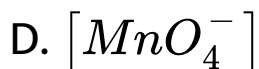
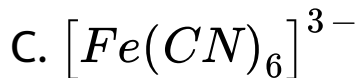
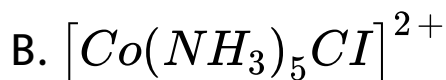
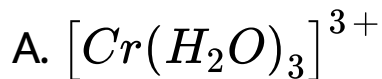
- A. Oxidation reaction
- B. Reduction reaction
- C. Disproportionation reaction
- D. Decompositon eaction.

Answer:



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3. Which of the following compex ions has no 'd' electron (s) in the central metal atom?



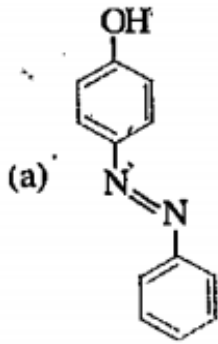
Answer:



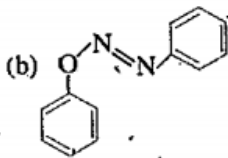
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4. Which of the following is produced when benzene diazonium chloride is coupled with phenol in alkaline medium?

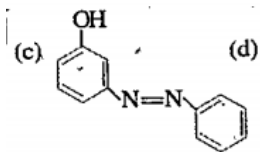
A.



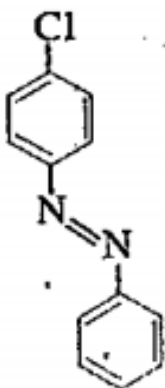
B.



C.



D.



Answer:



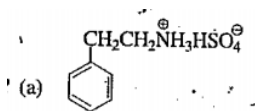
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5. An organic compound (A) is soluble in water.

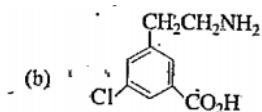
Its aqueous solution liberates carbon dioxide,

from $NaHCO_3$, forms a white precipitate with aqueous $BaCl_2$ solution and responds to azo dye test. Which is (A) among the following.i

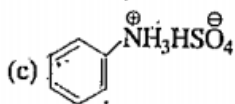
A.



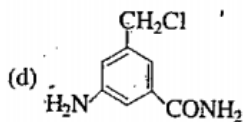
B.



C.



D.



Answer:



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6. Which of the following is a polyimide polymer?

A. Terylene

B. Nylon

C. Rubber

D. Bakelite

Answer:



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7. For which of the following purpose sodium benzoate is used?

A. As antioxidant

B. As analgesic

C. As tranquiliser

D. As food preservative

Answer:



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8. What is the number of unit cells in 6.4 g of X (atomic mass=64) (X crystallises in body centred cubic lattice)?

A. $\frac{N_A}{10}$

B. $\frac{N_A}{20}$

C. $\frac{N_A}{5}$

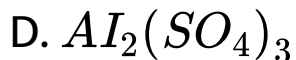
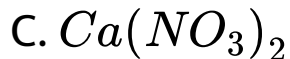
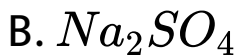
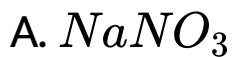
D. $2N_A$

Answer:



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9. Which of the following is the most effective in bringing about the coagulation of Ag I/I^- sol?

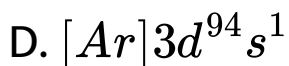
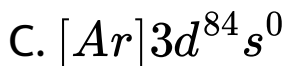
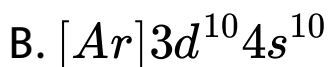
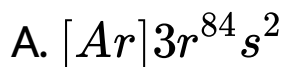


Answer:



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10. Which of the following is the correct electronic configuration of Ni in $Ni(CO)_4$?



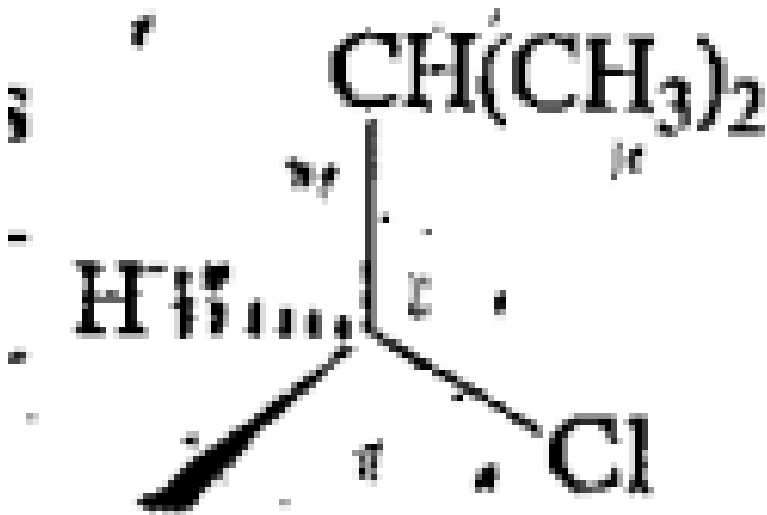
Answer:



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11. A molecule has the following structure.

Which one is the IUPAC name of the molecule?



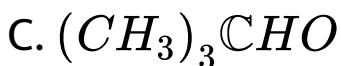
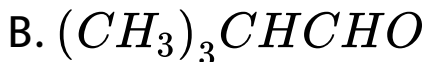
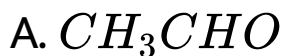
- A. 2-chloro-3-methylbutane
- B. 2-chloro-3-methylbutane
- C. 3-chloro-2-methylbutane
- D. (S)-2-methyl-3-chlorobutane

Answer:

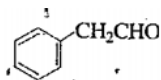


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12. Which of the following will respond to Cannizzaro reaction?



D.

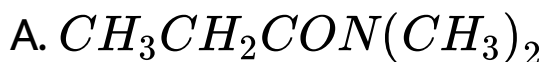


Answer:



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13. In which of the following peptide bond is present?



Answer:



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14. Among the following which is artificial sweetening agent?

A. Sucrose

B. Lactose

C. Sucralose

D. Cellulose

Answer:



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15. Give an example of a soap and indicate its nonpolar and polar parts.



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16. What is the magnetic character of Cu^+ ion?



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17. Which trivalent ion among lanthanoids has the largest size?



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18. What happens when NaCl solution is added to a gold sol?



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19. The specific conductance of a 0.20 mol L^{-1} solution of KCl at 300 K is 0.026 s cm^{-1} .

Calculate molar conductivity of the solution.



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20. Write down the reactions occurring at the two electrodes when current is drawn from a Daniell cell.



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21. 2.00 g of non-electrolyte solute dissolved in 100 g of benzene lowered the freezing point of benzene by 0.50K. The freezing point depression constant of benzene is $5.12 \text{ K kg mol}^{-1}$. Find out the relative molar mass of the solute.



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22. Explain, with reason, the nature of variation of the vapour pressure of a liquid in presence of a non-volatile solute.



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23. What is a micelle? Give two examples of micelle forming substances.



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24. Explain the formation of delta at the mouth of the river where it meets the sea.



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25. What is the hybridisation state of Xenon in $XeOF_4$? What is the shape of this molecule?

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26. Complete and balance the following reaction: $Na_2O_2 + ClO_2 \rightarrow$

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27. $[Ti(H_2O)_6]^{3+}$ is coloured while $[Sc(H_2O)_6]^{3+}$ is colourless. Explain.



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28. What is the difference between homopolymer and copolymer? Give one example of each type.



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29. Which type of semiconductor is silicon having arsenic as impurity?



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30. An element (density = 7.2 g cm^{-3}) crystallises in a body centred cubic structure its unit cell edge length 2.88 \AA . Calculate the number of atoms and the number of unit cells present in 156 g of the element.



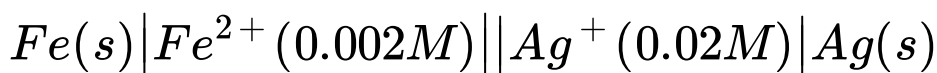
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31. Mention three specific conditions necessary for the determination of correct molar mass of a solute by studying colligative properties of its solution.



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32. Write down the appropriate Nernst equation for the following voltaic cell and calculate the e.m.f. of the cell at 298 K.



(Given : $E_{Fe^{2+}/Fe}^{\circ} = -0.44V$ and

$E_{(Ag^{+}/Ag)}^{\circ} = 0.80V$ at 298 K) 1+2



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33. Write down Kohlrausch's law of independent migration of ions. Find out the molar conductivity of ammonium hydroxide at infinite dilution (Λ_m°) at 298K, given that (Λ_m°) values for NH_4Cl , $NaCl$ and $NaOH$ are 149, 126 and 248 $S.cm^2 \cdot mol^{-1}$ respectively at 298 K.



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34. Write the composition of electrolytic mixture used in the extraction for aluminium by electrolytic process. Write the chemical reactions occurring at the electrodes in this process.



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35. Write chemical reactions involved in acid Bessemer process in the purification of iron.



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36. Name an acidic flux.



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37. Why does praseodymium possess electronic configuration $4f^36s^2$ instead of the expected one, $4f^25d^16s^2$?



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38. What is the most common oxidation state exhibited by actinoids ?



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39. Write, with balanced chemical equation, what happens when: Potassium iodide solution is added to the aqueous solution of copper sulphate.



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40. Write, with balanced chemical equation, what happens when: $KMnO_4$ is heated strongly.



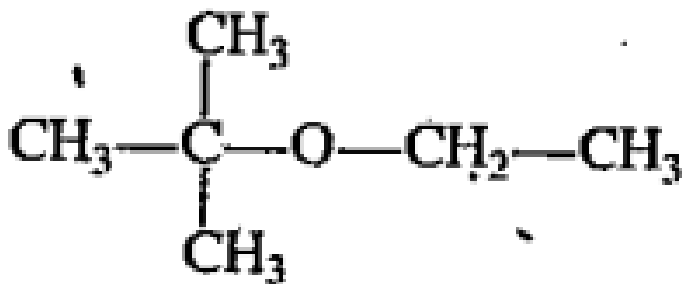
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41. Write the environmental effect of DDT.



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42. How the following ether could be synthesised by Williamson synthesis?



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43. What reagent would you use to differentiate between a secondary and a tertiary alcohol?



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44. Which is More Acidic in Nature ? Phenol and Anisole



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45. Give an example of Reimer-Tiemann reaction.



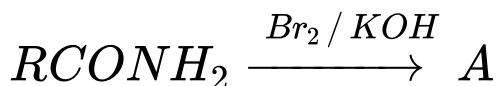
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46. An organic compound (A) of molecular formula C_7H_7NO , on treatment with P_2O_5 provides (B). Reaction of both (A) and (B) with $LiAlH_4$ gives (C). Acid hydrolysis of both (A) and (B) affords benzoic acid. Identify (A), (B) and (C) with reason.



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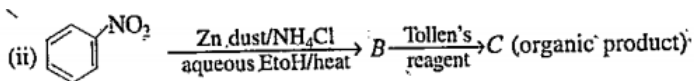
47. Identify A in the following reaction:





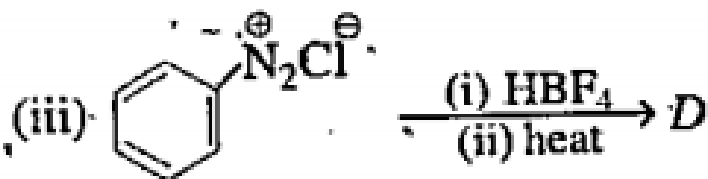
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48. Identify A, B, C, D, E and F in the following reactions:



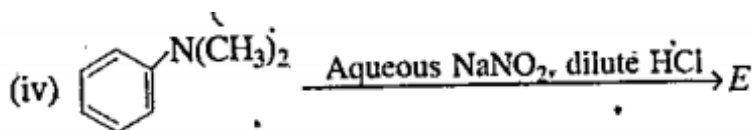
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49. Identify D in the following reactions:



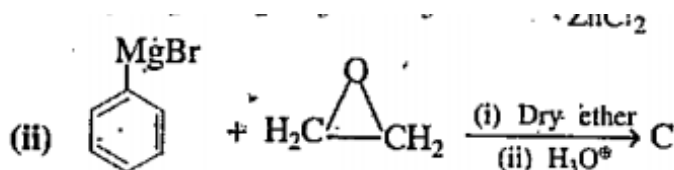
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50. Identify E in the following reactions:



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51. Identify A, B, C, D, E and F in the following reactions:



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52. Write the structure of D-glucose. How does structure differ from that the D-fructose?



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53. What is denaturation of protein?



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54. What is meant by pseudo unimolecular reaction? Explain with an example. 0.0625 g remains from 1 g of a radioactive element after 20 years of radioactive decay. Determine the rate constant and half-life ($t_{1/2}$) of the reaction. How much of the element did remain after 10 years from the start?



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55. On the basis of rate equation show that a first order reaction does never go to completion. For an elementary reaction $A + B \rightarrow C$, the rate constant increases 10 times on increasing the temperature from $27^\circ C$ by 10 degrees, Find out the activation energy of the reaction.



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56. Fluorine has less negative electron gain enthalpy than chlorine and yet it is a stronger oxidising agent than chlorine. Explain.



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57. What happens when white phosphorus is boiled with caustic soda solution? Write the balanced chemical equation.



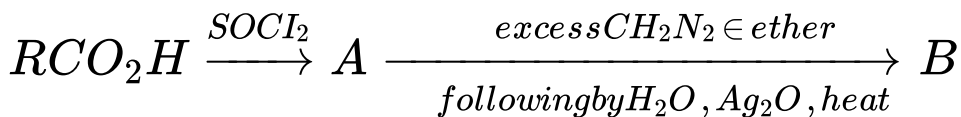
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58. Between N_2O and NO_2 molecules which one is more polar? Explain.



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59. Identify A, B, C, D, E and F in the following reactions:



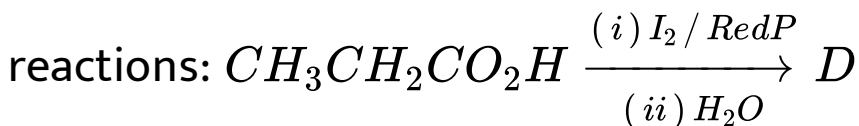
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60. Identify A, B, C, D, E and F in the following



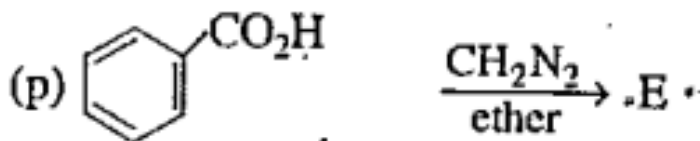
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61. Identify A, B, C, D, E and F in the following



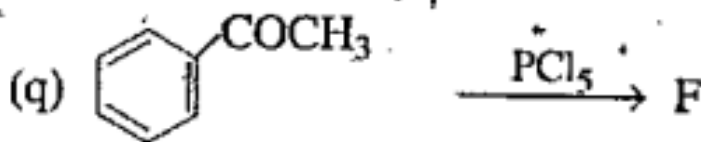
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62. Identify E in the following reactions:



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63. Identify F in the following reactions:

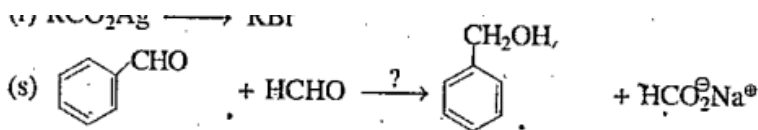


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64. Write the reagents required in the following reactions: $RCO_2Ag \xrightarrow{?} RBr$

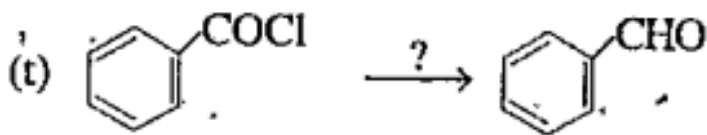
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65. Write the reagents required in the following reactions:



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66. Write the reagents required in the following reactions:



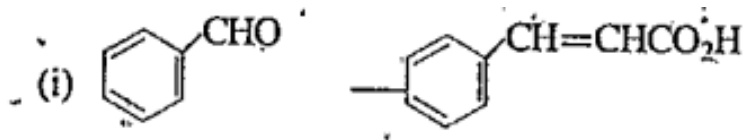
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67. Write the reagents required in the following reactions:



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68. How would you convert?



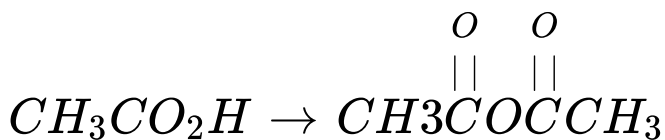
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69. How would you convert?



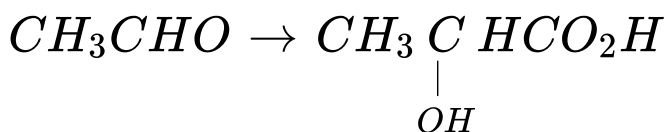
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70. How would you convert?



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71. How would you convert?



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72. How would you convert?



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