Test / Exam Name: Revision | Standard: 12TH SCIENCE | Subject: CHEMISTRY
Student Name: ---------- | Section: ---------- | Roll No.: ----------

Questions: 12	Time: 60 Mins	Marks: 60

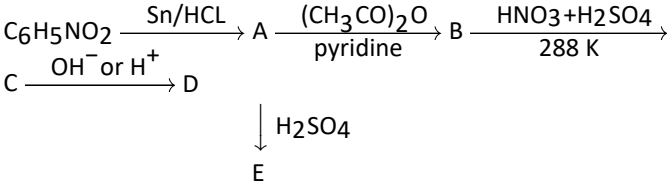
Q1a. Write the structures of the main products when benzene diazonium chloride reacts with the following reagents: **5 Marks**

i. CuCN
ii. CH_3CH_2OH
iii. Cu/HCl

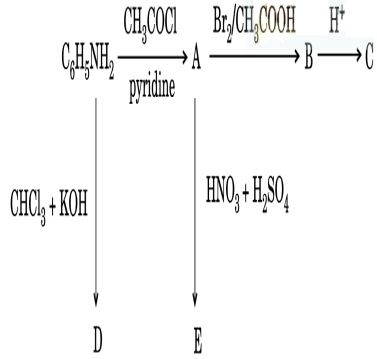
b. Arrange the following in the increasing order of their basic strength:
CH_3NH_2, $(CH_3)_2NH$, $C_6H_5NH_2$, $C_6H_5CH_2NH_2$

c. Write one chemical test to distinguish between Aniline and Ethylamine.

Q2. Write the structures of A, B, C, D and E in the following reactions: **5 Marks**



Q3. Write the structures of A, B, C, D and E in the following reactions: **5 Marks**



Q4a. Complete the following equations: **5 Marks**

i. $Cr_2O_7^{2-} + 2OH^- \rightarrow$
ii. $MnO_4^- + 4H^+ + 3e^- \rightarrow$

b. Account for the following:

i. Zn is not considered as a transition element.
ii. Transition metals form a large number of complexes.
iii. The E^o value for the Mn^{3+}/Mn^{2+} couple is much more positive than that for Cr^{3+}/Cr^{2+} couple.

Q5a. Complete the following chemical reaction equations: **5 Marks**

i. $MnO_{4(aq)}^- + C_2O_{4(aq)}^{2-} + H_{(aq)}^+ \rightarrow$
ii. $Cr_2O_{7(aq)}^{2-} + Fe_{(aq)}^{2+} + H_{(aq)}^+ \rightarrow$

b. Explain the following observations about the transition/inner transition elements:

i. There is in general an increase in density of element from titanium (Z=22) to copper (Z=29).
ii. There occurs much more frequent metal-metal bonding in compounds of heavy transition elements (3rd series).

iii. The members in the actinoid series exhibit a larger number of oxidation states than the corresponding members in the lanthanoid series.

Q6 a. Draw the structures of the following: **5 Marks**

i. $H_2S_2O_7$.

ii. $HClO_3$.

b. Explain the following observations:

i. In the structure of HNO_3, the N–O bond.

(121 pm) is shorter than the N–OH bond (140 pm).

ii. All the P–Cl bonds in PCl_5 are not equivalent.

iii. ICl is more reactive than I_2.

Q7 a. How do you prepare: **5 Marks**

i. K_2MnO_4 from MnO_2?

ii. $Na_2Cr_2O_7$ form Na_2CrO_4?

b. Account for the following:

i. Mn^{2+} is more stable than Fe^{2+} towards oxidation to +3 state.

ii. The enthalpy of atomization is lowest for Zn in 3d series of the transition elements.

iii. Actinoid elements show wide range of oxidation states.

Q8 a. Give chemical tests to distinguish between **5 Marks**

i. Propanol and propanone.

ii. Benzaldehyde and acetophenone.

b. Arrange the following compounds in an increasing order of their property as indicated:

i. Acetaldehyde, Acetone, Methyl tertbutyl ketone (reactivity towards HCN).

ii. Benzoic acid, 3,4-Dinitrobenzoic acid, 4-Methoxybenzoic acid (acid strength).

iii. CH_3CH_2CH (Br) COOH, CH_3CH (Br) CH_2COOH, $(CH_3)_2CH$ COOH.

(acid strength).

Q9 a. Write a suitable chemical equation to complete each of the following transformations: **5 Marks**

i. Butan-1-ol to butanoic acid.

ii. 4-Methylacetophenone to benzene-1,4-dicarboxylic acid.

b. An organic compound with molecular formula $C_9H_{10}O$ forms 2,4-DNP derivative, reduces Tollen's reagent and undergoes Cannizzaro's reaction. On vigorous oxidation it gives 1,2-benzenedicarboxylic acid. Identify the compound.

Q10 a. Explain the following terms: **5 Marks**

i. Rate of a reaction.

ii. Activation energy of a reaction.

b. The decomposition of phosphine, PH_3, proceeds according to the following equation:

$4\ PH_3\ (g) \rightarrow P_4\ (g) + 6H_2\ (g)$.

It is found that tile reaction follows the following rate equation:

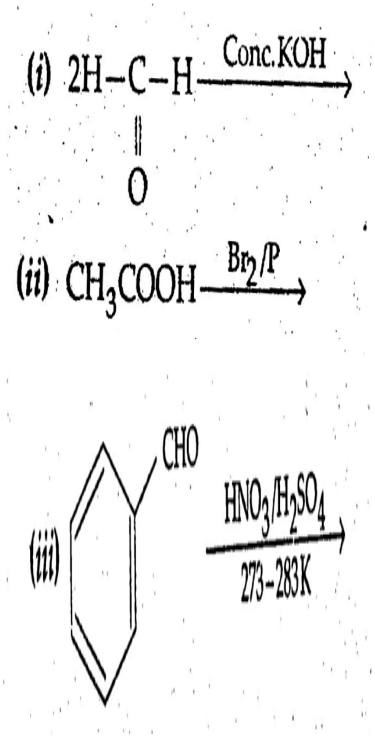
Rate = $k\ [PH_3]$.

The half-life of PH_3 is 37.9 s at 120^oC.

i. How much time is required for 3/4th of PH_3 to decompose?

ii. What fraction of the original sample of PH_3 remains behind after 1 minute?

Q11. Complete the following reactions: **5 Marks**



b. Give Simple chemical tests to distinguish between the following pairs of compounds:

i. Ethanal and propanal.

ii. Benzoic acid and phenol.

Q12. Complete the following chemical equations for reactions: **5 Marks**

i. $MnO^-_{4(aq)} + S_2O^{2-}_{3(aq)} + H_2O(l) \rightarrow$

ii. $Cr_2O^-_{7(aq)} + H_2S(g) + H^+_{(aq)} \rightarrow$

b. Give an explanation for each of the following, observations:

i. The gradual decrease in size (actinoid contraction) from element to element is greater among the .actinoids than that among the lanthanoids (lanthanoid contraction).

ii. The greatest number of oxidation states are exhibited by the members in the middle of a transition series.

iii. With the same d-orbital configuration (d^4) Cr^{2+} ion is a reducing agent but Mn^{3+} ion is an oxidising agent.