**AGA KHAN UNIVERSITY EXAMINATION BOARD**

**HIGHER SECONDARY SCHOOL CERTIFICATE**

**CLASS XII**

**MODEL EXAMINATION PAPER 2020**

**Chemistry Paper II**

**Time: 2 hours 10 minutes  Marks: 50**



**INSTRUCTIONS**

**Please read the following instructions carefully.**

1. Check your name and school information. Sign if it is accurate.

| **I agree that this is my name and school.**<br>**Candidate's Signature** |
|---|
| |

**RUBRIC**

2. There are ELEVEN questions. Answer ALL questions. Questions 10 & 11 each offer TWO choices. Attempt any ONE choice from each.

3. When answering the questions:

   Read each question carefully.
   Use a black pointer to write your answers. DO NOT write your answers in pencil.
   Use a black pencil for diagrams. DO NOT use coloured pencils.
   DO NOT use staples, paper clips, glue correcting fluid, or ink erasers.
   Complete your answer in the allocated space only. DO NOT write outside the answer box.

4. The marks for the questions are shown in brackets ( ).

5. You may use a scientific calculator if you wish.

Q.1. (Total 3 Marks)

a. Which of the following metals has higher ionisation energy? Give a reason to support your answer. (2 Marks)

i. Caesium

ii. Lithium

b. Why is the radius of fluorine atom smaller than that of the fluoride ion? (1 Mark)

Q.2. (Total 4 Marks)

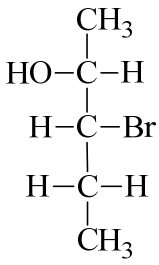
Write the systematic names of the given transition metal complexes.

| Transition Metal Complex | Systematic Name |
|---|---|
| $Na_3[FeCl(CN)_5]$ | |
| $[Pt(NH_3)_2Cl_2]Cl_2$ | |
| $Na_2[NiCl_4]$ | |
| $K_3[CoF_6]$ | |

Q.3. (Total 5 Marks)

a. Describe the process of destructive distillation of coal and name any TWO products obtained through this process. (3 Marks)

b. Consider the given structure of an organic compound.

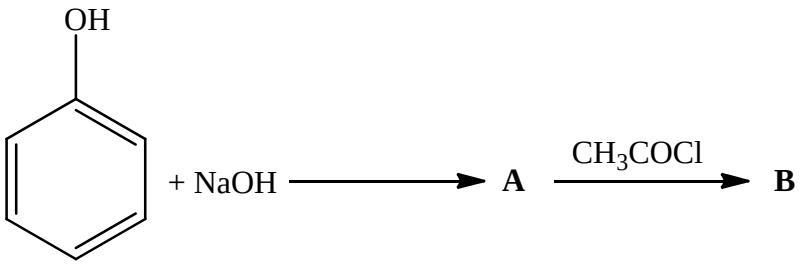


i. Encircle the chiral carbons in the given structure. (1 Mark)

ii. How many optical isomers are possible from the given compound? (1 Mark)

Q.4. (Total 4 Marks)

a. Draw the structures of **A** and **B** to complete the given reaction of phenol. (2 Marks)




**Space for drawing**



b. Why is iodoform test used to differentiate between methanol and ethanol? Give reason with reference to the structure of methanol and ethanol. (2 Marks)

Q.5. (Total 4 Marks)

Draw the structural formulae of the following compounds.

| Compound | Structural Formula |
|---|---|
| Propanone phenylhydrazone | |
| 4-hydroxybenzaldehyde | |
| Ethanaloxime | |
| 3-Methyl-2-butanone | |

Q.6. (Total 4 Marks)

Show the preparation of acetic acid by reacting methylmagnesium bromide (Grignard's reagent) with carbon dioxide. Mention the conditions necessary for this reaction.

**Space to show reaction and conditions**

Q.7. (Total 4 Marks)

a. 2-bromo-2-methylpropane in the presence of alcoholic potassium hydroxide forms 2-methylpropene.

Deduce the mechanism of the given chemical reaction. (2 Marks)

**Space for deduction of mechanism**



b. Write any TWO uses of dyes or pigments in cosmetic industry. (2 Marks)

i.

_____

_____

ii.

_____

_____

Q.8. (Total 3 Marks)

a. What causes photochemical smog? (1 Mark)

_____

_____

b. Mention any TWO harmful effects of smog on living organisms. (2 Marks)

_____

_____

_____

_____

Q.9. (Total 4 Marks)

a. Infrared spectroscopy is used to identify the structures of molecules.

Mention any TWO specific type of information that it provides. (2 Marks)

i. _____

_____

ii. _____

_____

b. State ONE use and ONE drawback of combustion analysis. (2 Marks)

_____

_____

_____

_____

Q.10. (Total 8 Marks)

**EITHER**

a.

i. Explain why alkenes are more reactive towards electrophilic reagents than alkynes.(4 Marks)

ii. Write a chemical equation showing preparation of alkenes from (4 Marks)

I. dehydrohalogenation of alkyl halide.

II. dehydration of alcohol.

(**Note**: In the equations, mention all the necessary conditions for reactions.)

**OR**

b. Using balanced chemical equations,

i. show the preparation of propanoyl chloride by reacting propanoic acid with thionyl chloride in the presence of pyridine. (2 Marks)

ii. show the reaction of propanoyl chloride with (6 Marks)

I. sodium propanoate to distill over propanoic anhydride.

II. propanol in the presence of pyridine to prepare propyl propionate.

III. ammonia to form propanamide.

Q.11. (Total 7 Marks)

**EITHER**

a.

i. Why are enzymes called biological catalysts? (1 Mark)

ii. Explain the effects of the following factors on enzyme activity: (6 Marks)

I. Enzyme concentration

II. Temperature

III. pH

**OR**

b.

i. Write the importance of each of the given pesticides: (4 Marks)

I. Molluscicides

II. Rodenticides

III. Herbicides

IV. Fungicides

ii. What are dyes? (1 Mark)

iii. What is the colour of methyl orange in acidic medium and basic medium? (2 Marks)

END OF PAPER