Royal University of Bhutan
Paro College of Education
Autumn Semester Examination - 2013

B.Ed(S) IV – Applied Chemistry (CHE410)

Full mark: 100 Time: 3 hours

Instruction:

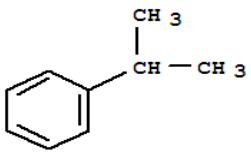
1. *Do not write for the first ten minutes. This time is to be spent in reading the questions.*
2. *This question paper consists of two sections A & B. Section A is short answer type and Section B is subjective type.*
3. *All the question from Section A are compulsory and Section B has choice (Answer any six questions from seven questions)*

Section A (40 marks)
(Answer all the Questions)

Question 1
Each question carries four possible answers, choose the most appropriate answer from the given options; [2x10=20 Marks]

a. The nutrient responsible for the formation of amino acids like cystine and methionine is;
   i. Mg ii. Ca iii. S iv. Mn

b. The name of the compound as shown below is;



   i. Styrene ii. Cumene iii. Terephthalic acid iv. Phenyl ethane

c. One of these is selective and primarily effective in controlling broadleaf weeds. It is quite mobile in soils and can be taken up by roots of sensitive trees and ornamentals.
   i. Dicamba ii. ROUNDUP iii. FINALE iv. Siduron

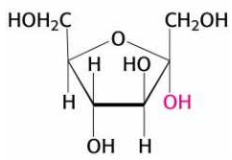
d. The fertilizer Calcium Cyanamide is also known by the name;
   i. Nitrolium ii. Sylvine iii. Nitrolime stone iv. Nitrolime

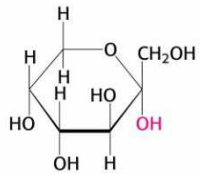
e. One of the followings is the effects of reducing sugar on Benedicts reagent:
   i. Cu^{+} ---------→ Cu
   ii. Cu^{2+} ---------→ Cu^{+}
   iii. Ag^{2+} ---------→ Ag^{+}
   iv. Ag^{+} ---------→ Ag

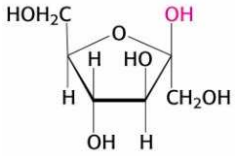
f. An antiseptic applied for antimicrobial activity, killing all principal pathogens and, given enough time, even spores;
   i. $B(OH)_3$ ii. $KMnO_4$ iii. H_2O_2 iv. I_2

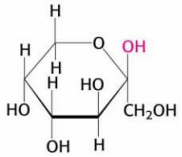
g. All are the gram-positive strains of bacteria EXCEPT;
   i. Staphylococcus ii. Streptococcus iii. Meningococcus iv. lactococcus

h. The correct structure for ά-D-Fructopyranose is;

i. 

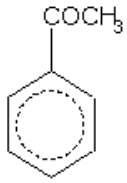
ii. 

iii. 

iv. 

i. Most of the antibiotic works as an enzyme;
   i. activator. ii. neutralizer. iii. inhibitor. iv. buffer.

j. The figure given below is to be used for answering Q.1.j. The substiuent -COCH3 on this aromatic ring will direct the incoming electrophiles in



   i. 'Ortho' Positions
   ii. 'Para' Position
   iii. 'Meta' Positions
   iv. Nuclear Position

Question 2 Give one word answer; [1x5 = 5 Marks]

a. The only organic nitrogenous fertilizer.
b. It is a pharmacological agent that modifies the effect of other agents (e.g., drugs, vaccines) while having few if any direct effects when given by itself.
c. The category of antibiotic used to reduce fever.

d. The type of chemicals that kills the disease causing organisms after it appears on plants.
e. The commonly known name for Fructose.

Question 3 Give reason for the following with example where possible;
[5 x 2 =10 Marks]

a. Organic farming is preferred over inorganic farming.
b. Glufosinate is used for clearing guardrails and industrial areas.
c. Lactose is a reducing type of sugar.
d. Overdose of Acetaminophen causes liver damage.
e. Glucose and fructose exhibit stereoisomerism.

Question 4 State whether the following are TRUE or FALSE [1x5 = 5 Marks]

a. Antibiotics are useless against viral infections.
b. Plants in need of phosphorus show stunted growth with weak stems and they will have yellowed or discoloured leaves.
c. Argon gas is used in filling up of light bulbs.
d. Maltose is a reducing sugar.
e. It is not necessary to always apply mixed fertilizers in the agricultural fields.

Section B (60 Marks)

(Answer any six Questions)

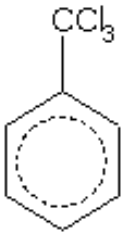
Question 5 Draw the correct structure for the following aromatic compounds.
[5 x 2=10 Marks]

a. MCPA
b. Benzoyl chloride
c. Benzoic anhydride
d. Phenoxybenzene
e. Naphthalein

Question 6 Write down the IUPAC name of the following compounds.

[5 x 2= 10 Marks]

a.



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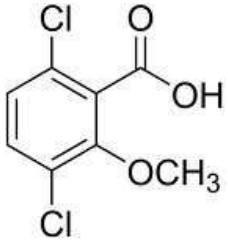

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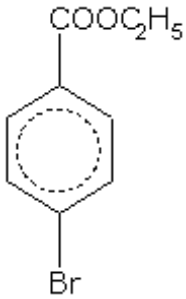
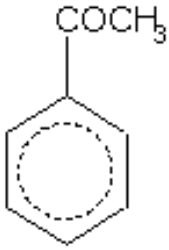
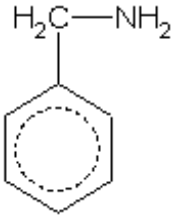


d.



e.



Question 7 [5 + 2 + 3=10 Marks]

a. Explain briefly the manufacturing process of Calcium ammonium nitrate. Include all the necessary steps with chemical equation and conditions.
a. State at least two of its uses.
b. Organic fertilizers are preferred over inorganic fertilizer. Give four reasons to support this statement.
c. Describe Friedel-Craft Alkylation reaction with necessary equations.

Question 8 Differentiate the following with appropriate example or structure wherever possible. [5 x 2= 10 Marks**]**

a. Enantiomer and isomer.
b. Antiseptic and disinfectant.
c. Vicinal and unsymmetrical trisubstituted product of C_6H_6.
d. Contact and systemic insecticides.
e. α –D-glucose and β-D-glucose.

Question 9 [1+3 + 3+3=10 Marks]

a. What is saponification? Give chemical name for soap.
b. Briefly explain the manufacturing process of soap?
c. How do you differentiate Glucopyranose and Fructopyranose structurally?
d. How is superphosphate prepared? Is it different from triple superphosphate?

Question 10 [5 x 2=10 Marks]

Carry out any five of the following conversion with all the necessary conditions.

a. Glucose to fructose
b. Fructose to glucose
c. Glucose to osazone
d. 1-hydroxy benzoic acid to (acetyloxy)benzoic acid
e. Glucose to glucose oxime
f. Fructose to fructose cyanohydrins.

Question 11 [3+ 3 +2 +2=10 Marks]

a. What are the characteristics of '0' group elements? State all the elements with their uses.
b. Explain briefly the preparation of Malathion?
c. State some Safe susbstitutes for insect and weeds so as to minimize health hazards.
d. Aryl halide like chlorobenzene and aromatic nitrobenzene and acetophenone do not undergo Friedel-Crafts reaction. Support with reason.