

Royal University of Bhutan
Paro College of Education
Autumn Semester Examination 2012

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

Full marks 100

Pass Mark: 50

Time: 3hour

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 subjective type.
 3. All the question from Section A are compulsory and Section B has choice (Answer any six question from seven question)
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Section A (40 marks)

Answer all the Questions.

Question 1

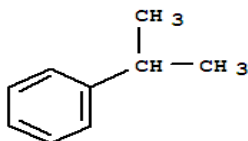
Each question carries four possible answers, choose the most appropriate answer from the given options; [2x10=20marks]

a. The nutrient responsible for the formation flower and fruit production is;

- i. N
- ii. P
- iii. K
- iv. S

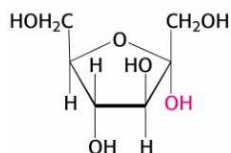
b. The figure given below is to be used for answering question1.b.

The name of the compound as shown below is;

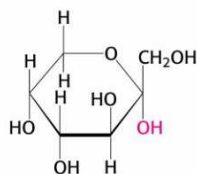


- i. Styrene
 - ii. Cumene
 - iii. Terephthalic acid
 - iv. Phenyl ethane
- c. One of these is selective and primarily effective in controlling broadleaf weeds. It is quite mobile in soils and can be taken up by roots of sensitive trees and ornamentals.
- i. Dicamba
 - ii. ROUNDUP
 - iii. FINALE
 - iv.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

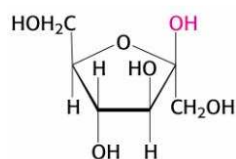
- d. The chemical name of the Nitrolime fertilizer is;
- Calcium Ammonium Nitrate
 - Calcium Nitrate
 - Calcium Cyanamide
 - Calcium Hydrogen Phosphate
- e. One of the followings is the effects of reducing sugar on Benedicts reagent;
- $\text{Cu}^{+} \longrightarrow \text{Cu}$
 - $\text{Cu}^{2+} \longrightarrow \text{Cu}^{+}$
 - $\text{Ag}^{2+} \longrightarrow \text{Ag}^{+}$
 - $\text{Ag}^{+} \longrightarrow \text{Ag}$
- f. An antiseptic applied for antimicrobial activity, killing all principle pathogens due to its strong oxidizing property;
- B(OH)_3
 - KMnO_4
 - H_2O_2
 - I_2
- g. The circle within the benzene ring represents;
- localized electrons
 - aromatic ring
 - delocalized electrons
 - resonance donating effect
- h. The correct structure for α -D-Fructopyranose is;
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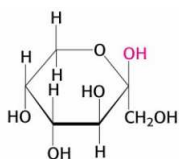
ii.



iii.



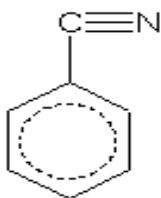
iv.



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 question 1.j. The substituent -COCH₃ on this aromatic ring will direct the incoming electrophiles in;



- i. 'Ortho' Position.
- ii. 'Meta' Position
- iii. 'Para' Position.
- iv. 'Ortho& meta' 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 is 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. Fructose is commonly called as laevulose.
- b. Glufosinate is used for clearing guardrails and industrial areas.
- c. Glucose is also called as aldohexose.
- d. Overdose of Acetaminophen causes liver damage.
- e. Glucose and fructose exhibit stereoisomerism.

Question 4

State whether the following are TRUE or FALSE

[1 x 5 = 5 marks]

- Antibiotics are generally used for bacterial infections only.
- Plants in need of phosphorus show stunted growth with weak stems and they will have yellowed or discoloured leaves.
- Argon gas is used in filling up of light bulbs.
- Maltose is a reducing sugar.
- 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:

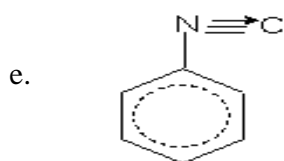
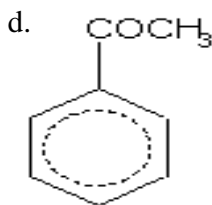
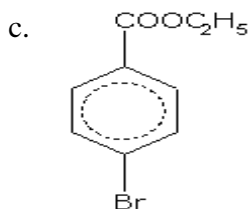
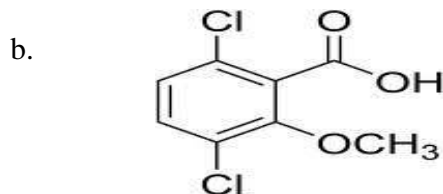
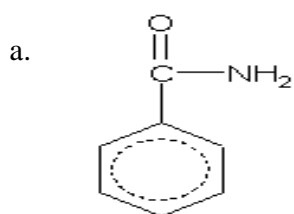
[5 x 2 = 10 marks]

- MCPA (Phenoxy herbicide)
- Benzoyl chloride
- Benzoic anhydride
- Phenoxybenzene
- Lactose

Question 6

Write down the IUPAC name of the following compounds:

[5 x 2 = 10 marks]



Question 7

[5 + 2 + 3=10 marks]

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

Question 8

Differentiate the following with appropriate example wherever possible.

[5 x 2= 10 marks]

- Aromatic compound and aliphatic compound.
- Sucrose and maltose (include their structures also)
- Vicinal and unsymmetrical trisubstituted product of C_6H_6 .
- Contact and systemic insecticides.
- α -D-fructose and β -D-fructose.

Question 9

[1+3 + 3+3=10 marks]

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

Question 10

[2+ 3 + 3 + 2=10 marks]

- What are the hydrolyzed products of Sucrose molecule? Explain with equation.
- Explain the Sulphonation of Benzene with all the necessary conditions and reagents.
- Illustrate the mechanism of Chlorination reaction of Benzene.
- Write the difference between L-Glucose and D-Glucose through its structure.

Question 11

[3+ 3 +3 +1=10 marks]

- What are the characteristics of '0' group elements? State all the elements and write down the uses of any 3 elements.
- Explain briefly the preparation of Malathion?
- State atleast six safe substitutes for insecticides and weedicides so as to minimize health hazards.
- Aryl halide like chlorobenzene and aromatic nitrobenzene and acetophenone do not undergo Friedel-Crafts Alkylation reaction. Support with reason.