Birla Institute of Technology & Science, Pilani, Rajasthan - 333 031

# Comprehensive Examination

# IIst Semester 2016-2017

**Name: …………………………………………………….. ID No. ……………………………………….**

**Course No: CHEM F242 Course Title: CHEMICAL EXPERIMENTATION I CLOSED BOOK**

**Max. Marks: 40 Time: 60 minutes Date: 02th May 2017**

***Note:*** *Write your name and ID no. on the question paper. All questions are compulsory. The question paper contains 3 printed pages. Rough work can be done on last page.*

**Q. No. 1.** *Indicate the most appropriate answer by entering* ***A, B, C or D*** *in boxes provided in front of the questions. Do not overwrite. Do not use a pencil.* [10x1=10]

(i). In Lassaigne's test, the organic compound is fused with a piece of sodium metal in order to

(A) increase the ionization of the compound (B) decrease the melting point of the compound

(C) increase the reactivity of the compound (D) convert covalent into a mixture of ionic compounds

(ii). Beilstein's test is a rapid test used to detect the presence of ....................... in an organic compound

(A) any halogen (B) any halogen (except Fluorine)

(C) only chloro (D) chloro or bromo

(iii). Among the following compounds, NaBH4 will normally reduce



(A) a, b, c (B) a, c, f

(C) a, c (D) a, c, d

(iv). Which one of the following solvents will be heated up faster in microwave?

(A) Toluene (B) Hexane (C) Benzene (D) DMF

(v). The benzilic acid is usually recrystallized from…………………..

(A) ethanol (B) dichloromethane (C) water (D) ethyl acetate

(vi). When curcumin is esterified with excess of ethanol, the resulting product has molecular formula:

(A) C19H16O6 (B) C21H20O6 (C) C23H24O6 (D) C25H28O6

(vii). In curcumin extraction, the crude product is tritutrated with a solvent to remove the solid impurities.

During this trituration, the impurities are more soluble in:

(A) water (B) ethyl acetate (C) DCM (D) hexanes

(viii). Which one of the following reagent is present in Fehling’s solution-B ?

(A) CuSO4  (B) α-naphthol

(C) dilute H2SO4 (D) Sodium potassium tartarate

(ix). To a mixture of organic sample and phthalic anhydride (1:2), few drops of concentrated sulphuric acid was added and heated in a dry test tube. The contents were cooled and added cautiously to water (100 mL) taken in a beaker. Upon addition of sodium hydroxide solution, a yellow fluorescence was appeared. The general structure of organic sample might be

(A) RCOOH (B) RCHO (C) ArOH (D) ArCH2OH

(x). Which one of the following compound will not respond to Mulliken Barker test.

(A) p-nitroethyl benzoate (B p-nitrotoluene

(C) p-nitrobenzaldehyde (D) p-nitrobenzoic acid

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**Q. No. 2.** *Fill in the Blanks* [10x1=10]

(i). During the work up step in the reduction reaction of ethyl acetoacetate, ………………………….. compound is

usually added to remove traces of moisture from the crude product.

(ii). A drop of ferric chloride solution is added to alcoholic solution of an unknown organic sample. Formation of

violet coloration indicates the presence of ……………………….. functional group in the sample.

(iii). The decreasing order of reactivity of the following substrates towards SNAr reaction with NaOMe is



…… > ……. > ………>………

(iv). ………………………………. and ……………………………. are the chemical tests that could be used for

the detection of functional group (s) present in methylbenzoate.

(v). From a mixture of the following two compounds (**I** & **II**) when loaded on a silica gel chromatography column, the compound that will be eluted first is ……………



(vi).A mixture of naphthalene and glucose can be separated by aqueous extraction. If the mixture is dissolved in diethyl ether and mixed well with water, the glucose will mostly dissolve in the ……………… phase and will be ……………*(lower/upper)* layer in the separating funnel.

(vii).Nesseler’s reagent is used to detect …………………………………………..group.

(viii). When a compound **Y** is heated with 50 % NaOH solution and the vapour is passed through copper sulfate solution, latter turned deep blue. This observation supports that **Y** might contain ………………………group.

**Q. No.3.** (i). Write balanced chemical equation(s) for the following reactions: [3x1=3]

(a) Benzoic acid with sodium bicarbonate

(b) Sodium benzoate with hydrochloric acid

(c) Benzoic acid with KI/KIO3

(ii). How can you differentiate pyranose and open chain structure of glucose using IR spectroscopy? [2]

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**P.T.O Page 2**

(iii). Under specific reaction conditions, a solution of **X** is poured into an alkaline solution of β-naphthol to get intense rose colored compound. Write the composition of (a) solution **X** and (b) structure of final colored compound. [3]

(iv). Four choices for solvents are listed in front of each compound, circle the solvents in which the compound is soluble. [2]



**Q. No.4.** *Complete the following chemical reactions by identifying the missing reactant(s) or product.* [5x2=10]



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**END Page 3**

***(ROUGH WORK COULD BE DONE ON BACK SIDE OF THIS SHEET)***