REV-01
BSC/13/18

2023/06

SET A

B.Sc. CHEMISTRY
SIXTH SEMESTER
RESEARCH METHODOLOGY FOR CHEMISTRY
BSC - 605A
[USE OMR FOR OBJECTIVE PART]

Duration: 3 hrs. **Full Marks: 70**

(Objective)

Time: 30 min. **Marks: 20**

Choose the correct answer from the following: ***1X20=20***

1. "Journal of Physical Chemistry" can be abbreviated as
   a. J. Ph. Chem. b. J. Phys. Chem.
   c. J. Phy. Chem. d. J. Ph. Ch.

2. 'Textbooks', source of information for Literature survey, can be considered as
   a. a primary source b. a secondary source
   c. a tertiary source d. both secondary and tertiary source

3. Impact Factor is calculated by
   a. Clarivate Analytics b. Elsevier
   c. Wiley d. Thomson Reuters

4. Full form of '*HTML*' is
   a. High transfer manual language b. Hyper technical and mechanical language
   c. Hypertext Markup Language d. Hyper Markup Language

5. The h index was proposed by
   a. J E Hirsch b. Clarivate Analytics
   c. J E Thomson d. None of these

6. The full form of 'MSDS' is
   a. Material Safety Data Sheets b. Manual of Safety Data Sheets
   c. Molecules Safety Data Sheets d. Mass Safety Data Sheets

7. Which one of the followings is the correct way of writing the measurements?
   a. 10 mol% catalyst resulted 85% product b. 10 mol% catalyst resulted 85 % product
   c. 10mol% catalyst resulted 85% product d. 10mol % catalyst yielded 75 % product

8. The total number of significant figures for 2.035 x 3.05 will be
   a. 1 b. 2
   c. 3 d. 4

9. The example of a pyrophoric chemical is
   a. organoazide b. alkylnitrate
   c. organolithium d. diethyl ether

10. Which one of the following chemicals is shock sensitive?
    a. organoazide
    b. alkylnitrate
    c. organolithium
    d. diethyl ether

11. A liquid is considered to be ignitable if it has a flash point
    a. < 40 °C
    b. 100 °C > flash point > 60 °C
    c. 80 °C > flash point > 30 °C
    d. < 60 °C

12. The following GHS is for

    a. Oxidizable
    b. Explosive
    c. Flammable
    d. Extremely flammable

13. Laboratory method for the disposal of iodine after treatment with the aqueous sodium carbonate solution having
    a. Na_2SO_4
    b. $NaHSO_4$
    c. Na_2SO_3
    d. $Na_2S_2O_3$

14. Laboratory method for the disposal of alkali metals after treatment with
    a. water
    b. ethanol
    c. Ice
    d. water & petroleum ether

15. The correlation coefficient (r) and regression coefficient (b_{xy}, b_{yx}) always have
    a. Same sign
    b. Opposite sign
    c. [r] +ve, [b_{xy}, b_{yx}] (-ve)
    d. [r] +ve, [b_{xy}, b_{yx}] (-ve)

16. Product moment method is used for the determination of
    a. ANOVA
    b. Correlation Coefficient
    c. Regression
    d. None of these

17. Z-test is used when sample size 'n' is
    a. n < 30
    b. n > 50
    c. n < 50
    d. n > 30

18. F- test never be----------
    a. Positive
    b. Zero
    c. Negative
    d. None of these

19. A device that converts incident photons into an electrical signal is called
    a. Photodiode
    b. Photomultiplier
    c. Phototube
    d. Photovoltaic cell

20. What is the full form of CCD in spectrophotometer
    a. Charge- Coupled Device
    b. Charge- Coupled Display
    c. Current- Coupled Device
    d. Current- Coupled Display

-- --- --

Descriptive

Time : 2 hrs. 30 mins. Marks : 50

[Answer question no.1 & any four (4) from the rest]

1. a. What do you mean by 'monograph'? Can textbook be considered as a monograph? **3+2+2 +3=10**

   b. How many significant numbers are present in 3.057? Express it by three significant numbers?

   c. What do you mean by GHS and why it is important? Explain with example.

   d. Write about the differences between Correlation and Regression?

2. a. What is impact factor? Show the calculation of impact factor with a proper example. **5+5=10**

   b. What are advantages of E-journals? What do you mean by TOC?

3. a. Describe H-index with example. What are the resources to find H-index? **5+5=10**

   b. Discuss five important points of technical writing of scientific research paper of chemistry.

4. a. Rewrite the following paragraph considering the technical scientific writing. **5+5=10**

   $VO(OPr)_3$ (227µ.lit, 1.0mmol) was added drop wise to stirred solution of ligand-1 (0.2575g, 1.0mmol) in methanol (MeOH, 20m.lit), resulting the reaction mixture dark red. The reaction mixture is refluxed for 30 min, followed by hot filtration. The filtrate is then cooled to room temperature and kept aside for crystallization to obtain reaction product-1 by slow evaporation (0.248g, 70%).

   b. What are the major points a scientific research article should consist of? Discuss briefly.

5. How to categorize unknown chemicals for waste disposal? Discuss with a flow chart. **10**

6. a. Write the salient features of an 'Abstract' of the scientific research article. **3+2+5 =10**

   b. Write a short note on the rulings of writing 'units' in a scientific research article.

   c. What is ANOVA? What is this test used for and what this test do? Mentions the steps for calculating ANOVA.

7. a. The table represents the analysis of 200 families according to their eye and skin color. Test the hypothesis that there is an association between eye color and skin color at 4% level of significance ($\chi^2_{0.04} = 9.75$) using Chi-Square test. **5+5=10**

		Eye color		
		Blue	Grey	Brown
Skin Color	Fair	30	20	30
	Brown	30	30	40
	Black	40	10	30

   b. What are the types of statistics? How to describe descriptive statistics? What do you mean by Chemomatrics? Explain.

8. a. Find the Correlation coefficient of the following data: **5+5=10**

   X = 100 200 300 400 500 600 700

   Y = 30 50 60 80 100 110 130

   b. Find the curve of best fit $y = ae^{bx}$ to the following data using least square method

   X = 1 5 7 9 12

   Y = 10 15 12 15 21

= = *** = =