

(6 pages)

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M.Sc.(CBCS) DEGREE EXAMINATION,
NOVEMBER 2012.

First Semester

Chemistry

Elective – RESEARCH METHODOLOGY

(For those who joined in July 2012 onwards)

Time : Three hours

Maximum : 75 marks

PART A — (10 × 1 = 10 marks)

Answer ALL questions.

1. Which one of the following is a secondary source of literature survey?
- (a) Letters
 - (b) Professional journals
 - (c) Diaries
 - (d) Biographies

2. Which one of the following is a quantitative research problem?
- (a) Outcome oriented
 - (b) Evolving
 - (c) Open
 - (d) None of the above
3. Atomic absorption spectroscopy is also known as
- (a) UV - spectroscopy
 - (b) IR - spectroscopy
 - (c) Absorption flame photometry
 - (d) Raman spectroscopy
4. Debye-Scherrer formula to calculate particle size is
- (a) $B = k\lambda / s \cos \theta$
 - (b) $Bk = 1/s \cos \theta$
 - (c) $s \cos \theta = n\lambda$
 - (d) $n\lambda = 2d \sin \theta$
5. The carrier gas used in Gas chromatography is
- (a) NH_3
 - (b) Xe
 - (c) $\text{CH} \equiv \text{CH}$
 - (d) N_2
6. The process of disintegration will continue till an element with stable ratio of ——— is reached.
- (a) Proton /electron
 - (b) Neutron /proton
 - (c) Electron/ proton
 - (d) Proton/ neutrpn

7. Which one of the following method can be used to determine the amount of a radioactive constituent by adding a known amount of the inactive compound.

- (a) Reverse isotopic dilution method
- (b) Isotopic derivative method
- (c) Absolute method
- (d) Comparator method

8. Dead time of the G.M counter can be calculated by

- (a) $\tau = (N_1 + N_2 - N_c / 2N_1N_2)T$
- (b) $\tau = (2N_1 N_2 / N_1 + N_2 - N_c)T$
- (c) $\tau = T(2N_1 / N_2 + N_c)$
- (d) $T = 2N_1 N_2$

9. Find out the mean for 17.4, 18.5, 19.6, 20.1 and 23.2

- (a) 19.60
- (b) 19.72
- (c) 19.76
- (d) 19.68

10. Arithmetic mean also known as

- (a) Median
- (b) Mean
- (c) Precision
- (d) Standard deviation

PART B — (5 × 5 = 25 marks)

Answer ALL questions, choosing either (a) or (b).

11. (a) What is Hand book? How does it differ from Dictionary?

Or

- (b) Write short notes on identification of a research problem.

12. (a) List out the advantage and disadvantage of Atomic absorption spectroscopy.

Or

- (b) Explain in detail about the instrumentation of XRD.

13. (a) Write short notes on FID detector used in Gas Chromatography.

Or

- (b) Write down the principle and applications of HPLC.

14. (a) Explain the following:

(i) G.M Counter (2)

(ii) Tracers and traces (3)

Or

- (b) Describe the applications of isotope dilution analysis.

15. (a) What is significant figure? Explain with two examples.

Or

- (b) Explain 'f' and 'chi' square test for rejection of a data.

PART C — ($5 \times 8 = 40$ marks)

Answer ALL questions, choosing either (a) or (b).

16. (a) What are the search engines. Explain their uses.

Or

- (b) Describe the significance of various components of a thesis.

17. (a) Explain various atomizers used in atomic spectroscopy.

Or

- (b) Discuss the principle, instrumentation and applications of TEM.

18. (a) Discuss the principle and applications of GC/MS in detail.

Or

- (b) Explain the principle and instrumentation of HPLC in detail.

19. (a) Discuss in detail about the determination of dead time of GM tube.

Or

- (b) Explain the following

(i) Determination of absorption curve for ^{234}Th - ^{234}Pa (4)

(ii) Determination of equilibrium constant of a reaction by ion-exchange method. (4)

20. (a) Discuss various methods of accuracy determination.

Or

- (b) Write notes on sequence of writing research article to a journal.
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