



UNIVERSITY OF THE PUNJAB

Seventh Semester – 2019

Examination: B.S. 4 Years Program

Roll No. in Fig.

Roll No. in Words.

PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-412 Part-I (Compulsory)

MAX. TIME: 15 Min.
MAX. MARKS: 10

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Signature of Supdt.:

Attempt this Paper on this Question Sheet only.

Please encircle the correct option. Division of marks is given in front of each question.

This Paper will be collected back after expiry of time limit mentioned above.

Q.1: Encircle the right answer, cutting and overwriting is not allowed. (1x10=10)

(i)- Which of the following phenomena taking place in DTA is exothermic?

(a) Reduction (b) Vaporization (c) Desorption (d) Chemisorption

(ii)- In thermo gravimetric analysis, the result obtained appears as a _____.

(a) Continuous chart (b) Continuous parabola
(c) Continuous circular positions (d) Discontinuous chart

(iii)- The radioactive β emitter usually used in electron capture detector is

(a) Zn^{64} . (b) Cu^{62} (c) Co^{59} (d) Ni^{63} .

(iv)- Which is not the quality of open tubular column?

(a) Shorter analysis time (b) Higher resolution measured
(c) Higher sample capacity (d) Greater sensitivity

(v)- Which gas possesses the highest thermal conductivity?

(a) H_2 (b) O_2 (c) CO_2 (d) Ar

(vi)- Electrodes used in potentiometric titrations are?

(a) 2 (b) 3 (c) 1 (d) 4

(vii) Which stationary phase is used for separation of basic compounds at pH 8–12 in HPLC?

(a) Silica gel (b) Alumina (c) Polystyrene (d) $MgSO_4$

(viii) Syringe pumps used in HPLC are most suitable for which of the following column

(a) Capillary column (b) Small bore column
(c) Short-fast column (d) Guard column

(ix)- Which one is the most common separation mode in HPLC?

(a) Reversed-phase mode (b) Normal-phase mode
(c) Ligand exchange mode (d) Ion exchange mode

(x)- A glass membrane with a composition of 11% Na_2O , 18% Al_2O_3 , and 71% SiO_2 is used as an ion-selective electrode for

(a) Al^{3+} (b) H^+ (c) K^+ (d) Na^+



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PAPER: Analytical Chemistry (Sp. Theory-I)
Course Code: CHEM-412 Part – II

MAX. TIME: 2 Hrs. 45 Min.
MAX. MARKS: 50

ATTEMPT THIS (SUBJECTIVE) ON THE SEPARATE ANSWER SHEET PROVIDED

Q.2- Attempt all Short questions:

(2x10=20)

- (i) What are the advantages of thermal conductivity detector?
- (ii) -What do you understand by temperature programming in gas chromatographic analysis?
- (iii) - What are the disadvantages of H₂ as carrier gas in gas chromatography?
- (iv) -Define retention time. On what factors does it depend?
- (v) Write down the principles of TGA and DTA.
- (vi) -Give difference between normal phase chromatography and reverse phase chromatography.
- (vii) What is the role of liquid junction potential in potentiometry?
- (viii) - What are the Characteristics of an ideal reference electrode?
- (ix) Briefly describe the principle involved in potentiometric titrations.
- (x) What is DTA curve? Give its characteristics.

Q.3 (a) Discuss Open Tubular Columns in gas chromatography. (5)

(b) Discuss the construction and working of saturated Calomel electrode (5)

Q.4 (a) Discuss various types of columns in HPLC. (5)

(b) Explain solid state membrane electrodes in potentiometry. (5)

Q.5 (a) Write down the applications of differential scanning calorimetry(DSC) (5)

(b) Explain the working of Electron Capture Detector in gas Chromatography. (5)