M. SC. (Analytical Chemistry) Sem-III (Choice Based Credit & Grade System): SUMMER - 2019

SUBJECT: MODERN ASPECTS OF ANALYTICAL CHEMISTRY

Day : Wednesday

Time: 03.00 PM TO 06.00 PM

Date:

24/04/2019

S-2019-1177

Max. Marks: 60

N.B.:

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate FULL marks.
- 3) Use of non-programmable **CALCULATOR** is allowed.
- 4) Draw neat and labeled diagram WHEREVER necessary.
- 5) Answers to both the sections should be written in **SEPARATE** answer books.

SECTION - I

Q.1 Attempt ANY THREE of the following:

[15]

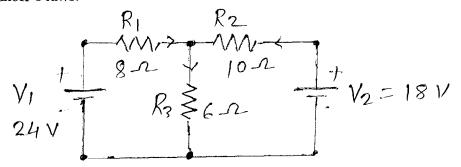
- a) Draw and explain the circuit diagram of bridge rectifier.
- b) With neat diagram explain the working principle of transformer.
- c) Draw the symbols of:
 - i) Fixed resistor
- iii) Iron ore inductor
- v) PNP transistor

- ii) Electrolytic capacitor
- iv) Light emitting diode
- d) List any five specifications of digital computer.
- e) Explain charging of the capacitor.

Q.2 A) Attempt ANY TWO of the following:

[10]

a) Find the current flowing through resistor R₃ in the following circuit. Use Kirchhoff's laws.



- b) Explain zener diode as voltage regulator.
- c) Write the truth tables of following logic gates: NAND, NOR, NOT.
- B) Solve ANY ONE of the following:

[05]

- a) Find the colour coded for the following resistor values:
 - i) $470\Omega \pm 5\%$
- ii) $1000\Omega \pm 5\%$.
- b) Draw and explain the block diagram of digital computer.

P.T.O.

SECTION - II

Q.3 Attempt ANY THREE of the following: [15]

- a) Write the composition of steel alloy. Discuss the quantitative method for estimation of *cobalt* from the given sample of steel.
- b) What is ore? Write the major and minor constituents of Ilmenite ore. Explain the analytical method for estimation of *Manganese* from the given sample of Ilmenite ore.
- c) Give an account of estimation of *Phosphorus* from given fertilizer sample.
- **d)** What do you mean by Bronze alloy? Discuss the analytical method of estimation of *Lead* from given Bronze alloy sample.
- e) Give the composition of Monazite sand. Write the experimental procedure for the estimation of *Titanium* from monazite sand sample

Q.4 A) Attempt ANY TWO of the following:

[10]

- a) Discuss the quantitative method of determination of *Vanadium* from the given sample of steel.
- b) Give the composition of Portland cement. Explain the analytical procedure for the estimation of *Magnesium* from Portland cement.
- c) What is Chalcopyrite ore? Give an account of estimation of *zinc* from the given sample of chalcopyrite ore.
- B) Solve ANY ONE of the following:

[05]

- a) In the analysis of zinc from Bronze alloy, 0.450 gm sample was analysed. The weight of Zn_2P_2O , residue obtained was 0.090 gm. Calculate the % Zn in the given Bronze sample.
- **b)** 0.530 gm of a fertilizer sample containing phosphorus as Ca₃(PO₄)₂ was determined gravimetrically by using molybdate method when the weight of residue obtained was 0.120 gm. Calculate the % Phosphorus in the given fertilizer sample.

[Given Atomic weight : O = 16, P = 31, Ca = 40, Mo = 96]