

M. SC. (ANALYTICAL CHEMISTRY) SEM-III (CHOICE BASED  
CREDIT & GRADE SYSTEM) : SUMMER - 2018

SUBJECT : MODERN ASPECTS OF ANALYTICAL CHEMISTRY

Day : Monday  
Date : 23/04/2018

S-2018-0875

Time : 03.00 PM TO 06.00 PM  
Max. Marks : 60

N. B. ;

- 1) All questions are **COMPULSORY**.
- 2) Figures to the right indicate **FULL** marks.
- 3) Answers to both the sections should be written in **SEPARATE** answer books.
- 4) Neat diagrams must be drawn **WHEREVER** necessary.
- 5) Use of non-programmable calculator is **ALLOWED**.

SECTION - I

Q.1 Attempt any **THREE** of the following: (15)

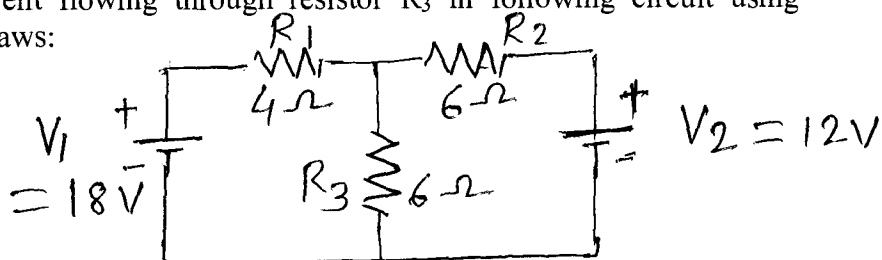
- a) Define the term inductance. State different types of inductors based on core material used and draw their symbols.
- b) Explain the forward biased P-N junction diode with necessary circuit diagram.
- c) State and explain amplifiers based on coupling method.
- d) Draw the logic symbols and write truth tables for following gates:  
i) AND ii) OR iii) NOT
- e) Explain the working principle of transformer.

Q.2 A) Attempt any **TWO** of the following: (10)

- a) With neat diagram, explain the working of full-wave rectifier.
- b) Draw the symbols for :
  - i) P-N Junction diode
  - ii) Zener diode
  - iii) Light emitting diode
  - iv) Photo diode
  - v) Photo resistor
- c) Define the terms :
  - i) Amplification
  - ii) Voltage gain
  - iii) Current gain
  - iv) Bandwidth
  - v) Impedance

B) Solve any **ONE** of the following: (05)

- a) Find the value of resistors which are colour coded as :
  - i) Yellow, violet, orange, gold.
  - ii) Orange, Orange, Red, Silver
- b) Find the current flowing through resistor  $R_3$  in following circuit using Kirchhoff's Laws:



P. T. O.

## SECTION - II

**Q. 3** Attempt any **THREE** of the following: **(15)**

- a) Define ore and mineral. Write the composition of chalcopyrite ore. Discuss the procedure of estimation of Iron from given chalcopyrite ore.
- b) What do you mean by an alloy? Write the composition of stainless steel alloy. Explain the analytical method for estimation of Cobalt from stainless steel.
- c) What is Fertilizer? Explain the Kjeldahl's method for estimation of Nitrogen from given fertilizer sample.
- d) Write the analytical method for quantitative estimation of Magnesium from Portland Cement.
- e) What do you mean by Bronze alloy? Write its constituents. Explain the analytical method for estimation of Tin from bronze alloy sample.

**Q. 4** **A)** Attempt any **TWO** of the following: **(10)**

- a) Write the constituents of Ilmenite ore. Discuss the analytical procedure for the estimation of Titanium from given sample of Ilmenite ore.
- b) What is German Silver Alloy? Explain analytical method of estimation of Zinc from German Silver Alloy.
- a) Write the Quantitative method of estimation of SiO<sub>2</sub> from the given sample of Monazite sand.

**B)** Solve any **ONE** of the following: **(05)**

- a) 1.5 gm Nitrogen fertilizer was Kjeldahlised to liberate NH<sub>3</sub> gas which is then distilled into 40 ml of 0.5 N H<sub>2</sub>SO<sub>4</sub>. Unreacted excess std. acid was then back titrated with 0.5 N NaOH required 12.0 ml of std. alkali. Calculate the % Nitrogen present in the fertilizer sample.
- b) 0.450 gm sample of Bronze was analysed for Tin. The weight of SnO<sub>2</sub> residue obtained was 0.055 gm. Calculate the % Sn in the given sample of Bronze alloy.

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