

M. SC. (Analytical Chemistry) Sem-III (Choice Based Credit & Grade System) : WINTER - 2018

SUBJECT : MODERN ASPECTS OF ANALYTICAL CHEMISTRY

Day : Monday  
Date : 22/10/2018

W-2018-0988

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) 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.

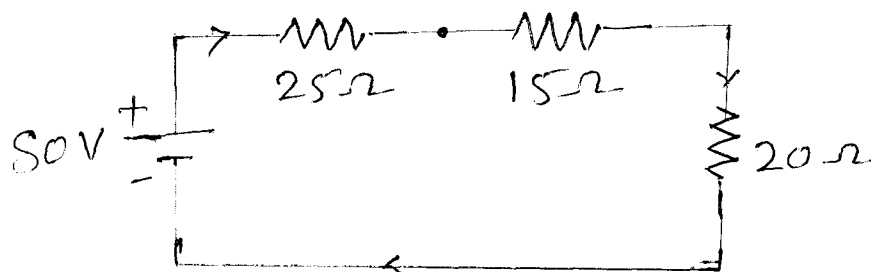
SECTION - I

Q.1 Attempt **ANY THREE** of the following: [15]

- a) With neat circuit diagram explain the working of full-wave rectifier.
- b) With suitable diagram explain the working principle of photo-diode.
- c) Find the resistance value of the resistor which are colour coded as :
  - i) Red, Red, Orange, Gold
  - ii) Yellow, Violet, Red, Silver
- d) State types of transistor amplifiers based on coupling mode of operation and explain anyone in brief.
- e) State the truth tables of AND, OR, NOT gates.

Q.2 A) Attempt **ANY TWO** of the following: [10]

- a) State Ohm's Law. By using Ohm's law find the current flowing through each resistor in the following circuit



- b) Explain charging of the capacitor.
- c) Convert : i)  $84_{(10)} = (?)_{(2)}$       ii)  $1101101_{(2)} = (?)_{(10)}$

B) Solve **ANY ONE** of the following: [05]

- a) Draw the symbols of:
  - i) NPN transistor
  - ii) Fixed inductor
  - iii) Rectifying diode
  - iv) Zener diode
  - v) Photo resistor
- b) Explain forward biased PN junction diode.

P.T.O.

## SECTION – II

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

- a) Define fertilizer. Write the qualities of the fertilizer. Write the analytical method for determination of *Potassium* from given sample of fertilizer.
- b) Give the major and minor constituents of Chalcopyrite ore. Explain the chemistry behind the estimation of *Iron* from given chalcopyrite sample.
- c) Outline the analytical procedure for the quantitative estimation of *Tungsten* from the given sample of Hard steel.
- d) What is Portland cement? Explain the analytical method of estimation of *Aluminium* from given Portland cement.
- e) What is German Silver alloy? Write the constituents of German Silver alloy. Explain the analytical method of *Nickel* from given alloy sample.

**Q.4** A) Attempt **ANY TWO** of the following: **[10]**

- a) What is Monazite sand? Outline the analytical procedure for the quantitative determination of *Silica* ( $SiO_2$ ) from the Monazite sand sample.
- b) What is steel? Write the major constituent steel. Discuss the quantitative method for the estimation of *Manganese* from given sample of steel.
- c) Write the minors and major constituents of Ilmenite ore. Outline the quantitative method of estimation of *Titanium* from given sample of Ilmenite ore.

B) Solve **ANY ONE** of the following: **[05]**

- a) In the analysis of Ni from given German Silver alloy, 0.750 gm of the alloy was treated for gravimetric estimation of Ni as Ni-(DMG)<sub>2</sub> ppt. The weight of the dried ppt obtained was 0.095 gm. Calculate the % Ni in the given alloy sample.
- b) 1.20 gm of Nitrogen fertilizer was kjeldahlised to liberate NH<sub>3</sub> which is then reacted into 50 ml of 0.5 N HCl. Unreacted excess 0.5 N HCl was then back titrated with 0.5N NaOH require 10.1 ml of 0.5 N NaOH. Calculate % nitrogen in the given fertilizer sample.

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