

**M. SC. (ANALYTICAL CHEMISTRY) SEM-III (CHOICE
BASED CREDIT & GRADE SYSTEM) : WINTER - 2017
SUBJECT : MODERN ASPECTS OF ANALYTICAL CHEMISTRY**

Day : Monday
Date : 06/11/2017

W-2017-0775

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) Explain the detailed classification of resistors.
- b) With neat circuit diagram explain the working of half-wave rectifier.
- c) Draw and explain the circuit diagram of single stage RC-coupled amplifier.
- d) Draw and explain the block diagram of digital computer.
- e) With suitable diagram explain the working principle of Light emitting diode.

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

- a) State and explain :
 - i) Kirchhoff's Current Law (KCL)
 - ii) Kirchhoff's Voltage Law (KVL)
- b) Explain Zener diode as voltage regulator.
- c) Draw the symbols for :
 - i) Photodiode
 - ii) Zener diode
 - iii) Photo resistor
 - iv) NPN transistor
 - v) PNP transistor

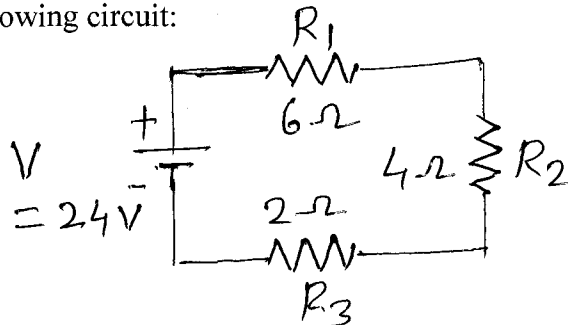
B) Solve any **ONE** of the following: **(05)**

a) Convert the following:

i) $(1101)_{(2)} = (?)_{(10)}$

ii) $(128)_{(10)} = (?)_{(2)}$

b) State Ohm's law. Using Ohm's law find the voltage across each resistor in the following circuit:



P. T. O.

SECTION - II

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

- a) Define fertilizer. Explain the analytical method for the estimation of *potassium* from the given sample of fertilizer.
- b) What is ilmenite ore? Write the constituents of ilmenite ore. Discuss the quantitative method of estimation of *SiO₂* from ilmenite ore.
- c) Write the constituents of Portland cement. Explain the method of analysis of *calcium* from given Portland cement.
- d) What do you mean by steel? Write the composition of stainless steel. Discuss the estimation of *Nickel* from stainless steel.
- e) Write the composition of Brass alloy. Explain the procedure for the estimation of *Copper* from brass alloy.

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

- a) What is monazite sand? Write its composition. Discuss the procedure for the disintegration of monazite sand. Outline the method for estimation of *Thorium* from monazite sample.
- b) Define carbon steel. Explain the analytical method for estimation of *Total Carbon* from carbon steel.
- c) Write the constituents of gun metal. Explain the procedure of estimation of *Zinc* from gun metal sample.

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

- a) Calculate the % carbon present in given carbon steel when 0.525 gm of the alloy sample was analyzed for total carbon by combustion method. The weight of silica boat containing strong base before absorption of *CO₂* gas was 0.135 gm and after absorption of *CO₂* gas was 0.210 gm.
- b) In the quantitative estimation of *Ni* as *Ni-DMG* from the given steel alloy, the weight of *Ni-DMG* residue was 0.125 gm. The weight of steel alloy sample taken was 0.700 gm. Find out the % *Ni* in the alloy.

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