Enrollment No: _____ Exam Seat No: _____

C.U.SHAH UNIVERSITY

Winter Examination-2015

Subject Name: Operational Amplifier
Subject Code: 5SC03PHE1 **Branch: M.Sc.(Physics)**
Semester: 3 **Date: 05/12/2015** **Time: 2:30 To5:30** **Marks: 70**

Instructions:

(1) Use of Programmable calculator and any other electronic instrument is prohibited.
(2) Instructions written on main answer book are strictly to be obeyed.
(3) Draw neat diagrams and figures (if necessary) at right places.
(4) Assume suitable data if needed.

SECTION – I

Q-1 **Attempt the Following questions** **(07)**

a. Define CMRR. **02**
b. Draw Schematic symbol of Op-Amp. **02**
c. Define input offset voltage. **02**
d. Define Slew rate? **01**

Q-2 **Attempt all questions** **(14)**

a) Explain open loop Op-Amp configurations. **05**
b) Explain in details Differential amplifier with one Op-amp. **05**
c) Draw and explain equivalent circuit of Op-Amp in details. **04**

OR

Q-2 **Attempt all questions** **(14)**

a) Explain the open-loop voltage gain as a function of frequency. **05**
b) Explain differentiator in details. **05**
c) Explain in details peaking amplifier. **04**

Q-3 **Attempt all questions** **(14)**

a) Draw the circuit of basic integrator using an op-amp. What are the problems associated with this configuration? How can they be overcome? **07**
b) Derive the expression for voltage gain , input resistance, output resistance and bandwidth of a non- inverting amplifier with feedback using op-amp with voltage Series feedback. **07**

OR

Q-3 **Attempt all questions** **(14)**

a) Explain application of op-amp (Inverting configuration) as summing, scaling and averaging circuit. **07**
b) Derive the expression for voltage gain , input resistance, output resistance and bandwidth of an inverting amplifier using op-amp with negative voltage shunt feedback. **07**

SECTION – II

Q-4 **Attempt the Following questions** **(07)**

a. What are the differences between active and passive filters **02**
b. Give the types of oscillators. **02**
c. Give the important characteristics of comparators. **02**
d. What is PLL? **01**

Q-5 **Attempt all questions** **(14)**
a) Explain working and application of 555 IC based Astable multivibrator. **05**
b) Write a short note on peak detector. **05**
c) Explain Basic comparator in details. **04**

OR

Q-5 **Attempt all questions** **(14)**
a) Draw and explain the block diagrams of 555 Timer. **05**
b) Write a short note on Schmitt Trigger. **05**
c) Explain phase shift oscillator with help of suitable figure and waveforms. **04**

Q-6 **Attempt all questions** **(14)**
a) Explain in details 555 IC based Monostable multivibrator. **07**
b) Discuss the fixed voltage regulator and adjustable voltage regulator with necessary circuit diagram. **07**

OR

Q-6 **Attempt all Questions** **(14)**
a) Explain in details Positive and Negative Clippers. **07**
b) With the help of a circuit diagram, explain the operation of first order Low pass filter. **07**