

**KADI SARVA VISHWAVIDHYALAYA**  
**BE 4<sup>th</sup> SEMESTER (EE)**

**End Semester Examination - 2015**

**Subject Code:** EE404

**Subject Name:** - ANALOG ELECTRONICS

**DATE:** 5-5-15

**TIME:** 10:30 to 1:30

**TOTAL MARKS:** 70

**Instructions:**

1. Answer each section in good handwriting in separate answer sheet.
2. All questions are compulsory.
3. Use of scientific calculator is permitted.
4. Indicate clearly the options you attempt, along with its respective question number.

**SECTION - I**

- Q-1** [A] Define any **FIVE** of the following terms: [05]  
 (i) CMRR    (ii) Slew Rate    (iii) PSS    (iv) SSI, MSI, LSI    (v) Input Offset Voltage  
 (vi) Gain Bandwidth Product    (vii) Input Offset current
- [B] Explain an Inverting Amplifier with neat circuit diagram and derive the expression for the closed loop gain. [05]
- [C] Discuss the properties for an Ideal Op-Amp. [05]
- OR**
- [C] What is a voltage transfer curve of an Op-amp? [05]

- Q-2** [A] Find the output of the circuit shown in fig. 2.A. [05]

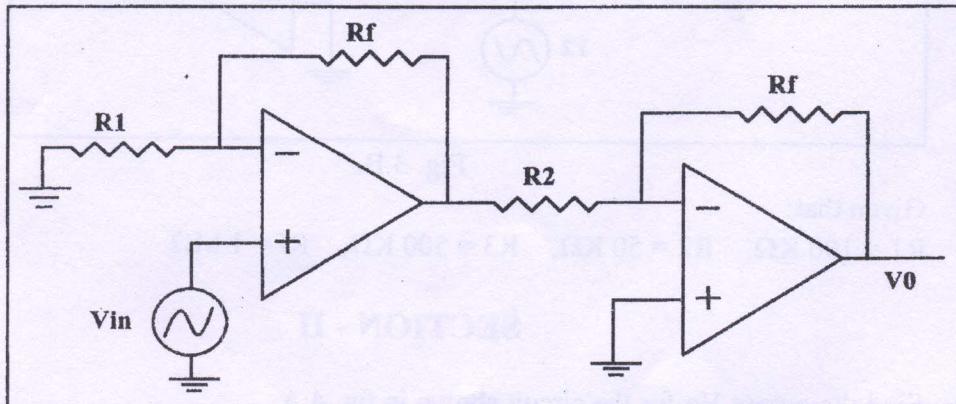


Fig. 2.A

Given that:

$$V_{in} = 80 \mu V, \quad R_f = 470 K\Omega, \quad R_1 = 4.3 K\Omega, \quad R_2 = 33 K\Omega$$

- [B] Explain an integrator circuit using Op-Amp with neat circuit diagram. Derive the expression for output voltage. [05]

**OR**

- Q-2** [A] Explain the concept of virtual ground for Op-Amp. [05]
- [B] Discuss 5 (FIVE) applications of Op-Amp. [05]

**Q-3 [A]** Draw a circuit diagram for LED tester using Op-Amp. Explain the circuit with neat fully labeled circuit diagram. [05]

**[B]** Explain a square wave generator using Op-Amp. Draw and explain the circuit diagram. Also draw the waveforms. [05]

**OR**

**Q-3 [A]** Find the output  $V_{out}$  for the circuit in fig. 3.A. [05]

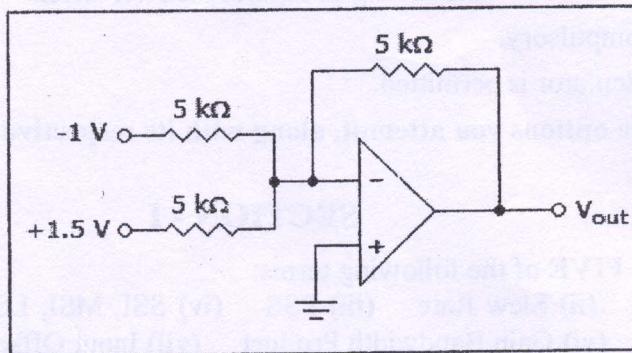


Fig. 3.A.

**[B]** Find the output  $V_o$  for the circuit shown in fig. 3.B. [05]

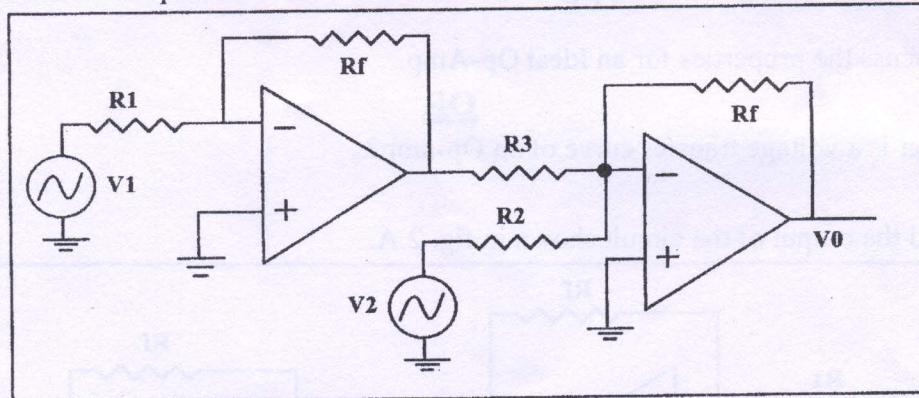


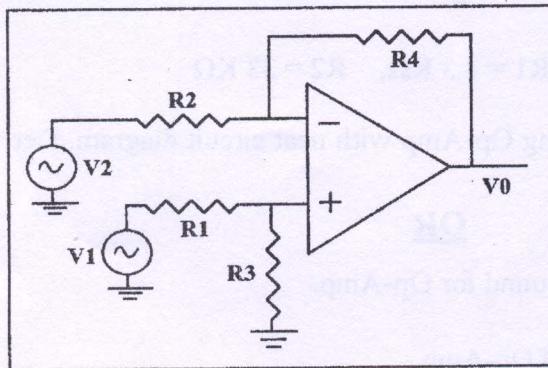
Fig. 3.B.

Given that:

$$R_1 = 100\text{ K}\Omega, R_2 = 50\text{ K}\Omega, R_3 = 500\text{ K}\Omega, R_f = 1\text{ M}\Omega$$

## SECTION - II

**Q-4 [A]** Find the output  $V_o$  for the circuit shown in fig. 4.A. [05]



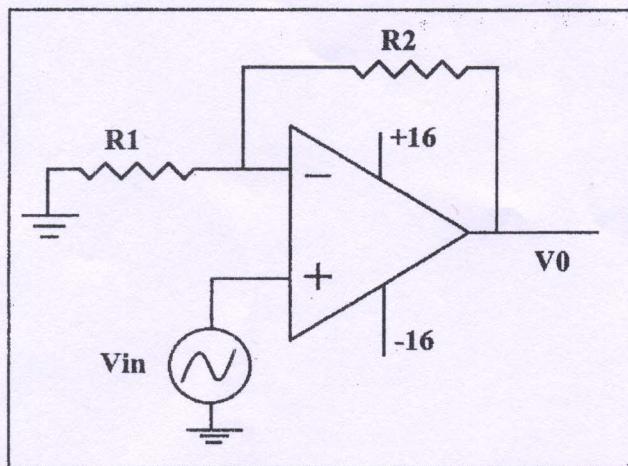
Given that:

$$R_1 = R_3 = 20\text{ K}\Omega, R_2 = R_4 = 100\text{ K}\Omega$$

Fig. 4.A.

- [B] Find the gain and output for the circuit shown in fig. 4. B.

[05]



Given that:

$$V_{in} = 120 \mu V$$

$$R_1 = 2.4 K\Omega$$

$$R_2 = 240 K\Omega$$

Fig. 4.B.

- [C] A 100 pF capacitor has a maximum charging current of 150  $\mu A$ . What is the Slew Rate?

[05]

OR

- [C] Explain Voltage follower circuit. Explain its advantages.

[05]

- Q-5** [A] Discuss different types of commonly used active filters. Also draw their frequency response.

[05]

- [B] Explain a first order low pass Butterworth filter. Draw and explain the circuit diagram. Also draw the waveforms.

[05]

OR

- Q-5** [A] Explain the block diagram of 7805 voltage regulator. Also draw the circuit for fixed output regulator using 7805.

[05]

- [B] Explain a Zero crossing detector. Draw and explain the circuit diagram. Also draw the waveforms.

[05]

- Q-6** [A] Draw and explain the pin out and block diagram of IC-555 timer.

[05]

- [B] Discuss various modes of IC-555 timer.

[05]

OR

- Q-6** [A] Discuss a three terminal adjustable voltage regulator using LM317 with circuit diagram.

[05]

- [B] Explain Phase Locked Loop.

[05]

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*Use your brains, Have patience, Think hard, write neatly and clearly*

*Best of Luck*

# KADI SARVA VISHWAVIDHYALAYA

End Semester Examination

B. E. (Electrical Engg.)

Semester - IV

Course Name : Analog Electronics

Course Code : EE 404

Date: 14.5.14

Time: 10:30 to 1:30

Max. Marks: 70

**Instructions:**

1. Do not write anything other than your roll number on question paper.
2. Assume suitable data wherever essential and mention it clearly.
3. Writing appropriate units, nomenclature, and drawing neat sketches/schematics wherever required is an integral part of the answer.

## Section-1

- Q.1** A. Explain differential amplifier in detail with its ideal and practice voltage transfer characteristic 5  
 B. Derive the equation of close loop gain of op-amp with suitable diagram. 5  
 C. Explain dominant pole frequency compensation technique. 5

**OR**

- C. Explain the concept of frequency compensation. 5

- Q.2** A. Define the following term 5  
 (1) Slew rate (4) PSRR  
 (2) Common mode gain (5) Input offset voltage  
 (3) CMRR  
 B. Discuss Op-Amp as Practical Differentiator. Derive its equation; Draw necessary Circuit 5 and its waveforms for input and output.

**OR**

- A. Give the comparison between inverting and non inverting amplifier. 5  
 B. Explain any one technique for offset voltage compensation technique. 5

- Q.3** A. Explain the voltage follower circuit with suitable wave form and hence explain its practical 5 application.  
 B. Explain inverting schmittz' trigger in detail. 5

**OR**

- A. Explain half wave and full wave rectifier in detail with appropriate diagram. 5  
 B. Explain the use of op-amp in log and anti log amplifier with suitable diagram. 5

## Section-2

- Q.4** A. Explain application of op-amp in narrow band reject filters with suitable diagram. 5  
 B. Explain application of op-amp as a constant source with suitable diagram 5  
 C. Explain zero crossing detector circuit with suitable diagram and waveform. 5

**OR**

- C. Explain adder and subtractor circuit with suitable diagram. 5

- Q.5** A. Draw and explain block diagram of IC-555 timer 5  
 B. Explain mono-stable multi-vibrator in detail. 5

**OR**

- A. Explain voltage to frequency converter in detail. 5

B. Explain 3 terminal adjustable regulator LM- 317 with schematic diagram. 5

- Q.6** A. Explain LM- 337 with schematic diagram. 5  
 B. Explain current regulator using LM- 340 with suitable diagrams. 5

OR

- A. Give the classification of IC voltage regulators and hence draw and explain functional block diagram of typical three terminal IC voltage regulator. 5

B. Draw detail circuit for +5V power supply using IC 7805 and give the comparison between IC 78XX and IC 79XX. 5

# KADI SARVA VISHWAVIDYALAYA

## B.E. SEMESTER IV EXAMINATION NOVEMBER 2014

SUBJECT CODE: EE-407

SUBJECT NAME: ANALOG ELECTRONICS

DATE: 7<sup>th</sup> November 2014

TIME: 10:30 am to 1:30 pm

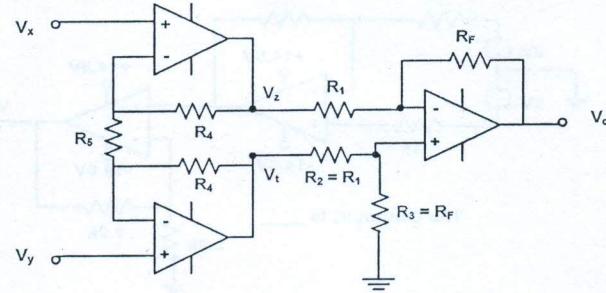
TOTAL MARKS: 70

### Instructions:

1. Answer each section in separate Answer Sheet.
2. Use of scientific calculator is permitted.
3. All questions are compulsory.
4. Indicate clearly, the options you attempted along with its respective question number.
5. Use the last page of main supplementary for rough work.

### Section – I

- Q-1:(A) Define any five terms: (i) PSS (ii) CMRR (iii) Output Voltage Swing (iv) Slew Rate (v) Voltage Follower (vi) Input offset voltage(vii) Ideal Voltage Transfer Curve 05
- Q-1 (B) Explain Non-inverting Amplifier with circuit and derive expression of closed loop gain, Input resistance and output resistance with feedback. 05
- Q-1 (C) Derive closed loop voltage gain for inverting amplifier with neat circuit diagram and draw output waveform when  $R_f = R_i = 1k\Omega$  and input waveform is sinusoidal. 05
- OR
- Q-1 (C) Explain AC analysis of Dual Input, Balanced Output Difference Amplifier with proper circuit. 05
- Q-2(A) Explain Summing amplifier with inverting and non inverting configuration and give their applications. 05
- Q-2(B) Derive the expression of  $V_o$  in terms of  $V_x$  and  $V_y$ . (Note: Use the same notation given in figure) 05



OR

- Q-2(A) What is Instrumentation Amplifier? Explain with block diagram and derive its expression for transducer bridge. 05
- Q-2(B) Explain necessity of Integrator. Derive its output equation and also draw output waveform when input signal is square and sinusoidal waveform with unity peak value. 05
- Q-3(A) List out active filters which are commonly used and draw their frequency responses. 05
- Q-3(B) Explain square wave generator using op-amp. 05
- OR
- Q-3(A) Explain voltage follower in detail. 05
- Q-3(B) The op amp is configured as an Inverting amplifier. The following data are given for the circuit:  $A = 4 \times 10^5$ ,  $R_1 = 1k\Omega$ ,  $R_F = 4.7k\Omega$ ,  $R_i = 33M\Omega$ ,  $R_o = 60\Omega$ ; Supply Voltage =  $\pm 15V$ ; Maximum Output voltage swing =  $\pm 13V$ ; Unity Gain Bandwidth = 0.6MHz; Compute the closed loop parameters  $A_F$ ,  $R_{iF}$ ,  $R_{oF}$ ,  $f_F$  and  $V_{ooT}$ . 05

## Section – II

- Q-4:(A) Explain types of multivibrator and also one of its working with block diagram using 555 IC 05  
 Q-4 (B) What is Oscillator? Explain its principle and list out basic oscillators. 05  
 Q-4 (C) Explain Pin Diagram of 555 IC in detail and its application 05

**OR**

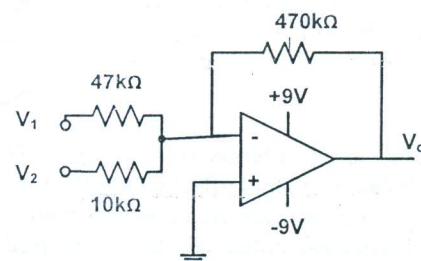
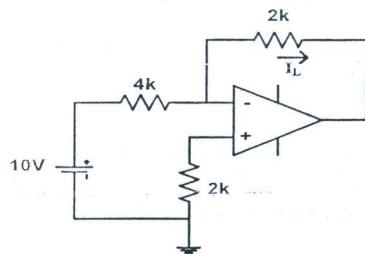
- Q-4 (C) Explain Phase Locked Loop in detail. 05

- Q-5(A) Draw the circuit diagram of peak detector and explain it. 05  
 Q-5(B) Explain Log and Antilog Amplifier with circuit diagram. 05

**OR**

- Q-5(A) Draw circuit diagram of first order and second order low pass filter and their frequency responses. 05

- Q-5(B) (i) Calculate  $I_L$  for this circuit (ii) Calculate output voltage if  $V_1 = -0.4 \text{ V}$  and  $V_2 = 0.2 \text{ V}$  05

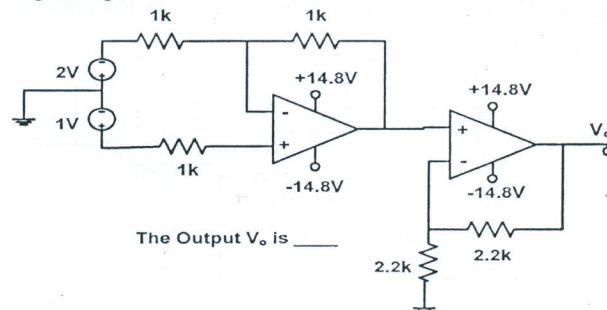


- Q-6(A) What is a Voltage regulator? List four different types of voltage regulators with their definitions. 05  
 Q-6(B) What is the difference between 78XX and 79XX IC? And explain 78XX IC in detail. 05

**OR**

- Q-6(A) Design a Zener diode tester circuit to test 1N3826 zeners to block 5.1V and also design LED tester using Op-amp. 05

- Q-6(B) Calculate output voltage for given circuit. 05



**KADI SARVA VISHWAVIDHYALAYA**  
**B.E. Semester IV EXAMINATION (OCT 2015)**

**Subject Code:-EE-404      Subject Name:-Analog Electronics**

**Date:-28/10/2015      Time:-10:30 a.m TO 1:30 p.m      Total Marks - 70**

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**Instructions:**

1. Answer **each section** in separate answer sheet.
  2. Use of scientific calculator is **permitted**.
  3. All the questions are **compulsory**.
  4. Indicate **clearly**, the options you attempt along with its respective question number.
  5. Use the last page of main supplementary for rough work.
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**Section-I**

**Q-1. (All Compulsory).**

- (A) Write Short note: Op-amp as **voltage follower**. [5]  
(B) Write short note on **slew rate**. [5]
- (C) Explain the **inverting amplifier** configuration of the op-amp with circuit diagram. [5]

**OR**

- (C) Discuss basic design consideration for designing **regulated power supplies**. [5]

**Q-2 Answer the following questions.**

- (A) Discuss the operation of **LM 340** voltage regulator. [5]  
(B) Draw the block diagram of **PLL** system and explain the function of each block. [5]

**OR**

- (A) Write short note on **integrator**. [5]  
(B) Derive **closed loop voltage gain** of **voltage-series feedback** amplifier. [5]

**Q-3 Answer the following questions.**

- (A) Discuss the applications of **IC 555**. [5]  
(B) Explain the application of op-amp as **active filter**. [5]

**OR**

- (A) Write short note on **summing amplifier**. [5]  
(B) Draw the functional block diagram of **IC 555** and discuss the function of each pin. [5]

## Section – II

**Q-4. (All Compulsory).**

- (A) Explain the open loop op-amp configuration as **differential amplifier**. [5]  
(B) Discuss the operation of **LM 317** voltage regulator. [5]  
(C) Draw and explain basic block schematic of **78XX** series three terminal voltage regulator ICs. [5]

**OR**

- (C) Derive the equation of **open-loop voltage gain** as a function of frequency. [5]

**Q-5 Answer the following questions.**

- (A) Explain **input offset voltage** and **input offset current** of op-amp. [5]  
(B) Explain **adder** and **subtractor** using op-amp. [5]

**OR**

- (A) Explain application of op-amp as **constant voltage source**. [5]  
(B) Write a note on **Schmitt Trigger**. [5]

**Q-6 Answer the following questions.**

- (A) Explain the operation of **zero crossing detector** using the op-amp. [5]  
(B) Draw equivalent circuit of the op-amp and explain significance of each component. [5]

**OR**

- (A) Explain op-amp as **active peak detector**. [5]  
(B) Explain the working of IC 555 as **astable multivibrator**. [5]

\*\*\*\*\* ALL THE BEST \*\*\*\*\*