Department of Computer Science and Engineering

Electronic Circuits
(CSE 251/ICE213)
Course Project)

Course Outcome: CO4

Program Outcome: PO1

Cognitive Level: C3

Psychomotor Level: P2, P3

Affective Level: A2

Knowledge Profile: K1, K3

Complex Engineering Problem: EP1, EP2

Project-1

Design of a Triangular wave generator using an Operational Amplifierfor a specified input.

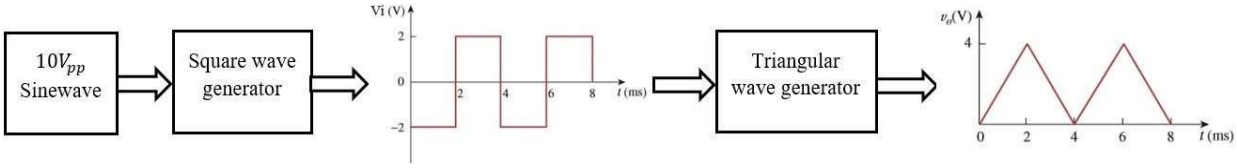

Fig. 1

Fig.1 shows a design process of a Triangular wave generator circuit. The design process includes two design segments (a square wave generator & a triangular wave generator) to get the final output v_o (V). Use a $10V_{pp}$ sinusoid as input and operational amplifiers to the design. Design the circuit components, implement, andfinally test the circuit. [Note that, for design purposes, the values of the resistors should not exceed more than 10kΩ.]

Project-2

Design of an Adder circuit using an Operational Amplifier for a specified input.

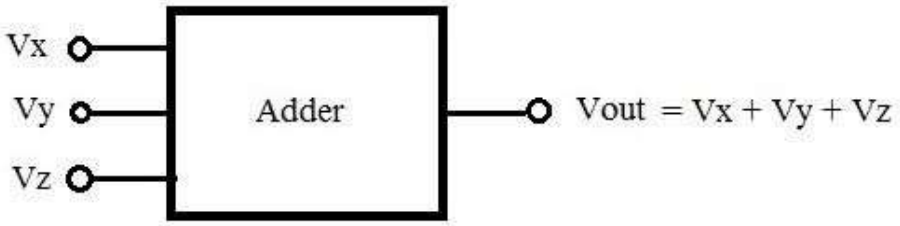

Fig. 2

Fig. 2 shows a block diagram of a 3-input Adder circuit. The circuit will add any three random signals and give the output. You can use weighted summer and inverting amplifiers as internal building blocks to construct the final circuit. [Note that, for design purposes, the values of the resistors should not exceed more than 10kΩ and you can use ± 15V to bias your operational amplifiers.]

Project-3

Design a 5V DC Power Supply.

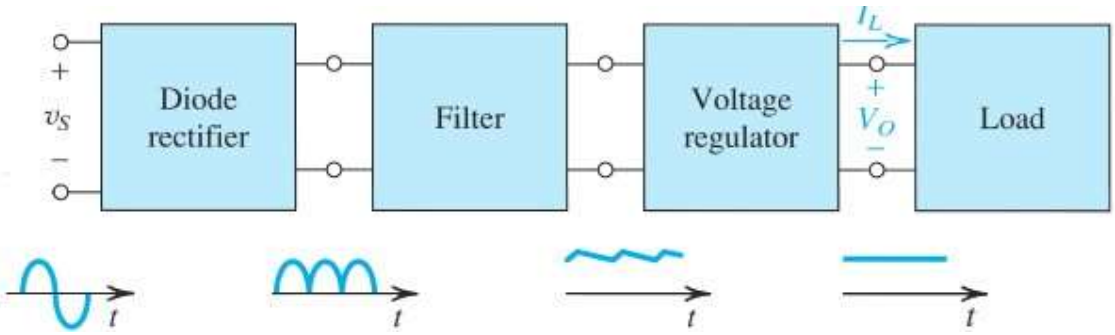

Fig. 3

Fig. 3 shows the block diagram of a dc power supply design process. The design process includes three design segments: a diode rectifier, a filter, and a voltage regulator to get the final output v_o. The diode rectifier converts the input sinusoid
v_S to a unipolar output, which can have the pulsating waveform indicated in Fig. 3.

The variations in the magnitude of the rectifier output are considerably reduced by the filter block. The output of the rectifier filter contains a time-dependent component, known as ripple. To reduce the ripple and to stabilize the magnitude ofthe dc output voltage against variations caused by changes in load current, a zener shunt voltage regulator can be implemented. Design the circuit components, implement, and finally test the circuit. Use sine wave as the input signal, and capacitor, resistors, and zener diode of suitable value for the design. Note that, for design purposes, the values of the resistors should not exceed more than 10kΩ.

Project 4

Simplest BJT Amplifier

Fig. 4

Design a common emitter amplifier circuit as Fig. 4 where the output voltage is increased by a minimum of two times that of the input voltage. Use the **collector feedback** network that employs a feedback path from collector to base to increase the stability of the system. Although the Q-point is not independent of beta (even under approximate conditions), the sensitivity to changes in beta or temperature variations is normally less than encountered for the fixed-bias or emitter-biased configurations. To build the above circuit use the 5V peak-to-peak as input voltage and 1 kHz as frequency.

Project-5

A simple fire alarms

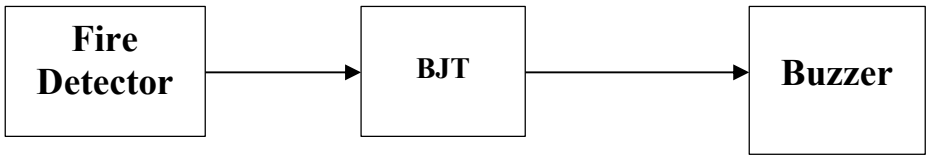

Fig. 5

Design a simple fire alarm using BJT, a diode, a fire detector, and a buzzer as Fig 5. For this design use a common emitter follower circuit where the input is connected with the fire detector and the output is connected with the buzzer. Show all required voltages and currents to drive the circuit properly.

Project-6

Touch sensor electric lamp and buzzer

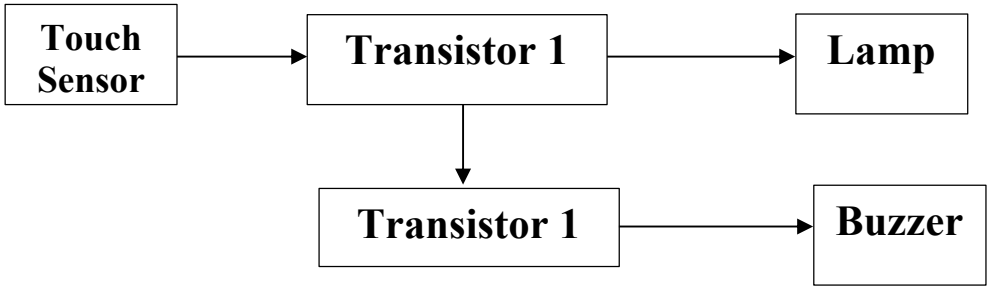

Fig. 6

Design an electric lamp and a buzzer through the torch sensor as Fig. 6. Here the touch sensor-based electric lamp turns on when it comes into contact with a conducting surface (such as a human body) and turns off when there is no contact. When the conducting surface touches the touch sensor circuit, it will allow current to flow, turning on the electric lamp (2V LED) as well the buzzer will give a sound. When the contact is broken, the lamp will turn off. Show the required voltages and currents to drive the circuit properly.

Project-7

An Automatic Night Light

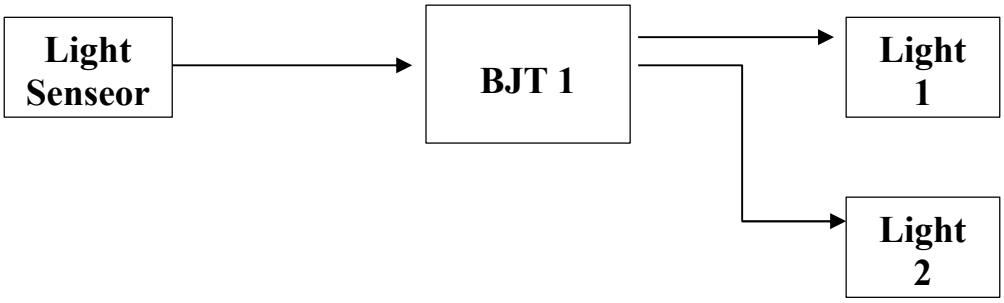

Fig. 7

Design an automatic night light circuit as Fig. 7. Here the lights will turn on depending on the light sensor. Use a common emitter follower circuit as a driver circuit for the lights. For light sensors use a LDR and 9V as a source. Show the required voltages and currents to drive the circuit properly.

Project-8

Leaser Security Alarm System

Design a Leaser Security Alarm System as Fig. 8. Laser-based Security System is a type of security and alarm system that uses laser light and a light sensor. A Laser security system can act as a standalone system, which makes some sound or noise when it detects any irregular activity or can be part of a much bigger security and home automation system, which can send messages, call the owner, etc.

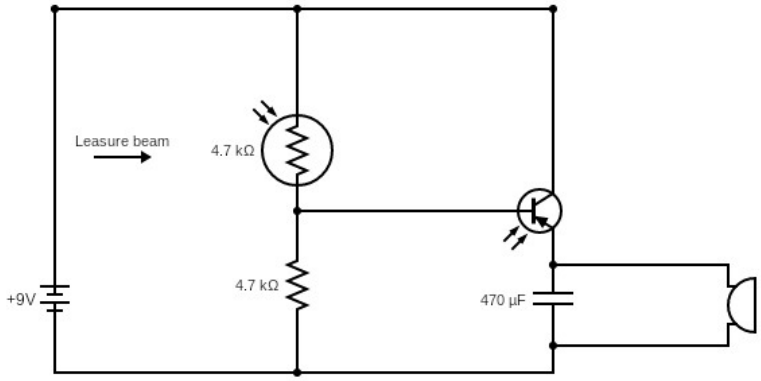

Fig. 8

Marks Distribution

Assessment Area	Mark
C3: Cognitive: Applying	4
P2: Psychomotor: Manipulation	2
P3: Psychomotor: Precision	2
A2: Affective: Responding	2
Total	**10**

The project Report should contain:

1. Problem Statement
2. Design Details
3. Circuit Diagram (Draw using **VISIO**)
4. Simulation Result

Project Presentation:

1. Problem Statement
2. Design Details
3. Circuit Diagram
4. Simulation Result
5. Demonstration