

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES



End Semester Examination, Oct, 2017

Program Name: M.Tech A&RE
 Course Name : Electronics System Design
 Course Code : ECEG7001
 No. of page/s: 2

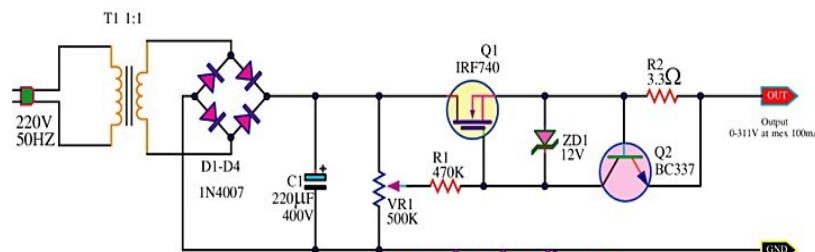
Semester – I
 Max. Marks : 100
 Duration : 3 Hrs.

Section A: All Questions are compulsory

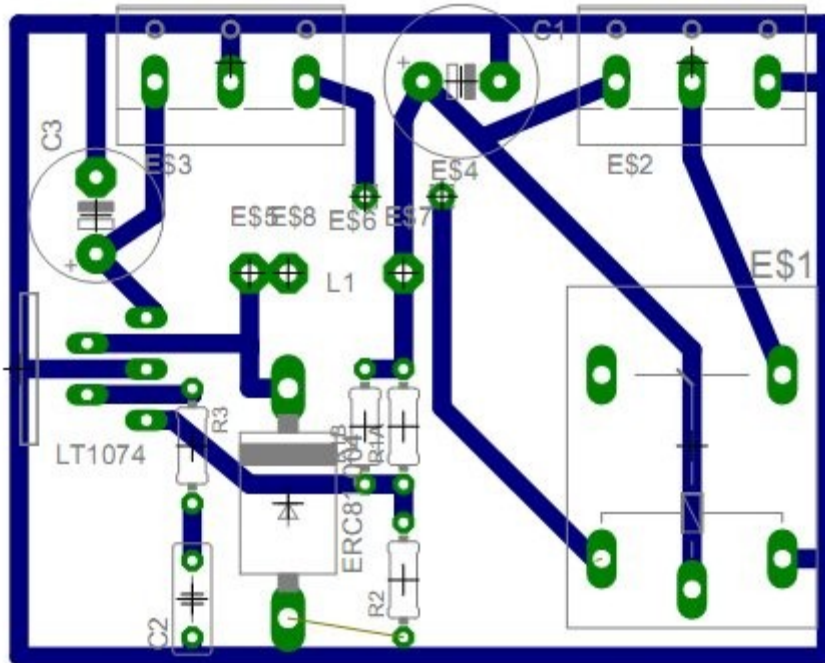
- 1 Discuss the voltage divider filter circuit used to calibrate the sensor reading. Draw the circuit also for the same. [5]
- 2 Discuss the MOSFET based power supply circuit used to drive a robot wheels. [5]
- 3 What is the role of a Zener diode and explain can it be possible to use Zener diode for reducing back EMF from DC motor. Draw the circuit to support your answer if any. [5]
- 4 Discuss the rules one should keep in mind while designing analog and digital circuits. [5]

Section B: Attempt All Questions.

- 5 Apply the fundamental rules of designing printed circuit board and explain how the power supply section of PCB is designed and managed for 1.5 A of current. [10]
- 6 Explain in detail the circuit shown below. The below circuit is MOSFET based. [10]



- 7 Below is the PCB design of a tiny robot. Comment on the circuit and flaws of the design [10]



- 8 Design and explain ULN2008 IC (motor driver) and explain the circuit diagram and the digital logic for the rotation of stepper motor. [10]

Section C: Attempt All Questions

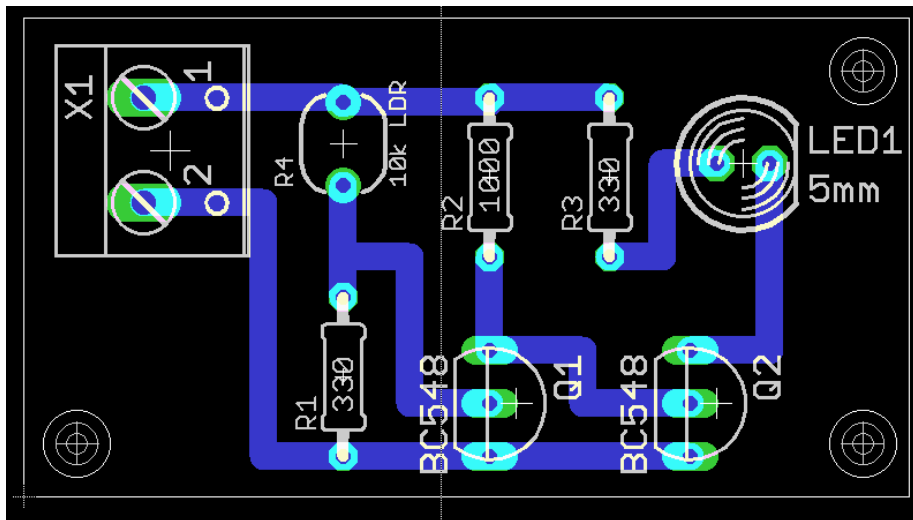
- 9 Design a digital IC which will be used to rotate the DC motor in a clockwise direction to 12 clock cycles. The clock cycles can be assumed by the user. Design the IC using D flip-flop. [20]
- 10 Design a sun tracking circuit for a Robot that will track the sun positioning in real time [20]

Section A: All Questions are compulsory

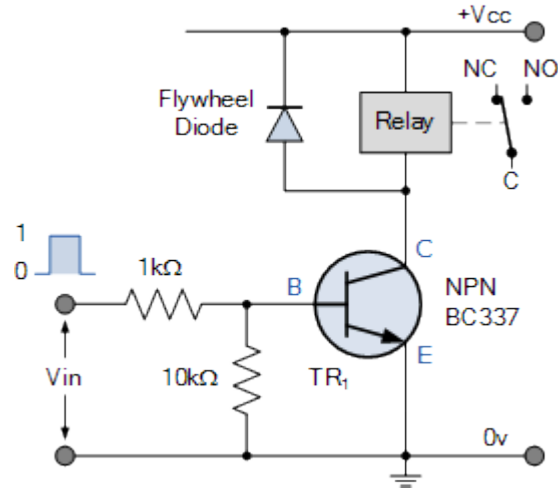
- 1 Discuss the various filter circuits used to calibrate the sensor reading. [5]
Draw the circuit also for the same.
- 2 Discuss the transistor based H- bridge driver circuit used to drive a [5]
robot wheels.
- 3 What is the role of a capacitor (ceramic and electrolytic) for reducing [5]
back EMF from DC motor?
- 4 Discuss the rules one should keep in mind while designing digital ICs. [5]

Section B: Attempt All Questions.

- 5 Below is the PCB design of a tiny robot. Comment on the circuit and [10]
flaws of the design



- 6 Explain in detail the circuit shown below. The below circuit is relay [10]
based, can it be replaced with TRIAC.



- 7 Apply the fundamental rules of designing printed circuit board and explain how the power supply section of PCB is designed and managed for 1.5 A of current. [10]
- 8 Explain the MAX232 level converter IC and explain the circuit diagram in detail. Also, explain the circuit for reading sensor values in terminal software. [10]

Section C: Attempt All Questions

- 9 Design a triggering circuit for a robot movement in north and south direction that will trigger with a digital clock. When digital clocks count reaches to 8 the robot moves to north direction and else to the south direction. Design it using D flip-flop. [20]
- 10 Design a sun tracking circuit for a Robot that will track the sun positioning in real time. [20]

