The Electronics skill challenges will have the following 3 tasks:

Task A – Schematic Design Task B – Design of Printed Circuit Board

Task C – Embedded System Programming

Task A – Schematic Design

You have 60 Minutes to complete this task

You are to complete designs, keep in the mind the following observations

- 1. Please complete the design according to the following requirements.
- 2. Use only the component from the part list of your designs.
- 3. You may not need all components in the parts list.
- 4. You can start using PCB design only after submitting the paper schematic.

Competitors can read component data sheet that is provided with only personal computer which contains data sheet pack. The hard copies brought by competitor can't be used, but competitors can read the hard copies provided with competition organizer. When you have completed your designs you are to submit your answers on the provided Answer Sheets to the Expert. You will then be given the schematic solution for schematic entry into PCB design software. You cannot start your PCB design in this phase of the Test Project.

Example of Test Project-Hardware Design

"Digital Industrial Counter"

Introduction

The task is to develop digital industrial counter, which is used to count input pulses/ events sensed by an U-shape opto-coupler

Here the counter is taking input /signal sensing from opto-coupler and display the count on seven segment displays. Initially the count on displays will be 00. At every event on opto-coupler count will increase by 1 and it will go till 20(twenty). Once it reaches to 20, a buzzer will beep. If further event comes at opto-coupler count will reset back to 00. And this process keeps going on while POWER is ON.

Eg: 00 01 02 ..... 20 00 01.....

Task B – Design of Printed Circuit Board

You have 90 Minutes to complete this task

- 1. Design printed circuit board using PCB design software tool.
- 2. Prepare the PCB design as per specified position of components in shown figure.

- 3. Complete the design, save PCB Gerber files in the pen drive.
- 4. Create a BOM, containing all information for your schematic design.
- 5. Create a pdf files as requested in the statement.
- 6. Follow the rules as specified in the statement.

Example:

PCB Design

Submit the following PCB Gerber files to the experts in the usb sticks. \*.GBL Bottom Layer \*.GKO Keep Out Layer (Dimension) \*.txt NC Drill File Submit the following files as \*.pdf Data All schematics PCB Top Layer (scale 1:1) PCB Bottom Layer (scale 1:1) Component Placement Side (scale 1:1) PCB size is 180mm x 80mm and should be Single side PCB. Place Power supply, 7-Segment units and controlling part as shown in the "Figure".

Task C – Embedded System Programming

You have 90 Minutes to complete this task.

1. Write a program in embedded C language for a microcontroller.

2. Interface the required hardware modules like LCD, Motor, Keypad, Touch Screen etc. to demonstrate the required functionality.

Example of Test Project - Embedded System Programming

"Digital Electronic Safe"

Introduction

Digital Electronic Safe is used to keep highly valuable items at home and offices. It has a small storage space, which can be accessed by opening of an automatic door controlled by programmed microcontroller and circuits. The features of Digital Electronics Safe are:

- 1. 4-bit Secure Password
- 2. Owner can change Password
- 3. Notification for right and wrong password