**University of Engineering and Technology Lahore, Faisalabad Campus**

**Department of Mechanical, Manufacturing, and Mechatronics Engineering**

**Subject:** Allotment of Budget for Inverted Pendulum and Cart Model

Respectable sir,

The inverted pendulum and cart model’s apparatus was allotted to me and my task is to improve the model so that it can be used in the lab of subject “MCT-431L Control System-II” as lab apparatus. The improvement and modifications are related to the design of the control system for the inverted pendulum and cart model. The end result of these modifications and improvements will be a properly controlled working model of the cart and pendulum model which can be used as an experimental apparatus in the control systems lab. For necessary improvement and redesigning of model I have to use some additional components along with the previous ones, I have attached the components list with the application. It is being requested to allot the budget for the required components. So that I can redesign the system according to the requirements. I assure you that my team and I will work hard to meet the desired objectives.

I shall be very thankful to you.

Yours Obediently,

Sabir Husnain

Reg. 2019-MC-263

Applicant Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Supervisor Signature: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Dated: November \_\_\_\_ , 2022.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Sr. No.** | **Name** | **Amount Required** | **Price/Piece** | **Total Price** | **Online Availability** | | | | **Offline Availability** |
| 1. | 8mm Horizontal Linear Bearings | 2 | 250 | 500 | <https://electrobes.com/product/kfl08-8mm-t8-horizontal-linear-bearing-bracket-screw-pillow-blocks-for-cnc/> | | | | Islamabad |
| 2. | ESP32 Controller | 1 | 1050 | 1050 | <https://electrobes.com/product/esp32-wroom-32-38-pins-wifibluetooth-mcu-module/> | | | | Islamabad, Lahore |
| 3. | MPU9250 (IMU Sensor) | 1 | 950 | 950 | <https://electrobes.com/product/mpu9250-9-axis-9dof-accelerometer-gyroscope-compass-module/> | | | | Islamabad, Lahore |
| 4. | 8mm-8mm Shaft Coupler | 1 | 220 | 220 | <https://electrobes.com/product/8mm8mm25mm-3d-printer-stepper-motor-fixed-coupler/> | | | | Islamabad, Lahore |
| 5. | 8mm Linear Rail Shaft (400mm) | 1 | 580 | 580 | <https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&attribute_pa_length=400mm> | | | | Islamabad, Lahore |
| 6. | 8mm Linear Rail Shaft (250mm) | 1 | 380 | 380 | <https://electrobes.com/product/5mm-8mm-10mm-12mm-linear-rail-shaft-smooth-rod-for-cnc-machine-and-3d-printer/?attribute_pa_diameter=8mm&attribute_pa_length=250mm> | | | | Islamabad, Lahore |
| 7. | Hole to Hole Jumpers | 1 | 130 | 130 | <https://electrobes.com/product/hole-to-hole-40-jumper-wires-strip/?attribute_pa_jwire-length=20cm> | | | | Islamabad, Lahore |
| 8. | 2 Core Twisted Wire | 1 | 40 | 40 | <https://electrobes.com/product/1-meter-2-core-twisted-hard-jumper-wires-cable/> | | | | Islamabad, Lahore |
| 9. | Close Timing Belt | 2 | 290 | 580 | <https://epro.pk/product/closed-loop-rubber-timing-belt-for-2gt-6mm/?attribute_size=200> | | | | Lahore |
| 10. | Open Timing Belt & 20 Teeth Timing Pulleys (8mm Bore) | 1 | 950 | 950 | <https://hallroad.org/20t-8mm-gt2-pulley-and-2m-belt-in-pakistan.html> | | | | Lahore |
| 11. | 40 Teeth Timing Pulleys (8mm Bore) | 2 | 508 | 1016 | [https://www.daraz.pk//products/i268812663-s1483029222.html?spm=a2a0e.cart.0.0.60637d68K9VyDE&urlFlag=true](https://www.daraz.pk/products/i268812663-s1483029222.html?spm=a2a0e.cart.0.0.60637d68K9VyDE&urlFlag=true) | | | | Unavailable |
| 12. | Carbon Wound Pot (1k) | 1 | 150 | 150 | <https://hallroad.org/1w-single-turn-rotary-taper-carbon-wire-wound-potentiometer-volum-resistor.html> | | | | Lahore |
| 13. | DC Motor Driver | 1 | 350 | 350 | <https://electrobes.com/product/l298n-h-bridge-motor-driver-module/> | | | | Islamabad, Lahore |
|  | | | | | | | | | |
| **Delivery Chargers** | | **electrobes** | | | | **epro** | **daraz.pk** | **hallroad.org** | |
| 300 | | | | 280 | 120 | 200 | |
|  | | | | | | | | | |
| **Total** | | **7796** | | | | | | | |

**Required Components & Budget**