THE TECHNOCRACY
STUDENTS' TECHNICAL COMMITTEE, NIT RAIPUR

AAVARTAN'22-23

VIGYAAN
DEPARTMENT OF MECHANICAL ENGINEERING

PROBLEM STATEMENTS

MECH01. <u>Vegetable care without using refrigeration</u>

In areas with heavy population densities, the price you pay for home electricity is determined by supply and demand. Your overuse will contribute to a scarcity in this energy supply and thus an increase in overall electricity costs. Over the long term, the rise in demand may place additional burdens on threatened environmental areas -- such as coastal areas or wildlife refuges -- to ensure adequate resources. Drilling for natural gas or mining for coal to meet excessive energy demands will negatively impact the environment.

Keeping these things in mind, candidates are expected to design such a system that would provide vegetable care with no electricity input.

MECH02.<u>Vertical axis windmills tube installation for power generation</u>

Vertical axis windmills are an efficient consideration for power generation. The turbine used is vertical axis wind turbine(VAWT). VAWT blades are designed with aerofoil shape, with less weight and more stiffness, the assembled VAWT is mounted on the highways of a divider, so that the air velocity obtained from the moving vehicle is sufficient enough to cut the turbine blades, The power developed by the VAWT is stored in battery, the power is used for some useful application. The problem proposed is to build a model of the same.

MECH03.<u>Bridge designing using truss mechanism (minimum number of matchsticks and maximum withhold strength)</u>

Here candidates will be judged based on their concept design and structural analysis of the bridges. A unique approach of bridge design is expected.

MECH04. Automatic pneumatic bumper and break actuation for four wheeler

The technology of pneumatics plays a major role in the field of automation and modern machine shops and space robots.. The aim is to design and develop a control system based on an intelligent electronically controlled automotive bumper activation and automatic braking system called AUTOMATIC PNEUMATIC BUMPER AND BREAK ACTUATION.

MECH05. Automatic brake failure indicator and engine over heating alarm

The aim is to design and develop a control system based an electronically controlled automatic brake failure indicator by using IR Sensor and engine over heating alarm by using heat sensor is called *"AUTOMATIC BRAKE FAILURE INDICATOR AND ENGINE OVER HEATING ALARM"*

Automatic brake failure indicator and engine over heating alarm consists of IR sensor circuit, Heat sensor Circuit, Control Unit and frame. The sensor is used to detect the brake wire. There is any disconnection of the brake wire or cutting of any few turns of brake wire, the control signal to the alarm unit. Similarly the heat sensor is fixed to the engine and this heat is measured and gives the alarm signal when the engine heat exceeds the setted temperature limit.

MECH06. F1 vehicle design with autocad and aerodynamics

F1 cars are designed for optimum speed and precise aerodynamics such that the car does not leave the ground at high speed. The aim is to design a F1 car with such aerodynamics using autocad software.

MECH07. Design innovative lifting machines used to build pyramids -

how to move heavy objects to high altitudes, like application based on many aspects. Problem will be to create a model 'weight to be lifted' considering various parameters.

MECH08. Robotic arm design

Robots have widely been used for a wide number of tasks. But a very promising use of robotics lies in goods transport. Most robots use either a wheeled or a tracked mechanism for mobility. While wheeled mechanisms offer impressive speed and a significant advantage in steering, this often proves to be difficult to use in off-road conditions and for climbing over obstacles.

MECH09. Speed Boat design - autocad considering aerodynamics

During high speeds, boats suffer from upliftment due to pressure exerted by the water surface and the forward acceleration. The aim is to design an aerodynamic boat to sustain such pressure at higher speed and have optimum stability along with speed. The problem is to design it using autocad.

MECH10. Reducing sonar cross section of submarines

The active sonar of surface vessels is normally used for detection, surveillance, tracking, and identification of submarines. The frequencies used by active sonar range from a few kilohertz and down to and below 1 kHz.The low-frequency active sonar increases the detection range and reduces the advantages of stealth technology by submarines. So the driving idea here is to reduce sonar cross section of submarines marines.

MECH11. Unsteady flow over a cylindrical tube using Ansys and ML

The computational domain for simulating flow around a circular cylinder is to be modelled in SpaceClaim, the default solid modelling CAD software for the Fluid Flow (Fluent) Analysis System. Doing the simulation, a proper approach should be used to achieve the process.

MECH12. Industrial air purifier for PM, vocs and harmful gases

a small air purifier that employs water as an air filter rather than pricey filters. Additionally, it functions as an air humidifier and can be used as an oil diffuser, both of which promote relaxation and the elimination of some airborne bacteria and viruses. Homes in larger cities are often affected by poor interior air quality, which is a result of an expanding industrialization that contaminates the air we breathe with pollutants including industrial dust, smoke, and other particles from traffic.

MECH13. Irrigating robots

Farmers in India do a lot of work while sowing seeds into the plantations. For automatic working The, we are using certain technology, one of which is Irrigating robots. The problem is to develop a technical model to perform such activity of sowing mechanically.