COLLECTED QUESTIONS FROM CEE II

1. **State TWO factors considered when purchasing a Programmable Logic Controller (PLC)**
   - Availability of the technical support.
   - The cost-effectiveness of the PLC.
   - Cost of the programming tool.
   - The speed PLC's processor or processors performance.
   - The real time clock of the PLC.
   - The ability to simulate the program without having to connect to the PLC.
   - Compatibility and number of communication ports for input or output devices.
   - The communication protocols used by the PLC.
2. **Outline FOUR mechanical checks carried out on mounted and wired electrical machines.**
3. **Describe mechanical checks performed on electrical machines**
   - Temperature of machine
   - Vibration if any
   - Balance and alignment of the rotor
   - Oil or grease in bearings
   - Leakages if any
4. **Explain each of the following with reference to installation of motor:**
   a) **Foundation:** motor foundation should be level and of uniform stiffness. Non-uniform foundation stiffness leads to excessive vibrations in the motor frame. Uneven foundation leads to skewed the motor structure, increasing vibrations

   b) **Alignment:** alignment makes sure that the centre line of the rotor shaft coincides with the centre line of the driven machinery e.g. pump. Alignment is achieved via dial indicators and feeler gauges. Misalignment is results in excessive energy consumption, excessive ear of bearing, and failure of machine.

   c) **Coupling:** coupling is a connection component used to transmit torque between a drive shaft and a driven part e.g. between a motor shaft and a ball screw. Besides, electric motor couplings introduce mechanical flexibility, eliminating the possibility of misalignment for the shafts.
5. **Draw a labelled circuit diagram of the Ward Leonard Speed Control method**
   - This system is used where very sensitive speed control of motor is required e.g electric excavators, elevators etc.
   - M_2 is the motor to which speed control is required.
   - M_1 is AC motor or DC motor with constant speed.
   - G is a generator directly coupled to M_1.
   - In this method, the output from generator G is fed to the armature of the motor M_2 whose speed is to be controlled. The output voltage of generator G can be varied from zero to its