



- KEEPING MOBILE PHONE/ANY ELECTRONIC GADGETS, EVEN IN 'OFF' POSITION IS TREATED AS EXAM MALPRACTICE
- DON'T WRITE ANYTHING ON THE QUESTION PAPER

Answer ALL Questions

(10 X 10 = 100 Marks)

1. Give an example for a mechatronics system and explain the key elements of the system.
 2. Describe the static and dynamic characteristics of a measurement system.
 3. Evaluate the factors that influence the selection of appropriate sensors for a given application. Assess the trade-offs between different sensor characteristics, such as accuracy, resolution, and cost, and their impact on the overall system performance.
 4. Discuss the suitability of different types of load cells for force measurement applications, incorporating their working principles and advantages.
 5. Design a mechatronics system incorporating DC motors and solenoids to automate a manufacturing process. Justify your choice of actuators and explain how they will be integrated to achieve the desired motion and control.
 6. Analyze the components of a computer-based data acquisition system and explain how they interact to acquire, process, and store data with a neat schematic diagram.
 7. a) List the various techniques and instruments used for linear and angular measurements. [4]
b) Explain the process of taper measurement and surface finish inspection. [6]
 8. Discuss a mechatronics-based solution for a real-world problem in automated material handling and smart manufacturing.
 9. a) Describe the operation of a digital optical encoder, including its key components and the process of converting mechanical motion into electrical signals.
- OR**
9. b) Explain the construction and operation of hydraulic actuators, highlighting their key components and their role in converting hydraulic pressure into mechanical force.
 10. a) Critically evaluate the effectiveness of different sampling and quantizing techniques in converting analog signals to digital signals.
- OR**
10. b) How do you measure the bore and ovality of a hollow cylinder components? Suggest the measuring instruments and method for the same.