



Reg. No. :

--	--	--	--	--	--	--	--	--	--	--	--

**Question Paper Code : X 60857**

B.E./B.Tech. DEGREE EXAMINATIONS, NOV./DEC. 2020  
Sixth/Seventh Semester  
Mechanical Engineering  
ME 2401/ME 1402/10122 ME 702/ME 71 – MECHATRONICS  
(Common to Production Engineering)  
(Regulations 2008/2010)

(Also Common to PTME 2401 – Mechatronics for B.E. (Part-Time) Fifth Semester –  
Mechanical Engineering – Regulations 2009)

Time : Three Hours

Maximum : 100 Marks

Answer ALL questions.

PART – A

**(10×2=20 Marks)**

1. What is a control system ?
2. Full scale reading of voltmeter is 100 V. The accuracy of voltmeter is specified as  $\pm 1\%$  of true value. What is probable range of reading shown by voltmeter while measuring voltage of 50 V ?
3. Draw the sketch of a direction control valve.
4. Calculate the step angle of a stepper motor if it takes 120 steps in one revolution.
5. What is meant by open loop adaptive control ?
6. State the advantage of analog continuous controllers over discrete sampled data controller.
7. Define a programmable logic controller.
8. What are shift registers ?
9. Compare traditional and mechatronic design.
10. List down the various stages in mechatronic design system.



11. a) Explain the various elements of a closed loop control system with an example of speed control of a shaft. **(16)**  
(OR)
- b) i) What is the basic principle used in Level Measurement System ? Explain with neat diagram. **(8)**  
ii) What is RTD ? Explain the relationship between resistance and temperature for the RTD with temperature resistance curve. **(8)**
12. a) Explain with sketches the working of four mechanical actuation systems. **(4×4)**  
(OR)
- b) Explain the principle, construction and working of two types of stepper motors. **(8+8)**
13. a) i) Explain the mechanical systems models. **(8)**  
ii) Explain the hydraulic power system. **(8)**  
(OR)
- b) i) Briefly explain the ON-OFF controllers and give their limitations. **(8)**  
ii) Describe any application of proportional controllers and their limitations. **(8)**
14. a) i) Explain the configuration of a PLC.  
ii) Give advantages of PLC system over traditional mechanical system. **(12+4)**  
(OR)
- b) Explain the following :  
i) Internal relays **(4)**  
ii) Counters **(4)**  
iii) Shift Registers **(4)**  
iv) Timers. **(4)**
15. a) Design Automatic Tool Changer (ATC) of a CNC machine.  
(OR)
- b) Discuss in detail about mechatronic design of Automated Teller Machine (ATM).
-