



17660

11718

3 Hours / 100 Marks

Seat No.

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- Instructions :**
- (1) All questions are **compulsory**.
 - (2) Answer **each** next main Question on a new page.
 - (3) Figures to the **right** indicate **full** marks.
 - (4) Assume suitable data, if **necessary**.

	Marks
1. Attempt any five :	20
1) Draw block diagram of mechatronics system and explain the key elements of mechatronics system.	4
2) Distinguish between a transducer and a sensor. (any four point)	4
3) Give advantages and disadvantages of electronic controller.	4
4) Explain implementation of proportional hydraulic controller.	4
5) State applications of rack and pinion.	4
6) List any four application of robot.	4
7) Give the block diagram of CNC based drilling machine.	4
2. Attempt any four :	16
a) What is “mechatronics”? State its importance in engineering with suitable example.	4
b) What is the significance of signal conditioner?	4
c) Draw block diagram of pneumatic system. What is the role of filter in pneumatic system?	4
d) State the working principle of ‘solenoid valve’ with neat sketch.	4
e) Draw and explain MEMS microactuator.	4
f) Describe the working of PLC based automatic carport barrier system with block diagram.	4
3. Attempt any four :	16
a) Draw block diagram of pick and place robot. List the required movement of it.	4
b) Draw and explain electronics PID controller.	4
c) State the types of actuators. Draw and explain single acting cylinder.	4
d) How MEMS accelerometer is used as air bag sensors for car safety? Describe in brief.	4
e) Draw and explain fuzzy logic controller.	4
f) Explain microcontroller based antilock brake system.	4

P.T.O.



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| 4. Attempt any two of the following : | 16 |
| a) Explain with sketch torque measurement using | 8 |
| i) stroboscope method | |
| ii) capacitive method. | |
| b) Describe with sketch basic details of | 8 |
| i) poppet valve | |
| ii) shuttle valve. | |
| c) Draw construction of Cartesian and cylindrical robots and explain briefly their degree of freedoms. | 8 |
| 5. Attempt any four : | 16 |
| a) Draw and explain PLC ladder diagram of ON-OFF control of lamp. | 4 |
| b) How the piezoelectric effect is used to measure acceleration ? List the features of piezoelectric accelerometer. | 4 |
| c) Draw and explain gear type rotary actuator. | 4 |
| d) State the characteristics of PD and PI controller with their control equation. | 4 |
| e) Write note on evolution of mechatronics. | 4 |
| f) State function of | 4 |
| i) Isolator | |
| ii) Filter | |
| iii) Amplifier | |
| iv) Data convertor in mechatronics system. | |
| 6. Attempt any four : | 16 |
| a) Compare pneumatic and hydraulic system (4 point). | 4 |
| b) Draw and explain LVDT accelerometer. | 4 |
| c) Explain hall effect proximity sensor with diagram. | 4 |
| d) Describe the principle of operation of DC motor. | 4 |
| e) Give general configuration of CNC system. Give advantages of CNC (any two). | 4 |
| f) Draw and explain block diagram of Robot. | 4 |