PAPER ID-310223

Subject Code: KME052

Roll No: | | | | | | | | | | | | | |

BTECH
(SEM V) THEORY EXAMINATION 2023-24
MECHATRONICS SYSTEMS

TIME: 3 HRS **M.MARKS: 100**

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

Q no.	Question	Marks	CO
a.	Define the term "Mechatronics" and give four examples of mechatronic systems.	2	1
b.	Define Autotronics. Also write their applications.	2	1
c.	Explain the principle and working of inductive Proximity sensor.	2	2
d.	Define sensors and transducers with suitable examples.	2	2
e.	State the advantages and applications of stepper motor.	2	3
f.	What are servo-motors? Explain briefly.	2	3
g.	State the advantages and uses of PLCs.	2	4
h.	What criteria should be considered while selecting a PLC?	2	4
i.	Explain the application of mechatronics in manufacturing systems.	2	5
j.	Explain how pick and place robot works.	2	5

SECTION B

2. Attempt any *three* of the following:

Qno.	Question	Marks	CO
a.	Enumerate the various stages involved in the design of a system. Also describe the evolution of mechatronics systems.	10	1
b.	What are position sensors? Explain the working of Hall Effect sensors. Mention the advantages and applications of it.	10	2
c.	Illustrate the principle and working of 3 Phase Induction Motor with their merits and demerits.	10	3
d.	What are programmable logic controllers? Explain the working of PLC and also define scan cycle.	10	4
e.	Explain briefly the following mechatronics systems: (a) Bottling plant. (b) Flexible manufacturing systems(FMS).	10	5

SECTION C

3. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	What is a 'Control system'? How are control systems classified? Explain briefly a closed-loop control system with an example. State the advantages and disadvantages of a closed-loop control system.	10	1
b.	Discuss briefly the traditional and mechatronics designs. Explain different elements of a mechatronic system with the help of block diagram.	10	1

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4. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Explain static & dynamic characteristics of sensors.	10	2
b.	Discuss the working of LVDT with the help of diagram. State the advantages, disadvantages and applications of it.	10	2

5. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	What is 'hydraulic actuator'? Explain physical components in hydraulic system with diagram. List the advantages and disadvantages of hydraulic system.	10	3
b.	What are the functions of pressure control valves? Explain briefly the following valves: (a) Pressure relief valves. (b) Pressure sequencing valves. (c) Pressure reducing valves.	10	3

6. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Elaborate (a) Architecture of a PLC. (b) Counters (c) Timers in PLC ladder logic.	10	4
b.	What is latching/holding? Discuss the ladder program techniques with suitable ladder symbols. Write the ladder program for latching using single push button for on and off the output.	10	4

7. Attempt any *one* part of the following:

Qno.	Question	Marks	CO
a.	Discuss briefly the following mechatronics systems: (a) Engine management system. (b) Automatic washing machine.	10	5
b.	Discuss briefly the following mechatronics systems: (a) Automatic camera. (b) Automatic car parking system.	10	5