CBCS SCHEME

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18ME732

Seventh Semester B.E. Degree Examination, Jan./Feb. 2023
Automation and Robotics

Time: 3 hrs. Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 a. What is automation? Explain basic elements of an automated system. **(10 Marks)**

b. Briefly explain advanced automation functions. **(10 Marks)**

OR

2 a. Explain with a neat sketch, feed forward control. **(06 Marks)**

b. What is ADC? Explain three phases in ADC. **(06 Marks)**

c. Discuss the input/output devices for discrete data. **(08 Marks)**

Module-2

3 a. What is an automated production line? Explain general configuration of an automated production line and its system configuration. **(10 Marks)**

b. Explain storage buffer in automated production line. **(04 Marks)**

c. A 20 station transfer line has an ideal cycle time $T_C = 1.2$ mins. The probability of station breakdown/cycle is equal for all stations and P = 0.05. Down time $T_d = 0.8$ mins. For each of the upper bound and lower bound, determine

(i) Frequency of line stops / cycle.

(ii) Average actual production rate.

(iii) Line efficiency. **(06 Marks)**

OR

4 a. Discuss the problem areas in analysis and design of automated production lines. **(08 Marks)**

b. Write short notes on the following:

(i) Bar code technology.

(ii) RFID technology. **(12 Marks)**

Module-3

5 a. Define a robot. Explain with neat sketches any two robot configurations. **(10 Marks)**

b. With suitable examples, explain industrial applications of robots. **(10 Marks)**

OR

6 a. Write a note on generations of robots. **(08 Marks)**

b. Write short notes on,

(i) End effectors.

(ii) Robot sensors.

(iii) Robot accuracy and repeatability **(12 Marks)**

Module-4

7 a. What are actuators? Explain with sketches, hydraulic and pneumatic actuators. **(10 Marks)**

b. With neat sketch, explain the working of,

(i) Velocity sensor.

(ii) Touch and tactile sensor. **(10 Marks)**

OR

8	a.	Write an explanatory note on actuator space and joint space.	**(08 Marks)**
	b.	Derive the direct kinematic equation for PUMA 560 robot.	**(12 Marks)**

Module-5

9	a.	Explain the levels of robot programming.	**(10 Marks)**
	b.	List and explain the requirements of robot programming language.	**(10 Marks)**

OR

10		Write short notes on :	
	a.	Offline programming system.	
	b.	Problems in robot programming languages.	
	c.	Issues in OLP systems.	
	d.	Sub tasks in OLP systems.	**(20 Marks)**

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