CBCS SCHEME

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17ME563

Fifth 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. Define automation. Briefly explain the basic elements of automated system. **(10 Marks)**

b. Explain the various levels of automation. **(10 Marks)**

OR

2 a. Explain briefly the advanced automation function. **(08 Marks)**

b. Briefly explain the hardware components for automation :
i) Sensors
ii) Actuators
iii) Analog to digital conversion
iv) Digital to analog conversion. **(12 Marks)**

Module-2

3 a. Define automated production line. Briefly explain the system configurations for the automated production line. **(12 Marks)**

b. List out the applications and benefits of automated production lines. **(08 Marks)**

OR

4 a. Explain the following with respect to automated assembly system.
i) Carousel assembly system
ii) Single station assembly cell. **(08 Marks)**

b. Explain briefly the following automatic identification methods :
i) Barcode technology
ii) Radio frequency identification. **(12 Marks)**

Module-3

5 a. Define Robot, with neat sketch explain briefly the robot configuration. **(14 Marks)**

b. Explain the following with respect to robot
i) Accuracy
ii) Repeatability. **(06 Marks)**

OR

6 a. Write short notes on :
i) Sensors in robotics
ii) End effectors
iii) Robot control systems. **(12 Marks)**

b. Explain the application of industrial robots. **(08 Marks)**

Module-4

7 a. Briefly explain the description of a position with respect to universe coordinate system. **(06 Marks)**
b. Explain briefly the mapping involving translated frames. **(08 Marks)**
c. Explain the rotational operators within the same frame. **(06 Marks)**

OR

8 a. Briefly explain the transformation of free vectors. **(08 Marks)**
b. Explain the following :
i) Direct kinematics of a manipulator
ii) Inverse kinematics of a manipulator. **(12 Marks)**

Module-5

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

OR

10 a. Discuss the problems peculiar to robot programming languages. **(10 Marks)**
b. List the automating subtasks in OLP systems and explain any two. **(10 Marks)**

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