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School of Engineering**B.TECH Mechanical Engineering****Mid Term Examination - May 2024****Duration : 90 Minutes****Max Marks : 50****Sem VI - G3UB603B - Robotics and Automation**General Instructions*Answer to the specific question asked**Draw neat, labelled diagrams wherever necessary**Approved data hand books are allowed subject to verification by the Invigilator*

- 1) Identify the key components of robot dynamics. K2 (2)
- 2) Explain the distinction between fixed automation and flexible automation in automated systems. K1 (3)
- 3) Propose a plan for implementing an automated storage and retrieval system (AS/RS) in a warehouse environment. K2 (4)
- 4) Analyze the concept of trajectory planning in robotics and its importance in robot motion control. K2 (6)
- 5) Compare and contrast forward and inverse kinematics in robotics. K3 (6)
- 6) Evaluate the effectiveness of barcode technology in enhancing inventory management processes. K3 (9)
- 7) Devise a proposal for integrating barcode technology into a manufacturing facility, detailing required equipment and potential benefits. K4 (8)
- 8) A roller conveyor follows a pathway 35 m long between a parts production department and an assembly department. Velocity of the conveyor is 40 m/ min. Parts are loaded into large tote pans, which are placed onto the conveyor at the load station in the production department. Two operators work at the loading station. The first worker loads parts into tote pans, which takes 25 sec. Each tote pan holds 20 parts. Parts enter the loading station from production at a rate that is in balance with this 25-sec cycle. The second worker loads tote pans onto the conveyor, which takes only 10 sec. Determine (a) spacing between tote pans along the conveyor, (b) maximum possible flow rate in parts/ min, and (c) the maximum time allowed to unload the tote pan in the assembly department K4 (12)

OR

- Evaluate the effectiveness of using robot sensors for quality control in assembly processes. K4 (12)