



23MCT305 – DATA ANALYTICS IN AUTOMATION SYSTEM
TECHNICAL PUZZLES

UNIT V: CASE STUDIES, INDUSTRIAL APPLICATIONS & EMERGING TRENDS
(CO5)

Puzzle No.	Puzzle Description	Expected Approach / Key Concept	Bloom's Level	CO
1	A factory uses predictive maintenance (data analytics) and reduces downtime by 30%. Now they introduce digital twins. Predict two additional benefits they can achieve by combining both.	Simulation-based optimization, what-if scenarios	Analyze	CO5
2	In Industry 5.0, human-robot collaboration is key. Explain how data analytics on human operator actions + robot sensor data can optimize a shared workstation (give two specific metrics).	Cycle time reduction, ergonomic score improvement	Apply	CO5
3	Choose between predictive maintenance and condition monitoring for a remote wind turbine with limited bandwidth. Justify your choice and suggest how data analytics helps in the chosen approach.	Condition monitoring (real-time alerts with less data)	Evaluate	CO5
4	A digital twin accurately mirrors a physical machine. Suddenly predictions diverge. List three possible real-world causes and how data analytics can detect which one occurred.	Sensor drift, process change, model degradation	Analyze	CO5
5	Design a future Industry 5.0 application: combine digital twin, predictive analytics, and human feedback loop to achieve zero-defect manufacturing. Describe the data flow cycle in 4 steps.	Physical → Twin → Analytics → Human decision → Physical	Create	CO5