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JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2025

MTech SE

COURSE CODE (CREDITS): 25M1WCE131 (3) MAX. MARKS: 15

COURSE NAME: MODELLING, SIMULATION AND COMPUTER APPLICATIONS

COURSE INSTRUCTORS: Dr. Tanmay Gupta MAX. TIME: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

Q.No	Question	CO	Marks
Q1	Compare and contrast deterministic and stochastic simulation models in Civil Engineering. Analyze two case studies in Civil Engineering where each type is more appropriate	1	3
Q2	Analyze the roles of system entities, input variables, performance measures, and functional relationships when developing a Civil-Engineering simulation model. Differentiate between decision variables and uncontrollable (random) variables and evaluate how misclassifying any one of these elements can invalidate simulation results	1	3
Q3.	A city plans to construct a square water storage tank with an open top to be placed in a residential colony. The tank must hold 1,000 m^3 of water. The cost of the base slab is ₹1,500 per m^2, while the cost of the side walls is ₹1,000 per m^2. Formulate the optimization problem to minimize the total construction cost. Determine the dimensions (length, width, height) of the tank that will give the least cost.	2	4
Q4.	A contractor must procure at least 100 tonnes of aggregates for a concrete project, which have coarse/medium/fine fractions in it. Three suppliers are available: Supplier A: cost ₹40/tonne, contains 60% coarse, 10% fines, rest medium Supplier B: cost ₹50/tonne, contains 40% coarse, 20% fines, rest medium Supplier C: cost ₹45/tonne, contains 50% coarse, 15% fines, rest medium The blend must contain at least 60 tonnes of coarse fraction and not more than 15 tonnes of fines fraction. Formulate this as a minimization LPP, solve it using the Two-Phase Method or Big-M Method for optimized cost.	2	5