JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2025

B.Tech-V Semester (CE)

COURSE CODE (CREDITS): 18B1WCE531 (3) MAX. MARKS: 35

COURSE NAME: CONSTRUCTION TECHNOLOGY AND MANAGEMENT

COURSE INSTRUCTORS: Dr. KAUSHAL KUMAR MAX. TIME: 2 Hours

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

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

(c) Scientific Calculator is allowed.

<table>
<tr><th>Q.No</th><th>Question</th><th>CO</th><th>Marks</th></tr>
<tr><td>Q1</td><td>A small CPM network has the following data given in the table below. Establish the optimum schedule for (i) minimum cost, and (ii) minimum duration. Indirect cost is Rs 3000 per day and normal total cost is Rs 2,00,000 only. Above results must be clearly shown in Graph paper along with total cost curve on it.
<table>
<tr><th rowspan="2">Activity</th><th rowspan="2">Following</th><th rowspan="2">Preceding</th><th colspan="2">Duration, days</th><th rowspan="2">Cost slope in Rs/day</th></tr>
<tr><th>Normal</th><th>Minimum</th></tr>
<tr><td>A</td><td>D & E</td><td>-</td><td>8</td><td>6</td><td>2000</td></tr>
<tr><td>B</td><td>F</td><td>-</td><td>12</td><td>8</td><td>1500</td></tr>
<tr><td>C</td><td>-</td><td>-</td><td>20</td><td>19</td><td>2500</td></tr>
<tr><td>D</td><td>-</td><td>A</td><td>10</td><td>9</td><td>3000</td></tr>
<tr><td>E</td><td>F</td><td>A</td><td>5</td><td>3</td><td>1000</td></tr>
<tr><td>F</td><td>-</td><td>B & E</td><td>10</td><td>9</td><td>2200</td></tr>
</table></td><td>3</td><td>7</td></tr>
<tr><td>Q2</td><td>Differentiate between wheeled and crawler scrapers. Also, A project requires 36,000 m³ of earth excavation in 30 working days, with job efficiency of 0.8. If one excavator produces 160 m³/hour, calculate the minimum number of excavators required.</td><td>4, 5</td><td>3+4</td></tr>
<tr><td>Q3</td><td>Sketch a Batching Plant used in RMC operations. List the advantages of RMC over site mixing.</td><td>4, 5</td><td>7</td></tr>
<tr><td>Q4</td><td>Which soil types are most suitable for Vibratory Roller and why? Calculate the Ownership Cost per year using straight-line depreciation:</td><td>4, 5</td><td>7</td></tr>
</table>

	Purchase cost = ₹40,00,000 Salvage value = ₹5,00,000 Useful life = 7 years Interest/Tax = ₹75,000 annually.		
Q5	A construction project has the following activity data. The project is network-based (CPM), and the duration and resource (labour) requirements for each activity are given below:	4	7

Activity	Duration (Days)	Predecessor	Labour Required (Workers/day)
A	4	—	5
B	6	A	4
C	7	A	6
D	5	B	3
E	4	B	5
F	6	C	4
G	5	D, E, F	7

The available resource limit is maximum 12 workers per day, due to site constraints.

Identify which days exceed the 12-worker limit, and apply Resource Levelling using: Minimum slack principle Show revised schedule and draw the leveled histogram (Time scale version).