JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -3 EXAMINATION- 2024

B.Tech-I Semester (CE)

COURSE CODE (CREDITS): 18B11CE531 (3) MAX. MARKS: 35

COURSE NAME: Construction Technology and Management

COURSE INSTRUCTORS:Mr. Kaushal Kumar MAX. TIME: 2 Hours

Note: *(a) All questions are compulsory. For questions 5 to 9, attempt only one part.*

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

<table>
<tr><th>Q.No</th><th>Question</th><th>CO</th><th>Marks</th></tr>
<tr><td>Q1</td><td>For a project, the following activities have estimated times (t_o, t_m & t_p):
<table><tr><th>Activity</th><th>Optimistic (t_o)</th><th>Most Likely (t_m)</th><th>Pessimistic (t_p)</th></tr><tr><td>A</td><td>2</td><td>4</td><td>10</td></tr><tr><td>B</td><td>3</td><td>5</td><td>9</td></tr><tr><td>C</td><td>1</td><td>2</td><td>3</td></tr><tr><td>D</td><td>4</td><td>6</td><td>8</td></tr></table>• Calculate the expected time (t_e)and variance for each activity.
• Assume that the critical path involves A→B→D. Calculate the expected project duration and standard deviation.
• Determine the probability that the project will be completed within 16 days using the standard normal distribution.</td><td>CO-2</td><td>5</td></tr>
<tr><td>Q2</td><td>A project has the following activities, durations, and dependencies:
<table><tr><th>Activity</th><th>Duration (Days)</th><th>Predecessor(s)</th></tr><tr><td>A</td><td>4</td><td>-</td></tr><tr><td>B</td><td>6</td><td>A</td></tr><tr><td>C</td><td>3</td><td>A</td></tr><tr><td>D</td><td>7</td><td>B</td></tr><tr><td>E</td><td>5</td><td>B, C</td></tr><tr><td>F</td><td>4</td><td>D, E</td></tr><tr><td>G</td><td>2</td><td>E</td></tr><tr><td>F</td><td>3</td><td>F, G</td></tr></table>• Draw the network diagram.
• Calculate EST, EFT, LST, LFT, total float, and free float for all activities.
• Determine the critical path and overall project duration.
• Suggest how the float values can be used to optimize resource allocation</td><td>CO-1, CO-2</td><td>5</td></tr>
<tr><td>Q3</td><td>Define project crashing and explain the process involved. Using a hypothetical example, calculate the optimal project duration and cost after crashing activities.</td><td>CO-3</td><td>5</td></tr>
</table>

<table>
<tr><td>Q4.</td><td>A project has the following activities with multiple resource requirements:
<table>
<tr><th>Activity</th><th>Duration</th><th>Resource A</th><th>Resource B</th><th>Predecessor (s)</th></tr>
<tr><td>A</td><td>4</td><td>2</td><td>3</td><td>-</td></tr>
<tr><td>B</td><td>3</td><td>3</td><td>2</td><td>A</td></tr>
<tr><td>C</td><td>5</td><td>2</td><td>2</td><td>A</td></tr>
<tr><td>D</td><td>6</td><td>3</td><td>4</td><td>B, C</td></tr>
</table>
Resource availability per day: Resource A: 4 units & Resource B: 5 units

Draw the network diagram.
Perform resource leveling to ensure the constraints on both resources are not exceeded.
Show the revised activity schedule and the new project duration.
Discuss the trade-offs between project duration and resource constraints in this scenario.
</td><td>CO-4</td><td>5</td></tr>
<tr><td>Q5.</td><td>(a). Explain the working principle of a concrete batch plant and list its main components.
(b). What is vacuum concrete? Discuss its advantages and the technique used for vacuum dewatering.</td><td>CO-5</td><td>3</td></tr>
<tr><td>Q6.</td><td>(a). What are the primary factors affecting the selection of excavation equipment?
(b). Differentiate between a power shovel and a dragline in terms of their applications</td><td>CO-5</td><td>3</td></tr>
<tr><td>Q7.</td><td>(a). What is the purpose of using mobile scaffolding, and what precautions should be taken during its use?
(b). Explain the difference between tube-and-coupler scaffolding and frame scaffolding.</td><td>CO-5</td><td>3</td></tr>
<tr><td>Q8.</td><td>(a). What are the disadvantages of improper compaction of concrete?
(b). Describe the process of vibration with pressure and jolting in concrete compaction.</td><td>CO-5</td><td>3</td></tr>
<tr><td>Q9.</td><td>(a). What are the key requirements for good formwork in construction?
(b). Compare timber and steel formwork in terms of durability and cost-effectiveness.</td><td>CO-5</td><td>3</td></tr>
</table>

End of the Paper