FINAL EXAMINATION – 9th Sept 2020

## name:

Duration: 1 hour and 45 minutes

# Contracting (6 points)

A car manufacturing company is considering the brown-field renovation of one of its former manufacturing facilities. As part of this program, the body painting line requires very urgent and specialized revamping, which is made particularly complex due to the unavailability of the original as-built drawings.

As the car manufacturer’s Project Manager charged with the responsibility of contracting out the painting line renovation project, please propose a suitable contract organization, payment scheme and award methodology.

# Project monitoring (6 points)

The team of SA Gold Mine was tasked to sink a 2,000 meter deep ventilation shaft, and then to excavate room for a station at the bottom of the shaft. The approved plan was to sink the shaft within 20 months at a cost of 65,000 R per meter of shaft depth (R =South Africa RAND, R1 = US $0.1244). For the station at the bottom, 30,000 cubic meter of rock would have to be excavated within 3 months at a cost of R700 per cubic meter. The plan assumed a straight line value progress over time.

After the work had begun, the scope of the project was changed to include excavation for a new station halfway down the shaft with a volume of 20,000 cubic meters (Figure below).

It was agreed that the additional work had to be done at the same excavation rate as the bottom station, but due to softer rock than the bottom one, the team agreed on the cost of R500 per cubic meter.

Because of space and resources available, the new station cannot be performed simultaneously to the other tasks. Currently, after 13 months from inception of work, the shaft has reached a depth of 1,400 meters below surface and the new halfway station is completed. The actual cost at this time is R90 million.

Your executive management has requested an earned value report as well as time and cost estimates at completion.

Ventilation shaft

Bottom station

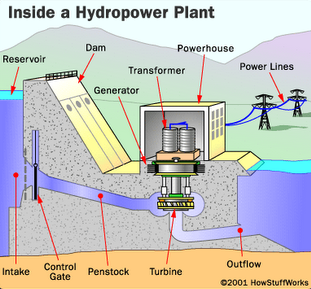
New station

## Small Project (6 points)

Pretend to be working as a Project Manager for a construction company that has been awarded by a Utility Company the contract to build a new hydropower station.

You are asked to prepare a Project Charter including a project plan. Please make your educated guess to provide information included in all sections of a standard Project Charter.

The plant section is represented in the figure above.

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The scope of work is composed of the following tasks and associated durations and cost, when performed by one team of workers:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Task** | **Predecessor** | **Duration (months)** | **Cost (k€)** |
| 1 | Dam (basement) |  | 6 | 2,000 |
| 2 | Dam (reservoir and elevation) | 1, 3 | 4 | 1,500 |
| 3 | Penstock and outflow | 1 | 1 | 500 |
| 4 | Control gate | 1, 2, 3 | 2 | 350 |
| 5 | Turbine | 1, 2, 3 | 3 | 1,200 |
| 6 | Generator | 5, 8 | 1 | 850 |
| 7 | Transformer | 6, 8 | 1 | 450 |
| 8 | Powerhouse | 2 | 2 | 900 |
| 9 | Power lines to backbone interface |  | 3 | 1,000 |

You have no more than 2 teams to be used (maximum available units). All tasks can be performed by 1 or more teams (if you make use of more than 1 team to perform a single task, please consider no loss of productivity. For example: 1 team takes 2 months; 2 teams take 1 month).