Daffodil International University
Department of Electrical and Electronic Engineering
Faculty of Engineering
Final Examination, Spring-2026

Course Code: 0709-321	Course Title: Project Management and Finance	
Section: A, B, C, D	Level-Term: L3-T2	Teacher's Initial: SKH, MTC, AMC
Full Marks: 40	Exam Date: April 28, 2026	Time: 2 Hours

[Answer any 4 of the given 5 questions.]
[The second rightmost column indicates the COs with respective bloom's level. The rightmost column indicates the assigned mark(s).]

Q1. A project quality manager at Daffodil General Hospital is overseeing the construction and commissioning of a new 5-storey diagnostic centre.

(a) During the quality planning phase, the manager faces **three challenges**: i)organizing 35 random quality concern cards generated from a brainstorming session; ii) anticipating potential failure points during CT scan room radiation shielding installation and preparing backup actions; iii) and mapping the strength of relationships between patient safety requirements, construction work packages, and responsible contractor teams. **Select** the most appropriate **quality planning tool** for each challenge and **justify** how its core function directly addresses the situation. — CO-2 C(3) — 6

(b) Introducing a third-party structural inspection at every floor slab costs **BDT 15,000** per floor across 5 floors. Past data shows skipping such inspections leads to an average rework cost of BDT 1,20,000. **Determine** whether this quality activity is worth implementing using Cost-Benefit Analysis. — CO-2 C(3) — 2

(c) Identify the differences between **quality control** and **quality assurance** with one suitable example. — CO-2 C(2) — 2

Q2. A regional water authority has awarded an 18-month contract worth BDT 12 crore to upgrade a 50 MLD water treatment plant in Gazipur involving civil works, membrane filtration, SCADA integration, and chemical dosing system upgrades.

(a) During execution, five events occurred. **Classify** each into the correct type of contract change and **justify** your answer: — CO-2 C(3) — 5

1. The authority updated the invoice submission address to the head office. No

payment terms were affected.

2. Due to new national water quality regulations, the authority instructed the contractor to upgrade filtration from Class B to Class A. A formal change order was issued, and a cost adjustment claim was submitted.
3. The authority repeatedly delayed providing approved shop drawings, forcing the contractor to idle the membrane installation crew for 3 weeks.
4. The authority and contractor mutually agreed to add a solar-powered backup pumping system with a separate payment schedule signed by both parties.
5. The contractor missed installation milestones and failed two consecutive SCADA quality inspections. The authority formally ended the contract.

(b) The water authority now needs to procure two additional work packages. **WP-1** is a chemical dosing system with a fully defined scope, complete drawings, known quantities, and a fixed 4-month timeline. **WP-2** is a SCADA system integration involving legacy control systems whose configuration is unknown until site investigation, with scope likely to evolve significantly. **Apply** your knowledge of traditional contract types to select the most suitable contract for each work package and **justify** your selection. CO-2 C(3) 2

(c) One of the suppliers of a chemical dosing system has been supplying products of low quality, which often break down. However, as the project has already passed two months out of the four-month timeline, the water authority is now stuck between a dilemma of purchasing the dosing system like earlier or leasing it for two months. The component's purchasing cost is **$8,000**, and the daily cost to maintain the equipment is **$60**. On the contrary, to lease it, authorities need to pay a daily cost of **$200**, with the daily maintenance **free of charge**. Identify the optimal solution mathematically for the authority and give proper reasoning behind the decision. CO-1 C(3) 3

Q3. The Roads and Highways Department of Bangladesh has initiated a 120 km Smart Highway Project connecting Dhaka to Mymensingh, incorporating IoT-based traffic management, solar-powered lighting, rainwater harvesting, and noise barriers alongside residential zones. Budget: BDT 850 crore. Duration: 36 months.

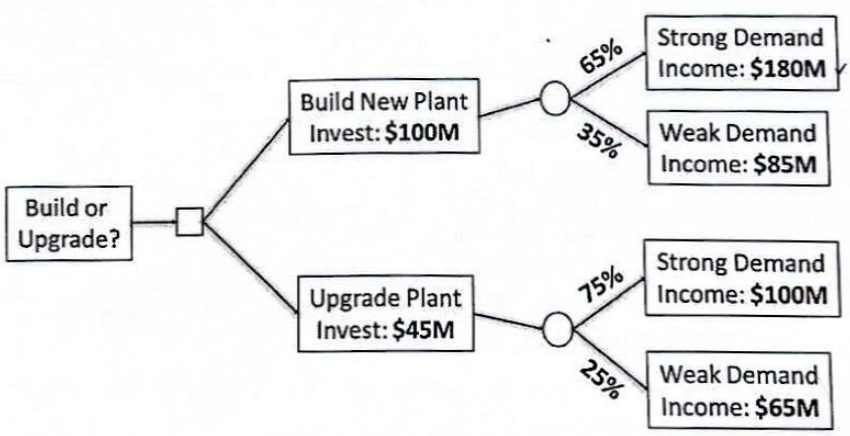
(a) As the sustainability manager of the Smart Highway Project, you are conducting a project closure review. During execution, the team exceeded waste targets, used non-certified suppliers, skipped regulatory compliance checks, and left community complaints unresolved for weeks. **Evaluate** the project's adherence to sustainable project management principles across the implementation steps and **recommend** corrective actions for the review phase, linking your recommendations to at least two relevant UN Sustainable Development Goals (SDGs). CO-3 C(4) 3

(b) The procurement team is preparing an SOW to invite vendors for the IoT Traffic Management System. There is a significant risk of biased evaluation. **Explain** what a Procurement SOW is and **describe** two ethical obligations the team must embed in the SOW to ensure fairness during vendor selection. CO-3 C(2) 3

(c) Three vendors have submitted proposals for the IoT Traffic Management System. **Construct** a Source Selection Criteria matrix using the following information and **recommend** the most suitable vendor with justification: CO-1 C(3) 4

- Criteria and weights: Technical Approach 30%, Management Approach 30%, Past Performance 20%, Price 20%
- Vendor A ratings: 8, 7, 9, 6, respectively
- Vendor B ratings: 7, 9, 6, 8, respectively
- Vendor C ratings: 9, 6, 7, 8, respectively

Q4 **(a)** Suppose you have a garment factory in Narayanganj. As the business is growing, you decide to expand your production. You have two options: either build a new factory in Narshingdi or renovate and enlarge the existing factory. Perform Quantitative Risk Analysis and make a decision to either build or upgrade using the following information. Provide **proper reasoning** behind the decision. CO-1 C(3) 5



(b) Write the single main difference between the **qualitative analysis** and **the quantitative analysis** CO-2 C(2) 1

(c) Suppose I am a fund manager. My **job is to maximise profit for the shareholders**. My risk threshold is **4%**, and my risk tolerance is **8%**. Due to the mortgage defaults skyrocketing, the housing market investments have a volatility of **10%**, although the housing market has a potential annual return of **15%**. On the contrary, stocks are somewhat stable with annual returns of **10%**, with a volatility of **7%**. Finally, the safest option, bonds and fixed deposits, have annual returns of **4%** with the volatility of **~1%**. **Where should I invest and why? Give reasons.** CO-2 C(3) 2

(Volatility means how fast and widely an asset's price changes.)

(d) Consider the ongoing **Iran-Israel/USA** conflict and the shutdown of the *Strait of Hormuz*. To some, it is a **threat,** and to some, it is an **opportunity,** and it is necessary to plan a risk response. Write and describe the risk response strategy, i.e., **minimally explain and describe** the three strategic techniques for increasing opportunities, and also minimally explain and describe the three strategic techniques for reducing threats. CO-2 C(3) 2

Q5. **(a)** Suppose you are a project manager. Your task is to design and estimate the budget costs and submit it to the management. Write and describe the **four different ways** of **estimating the budget cost**. Give examples where necessary. CO-2 C(3) 3

(b) Daffodil International University has launched a Digital Library Modernization project to upgrade its online library system with AI-based search, digital archives, and accessible e-learning tools. The total budget at completion is **BDT 6,000,000**. BAC CO-1 C-3 7
The project is scheduled to run for **15 months.**
Planned monthly spending profile:
Months 1–3: 10% of BAC each month
Months 4–9: 7% of BAC each month
Months 10–15: 5% of BAC each month
Status at the end of Month 8: Project is **55% complete**, and actual costs incurred so far: **BDT 3,800,000** AC
Compute:
I. Is the project ahead of or behind schedule?
II. Is the project under or over budget so far?
III. Draw the **Schedule Variance vs Cost Variance** plot and say which quadrant the current scenario falls under
IV. If the remaining work is expected to continue at the current cost performance, what is the **Estimate at Completion (EAC)?**
V. What is the **To-Complete Performance Index (TCPI)** to meet the original **BAC?**