UNIVERSITY OF RUHUNA

FACULTY OF MANAGEMENT AND FINANCE

No. of Pages : 04
No. of Questions: 06
Total Marks :70

BACHELOR OF BUSINESS ADMINISTRATION HONOURS DEGREE

3000 LEVEL SECOND SEMESTER END EXAMINATION – Aug/Sept 2025

Three Hours

MGT 31603: Project Management

Academic Year 2024/2025

Instructions

- The question paper contains six (06) questions.
- Answer only five (05) questions.

01.

i. Define a project and briefly explain its significance in a business context.

(03 marks)

ii. Explain why the implementation of a new irrigation system in a Sri Lankan tea estate should be classified as a project rather than a routine activity. Support your explanation by referring to three key characteristics of a project.

(04 marks)

iii. You are conducting a feasibility study for a proposed organic tea processing plant in a Sri Lankan tea estate.

a. Identify and explain two key areas of analysis that are essential to assess the project's overall viability.

(04 marks)

b. For one of these areas, describe one specific activity involved and briefly explain its importance to decision-making.

(03 marks)

(Total 14 marks)

02.

ABC Industries is considering a project with the following three possible scenarios:

Scenario	Probability	Initial Investment (Rs. millions)	Annual Cash Inflow (Rs. millions)	Project Life (years)
Pessimistic	0.3	25	4	5
Expected	0.5	20	6	5
Optimistic	0.2	18	8	5

Cost of capital = 12%

Year	1	2	3	4	5
PV @12%	0.893	0.797	0.712	0.636	0.567
PVIFA @12%	0.893	1.690	2.402	3.038	3.605

*PV- present value, PVIFA- present value interest factor of annuity, NPV- net present value

You are required to:

i. Calculate the NPV for each scenario.

(03 marks)

ii. Calculate the expected NPV of the project.

(02 marks)

iii. Calculate the variance and the standard deviation of NPV.

(03 marks)

iv. What is the coefficient of variation?

(02 marks)

v. Comment on project risk and provide a recommendation.

(04 marks)

(Total 14 marks)

03.

You are managing a rural road construction project in Sri Lanka. The project includes the following activities (A–J): site survey, environmental assessment, community consultation, material procurement, equipment mobilization, roadbed preparation, drainage installation, paving, quality inspection, and handover. For each activity, the optimistic, most likely, and pessimistic time estimates (in weeks) and their immediate predecessors are provided in the table below.

Activity	Optimistic time	Most Likely time	Pessimistic time	Predecessor(s)
A	3	4	5	-
B	2	2.75	5	-
C	1	2	3	A
D	3	6.25	8	A
E	5	9.5	11	B, D
F	6	7	8	D
G	10	11.75	15	C
H	6	8	10	B
I	3	4.5	9	F, G
J	8	10	12	E, H, I

i. Using the PERT (Program Evaluation and Review Technique) method, compute the following for each activity:

a. Weighted average activity time.

(02 marks)

b. Variance.

(02 marks)

ii. Draw the project network diagram using the Activity-on-Arrow (AOA) method, including dummy activities if necessary to maintain correct precedence logic, and clearly showing all forward pass and backward pass calculations.

(06 marks)

iii. Identify the critical path and determine the total project duration.

(02 marks)

iv. Calculate the standard deviation of the project.

(01 mark)

v. Compute the scheduled completion time with a 95% confidence level, assuming the normal distribution (use Z = 1.645).

(01 mark)

(Total 14 marks)

04.

You are managing a hospital ward expansion project in Sri Lanka, aimed at increasing bed capacity and upgrading essential medical infrastructure. The following table provides normal and crash durations, along with the corresponding normal and crash costs for each activity. The project's indirect cost is Rs. 1,250 per day.

Activity	Start node	End node	Time (days)		Cost (Rs. '000)	
			Normal	Crash	Normal	Crash
A	1	2	5	3	4	6
B	1	3	5	1	3	5
C	2	4	7	5	4	7
D	3	4	5	2	3	6
E	2	6	6	2	3	5
F	4	5	6	4	3	6
G	6	7	5	1	1	4
H	5	7	2	1	2	5

i. Calculate the crash cost per day for each activity.

(02 marks)

ii. Develop the optimal crashing plan for the critical path, specifying the activity or activities to be crashed and the sequence, in order to minimize total project cost.

(03 marks)

iii. For each possible project duration, calculate the direct cost, indirect cost, and total project cost.

(03 marks)

iv. Identify the optimum project duration and the minimum total project cost.

(01 mark)

v. During the execution phase of the hospital ward expansion project, an unexpected material shortage causes a delay in the project schedule. Discuss how you, as the project manager, can effectively balance the project's scope, time, and cost (the triple constraints) in response to this delay. Support your answer with reference to relevant project management principles.

(05marks)

(Total 14 marks)

05.

i. Describe the four phases of the project life cycle and discuss how each phase contributes to the overall success of project delivery. (08 marks)

ii. You are the project manager for a solar-powered water pumping system installation in the Southern Province of Sri Lanka. The project consists of several activities, each with a defined duration and labor team requirement, as shown in the table below. Only three labor teams are available for the entire project, and this limit applies at all times. Develop a resource loading chart for each time unit based on the following information given in the table.

(04 marks)

Activity	Duration (Days)	Immediate Predecessors	Labor Teams Required
A	3	-	1
B	2	-	2
C	4	B	3
D	2	A	1
E	3	C, D	2
F	2	E	3
G	5	D	2
H	3	F, G	3

iii. Briefly explain the difference between time-constrained and resource-constrained scheduling.

(02 marks)

(Total 14 marks)

06.

You are the project manager for a road construction project in Sri Lanka, specifically the upgrading of a 10 km rural road in the Central Province. The project's Budget at Completion (BAC) is Rs. 10,000,000. At the end of Month 4, the following data is available:

- Planned Value (PV): Rs. 4,000,000
- Earned Value (EV): Rs. 3,500,000
- Actual Cost (AC): Rs. 4,200,000

i. Calculate the following:

a. Schedule Variance (SV) (01 mark)

b. Cost Variance (CV) (01 mark)

c. Schedule Performance Index (SPI) (01 mark)

d. Cost Performance Index (CPI) (01 mark)

e. Estimate at Completion (EAC) (02 marks)

f. Variance at Completion (VAC) (01 mark)

g. To-Complete Performance Index (TCPI) (01 mark)

ii. Based on your calculations, provide a brief analysis of the project's status and recommend one action to improve project performance.

(06 marks)

(Total 14 marks)

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