

CVL 772		Construction Project Management	MAJOR EXAMINATION	
Time allowed	2.0 HOURS 2:00-4:00 PM		Maximum Marks	100
Venue	LH-510		Date	18.11.2022

ASSUME MISSING DATA SUITABLY IF REQUIRED.

Q 1 (20 marks)

Fill up the blank cells of the following table for each of the projects. For cost analysis write either of **On target**, **Over budget** or **Under budget**. Similarly, for schedule analysis write either of **On target**, **Ahead of schedule**, or **Behind schedule**.

Project	BCWS	BCWP	ACWP	CV	CPI	Cost analysis	SV	SPI	Schedule analysis
1	50,000	50,000	50,000		1	OT		1	OT
2	50,000	40,000	60,000		0.66	OB		0.8	BS
3	40,000	40,000	50,000		0.8	OB		1	OT
4	50,000	50,000	40,000		1.25	UB		1	OT
5	40,000	50,000	50,000		1	OT		1.25	AS
6	60,000	40,000	60,000		0.66	OB		0.66	BS

Where

CV=Cost variance,

CPI= Cost performance index,

SV= Schedule variance,

SPI = Schedule performance index.

Q 2. (20 marks)

Table 1 shows the budgeted monthly cash flow requirements for a construction project. At the end of October'21, the total Actual Project Expenditure is reported as \$ 114 million and the project progress is reported at 50 %.

Draw an 'S' curve for cumulative cash flows for the project and calculate Cost & Schedule performance indices as of the end of October'21. What is the delay in the project as of the end of October'21 in number of months?

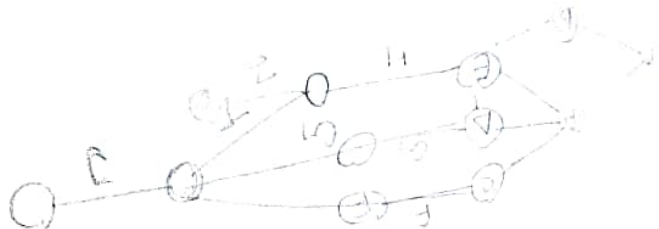
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Table 1

Month	MA Y 21	JUN 21	JUL 21	AUG 21	SEP 21	OCT 21	NOV 21	DEC 21	JAN 22	FEB 22	MAR 22
Cash Flow \$ million	8.5	11.5	13.5	15.5	30.5	27.0	22.5	20.0	20.0	12.5	2.5

Q 3. (20 marks)

A new product is to be released on a deadline for which 25 days are left. Remaining activities in product launch with their interdependencies, expected average times and standard deviations are given in the table. Draw a project network using AoA convention and find the probability of completing the project in time.



Activity	Preceding activities	Average T_a	Standard Deviation
A	-	6	1.5
B	-	3	0.5
C	A	5	1.0
D	A	4	0.5
E	A	3	0.5
F	C	3	0.5
G	D	5	1.0
H	B,E,D	5	2.0
I	H	2	0.5
J	I,G,F	3.5	1.5

Z	Cum Prob	Z	Cum Prob	Z	Cum Prob	Z	Cum Prob
1.2	.8849	.6	.7257	0.0	.5	-6	.2743
1.15	.8749	.55	.7088	-.5	.4801	-.65	.2578
1.1	.8643	.50	.6915	-.1	.4602	-.7	.2420
1.05	.8531	.45	.6736	-	.4404	-.75	.2264
				.15			
1.0	.8413	.4	.6544	-.2	.4207	-.8	.2119
.95	.8289	.35	.6368	-	.4013	-.85	.1977
				.25			
.90	.8159	.30	.6179	-.3	.3821	-.9	.1841
.85	.8023	.25	.5987	-	.3632	-.95	.1711
				.35			
.80	.7881	.2	.5793	-.4	.3446	-1.0	.1587
.75	.7736	.15	.5596	-	.3264	-1.05	.1469
				.45			
.70	.7580	.10	.5398	-.5	.3085	-1.1	.1357
.65	.7422	.5	.5199	-	.2912	-	.1215
				.55		1.15	

Extract from 'z' value table with cumulative probabilities for normal distribution curve.

Handwritten notes: $1.2 \rightarrow .88$, $1.6 \rightarrow .95$

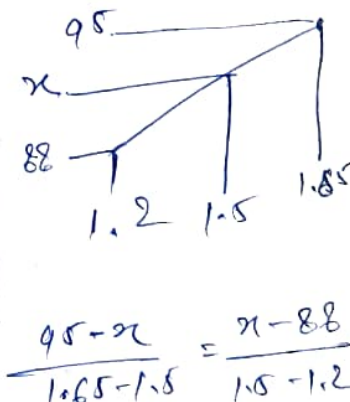
Q 4. (20 marks)

Table 2 shows the details of activities for a small project. The indirect costs are \$11,500 per week.

- What is the minimum time in which project can be completed considering maximum possible crashing?
- What will be the total project cost if the schedule is crashed to the maximum?

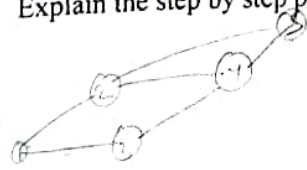
Table 2

Activity	Duration (weeks)		Cost (\$)	
	Normal	Crash	Normal	Crash
1-2	6	3	40,000	70,000
1-3	5	3	30,000	52,000
2-4	3	2	60,000	84,000
3-4	10	6	70,000	98,000
2-5	3	2	45,000	63,000
4-5	4	2	26,000	50,000



Q 5. Write short notes on the following (5 x 4 = 20 marks)

- What are the objectives of the Management Information System (MIS)? What are the three common reports in MIS?
- What are the advantages and disadvantages of centralized and local purchasing?
- What are the inventory-related costs? What are the functions of inventories?
- Define 'Work Breakdown Structure' (WBS) and explain with an illustrative diagram for a multi-storey house construction broken up to the 3rd level.
- Explain the step by step process of 'Resource allocation under resource constraints'.



Handwritten notes: "Inventory (Cost)", "Resource Allocation"