

TOOLS AND TECHNIQUES 1 ASSIGNMENT

INSTRUCTIONS: IN YOUR GROUPS ATTEMPT QUESTION ONE COMPULSORY AND ANY OTHER THREE QUESTIONS . THE WORK SHOULD BE SUBMITTED ON 17/3/2021.ADHHERE TO TIMELINE

1. Draw the network diagram and determine the CPM, PERT a

Activity	Description	Predecessors	Optimistic Duration (To)	Pessimistic Duration (Tp)	Most likely Duration (Tm)	Expected Duration $(To + 4Tm + Tp)/6$
O	Start Milestone	-	0	0	0	0
A	Select Technical Staff	O	12	18	15	15
B	Site Survey	O	6	12	9	9
C	Select Equipments	A	9	15	12	12
D	Prepare Designs	B	6	18	9	10
E	Bring Utilities to the Site.	B	18	36	30	29
F	Interview Applicants and Fill Positions	A	9	15	12	12
G	Purchase the Equipment.	C	36	42	36	37
H	Construct the Power Plant	D	42	54	48	48
I	Develop an Information System.	A	6	18	12	12
J	Install the Equipment.	H,G,E	3	9	6	6
K	Train the Staff to Run the System	F,J,I	3	9	6	6

2. Draw a network for a project of erection of steel works for a shed. The various elements of the project are as under:

Activity code	Description	Prerequisites
A	Erect site workshop	None
B	Fence site	None
C	Bend reinforcement	A
D	Dig foundation	B
E	Fabricate steel works	A, C
F	Install concrete plant	B
G	Place reinforcement	C, D
H	Concrete foundation	G, F
I	Paint steel works	E
J	Erect steel work	H, I
K	Give finishing touch	J

3. A system project has the following activities and other characteristics A project has the following characteristics

Activity	Preceding activity	Time estimates in weeks		
		Most optimistic	Most likely	Most pessimistic
A	None	4	6	8
B	None	2	4	6
C	A	3	5	7
D	B	6	9	12
E	C	2	3	4
F	D	3	4	5
G	E,F	6	7	8
H	F	5	5	5
I	G,H	6	7	8
J	I	4	5	6

Required:

- i. Draw the PERT network diagram and determine its critical path method.
 - ii. Find Z if the project is to be completed within 31 weeks.
4. An initial investment of \$10,320 thousand on plant and machinery is expected to generate cash inflows of \$8,400 thousand, \$7,000 thousand, \$6,224 thousand and \$4,065 thousand at the end of first, second, third and fourth year respectively. At the end of the fourth year, the machinery will be sold for \$1000 thousand. Calculate the net present value of the investment if the discount rate is 12%. A project has the following characteristics

Activity	Preceding activity	Time estimates in weeks			Expected duration $T_e = (a+4m+b)/6$	standard deviation $sd(T_e) = (b-a)/6$	variance $var = (sd(T_e))^2$
		Most optimistic (a)	Most likely (m)	Most pessimistic (b)			
A	None	3	7	11			
B	None	2	2.5	6			
C	A	2	3	4			
D	A	6	7	14			
E	A	2	3	4			
F	C	2.5	3	3.5			
G	D	2.5	4	5.5			
H	B, E	4.5	5.5	9.5			
I	H	1	2	3			
J	F, G, I	1	2	3			
		standard deviation					
		variance = sum of variance of the critical activities					

Required:

- i. Draw the PERT network diagram.

- ii. Identify the critical path.
 - iii. Determine the mean project completion time.
 - iv. Find the probability that the project is completed in 20 weeks.
7. A system project has the following activities and other characteristics A project has the following characteristics

Activity	Preceding activity	Time estimates in weeks			Expected duration $T_e = (a + 4m + b) / 6$	standard deviation $sd(T_e) = (b - a) / 6$	variance $var = (sd(T_e))^2$
		Most optimistic (a)	Most likely (m)	Most pessimistic (b)			
A	None	7	6	8			
B	None	2	4	6			
C	A	3	5	7			
D	B	7	5	10			
E	C	2	3	4			
F	D	3	4	5			
G	E,F	6	7	8			
H	F	5	5	7			
I	G,H	6	7	9			
J	I	5	5	6			
		VARIANCE					
		STANDARD DEVIATION					

Required:

- iii. Draw the PERT network diagram and determine its critical path method. Find Z if the project is to be completed within 29 weeks.